DATE: Final Corrected Submittal Issued 10 February, 2016 (revised 28 March, 2016)

**SPECIFICATIONS INDEX, UHHZ130401, ADDITION/ALTERATIONS TO AIRCRAFT CORROSION CONTROL FACILITY, BUILDING 180**

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>TITLE</th>
<th>PAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLUME 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Division 01 – ROBINS AFB – General Requirements</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01005</td>
<td>Statement of Work (revised 28 March, 2016)</td>
<td>01005-1 thru 01005-7</td>
</tr>
<tr>
<td>01040</td>
<td>Site Requirements</td>
<td>01040-1 thru 01040-12</td>
</tr>
<tr>
<td>01300</td>
<td>Submittals and Contractor-Furnished Items</td>
<td>01300-1 thru 01300-9</td>
</tr>
<tr>
<td>01300</td>
<td>01300 Appendix A Submittal Register</td>
<td>No. of pages = 2</td>
</tr>
<tr>
<td>01310</td>
<td>CADD As-Built Drawings</td>
<td>01310-1 thru 01310-5</td>
</tr>
<tr>
<td>01501</td>
<td>Temporary Services for Contractor</td>
<td>01501-1 thru 01501-3</td>
</tr>
<tr>
<td>01540</td>
<td>Green Procurement</td>
<td>01540-1 thru 01540-12</td>
</tr>
<tr>
<td>01560</td>
<td>Environmental Requirements</td>
<td>01560-1 thru 01560-24</td>
</tr>
<tr>
<td>01572</td>
<td>Construction &amp; Demolition Waste Management</td>
<td>01572-1 thru 01572-6</td>
</tr>
<tr>
<td>01580</td>
<td>Safety Requirements</td>
<td>01580-1 thru 01580-6</td>
</tr>
<tr>
<td>01600</td>
<td>Product Requirements</td>
<td>01600-1 thru 01600-3</td>
</tr>
<tr>
<td>01700</td>
<td>Execution Requirements</td>
<td>01700-1 thru 01700-6</td>
</tr>
<tr>
<td>01730</td>
<td>Operations and Maintenance Data</td>
<td>01730-1 thru 01730-6</td>
</tr>
<tr>
<td><strong>Division 02 – Existing Conditions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>024100</td>
<td>Demolition and Deconstruction</td>
<td>024100-1 thru 024100-10</td>
</tr>
<tr>
<td>024251</td>
<td>Carpet Removal and Reclamation</td>
<td>024251-1 thru 024251-4</td>
</tr>
<tr>
<td><strong>Division 03 – Concrete</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>033000</td>
<td>Cast-In-Place Concrete</td>
<td>033000-1 thru 033000-37</td>
</tr>
<tr>
<td><strong>Division 04 – Masonry</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>042000</td>
<td>Masonry</td>
<td>42000-1 thru 042000-25</td>
</tr>
<tr>
<td><strong>Division 05 – Metals</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>053000</td>
<td>Steel Decks</td>
<td>053000-1 thru 053000-13</td>
</tr>
<tr>
<td>054001</td>
<td>Prefabricated Cold-formed Metal Trusses</td>
<td>054001-1 thru 054001-6</td>
</tr>
<tr>
<td>055013</td>
<td>Miscellaneous Metal Fabrications</td>
<td>055013-1 thru 055013-8</td>
</tr>
<tr>
<td>055200</td>
<td>Metal Railings</td>
<td>055200-1 thru 055200-4</td>
</tr>
<tr>
<td><strong>Division 06 – Wood, Plastics and Composites</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>062000</td>
<td>Finish Carpentry</td>
<td>062000-1 thru 062000-6</td>
</tr>
</tbody>
</table>
066116  Solid Polymer (Solid Surfacing) Fabrications 066116-1 thru 066116-8

Division 07 - Thermal and Moisture Protection

071113  Bituminous Dampproofing 071113-1 thru 071113-3
071353  Elastomeric Sheet Waterproofing 071553-1 thru 071553-5
072113  Board Insulation 072113-1 thru 072113-6
072116  Mineral Fiber Blanket and Sound Attenuation Batt Insulation 072116-1 thru 072116-5
072129  Sprayed Polyurethane Foam Insulation 072129-1 thru 072129-12
074113  Metal Roof Panels 074113-1 thru 074113-25
074213  Metal Wall and Soffit Panels 074213-1 thru 074213-18
075419  Polyvinyl-Chloride Roofing 075419-1 thru 075419-14
076000  Flashing, Sheet Metal, Parapet Wall Coping and Roof Curbs 076000-1 thru 076000-7
078400  Firestoppping 078400-1 thru 078400-5
079200  Joint Sealants 079200-1 thru 079200-6

Division 08 – Openings

081113  Steel Doors and Frames 081113-1 thru 081113-6
081116  Aluminum Doors and Frames 081116-1 thru 081116-7
081400  Wood Doors 081400-1 thru 081400-3
084113  Aluminum-Framed Storefronts 084113-1 thru 084113-11
087100  Door Hardware 087100-1 thru 087100-10
088100  Glazing 088100-1 thru 088100-7

Division 09 – Finishes

092200  Supports for Gypsum Board 092200-1 thru 092200-3
092900  Gypsum Board 092900-1 thru 092900-8
093013  Ceramic Tiling 093013-1 thru 093013-6
095100  Acoustical Ceiling 095100-1 thru 095100-7
096500  Resilient Flooring 096500-1 thru 096500-5
096723.13  Standard Resinous Flooring 096723.13-1 thru 096723.13-7
096800  Carpeting 096800-1 thru 096800-7
099000  Paints and Coatings 099000-1 thru 099000-22

Division 10 - Specialties

101100  Visual Display Units 101100-1 thru 101100-2
101400.10  Exterior Signage 101400.10-1 thru 101400.10-2
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>101400.20</td>
<td>Interior Signage</td>
<td>101400.20-1 thru 101400.20-5</td>
</tr>
<tr>
<td>102113</td>
<td>Toilet Compartments</td>
<td>102113-1 thru 102113-7</td>
</tr>
<tr>
<td>102613</td>
<td>Corner Guards</td>
<td>102613-1 thru 102613-3</td>
</tr>
<tr>
<td>102813</td>
<td>Toilet, Locker Room, and Decontamination Room Accessories</td>
<td>102813-1 thru 102813-4</td>
</tr>
<tr>
<td>104416</td>
<td>Fire Extinguishers</td>
<td>104416-1 thru 104416-3</td>
</tr>
<tr>
<td>107316</td>
<td>Pre-Engineered Aluminum Canopy Systems</td>
<td>107316-1 thru 107316-17</td>
</tr>
</tbody>
</table>

**Division 11 - Equipment**

**Division 12 – Furnishings**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>122100</td>
<td>Window Blinds</td>
<td>122100-1 thru 122100-4</td>
</tr>
<tr>
<td>124813</td>
<td>Entrance Floor Mats and Frames</td>
<td>124813-1 thru 124813-3</td>
</tr>
</tbody>
</table>

**Division 13 - Special Construction**

**Division 14 - Conveying Equipment**

**VOLUME 2**

**Division 21 – Fire Suppression**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
</table>

**Division 22 – Plumbing**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>220000</td>
<td>Plumbing, General Purpose</td>
<td>220000-1 thru 220000-35</td>
</tr>
</tbody>
</table>

**Division 23 – Heating, Ventilation and Air Conditioning**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>230000</td>
<td>Air Supply, Distribution, Ventilation and Exhaust Systems</td>
<td>230000-1 thru 230000-23</td>
</tr>
<tr>
<td>230593</td>
<td>Testing, Adjusting, and Balancing for HVAC</td>
<td>230593-1 thru 230593-26</td>
</tr>
<tr>
<td>230700</td>
<td>Thermal Insulation for Mechanical Systems</td>
<td>230700-1 thru 230700-30</td>
</tr>
<tr>
<td>230800.0010</td>
<td>Commissioning of HVAC Systems</td>
<td>230800.0010-1 thru 230800.0010-29</td>
</tr>
<tr>
<td>230923.1320</td>
<td>BACnet Direct Digital Control Systems for HVAC</td>
<td>230923.1320-1 thru 230923.1320-43</td>
</tr>
<tr>
<td>236426</td>
<td>Chilled, Hot and Condenser Water Piping Systems</td>
<td>236426-1 thru 236426-22</td>
</tr>
</tbody>
</table>

**Division 25 – Integrated Automation**

**Division 26 - Electrical**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>262000</td>
<td>Interior Distribution System</td>
<td>262000-1 thru 262000-28</td>
</tr>
</tbody>
</table>
264100  Lightning Protection System 264100-1 thru 264100-6
265100  Interior Lighting 265100-1 thru 265100-10
265600  Exterior Lighting 265600-1 thru 26500-10

Division 27 – Communications

271000  Building Telecommunications Cabling System 271000-1 thru 271000-16

Division 28 – Electronic Safety and Security

283176  Interior Fire Alarm and Mass Notification System 283176-1 thru 283176-38

Division 31 – Earthwork

310000  Earthwork 310000-1 thru 310000-15
311100  Clearing and Grubbing 311100-1 thru 311100-3
312300.0020  Excavation and Fill 312300.0020-1 thru 312300.0020-13
313116.13  Chemical Termite Control 313116.13-1 thru 313116.13-7
312111  Soil Surface Erosion Control 312111-1 thru 312111-14

Division 32 – Exterior Improvements

321313.06  Portland Cement Concrete Pavement for Roads and Site Facilities 321313.06-1 thru 321313.06-20
321613  Concrete Sidewalks and Curbs and Gutters 321613-1 thru 321613-13
321723.0020  Pavement Markings 321723.0020-1 thru 321723.0020-15

Division 33 – Utilities

331100  Water Distribution 331100-1 thru 331100-9
333000  Sanitary Sewers 333000-1 thru 333000-8

Division 34 – Transportation

Division 35 – Water and Marine Construction

Division 40 – Process Integration

Division 41 – Material Processing and Handling Equipment

Division 42 – Process Heating, Cooling and Drying Equipment

Division 43 – Process Gas and Liquid Handling, Purification, and Storage Equipment

Division 44 – Pollution and Waste Control Equipment
Division 46 – Water and Wastewater Equipment

Division 48 – Electrical Power Generation

Appendix A – Geotechnical Report

Appendix B – Hazardous Materials Report

TOTAL NUMBER OF PAGES (Including Index) = 947

<<<<<< END OF INDEX >>>>>
PART 1 - GENERAL

1.01 STATEMENT OF WORK: This is a general overview of the project. Follow details shown by the specifications and drawings, interpreted in accordance with contract clauses. Note especially DFAR 252.236-7001 regarding designer intent.

A. Location: Accomplish Work at Robins AFB, GA.

B. Price: The original contracted price includes special work times for utility outages and repair of damages.

C. Contract Documents: Follow details shown by the specifications and drawings.

D. Project Scope, Objectives, and Criteria. Provide all labor, material, plant, equipment, supplies, and coordination required to construct the PPE change rooms at Bldg 142 as described in the drawings and specifications. A general summary of the construction scope is below.

a. Existing Conditions
   Building #180, is a circa 1982, 43,150 square foot, steel frame and metal panel clad structure. The primary function of this facility is the stripping, preparing and repainting of protective coatings for aircraft components. The construction type appears to be Type II-B as defined by the International Building Code (2012). This facility is primarily a High Bay, Group F-1 occupancy with approximately 4,970 square feet of Group B occupancy dedicated to administrative and support spaces. The Administrative/Support area is separated by a 4 hour fire wall from the work areas. Fire protection/suppression systems are present throughout.

   The Administrative/Support area is a two storied structure with a mechanical mezzanine above. The roof of this northern appendage aligns with the roof of the single story High Bay area to the South. The mezzanine floor level is open into the High Bay painting functions. Several metal clad exterior walls are backed by 8” or 12” CMU while the majority of exterior walls are exposed steel structure with metal liner panels facing the interior. The existing roof is a newly installed, mechanically attached, PVC single ply membrane that is approximately one year old. This roof has an existing 20 year warranty that shall be maintained.

   In the Administrative area, the original interior wall construction was comprised solely of painted or tiled CMU construction. This was limited to the construction of the original Men’s and Women’s restroom and locker areas and the mechanical and break room. All ceilings are suspended acoustical ceiling tile. The mechanical room and dirty corridor Comm. room is exposed to structure above. Most recently, multiple additional gypsum board and metal stud walls, that appear to be demountable type partitions, were added in the administrative area to subdivide large spaces into offices and conference...
areas. The finish on these walls is vinyl wall fabric. A small amount of wood paneling is also present in this area.

Exterior doors and frames, in the original building construction, are primarily hollow metal with aluminum and glass doors and frames at entrances. Interior doors and frames in the newly configured administrative area are wood. Double insulated, fixed aluminum storefront type windows, in a ribbon fashion, are present at the administrative/support, and break room areas.

b. Abatement of Hazardous Materials:
Hazardous materials testing was performed on the existing facility in the area of the proposed addition. No asbestos or lead containing materials were discovered to be present in the areas tested. The hazardous materials reports are included as an Appendix to this specification book. The Contractor shall notify the Contracting Officer’s representative immediately if suspected hazardous materials are encountered during performance of the work.

c. Demolition:
Demolish and dispose of all building components necessary to construct the new work. Refer to the drawings and other specification sections for general scope of demolition. The Contractor will visit the site to observe existing conditions, review the existing conditions drawings as compared to the new work drawings in order to develop a full demolition scope of work. Waste disposal shall comply with Division 1 specifications.

Note: Various underground utilities exist within and near the proposed new construction footprint. Known utilities are shown on the site drawings. Existing utilities that conflict with the proposed new construction shall be relocated at the expense of the Contractor. If field conditions are found to differ from conditions described herein, the Contractor shall notify the Contracting Officer’s Representative (COR) immediately.

E. Project Requirements

New Work:
New work consists of construction of change rooms, locker rooms, toilets, support spaces and supporting HVAC and electrical systems. The building addition is approximately 1050 s.f. This addition will be of Type II-B construction as defined by the International Building Code (2012) edition and will be of “Non-Combustible, fully sprinklered” construction. This addition will primarily house the Women’s decontamination, shower and locker areas. One administrative office is also included which will have a fixed aluminum framed, insulated storefront type window. The exterior walls will be masonry cavity wall construction and will be load bearing. The exterior face veneer will be 4” Split Faced CMU. Light gauge steel trusses will provide a 2-1/2” in 12” single slope roof extending from the existing two story wall of the West side of the facility. Rigid insulation will be utilized in both the wall cavity and
above the metal roof decking. Cover board, a self-adhering vapor barrier and standing seam metal roofing will complete the roof construction.

The remainder of the project will involve the near complete demolition and rebuilding of interior spaces at the existing ancillary spaces of the facility. This renovation will house lockers, showers, restrooms, and break and a conference room.

Interior wall construction will be 3-5/8” or 6” metal studs at 1’-4” o.c. with 5/8” High Impact Resistant, gypsum board.

Existing fire protection systems will be modified extensively to support the new work.

The HVAC system as shown on the drawings is approximate. The contractor shall thoroughly investigate the site and verify dimensions and conditions of the existing buildings, equipment, structural members, existing and new HVAC configuration, vertical space clearance, piping, electrical, lighting, underground utilities, etc. prior to submitting the bid proposal and also during the shop drawings submittal phase and prior to the actual construction work. There shall be no additional cost to the Government for any difference in site conditions.

The attached drawings and specifications indicate the existing conditions and minimum project requirements. Contractor shall be fully responsible for development of all requirements and the construction documents and shop drawings for the project. The newly installed HVAC systems shall be turn-key complete and fully operational to the satisfaction of the C.O. representative. All systems shall comply with all applicable NFPA, Base Facility Standard, ETLs, ASHRAE Standards, National and Air Force codes and regulations in every respect.

Contractor shall protect all communication devices, equipment, outlets, and wiring not involved in the scope of work. Should damage occur contractor will be responsible for cost to repair and replace those communication items deemed available and operational at time of contractors work, as set by 78 ABW/SCXP (Base Comm). Verify conditions of all communication items prior to the construction work.

The building layout, i.e. locker rooms, hall ways, change rooms, restrooms and break and Classrooms, etc., for the project areas, as shown on the drawings, were developed using old record documents and may not be accurate. The contractor shall perform a thorough site survey and provide the shop drawings which shall reflect the actual layout of the project areas. The contractor shall readjust and/or locate the HVAC ductwork and diffusers/grilles accordingly to reflect the actual building plans.
Under **no** circumstances will any suppression or alarm system be left inoperative overnight.

The Contractor shall schedule and meet with the Civil Engineering utility shop personnel at the project site and locate their underground utility lines and buried structures that might be affected by any digging/excavation on the site plans during the design phase.

**F. Performance Period:**

The contractor shall have all submittals (except As-built drawings and O&M Manuals) submitted and approved within 60 days of Notice to Proceed. Contractor shall begin work within 80 days of NTP and be completed with project within 475 days of NTP.

**G. General Congestion:**

1. Work area is restricted to the area shown. It is highly congested.

2. Some factors that may restrict work include as follows.
   Temporary Facility staff trailers must be installed and made fully functional prior to commencement of any work within the facility.

**H. Evacuation:**

If Government personnel must evacuate the area before construction starts, notify the Contracting Officer in writing 21 days before ready to start.

**1.02 CONTINUED OCCUPANCY:**

**A. Access:** All working (shop) areas of building 180 shall remain in full operation during the time of the project. The contractor will be given full access to the majority of the project area.

Access will be limited, and shall be coordinated with the Contracting Officer, in the following areas

a. Vestibule #117A
b. Vestibule #117B
c. Steam Cleaning #118
d. Red Room #119A
e. Vestibule #119B
f. All Other Shops’ Areas

**B. Beneficial Occupancy:** The Government reserves the right to take beneficial occupancy of parts of the project area before the total project completion date. This is not final acceptance, and identified deficiencies must still be corrected.
1.03 **HOURS OF WORK:**

A. **Standard Work Hours**

1. Normal work hours of 7:30 AM to 4:00 PM eastern standard time Monday through Friday. Work must stop on official Government holidays and work curtailment days, unless specifically approved in advance.

B. **Alternate Work Hours**

1. If the Contractor desires to work alternate work hours, such as four 10-hour days, submit written request **five (5)** workdays before the date desired to work the different standard.

2. The Government reserves the right to refuse these requests. However, they will usually be approved unless they negatively affect the base or the using activity. For example, the using activity may have difficulty paying overtime for escorts in controlled areas. In addition, work requiring inspector presence such as placing concrete may not be possible outside normal hours with prior written approval. Digging outside of normal hours will not be approved.

C. All references to days mean calendar days unless otherwise noted.

1.04 **SUBMITTALS:**

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items. The contractor may submit manufacturer’s data in lieu of the required certificate of compliance if he desires. The government requires manufacturer’s data if an “X” appears under the “Mfg. Data Required” column.

B. Project Submittals shall be as required in individual specification sections, and may include shop drawings, product data, calculations, samples, etc.

C. Other Submittals: Provide any other required submittals as directed by the Contracting Officer.

**PART 2 - PRODUCTS**

Design Basis: as required where a Basis of Design product is listed in individual specification sections.

**PART 3 - EXECUTION**

3.01 **COMMENCEMENT OF WORK**
A. Construction Prohibition: Do not order any materials or start any construction until the Contracting Officer has approved all related submittals.

B. Noncompliance Impacts: Any contractor costs resulting from noncompliance with these requirements are the sole expense of the contractor. Noncompliance shall not be cause for contract extensions or other considerations, but they may be cause for the Government to charge the contractor for liquidated damages for all negative impacts upon the Government.

3.02 **COORDINATION**: The superintendent (or contractor on-site project manager) shall coordinate work between different disciplines.

A. Avoid conflicts between new mechanical, electrical, architectural, and civil systems. Also, avoid conflicts between new work and existing structural or physical aspects or features of the facility. Request guidance from the Technical Representative of the Contracting Officer, and then perform such work at no additional cost to the Government.

B. Locations shown are approximate and may be moved if approved by the Contracting Officer. Show such variations on as-built drawings and do them at no additional cost to the Government.

C. Manufacturers' recommendations and/or requirements, if more stringent than the specifications and drawings, shall be followed at no additional cost to the Government.

3.03 **GOVERNMENT-FURNISHED PROPERTY** will not be provided in this project.

3.04 **AS-BUILTS**: Also see Section 01300 for submittal items such as as-builts that apply to all projects.

<<<<<< END OF SECTION >>>>>
PART 1 - GENERAL

1.01 SPECIAL REQUIREMENTS:

A. Controlled Areas (General):

1. This project may include work in one or more Controlled Area(s). The Contracting Officer will assist in getting proper notation on personnel badges for applicable areas, such as warehouses and similar.

2. Use no radios, pagers, or walkie-talkies in these areas.

3. Allow 15 minutes wait at arrival for escorts.

4. The contractor is responsible for all controlled/restricted area badges issued for this project. Fifty dollars ($50.00) per badge will be deducted from the final contract payment for badges lost or not returned, regardless of the reason for said loss/nonreturn. If a receipt is desired for badges turned in during the contract period, the contractor must furnish it for coordination.

B. Airfield Zone Waivers:

NOTE: Work inside the airfield zone is not anticipated.

1. Construction Waiver: UFC 3-260-01, Appendix B, Section B1-2.5.4.7, requires a temporary waiver be obtained for construction on the airfield. This applies to any construction, construction equipment storage, or hauling of materials or waste products that will take place within the boundaries of the Airfield Zone as shown on the Location map of Drawings. The Base Project Manager has advised the Base Community Planner to accomplish the necessary internal documents to obtain the temporary construction waiver for that area, and they are in process. Do not start any work in the Airfield Zone until the Technical Representative of the Contracting Officer (TRCO = CE Inspector) has provided a copy of the approved waiver to the Contractor.

2. Crane Permit: If a crane is required for construction on the airfield, the Contracting Officer will work with the Civil Engineering Community Planner to obtain this permit. Any crane activity on the airfield requires approval from the 78 ABW Commander prior to starting work. Submit a request in writing to the Contracting officer at least 45 days prior to the start of the work. The request shall detail the schedule for such work, hours of operation, height of the crane, and location of the crane. Be prepared to abide by any restrictions noted on the approval documents.

C. Airfield Zone Site Requirements:

1. The Airfield Zone is shown on the Location map of Drawings. It is also referred to as the Flightline. Note that Section 01580, Safety Requirements, contains additional guidance on eliminating Foreign Object Damage (FOD) to the aircraft on the Flightline.

2. Schedule: Furnish a schedule to the Contracting Officer on the anticipated work schedule for each area in the contract.
3. **Storage Site Request**: Request in advance and obtain approval from Airfield Operations Management for any storage sites for all equipment and materials used on the contract.

4. **Haul Route Request**: Request in advance and obtain approval from Airfield Operations Management for all haul routes or other travel requirements on the Flightline.

5. Prior to driving on the Flightline, the contractor shall ensure that all personnel required to operate vehicles on the Flightline are trained and certified. The contractor is responsible for scheduling the training through 78 OSS/OSAB, (478) 926-2114, with adequate lead-time so as not to interfere with the contract schedule. Upon completion of the training, an AF Form 483 (Certificate of Competency) will be issued by the Airfield Manager’s office, which certifies that the individual has been trained on Flightline driving. This certification must be in the possession of the vehicle operator when driving on the Flightline.

6. **Forms to Return**: Upon completion of the contract, turn in the AF Forms 483 to the Contracting Officer so that final payment will not be delayed.

7. Prior to the start of work each day, coordinate with the Chief of Airfield Operations Management at (478) 926-2114 or (478) 926-2115. The contractor will advise Airfield Operations Management of the current work schedule, location and duration of work, and the type of equipment at the site for the day. The contractor shall also coordinate with Airfield Operations Management before leaving the site for the day.

8. Contractor employees requiring vehicle access to the controlled area of the Flightline shall display their company's name on both the right and left sides of the vehicle. Lettering shall be at least one and one half inches high and may be either permanently or magnetically affixed to the vehicle. The Government will deny entry to contractor vehicles not displaying the company name.

9. Provide an escort for all material suppliers or vendors transporting equipment or material to/from the Flightline job site. The certified escort can be a passenger or operate a lead vehicle no further than three vehicle lengths in front of the escorted vehicle. Ensure that all subcontractors comply with all Flightline requirements.

10. In addition to the validated AF Form 483, vehicle operators shall have valid state driver's licenses in their possession when driving on the Flightline. Vehicle operators shall adhere to Flightline driving procedures contained in RAFB Instruction 13-206, Control and Operation of Vehicle on Robins AFB Flightline and Industrial Area.

11. The contractor is responsible for ensuring that all contractor personnel, subcontractors, and suppliers meet all Flightline requirements. The Government may, at its discretion, remove any contractor, subcontractor, or supplier employee from and prohibit access to the Flightline for the duration of this contract for violations of Flightline procedures.

12. Employ a minimum of one person for each area where construction activity is underway whose full time job is to monitor radio traffic from the base control tower to ensure that no Flightline violations occur.
13. Under no circumstances shall contractor employees enter any Flightline building or area not covered by the contract or authorized for access to the contract area.

14. If a crane is required and approved for construction on the airfield, store the crane in such a manner as to not pose a hazard to flight operations. Contact, through the Inspector, 78 OSS, 926-2114, to receive instructions on how to store the crane each night.

15. Provide continuous cleanup at the work site. All areas shall be kept so clean as to prevent the spread of materials that may be tracked into other aircraft areas or which may be windblown in such a way as to cause a hazard to aircraft traffic. Materials will not be allowed to accumulate in such a manner as to create an eyesore. Clean all haul routes as required to maintain aircraft safety and site order.

1.02 UTILITY REQUIREMENTS

A. Outages: Request utility outages in writing to the Base Civil Engineer, with a copy to the Contracting Officer, a minimum of 21 days before the proposed outage. These will be scheduled at Government convenience and may be at times other than normal working hours. For example, the times may be on weekends or during the second and third shifts (including holidays, holiday weekends, and work curtailment days). These are at no additional cost to the Government.

B. Metering.

New meters are not required for this project scope.

1.03 SUBMITTALS:

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

B. Material Submittals: None required under this section.

C. Other Submittals: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

<table>
<thead>
<tr>
<th>Inspector</th>
<th>Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.04</td>
<td>Safeguarding LAN Com Lines</td>
<td>21 days prior to work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.03.C</td>
<td>Warning Tape</td>
<td>14 days after NTP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.03.D</td>
<td>Tracer Wire</td>
<td>14 days after NTP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.05</td>
<td>Before - Site Photos</td>
<td>Before Construction</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.05</td>
<td>After - Site Photos</td>
<td>Before Final Inspection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.08</td>
<td>Storage and Trailer Request</td>
<td>14 days after NTP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Form 1</td>
<td>Fire Alarm Request</td>
<td>7 days before work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Form 2</td>
<td>Fire Alarm Inspection Before Work</td>
<td>3 days before work</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Form 3</td>
<td>Fire Alarm Inspection After Work</td>
<td>Before pre-final</td>
<td></td>
</tr>
</tbody>
</table>

1.04 SAFEGUARDING COMMUNICATION FACILITIES: For work that will interfere with Local Area Network (LAN) cable, aerial cable, house cable, underground cable, or other communication
facilities, notify the Contracting Officer in writing 21 days before the scheduled construction. Do no work until receiving written approval.

PART 2 - PRODUCTS - OMITTED

PART 3 - EXECUTION

3.01 DIGGING/EXCAVATION REQUIREMENTS: The Drawings show underground utilities and structures as presently shown on the best available record drawings of the site, and these may have some inaccuracies. The information is provided for general bidding purposes only. Actual locations and quantities must be determined at the site while obtaining the form below.

A. Digging/Excavation Permit (Obtained on Base): Digging permits are obtained at 0800 Monday mornings, only, in Building 1555. The Contractor, along with the technical representative, shall meet with Civil Engineering utility personnel at this time to make all necessary arrangements for the excavation permit before any digging. The Contractor will be given instructions on how to prepare and properly complete Digging/Excavation Permit. This includes coordination before beginning any work involving digging/excavation and location of buried structures and utility lines. Before getting signatures, provide a drawing indicating the full extent of digging/excavation (width/depth/length of trench or hole). Civil Engineering utility personnel will meet with the Contractor at the site and locate their underground utility lines and buried structures that might be affected by any digging/excavation. Do not do any digging until all parties have approved the permit (three day maximum). The digging/excavation permit shall be effective only for the time period indicated by the final signature authority.

B. Re-coordination of the Digging/Excavation Permit with all organizations and the technical representative shall be required for any additional time required after expiration of the original time period. No digging/excavation shall be done after 1600 hours on weekdays or anytime on weekends unless prior approval is obtained.

C. Location of Buried Structures and Utility Lines: Accurately locate and stake buried structures and utility lines indicated.

D. Excavation, trenching, and backfilling: Excavate to the required depth by hand digging within three (3) feet either side of the buried structures or utility line. Do not use motorized equipment within these parameters. Only open those trenches for which material is ready for replacement. As soon as approved by the technical representative, backfill trenches as required by the drawings or specifications. As a minimum, replace topsoil and grass the disturbed area by seeding and watering.

E. Damage: The contractor is responsible for any damage to underground structures and utility lines identified on the drawings and any identified and marked in the field as a result of obtaining the digging/excavation permit. If any underground utility is damaged, notify the technical representative immediately.

F. Cutting of Roads, Streets, and Paved Parking Areas:

1. Mark, barricade, and illuminate construction work on or near roads or streets which may present a traffic hazard in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) 2000. Closures of streets, parking lots, and other traffic areas will not be
permitted unless approved by the Contracting Officer after written request 30 days before the scheduled closure.

2. Road cuts shall be backfilled immediately after completion of associated utility work. When the road is reopened, the cut shall be filled with temporary or permanent materials to a smooth condition, or metal plates or other approved methods shall be employed to prevent discomfort or damage to vehicular traffic. Road cuts shall be permanently closed within 5 working days unless approved otherwise by the Contracting Officer. Provide advance signage warning motorists of the condition in accordance with the MUTCD. Repair streets as shown on the drawings.

3.02 REPAIR OF WORK AND MATERIAL: Carefully lay out cutting, channeling, chasing, or drilling of finish or structure or other surfaces for the installation of equipment or material to avoid damaging Government property or adjacent materials not involved in the project. If Contractor personnel or equipment inadvertently damage such items, then follow the procedures below. Failure to follow the notification procedures below shall be considered a serious violation of the contract.

A. Notify the Contracting Officer by telephone immediately and confirm within 3 days with a typed letter if damage to Government property occurs. The Government reserves the right to require the Contractor to work overtime and purchase material for repair before the end of the workday at no additional cost to the Government.

B. Repair damage to building or equipment to match existing as directed by the Contracting Officer with skilled workmen of the trades involved at no additional cost to the Government.

C. Repair Fire Resistant Assemblies that have been violated before the end of the day. In the event the work is incomplete, provide fire-rated gypsum board to cover holes 2-inch and greater in any dimension.

D. Reconnect Disconnected Equipment before the end of the day and insure that it is operating.

E. Existing Equipment and Material to remain or to be relocated is the property of the Government. However, the Contractor is responsible for items to remain.

F. Labels on equipment plates with information shall be properly protected before any operation that could damage or cover the label.

G. Fire Alarm: This contract involves work requiring existing fire alarm equipment either to remain or to be removed and reinstalled. The Contractor shall comply with the requirements of the inspection forms in the Appendix at the end of this section. One form is to notify the appropriate personnel that work is being accomplished on fire alarm systems. The other forms are used to establish the conditions of the system components prior to and following the contractor’s work.

3.03 IDENTIFYING UNDERGROUND LINES AND STRUCTURES:

A. Regardless of statements in other Spec sections, provide tracer wires and warning tapes over buried underground utilities and structures. Follow these requirements if the other Spec sections are less detailed and stringent.
B. These include all underground items such as utility lines, oil/water separators, fuel and water storage tanks, and utility pits and manholes with tops below grade.

C. Provide a warning tape of standard industrial width and thickness with imprinted words identifying the type of utility line or structure below it. Place along the length (and width if not a utility line) of the protected item at one-foot depth below grade.

D. For buried non-metallic lines and structures also provide a tracer wire placed just above them, so conventional locating equipment may be used to locate the lines or structures. These items may be made of plastic, fiberglass, or similar non-metallic material. Design basis of the tracer wire is BMS Heavy Tracer Wire by Utilitronics, PO Box 480, Stoughton, MA 02072 - phone 1-800-245-8850. Use no less than #12 AWG copper solid wire, 5/64” HMWPE insulation, with white color.

3.05 SITE PHOTOGRAPHS:

   A. General: Take "before" and "after" color photographs of the work site on a digital camera with a resolution for each picture of at least 60 KB compressed image. Provide for approval on a CD-RW/DVD disk at least 24 views chosen by the Technical Representative of the Contracting Officer (TRCO) before construction. Provide additional views as directed to show the full extent of the work. Provide for approval an identical set of "after" views.

   B. Underground Utilities: For projects where there is trenching for any underground utilities, even if just laterals from outside equipment into mech-elec rooms, take an additional set of as-built photos after construction for approval before final inspection. These must cover the entire length of the trenching with a view to showing nearby landmarks to enable a person to locate the line in the field in the future by using the photos after the disturbed soil is no longer visible.

3.06 SITE MAINTENANCE, CLEAN UP, AND RESTORATION:

   A. Maintain the work site in a neat, orderly, and safe manner. Cut grass regularly to maintain site to base standards.

   B. Remove scrap, waste, and excess materials promptly. Provide signs, barricades, and lights as required to protect base personnel.

   C. Do not allow trash and debris to accumulate and become unsightly. Sweep up and collect in contractor-maintained disposal containers daily. Dispose of collected debris weekly as a minimum.

   D. Store materials on site in a neat and orderly manner.

   E. Restore the project site to its final condition as required by the contract as soon as possible.

   F. Do not open trenches or excavations until material is on-hand or scheduled to arrive within three days. Close excavations or ditches as soon as the work has been placed, inspected, and accepted by the Government.

3.08 STORAGE AND OFFICE AREA: Submit a request for approval if the Contractor desires a storage area or storage/office trailer(s) on Base. If approved, the Contractor will be allowed limited land area to put an office and/or storage trailer and storage area, but only for this contract. The location will be as identified by the Technical Representative within the Base perimeter.
A. Trailers: All contractor trailers must be identified with a professionally lettered and neat sign giving the name and phone number of both the trailer rental company and the contractor. Trailers must be in good repair and give a presentable appearance. Trailers used as Field Offices shall be anchored with rods and cable or by steel straps to ground anchors. The anchor system shall be designed to withstand high winds and must meet applicable state or local standards for anchoring mobile homes. Minimum 1 each corner.

B. Items stored for the project on Base are the responsibility of the Contractor. Replace all such items acquired for this contract that are stolen, vandalized, damaged, or otherwise unusable - at no additional cost to the Government. The Contractor may install a temporary fence in the manner and of the type that is acceptable to the Contracting Officer.

C. This site shall be kept clean and orderly, or the Contracting Officer may require the Contractor to evacuate the site before the end of the contract.

3.09 PROJECT CONSTRUCTION SIGNAGE: See Robins AFB Facility Standards, Part 4B.

<<<< END OF SECTION >>>>>

Appendix follows:

Form 1 – Fill out and submit to get approval to work on a fire alarm system.

Form 2 – Fill out and submit to document existing conditions of a fire alarm system to be worked on.

Form 3 – Fill out and submit to document conditions of a fire alarm system after contractor work is completed.
FIRE ALARM SYSTEM INSPECTION
COMPONENTS EXISTING TO REMAIN OR TO BE REMOVED AND REINSTALLED

PART 1. Prior to construction start    DONE    (Contractor to Initial/Date)

A. Schedule testing of all fire alarm components not scheduled for demolition (at Government's convenience-minimum 72-hours notice required)

Person Notified (at CENME)

B. List all persons attending test:
   * Fire Alarm Shop                CEOFA
   * Contractor Superintendent     ____________________________
   Construction Management         CENME
   ** Sub-Contractor Foreman

   * Required Personnel
   ** This shall be the person(s) directly overseeing any removal and re-installation of fire alarm equipment.

C. Inspection (CENME Inspector to check one of the following)
   (All parties to initial below):

   _____ All existing components in the project area have been tested and are working properly

   _____ All components have been tested and the following are not working properly. (Specify equipment, quantity, and location; e.g., 2 smoke detectors in northwest quadrant of Room 102.):

Acknowledgments:

CEOFA       CENME       Contractor
Sub-Contractor    Others:
FIRE ALARM SYSTEM INSPECTION  
(COMONENTS EXISTING TO REMAIN OR TO BE REMOVED AND REINSTALLED)  

PART 2. At completion of work (before Prefinal inspection):  

DONE  
(Contractor to  
Initial/Date)  

A. Schedule testing of all fire alarm components not scheduled for demolition (at Government's  
convenience-minimum 72-hours notice required)  

Person Notified (at CENME)  

B. List all persons attending test:  

* Fire Alarm Shop                          CEOFA  
* Contractor Superintendent  
Construction Management  
** Sub-Contractor Foreman  
* Fire Department (CEXFP)  

* Required Personnel  
**This shall be the person(s) directly overseeing any removal and re-installation of fire alarm  
equipment.  

C. Inspection Results (to check by CENME Inspector all parties to initial below):  

Passed: All components have been tested and the system has been returned to its  
original condition.  

Failed (Minor): All components have been tested and the system has not been  
returned to its original condition. The following items must be repaired, replaced, or reconnected as  
necessary to restore their operation, at no additional cost to the Government, and those items retested.
Failed (Major): All components have been tested and the system has not been returned to its original condition. The following items must be repaired, replaced, or reconnected as necessary to restore their operation, at no additional cost to the Government, and those items retested.

Acknowledgments:

CEOFA       CENME     Contractor
Sub-Contractor___________ Others:

NOTE: The contractor shall reimburse the Government for any failed (major) test at the current shop rate (between $30.00 and $50.00) per person hour, including one (1) hour per person travel and preparation time. This does not include the CENME Inspector. We estimate between 2 and 4 people will be required and the test will take.
78th CIVIL ENGINEER GROUP DIGGING PERMIT

Purpose: A digging permit is required for all work (contract or in-house) that may disrupt aircraft, vehicular, or personnel traffic flow, base utility services, protection provided by fire and intrusion alarm systems or routine activities of the installation. This form is used to coordinate the required work with key base activities and to identify potentially hazardous work conditions in an attempt to prevent accidental damage to base utilities and to ensure the proper restoration of the excavated site.

Damage: All Utilities must be located by hand when digging within 3 feet of any utility. Digging near marked cables shall be accomplished as spelled out in the contract specifications and drawings. Permittee also agrees not to use "plowing" implements to trench and install utilities. A backhoe is mandatory. All cost to restore services to base utilities resulting from damage will be billed to permittees. In case of emergency on base, call 222-2900 from personal cell phones and 911 from base land line phones.

GIS Notification: Promptly notify the Geobase office should digging uncover any undocumented utility lines or result in the relocation of known utility lines. It will be mutually beneficial to notify the Geobase office when the utilities are visible and or uncovered so that the utility can be documented and or captured with high-accuracy GPS. With that said, upon notification it will be incumbent upon the Geobase office to accommodate the site manager and project schedule in such a way as not to cause unnecessary hindrance.

Utility Outages: Utility outage forms can be obtained up in the CE conference room every Wednesday from 1000 to 1030 hrs. Your government representative must be present.

I. Permit Section:

   a. Clearance is requested to proceed with work at:
   b. Work order #:
   c. Project #:
   d. Contract #:
   e. Utilities Protection Center ticket (UPC) #:
   f. Specific Description & scope of work:

   - Repair
   - Communication
   - Irrigation
   - Steam
   - A&E
   - Replace
   - Compressed Air
   - Fuels
   - Industrial Waste
   - Water
   - Relocate
   - Electric
   - Sanitary Sewer
   - Environmental
   - New Installation
   - Natural Gas
   - Storm Sewer
   - Landscaping

g. Your organization or Company name:

h. Print name and phone number of on-site Foreman:

i. Print name and phone number of Gov't Representative:

j. I certify that the subcontractor(s) have been or will be briefed on the method and limits of excavation and will be provided a copy of this form to retain while working on Robins AFB. All subcontractors on the work site will comply with precautions measures
   - I agree to comply with the site, restoration plan as outlined on the attached.
   - I certify that I have personally visited the site covered under this permit and that the site will be properly restored in accordance with the attached restoration plan.
   - I further certify that it is my responsibility to ensure the area is kept marked at all times.

Signature:

Date:
II. Road Cuts:

Approved by: ____________________________________________
Date: __________________________

DO NOT WRITE BELOW THIS LINE

Approved by: ____________________________________________
Date: __________________________
Permit Expiration: __________________________
Assigned Date & Time: __________________________

Notes: __________________________________________________

<table>
<thead>
<tr>
<th>Contact</th>
<th>Company/Shop</th>
<th>Location</th>
<th>Phone</th>
<th>Cleared to Dig?</th>
<th>Initials</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dig Permit Manager</td>
<td>Alan Johnson</td>
<td>Geobase Office</td>
<td>Bldg. 1555</td>
<td>733-3599</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication Lines</td>
<td>Jeremy McGrunic</td>
<td>BTS</td>
<td>Hwy 247</td>
<td>334-6818</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td>Robby Lane</td>
<td>Exterior Electric</td>
<td>Bldg. 1555</td>
<td>538-9324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Impact</td>
<td>Ed May</td>
<td>Environmental</td>
<td>Bldg. 509</td>
<td>236-5893</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIS Utility Dews &amp; GPS</td>
<td>Alan Johnson</td>
<td>Geobase Office</td>
<td>Bldg. 1555</td>
<td>997-8922</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cox Cable</td>
<td>Don Holley</td>
<td>Cox Communications</td>
<td>Hwy 247</td>
<td>256-1599</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilities Protection Center</td>
<td><a href="http://www.gnpcc.com">www.gnpcc.com</a></td>
<td>Dahl, Georgia</td>
<td>1-800-282-7411</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paving/Storm Drainage</td>
<td>Walter Carter</td>
<td>Horizontal</td>
<td>Bldg. 1555</td>
<td>327-94354</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POL Systems</td>
<td>Arnold Hubbard</td>
<td>Fuels Distribution</td>
<td>Bldg. 9086</td>
<td>327-9887</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runway &amp; Ramp access</td>
<td>Rod Eady</td>
<td>Airfield Management</td>
<td>Bldg. 1</td>
<td>472-6470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steam &amp; Chilled Water</td>
<td>Mike Grover</td>
<td>Industrial Mechanical</td>
<td>Bldg. 1555</td>
<td>327-8459</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water, Sewer, Nat Gas, Ind Waste Irrigation</td>
<td>Ron May</td>
<td>Plumbing (CEU)</td>
<td>Bldg. 288</td>
<td>919-1499</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watson Cable</td>
<td>Robbie Watson</td>
<td>Watson Cable</td>
<td>1127 Everett</td>
<td>922-9440</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit Safety Rep</td>
<td>Ralph Brown</td>
<td>Safety</td>
<td>Bldg. 1555</td>
<td>497-8929</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PART 1 - GENERAL

1.01 GENERAL:

A. BASIC:

1. Provide items requiring drawings, diagrams, certifications, manufacturers’ literature, data brochures, technical data, sample requests, forms, and other data as noted under the submittals section of each specification section. All submittals and operations and maintenance data shall be submitted in a 3-ring binder or comb binder.

B. CONSTRUCTION SUBMITTALS:

<table>
<thead>
<tr>
<th>Para No.</th>
<th>Description</th>
<th>Date Required</th>
<th>Inspector</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.01.C1</td>
<td>Time Schedule</td>
<td>by Preperf/Precon Mtg</td>
<td></td>
</tr>
<tr>
<td>1.01.C1</td>
<td>Meeting Records</td>
<td>As Noted or Monthly</td>
<td></td>
</tr>
<tr>
<td>1.03.D</td>
<td>Progress Report</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td>1.03.E</td>
<td>List of Values</td>
<td>with First Progress Report</td>
<td></td>
</tr>
<tr>
<td>1.03.F</td>
<td>Daily Reports</td>
<td>Weekly</td>
<td></td>
</tr>
<tr>
<td>1.10</td>
<td>Closeout Report</td>
<td>before Final Inspection</td>
<td></td>
</tr>
</tbody>
</table>

C. PRECONSTRUCTION SUBMITTALS:

1. In accordance with this Section, the following documents are required and must be submitted within 14 days after Construction NTP is issued:

- List of proposed subcontractors
- List of proposed products
- Construction Progress Time Schedule (AF Form 3064)
- 1 Set of Bid Documents (Drawings & Specs)
- Submittal register
- Meeting Records
- Health and safety plan
- Work and Demolition plan
- Quality control (QC) plan
- Environmental protection plan
- Storm Water Pollution Prevention Plan
- Existing Conditions – Photographs and Field Verification Sign-off

D. CONTRACTOR RESPONSIBILITY:

1. Review, Corrections, or Comments made on the Submittals do not relieve the contractor from compliance with the requirements of the Drawings, Specifications, Addendums, and Contract
Documents. By entering into this contract, the contractor agrees that the purpose of submittals is to demonstrate to the contracting officer that the contractor understands the design concept and that he demonstrates his understanding by indicating which equipment and material he intends to furnish, install, and use. Review of shop drawing will be general only for basic conformance with the design concept. The Government’s review of such drawings, schedules, or cuts shall not relieve the contractor from the responsibility for correcting all errors of any sort contained in the submittals.

2. The contractor is responsible for confirming and correlating all quantities and dimensions; selecting proper fabrication processes, construction methods and installation techniques; coordinating this work with that of all other trades; and performing all work in a safe, workmanlike and satisfactory manner.

3. The Government has not stipulated dates for turning in material submittals, unless noted elsewhere in the specifications. The contractor must manage his/her material and equipment lead times for obtaining approval in sufficient time to complete work on schedule.

1.02 SUBMITTALS: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

<table>
<thead>
<tr>
<th>Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Check Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.05 A</td>
<td>Superintendent Data</td>
<td>As Directed</td>
<td>___</td>
</tr>
<tr>
<td>1.08</td>
<td>Equipment List</td>
<td>30 Days before Prefinal</td>
<td>___</td>
</tr>
</tbody>
</table>

1.03 SUBMITTAL INSTRUCTIONS: Each Specification Section lists the submittal requirements unique to it. The following apply to all sections.

A. SUBMITTAL FORMS: Material submittals shall be made using AF Form 3000. For design-build (DB) projects, all design submittals only require a transmittal letter.

B. MATERIAL SUBMITTALS:

1. COMPLETE SUBMISSIONS: All items requiring submittals for each section shall be provided at one time. Partial submittals will be returned without approval. No time extensions will be granted for failure to comply. In some instances the specifications may require certain items from one or more specifications sections to be submitted at one time. For example, condensing units and air handler submittals may be required to be provided together.

2. SUBMITTAL CHECKLIST: The contractor shall complete a copy of the checklist provided in the submittals paragraph of each specification section. This checklist shall be provided with each submittal. Submittal information shall be arranged in order to correspond with each checklist.
3. TIME: The Contractor shall have approved submittals before ordering any equipment under this contract. If equipment is ordered prior to receiving approval, it will be solely at the Contractor’s risk. Under no circumstances will material be installed prior to approval of submittals. There will be no time schedule for providing material submittals unless noted elsewhere in the specifications. The Contractor will be required to manage his materials/equipment lead times and obtain approval in sufficient time to complete the work on schedule. Disapproval of incomplete or unsatisfactory submittals shall not be grounds for contract extensions. Other submittals such as as-builts, test reports, etc., shall be provided as indicated.

4. MANUFACTURER’S DATA: When the specifications contain an “X” under the “Manufacturer’s Data Required” field of the submittals paragraph checklist, then the submission of manufacturer’s data is required. If an “X” is in the “Certificate of Compliance” field, then it becomes the Contractor’s option to submit manufacturer’s data or a Certificate of Compliance as detailed below.

5. EXCEPTIONS: If any material proposed for use on this contract deviates from the specifications, the Contractor shall submit those proposed deviations for approval along with detailed justification. All exceptions and deviations shall be described in detail with each product submittal. Cost will not be considered a justification for taking exceptions unless a credit is offered to the Government.

6. SUBSTITUTIONS: Products provided by manufacturers other than those specified as the “design basis” shall be considered substitutions.
   
   a. All features of items submitted as substitutions are implied to be in full compliance with Specifications and Drawings if not specifically noted as "Exceptions."

   b. Where a design basis is referenced in Specifications and Drawings, substitutions must meet or exceed the salient features of the design basis as determined by the Technical Representative of the Contracting Officer. Exceptions to design basis characteristics must be clearly noted as "Exceptions." Note: The Federal Acquisition Regulations place the burden of proving the substitute as equal or better on the contractor.

   c. Changes required to accommodate approved substitution shall be made at no additional cost to the Government. For example, an approved motor substitution may require upsized electrical cable and conduit.

7. Certificate of Compliance: The Contractor may, at his option, submit a “Certificate of Compliance” (COC) in lieu of providing manufacturer’s catalog cuts/data. Only one COC will be required per specification section. Submit three copies of each COC package. The COC must be signed by the contractor and either the supplier or the
manufacturer. The COC letter is attached at the end of this specification section. The letter must be completed in full.

C. OTHER SUBMITTALS: Other submittals such as samples, test results, spare parts, etc., shall be provided as required by each specification section. Provide 4 copies of each unless directed otherwise. Upon request contractor shall provide any other submittals as required by the COR.

D. CONSTRUCTION REPORTS

1. PROJECT TIME SCHEDULE

   a. Submit a schedule for the entire contract at the Kickoff (Preperformance or Preconstruction) Meeting, or before that meeting if so directed elsewhere in these specifications.

      (1). The schedule for the entire contract may be submitted in Microsoft Project format if the contractor so chooses. The Government will also accept similar sequence patterns shown in Word or Excel if they are properly developed and displayed.

      (2). If there are several projects in one contract, submit a separate schedule for each project at the same time.

   b. Include timelines for design (as applicable), mobilization, start site work, separate timelines for each discipline and subcontractor, prefinal and final inspection times, punchlist completion, and demobilization.

   c. The contracted total allotted time and the Government's estimate for each part of the schedule are included in the attachment to this specification.

      (1). The attached schedule includes days after award for holding the Pre-performance or Preconstruction Meeting and for one resubmittal of documents provided by the Contractor at the meeting.

      (2). No construction work may begin until the Contracting Officer has approved the schedule.

      (3). Resubmit if and as directed by the Contracting Officer.

      (4). If the approval process takes longer than the amount of days allotted, that will not result in a time extension for the entire contract.
2. PROJECT PAY SCHEDULE

a. Also submit at the Pre-construction Meeting time schedule(s) on AF Form 3064 that show(s) the percentage completion timeline. This establishes the pay schedule.

   (1). Ensure the Form 3064 matches up with the Project Time Schedule described above, even if that requires two or more pages of the Form 3064.

   (2). Also ensure the price percentages match up with the approved price proposal at each step on the timeline.

3. MEETING RECORDS:

a. Whenever the contractor meets with Government representatives to discuss outstanding issues or details, the contractor shall prepare a written meeting record of major decisions made and of action items, noting person responsible and date due for each item. These will stand as accepted by the Government unless contradicted by Government personnel who attended the meeting.

b. No decisions made constitute a contract change - the Contracting Officer handles these in separate contract modification packages.

c. Meeting records are due by e-mail or fax to all offices represented at the meeting by no later than two workdays after the meeting.

d. The Contracting Officer considers any resolved issues, decisions, or identified action items to the benefit of the Contractor without these written records to have never happened, since they were not documented and accepted by the Government.

e. For additional record purposes, either the Contractor or the Government may elect to audiotape the meeting.

4. PROGRESS REPORTS:

a. Prepare and submit a monthly progress report (AF Form 3065) for each project and the entire contract on a monthly basis.

b. Obtain coordination signature on the monthly progress reports from the Technical Representative of the Contracting Officer (CENME Inspector) before submitting to the Contracting Officer.
E. LIST OF VALUES: Include for approval with the first monthly progress report a breakout of net costs for each item of work for the project. These are costs that include materials, labor, equipment, overhead and profit, etc. to be prorated against each item. These numbers are for use by the base to improve future estimates.

F. LOG BOOKS:

1. Keep daily logs of the activities of the prime contractor and subcontractor employees. The logs shall include the following:

   a. Date
   b. Number of people on the job site and skills for each
   c. List of construction equipment on the job site
   d. Types of work accomplished and how much
   e. Materials delivered to the job site
   f. Problems and their impacts that arose with the site, the Inspector, facility users, subcontractors, and the weather.

2. Provide a copy of this daily log (or the original) to the Technical Representative of the Contracting Officer (CENME Inspector) weekly.

1.04 RETURN AND DISAPPROVAL OF SUBMITTALS: This is a routine project. The Contracting Officer will return submittals made with AF Form 3000 to the Contractor within 14 days after receipt, using the AF Form 3000 to show approval or disapproval. Resubmit revisions of disapproved submittals within 14 days after receipt of disapproval, again using AF Form 3000. Disapproval shall not be cause for time extension.

1.05 SUPERINTENDENT:

A. When requested, provide name and qualifications for review. Designate a competent person who shall have full authority to act for the Contractor and who shall be the primary contact with the Government until project acceptance. The superintendent is a non-working site supervisor/manager who shall be on site at all times when any Contractor personnel are on site. The “site” is defined as the location where construction work is being done. The Government through the Contracting Officer or Technical Representative of the Contracting Officer (CENME Inspector) reserves the right to shut down all Contractor site activities if the superintendent is not on site at such times. Site work shall not resume until the superintendent has returned to the site. Several violations of this requirement are cause for termination for default.

B. If the FAR clause requiring the formal Superintendent is not included in the contract, then the Contractor shall have a designated work leader or foreman on site during all occasions when there are
two or more personnel on site. There shall always be “someone in charge” who has authority to act for
the Contractor at all such times, even if the person is just the most senior of the laborers on site.

1.06 TURN-IN OF IDENTIFIED EQUIPMENT, SPARE PARTS, TOOLS, AND OTHER
MATERIALS: Items in the Submittals section of each Specification Section (or elsewhere) that are
indicated for turn-in to the Government shall be delivered as directed, or at least before prefinal
inspection. Obtain receipts from Government employees receiving the materials and deliver them to the
Contracting Officer before prefinal inspection.

1.07 AS-BUILT DRAWINGS: Submit CADD as-built project drawings for approval, as detailed in
Section 01310. The Government will not make Final Payment to the Contractor until these are fully
accepted and approved.

1.08 PROVIDE EQUIPMENT LIST to Contracting Officer.

A. Indicate the make, model number, and warranty expiration date of equipment installed by
Contractor. The Technical Representative will inform the Contractor which equipment should be on list.
After the Government approves the list, complete the GSA Forms 274 obtained from Technical
Representative, and then place these labels on the equipment in the list before prefinal inspection.

B. If any of the equipment needs repair during the warranty period, prior to the expiration date,
the Contractor Officer will notify the contractor of the problem. Also, the Contracting Officer’s
Technical Representative will be notified to accompany the Contractor to the equipment. The contractor
shall provide a service ticket to the Contracting Officer and Technical Representative to indicate the
corrective action taken to remediate the problem with the equipment.

1.09 FINAL INSPECTION ONLY: If the Contracting Officer elects to have only a final inspection, turn
in prefinal inspection submittals before the final inspection.

1.10 CLOSEOUT REPORT

A. Record: Keep a record of all new equipment, facility square footage, utility runs, and items
that may be considered “real property” which are purchased and installed under the contract,
separated by project for multiple project contracts. Upon request, the Technical Representative
of the Contracting Officer (CEG Inspector) may be willing to provide any engineering records
available to assist in this effort.

B. New Items: Include the following information in this record:

1. Equipment type and description

2. Sizes and parameters (i.e. tonnage, KW, dimensions, etc.)

3. Quantities
4. Model and Serial numbers

C. Demolished Items: Also include similar information for equipment removed, relocated to another facility, or disposed of at Government request. Do not include like-for-like replacements.

D. Submit for approval before Final Inspection.

<<<<<< END OF SECTION >>>>>

Certificate Follows.
MATERIALS CERTIFICATE OF COMPLIANCE

Project(s) UHHZ ___________, (Title)___________________________________________

Contract Number: ___________________

Specification Section (or Drawing) Number: __________________

Prime Contractor: __________
Sub Contractor: __________
Material Supplier: __________

Contractor Certification: I hereby certify that I and/or personnel under my direct supervision and/or control have reviewed all proposed materials for the above contract. I further certify that the submittal has been reviewed for completeness and accuracy and that all materials submitted will comply with the drawings and specifications in every respect unless specifically noted as an “exception taken” on the attached submittal checklist.

Signature: _______________________
Title: _______________________
Company: _______________________
Date: _______________________

Attachment:
Submittal Checklist for Spec or Drawing Listed Above
01300 APPENDIX A
Submittal Register
<table>
<thead>
<tr>
<th>LINE NUMBER</th>
<th>ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL</th>
<th>NO. OF COPIES REQUIRED</th>
<th>BEFORE CONSTR</th>
<th>AFTER CONSTR</th>
<th>REQUIRED SUBMITTAL DATE</th>
<th>DATE RECEIVED IN CONTRACTING</th>
<th>DATE TO CIVIL ENGR</th>
<th>RETURN SUSPENSE DATE</th>
<th>FOLLOW-UP</th>
<th>DATE CONTRACTOR NOTIFIED</th>
<th>CONTRACTOR RESUBMITTAL</th>
<th>FINAL APPROVAL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# SCHEDULE OF MATERIAL SUBMITTALS
## ROBINS AFB

<table>
<thead>
<tr>
<th>LINE NUMBER</th>
<th>ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL</th>
<th>NO. OF COPIES REQUIRED</th>
<th>BEFORE CONSTR</th>
<th>AFTER CONSTR</th>
<th>REQUIRED SUBMITTAL DATE</th>
<th>DATE RECEIVED IN CONTRACTING</th>
<th>DATE TO CIVIL ENGR.</th>
<th>RETURN SUSPENSE DATE</th>
<th>FOLLOW-UP</th>
<th>DATE CONTRACTOR NOTIFIED</th>
<th>CONTRACTOR RESUBMITTAL</th>
<th>FINAL APPROVAL</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE**: This Submittal Schedule is for the Contractor's use in assembling and organizing the Submittals to be made to the Government. See individual specification sections for possible additional submittal requirements.

**LEGEND**:
- B - Include with line 10 Warranty Book
- C - Include with line 14 Color Samples
PART 1 - GENERAL

1.01 GENERAL:

1. Basic: Submit as-built project drawings for approval at 50% construction completion stage (hard copy), 75% construction completion stage (hard copy), and final (hard copy and electronic) as noted below.

2. As noted in Section 01300, the Government will not make 50% construction completion payment, 75% construction completion payment, and Pre-Final Payment to the Contractor until these are fully accepted and approved.

1.02 SUBMITTALS: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

<table>
<thead>
<tr>
<th>Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Check Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.02.2.</td>
<td>As-Built Redlines</td>
<td>50% completion</td>
<td>___</td>
</tr>
<tr>
<td>3.02.2.</td>
<td>As-Built Redlines</td>
<td>75% completion</td>
<td>___</td>
</tr>
<tr>
<td>3.02.5.a</td>
<td>As-Builts Redlines, Soft Copies</td>
<td>100% completion by</td>
<td>___</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prior to Pre-Final</td>
<td>___</td>
</tr>
<tr>
<td>3.02.5.7</td>
<td>As-Built Resubmittals</td>
<td>As Directed</td>
<td>___</td>
</tr>
<tr>
<td>3.07</td>
<td>GIS for Facs. and Utils.</td>
<td>By Pre-Final</td>
<td>___</td>
</tr>
</tbody>
</table>

PART 2 - PRODUCTS - OMITTED

PART 3 - EXECUTION

3.01 Contractor Receiving CADD Files:

1. CADD Files will be provided after contract award and at Contractor request to the Technical Representative of the Contracting Officer (TRCO), normally after the mid-point of construction to ensure any contract modifications are shown on the final design drawings.

2. The Government will provide an electronic copy of the final design drawings and associated files to the Contractor at that point. The electronic copies will consist of the CADD files on CD standard format. The CADD files will be in the AutoCAD 2007 or latest version.

3.02 Submittals:

1. Acceptance and Quality Review by Government: The Government places a high value on the accuracy and detail provided in these as-builts. The contract shall not be considered complete until the as-built information is approved and accepted in its entirety.

2. 50% and 75% completion Submittal (Hardcopy Only): Submit for approval at 50% and 75% completion (with AF Form 3000) a full set of hardcopy contract drawings with “redline” changes indicated on the drawings. The as-built hard copy shall show all red lines in red color.

   a. Mark all drawings as “50% AS-BUILT” or “75% AS-BUILT” as applicable in the revisions block of the title block area.
b. If no changes to the drawings are required, submit the hardcopy drawings with "NO CHANGES" printed in large red letters on the title sheet.

c. Do not submit drawings with stray markings or sketches made in the field which are not red and are not intended to convey as-built information. Do not create new drawings to convey as-built conditions. Submit all redline information on an otherwise clean sheet of "hard copy" contractor drawings. If necessary and upon request, the Inspector will provide an extra set of drawings for this purpose.

3. The Inspector will evaluate the submittal for correctness and completeness and either approve or disapprove them via notation on the AF Form 3000. If the submittal is disapproved, it will be returned to the contractor, along with directions for corrections. Incorporate these corrections into the drawings and resubmit with AF Form 3000 for approval.

4. After receipt of the Inspector’s approval and prior to updating the drawings electronically, contact the Inspector and make contact with the As-built Coordinator for the originating design office to discuss technical issues associated with preparing the final as-built drawings.

5. Final Inspection Set

a. Submit (with AF Form 3000) prior to Pre-Final Inspection a 11” x 17” redline as-built drawings for approval, along with a full set of electronic drawing files (sheet files and model files) provided by the Government per para. 3.01.2 above, modified electronically to reflect the redline changes made on the hardcopy drawings. Accomplish all changes to the electronic drawing files according to industry standard CADD drawing practices acceptable to the Government. The as-built hard copy shall show all red lines in red color.

b. Maintain the file names and naming pattern of the files as provided by the Government.

c. Label the drawings as “Final As-built” in the revision block area of the electronic drawings.

d. Retain the existing georeferenced model file and sheet file structure originally used to produce the drawings to create the final drawings. Maintain the links of the reference (model) files. For example, if the floor plan was a model file, any changes to the floor plan shall be accomplished on the model file. If utility lines were a part of the sheet file, the changes shall be made to the sheet file.

e. Also submit PDF format files of all drawings readable with Adobe Acrobat Reader. Format files are to be printed at a 1:1 scale on the original size sheet (no enlargement or reduction will be allowed for accurate plotting to the original size sheet).

6. The Inspector and As-built Coordinator will reevaluate for correctness and completeness and then provide either approval or further directions for corrections to the Contractor.

7. Resubmit (with AF Form 3000) complete submittals as directed until the Government provides full approval.

3.03 Format:
1. Provide electronic copies of the design drawings and as-built drawings in AutoCAD 2007 or the latest version.

2. Drawing elements shall be retained in original format. Raster elements may remain raster, and vector elements shall remain vector.

3. Make all changes in the colors and levels that match those in the original drawings that were provided by the Government.

4. Notes shall be legible and changes shall be shown clearly indicating differences, however minor, between actual construction and project drawings. Include corrections to underground utilities and unforeseen site conditions discovered during performance of contract.

5. Update the indexes of the electronic files to reflect any changes.

3.04 Utility Data: Provide the following exterior utility information as “smart lines” when already on the original drawing files. If smart lines were not used, then provide a separate file in Microsoft Word or Excel format with the following data, as a minimum, for each segment of utility lines:

Size
Material
Depth
Date Installed (Normally to coincide with warranty date)

3.05 Accuracy of Dimensions for Site Drawings: Locate all significant exterior features and utility lines within a one (1) foot accuracy for purposes of as-built submission, even if not changed during construction.

1. The locating may be accomplished by traditional survey methods or by global positioning system (GPS) satellite equipment supplemented by traditional methods where required.

2. Locations may be from existing buildings or from base monument system. Any existing structures used as a survey reference must be checked for conformity to NAD 83 surveying coordinates.

3. Recognize that the base maps which are often the basis for the contract site plans have been prepared from aerial photographs and as such show the roofline instead of the building structure line.

3.06 Qualified Firms for CADD and GPS Support: The Contractor may use any commercial firm or in-house resources to accomplish the requirements. In some cases we used an Architect-Engineer (A-E) firm to design the project, and in those cases they are noted on the Drawings and may be used if desired. If requested, the Inspector will also provide names of other firms the Government believes should be capable of providing the services required, based upon base personnel experience with them.
3.07 GIS Submittals for Facilities and Utilities: This project also requires data and CADD drawing info for updating the Robins AFB GIS/Geobase data system.

1. GIS Software: The Robins AFB GIS utilizes the ESRI Suite of GIS products. Deliverables to RAFB must be compatible with ArcGIS 10.0 or newer.

2. IGDS File Format - IGDS Graphic File Format: All graphic files are to be supplied in Autocad 2007.dwg file format. The symbology of graphic features must comply to Tri-Service Spatial Data Specifications (TSSDS) Version 2.40.

3. Spatial Data Specification (*)

   a. Coordinate System/Projection:

   State Plane, Georgia West
   Mapping units resolution of 1,000 UOR’s per foot
   Storage Minimum Point X,Y = 0,0

   b. Geodetic Vertical Datum
   System: State Plane Coordinate System
   Geodetic Datum: North American Datum 1983 (NAD83)
   Ellipsoid: “GRS80”

   c. Note that a contractor should contact 78 CEG/CENME (Joshua Winters) POC for a copy of the 78 CEG/CENME GIS project design file that contains all the required NAD83 projection specifications.

4. Object ID Values for Attribute Tables: Contractor needs to contact the 78 CEG/CENME GIS Coordinator to ensure that Object ID values for attribute tables do not already exist in the 78 CEG/CENME GIS.

5. Delivery Media

   a. The delivery media can be on CD-ROM, or 14 GB density 8 mm Exabyte tape, compatible with a Windows NT 4.0 operating system. The volume name on the delivery media should match the data set name documented in the Delivery Media Metadata. The abstract should point to the Delivery Media Metadata file.

   b. The delivery media must be labeled with the following:

      Volume name
      Date - Record for the creation of the Data Set Contract Number and Work Order Number
      Project Name
      Name of Contractor preparing the data set

   c. NOTE: The TSSDS standard may be obtained by calling Bobby Carpenter at (601)634-4572 or sending e-mail at carenb@ex1.wes.army.mil. The Tri-Service Commission operates an internet web page at http://mr2wes.army.mil. For further information on 78 CEG/CENME’s
implementation of the TSSDS, please contact the 78 CEG/CENME GIS Coordinator, Joshua Winters.

3.08 GIS Submittals for Environmental Systems: (Omitted.)

<<<<<< END OF SECTION >>>>>
PART 1 - GENERAL

1.01 GENERAL: Electricity required for contractor convenience will be provided at no charge. Other utilities will be provided as available, also at no charge. Telephone hookups are contractor responsibility.

   A. These requirements are general in nature and are not intended to override safety requirements.

   B. Provide all equipment required for temporary utilities (such as transformers, poles, disconnects, etc.) hookup to base system and after final inspection remove equipment before final acceptance.

   C. This project scope is within and directly adjacent to an existing facility. Power within the existing facility, within the limits of work, may be utilized by the Contractor.

1.02 OMITTED:

1.03 SUBMITTALS:

   A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items. The contractor may submit manufacturer’s data in lieu of the required certificate of compliance if he desires. The Government requires manufacturer data if an “X” appears under the “Mfg. Data Required” column.

   B. Material Submittals: Omitted.

1.04 REQUIRED INFORMATION:

   A. Heating and Ventilating: The contractor shall submit shop drawings for approval indicating the methods and equipment to be used, if any, to maintain the space temperature.

   B. Electrical:

      1. Shop Drawing of Temporary Service Entrance: The routing, point of connection, size of pipe(s), and method of support for the temporary service mast shall be submitted for approval before installation.

      2. Notification of Need: Contractor shall submit typed letter to indicate the need for Government furnished electrical hook-up to his service before work begins.

      3. Notification of Installation: Contractor shall notify the Contracting Officer fifteen (15) days before electrical hook-up of Service. The pole shall be set before notification.

      4. Notification of Removal: Contractor shall notify the Contracting Officer fifteen (15) days before electrical disconnection of Service. The Service shall be removed before final inspection.

PART 2 - PRODUCTS - Omitted
PART 3 - EXECUTION

3.01 DOMESTIC WATER:

A. General: Where required for the convenience of the contractor or as required to maintain continued occupancy of the work area, the contractor shall provide temporary water service of adequate capacity. At all points of tie-in to existing lines, the contractor shall provide a cut-off valve to isolate temporary lines from existing.

B. Insulation: Where temporary water service lines are exposed to the weather, they shall be insulated to prevent freezing from 1 November through 31 March.

C. Disinfection: Where temporary lines will be used for drinking water, they shall be flushed and disinfected before being placed into service.

D. Removal: All temporary water lines shall be removed before final inspection. The shut-off valve at the point of tie-in to the existing line shall remain unless indicated otherwise. Provide a six (6) inch section of pipe on the downstream side of valve and cap.

E. Temporary Restrooms: Where construction work renders existing restrooms unusable and alternate facilities are not within a reasonable distance as determined by the Contracting Officer, the Contractor shall provide a minimum of one portable toilet for each 15 people of each sex. As a minimum, one toilet shall be provided for each sex. Temporary facilities shall be maintained by the Contractor and located where directed by the Contracting Officer.

3.02 HEATING AND VENTILATING:

A. General: Where temperature control is necessary for the contractor's comfort, the contractor may provide temporary heating and/or air conditioning.

B. Utilities: All utilities available on the site such as chilled water, steam, and electricity may be used by the contractor in conjunction with temporary heating and/or air conditioning equipment.

C. Removal of Temporary Equipment: Before final acceptance, the contractor shall remove all equipment used to provide temporary heating and/or air conditioning.

3.03 ELECTRICAL SERVICE: Omitted

3.04 WIRING:

A. Extension Cords: The use of a number of short extension cords to reach the power source is not acceptable. A single extension cord should be used in all cases. Flexible extension cords shall be of the hard usage (SF, SJO, SJT, and SJTO) or extra-hard usage (S, SO, SJ and STO) types and listed by Underwriters Laboratories. The size shall not be less than #14 AWG, and length shall be 50 ft or less. Protect them against accidental damage caused by traffic, sharp corners, projections, and pinching in doors or elsewhere. They shall not be fastened with staples, hung from nails, or suspended by wire.
3.05 OUTLETS: Omitted

3.06 LIGHTING:

A. Temporary lights, if used, shall be equipped with heavy-duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are so designed. Temporary festoon lighting strings shall be made with cords having lamp sockets and connections protected by insulating coverings. Handlamps of the portable type shall be of the molded composition or other type approved for the purpose. Brass-shell paper-lined lampholders shall not be used. Temporary lighting shall be connected to a ground fault interrupter outlet. A ground wire shall be provided for all temporary lighting circuits unless there are no exposed metal parts of the lighting fixture.

B. Guards: Temporary lights shall be equipped with guards to prevent accidental contact with the bulb. Guards are not required when the reflector construction has a deeply recessed bulb. Handlamps shall be equipped with a handle and a substantial guard over the bulb attached to the handholder or the handle. Do not use exposed empty light sockets and broken bulbs.

C. Lighting Levels: Temporary lighting systems which are installed to provide illumination during construction work shall furnish sufficient illumination for safe working conditions. Special attention should be given to illumination at stairways, ladders, floor openings, basements and other hazardous locations.
PART 1   GENERAL

1.1   GREEN PROCUREMENT & POLLUTION PREVENTION

Green Procurement is a mandatory component of the Air Force pollution prevention program. The AF Installation Pollution Prevention Program Guide includes this goal for Green Procurement: "100% of all products purchased each year in each of U.S. EPA's 'Guideline Item' categories shall contain recycled materials meeting U.S. EPA's Guideline Criteria." Currently, reporting of green procurement purchases is limited to contracts having a total value greater than $100,000 which include the purchase of any amount of U.S. EPA-designated items. This document contains guidelines for implementing the RCRA, EO, DOD, and Air Force requirements.

1.2   AUTHORITY AND REFERENCES

A.  The Resource Conservation and Recovery Act (RCRA), Section 6002 (42 U.S.C. 6962)

B.  The Farm Security and Rural Investment Act (FSRIA), Section 9002 (7 U.S.C. 8102)

C.  Executive Order (EO) 13423, Strengthening Federal Environmental, Energy, and Transportation Management.


F.  Federal Acquisition Regulations (FAR)

1.3   SUBMITTALS

Government approval is required for submittals with a "GA" designation. Submittals having an "FIO" designation are For Information Only. The following shall be submitted in accordance with Section 01300 SUBMITTAL PROCEDURES:

    SD-01  Data

Product Data; GA|CD

The Contractor shall submit manufacturer's material specifications, installation instructions, physical characteristics, etc, to show that the product meets project and specification requirements.

    SD-13  Certificates

Product Certificates; GA|CD

The Contractor shall submit documentation certifying that products meet or exceed the specified requirements.
SD-14  Samples

Product Samples; GA|CD

The Contractor shall submit samples of the product intended for use for project record.

1.4 DEFINITIONS

A. GREEN PROCUREMENT: The purchase of environmentally preferable products manufactured from recycled, reclaimed, and/or biobased materials.

B. ACQUISITION: The acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

C. Biobased Products: As defined by FSRIA, "biobased products" are products determined by the U.S. Secretary of Agriculture to be commercial or industrial goods (other than food or feed) composed in whole or in significant part of biological products, forestry materials, or renewable domestic agricultural materials, including plant, animal, or marine materials. Made from renewable plant and animal sources, biobased products are generally safer for the environment than their petroleum-based counterparts. They are usually biodegradable or recyclable.

D. CONTRACTOR: The prime contractor, subcontractors, material suppliers, and equipment suppliers who provide the products that will be used in the construction of this project.

E. ENVIRONMENTALLY PREFERABLE: Products or services having a lesser or reduced effect on human health and the environment when compared to competing products or services, serving the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packing, distribution, reuse, operation, maintenance, or product or service disposal. (Section 201, EO 12873)

F. EPA DESIGNATED ITEM: An item that is or can be made with recovered material; that is listed by the Environmental Protection Agency (EPA) in a procurement guideline (40CFR, part 427); and for which EPA has advised purchasing recommendations in a related Recovered materials Advisory Notice (RMAN). (FAR 23.402)

G. EXECUTIVE AGENCY OR AGENCY: An executive agency as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102 are covered under the auspices of the Department of Defense.

H. FORM: The Green Procurement Reporting Form found at the end of this section.
I. POLLUTION PREVENTION: Source reduction as defined in the Pollution Prevention Act of 1990 (42 U.S.C. 13102), and other practices that reduce or eliminate the creation of pollutants through (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

J. POSTCONSUMER MATERIAL: A material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Post-consumer material" is a part of the broader category of "recovered material".

K. PROCUREMENT: The purchase and providing of products to be used in the construction of this project.

L. PRODUCT: Materials and equipment that will be used in the construction of this project.

M. RECOVERED MATERIALS: Waste materials and by-products which have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process. (Section 205, EO 12873 and FAR 23.402)

N. RECYCLABILITY: The ability of a product or material to be recovered from or otherwise diverted from the solid waste stream for the purpose of recycling. (Section 206, EO 12873)

O. RECYCLING: The series of activities, including collection, separation, and processing by which products or other materials are recovered from the solid waste steam for use in form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion. (Section 207, EO 12873)

P. RECYCLED MATERIAL: A material utilized in place of raw or virgin material in product manufacturing consisting of materials derived from post-consumer waste, industrial scrap, material derived from agricultural wastes, and other items, all of which can be used in new product manufacturer. (EPA Guidelines & OFPP Policy Letter 92-4)

Q. RECYCLED PRODUCT: A recycled product is one made completely or partially from waste materials or by-products recovered or diverted from the solid waste stream.

R. SOLID WASTE: Garbage, refuse, sludges and other discarded materials including those from industrial, commercial, and agricultural operations, and from community activities. This excludes solids or dissolved materials in domestic sewage or other significant pollutants in water resources, such as silt, dissolved or suspended solids in industrial waste water effluents, dissolved materials in irrigation return flow, etc. (EPA Guidelines)

S. SPECIFICATION(S): A clear and accurate description of the technical requirements for materials, products, or services including the minimum requirement for materials' quality and construction and any equipment necessary for an acceptable product. In general, specifications are in the form of written descriptions, drawings, prints, commercial designations, industry standards, and other descriptive references.
T. UNREASONABLE PRICE: If the cost of the recycled content product exceeds the cost of a non-recycled item, the Air Force considers the cost to be unreasonable. (Air Force Green Procurement Plan)

U. VERIFICATION: Procedures used by procuring agencies to confirm both vendor estimates and certifications of the percentages of recovered materials contained in the products supplied to them or to be used in the performance of a contract. (EPA Guidelines)

V. WASTE PREVENTION: Any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they are discarded. Waste prevention also refers to the reuse of products or materials.

W. WASTE REDUCTION: Preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

1.5 REGULATORY BACKGROUND

Section 6002 of RCRA requires federal agencies to give preference in the acquisition process to products and practices that conserve and protect natural resources and the environment. EO 12873 requires federal agencies to expand waste prevention and recycling programs, implement green procurement programs for the United States Environmental Protection Agency (EPA) -designated items, and procure other environmentally preferable products and services. The stated purpose of the Green Procurement Program is to stimulate the market for recovered materials. As a result of EO 12873, the EPA issued the Comprehensive Procurement Guidelines (CPGs) that have established the mandatory procurement by federal agencies of 36 items produced with recovered materials. The EPA has also issued Recovered Material Advisor Notices (RMANs) to accompany the CPGs and provide detailed information on the designated items. Section 9002 of The Farm Security and Rural Investment Act (FSRIA) was signed into law in 2002. A goal of that legislation is to increase the government’s purchase and use of biobased products. In addition to lessening our national dependence on foreign oil, use of biobased materials promotes economic development by creating new jobs in rural communities and providing new markets for farm commodities. Please direct all questions regarding the plan to the Contracting Officer's Representative for forwarding to the 78 CEG/CEV Environmental Division, 478-327-4173.

1.6 APPLICABILITY

These procedures apply to Contractors employed in the construction of projects at Robins AFB, GA. For additional information on GPP, visit the following website, http://afenvsymp.ecatts.com/start. You will have to register first using the following registration password: symposium. Please direct all questions regarding the plan to the Contracting Officer's Representative for forwarding to the 78 CEG/CEIEC Environmental division, 478-327-4173.

1.7 DOD AND AIR FORCE REQUIREMENTS

Green Procurement programs are required of all Air Force (USAF) installations. Department of Defense (DOD) Instruction 4715.4, Pollution Prevention, calls for program establishment in

1.8 EXEMPTIONS

1.8.1 EPA Recommendations

The U.S. EPA recommends minimum content levels for those items listed in the attached GREEN PROCUREMENT REPORTING FORM. These levels are mandatory for Air Force procurements unless one of the following exemptions applies. RCRA provides the following exemptions from the requirement to purchase EPA-designated items:

1. The product is not available from a sufficient number of sources to maintain a satisfactory level of competition (i.e., available from two or more sources).

2. The product is not available within a reasonable period of time.

3. The product does not meet the performance standards in applicable specifications or fails to meet reasonable performance standards of the procuring agency.

4. The product is not available at a reasonable price. For Air Force purposes, "unreasonable price" is defined as follows: If the price of the recycled-content product exceeds the cost of a non-recycled item, then the price is considered unreasonable.

1.8.2 Contractor Responsibility

The Contractor is responsible for completion of the Form with respect to the work and products being provided. The Prime Contractor is responsible for insuring that all sub-contractors comply with this order. Each contractor shall provide written documentation to support his/her decision not to acquire items meeting the minimum content levels. This documentation shall be forwarded to the Contracting Officer for review and approval. In the event the documentation fails to support the contractor's findings, the Contracting Officer's Representative shall return the documentation to the Contractor citing the reason(s) for disapproval. The Contractor shall resubmit and address the deficiencies.

1.9 U.S. EPA DESIGNATED ITEMS

The 54 U.S. EPA-designated items are listed below. Not all of these materials may be required in the construction of this project. Please refer to the drawings and specifications. The attached GREEN PROCUREMENT REPORTING FORM shall be used to demonstrate compliance with the stated procurement requirements.

PAPER PRODUCTS

1. All paper and paper products, excluding building and construction paper grades.

VEHICULAR PRODUCTS
2. Lubricating oils containing re-refined oil, including engine lubricating oils, hydraulic fluids, diesel fuel additives, and gear oils, but excluding marine and aviation oils.
3. Tires, excluding airplane tires.
4. Reclaimed engine coolants, excluding coolants used in non-vehicular applications

CONSTRUCTION PRODUCTS

5. Building insulation products.
6. Structural fiberboard products for applications other than building insulation.
7. Laminated paperboard products for applications other than building insulation.
8. Cement and concrete, including products such as pipe and block, containing fly ash.
9. Cement and concrete, including concrete products such as pipe and block, containing ground-granulated blast furnace (GGBF) slag.
11. Floor tiles containing recovered rubber or plastic.
12. Patio blocks containing recovered rubber or plastic.
25. Shower and restroom dividers/partitions containing recovered steel or plastic.
26. Reprocessed and consolidated latex paint for specific uses.
37. Carpet cushion.
38. Flowable fill.
39. Railroad grade crossing surfaces.

TRANSPORTATION PRODUCTS

13. Traffic barricades used in controlling or restricting vehicular traffic.
14. Traffic cones used in controlling or restricting vehicular traffic.
27. Parking stops.
28. Channelizers used as temporary traffic control devices.
29. Delineators used as temporary traffic control devices.
30. Flexible delineators used as temporary traffic control devices.

PARK AND RECREATION PRODUCTS

15. Playground surfaces containing recovered rubber or plastic.
16. Running tracks containing recovered rubber or plastic.
31. Plastic fencing.
40. Park benches and picnic tables.
41. Playground equipment.

LANDSCAPING PRODUCTS

17. Hydraulic mulch products containing recovered paper or recovered wood.
18. Compost made from yard trimmings, leaves, and/or grass clippings.
32. Garden and soaker hoses containing recovered rubber or plastic.
33. Lawn and garden edging containing recovered rubber or plastic.
42. Food waste compost.
43. Plastic lumber landscaping timbers and posts.
NON-PAPER OFFICE PRODUCTS

19. Office recycling containers.
20. Office waste receptacles.
22. Toner cartridges.
23. Binders.
34. Printer ribbons (re-inked ribbons or re-inking equipment/service for ribbons).
35. Plastic envelopes.
44. Solid plastic binders.
45. Plastic clipboards.
46. Plastic file folders.
47. Plastic clip portfolios.

MISCELLANEOUS PRODUCTS

36. Pallets
49. Sorbents.
50. Industrial drums.
51. Awards and plaques.
52. Mats.
53. Signage, including sign supports and posts.
55. Water Tank Coatings.

1.10 INTENT

The intent of this section is to increase the awareness of all Contractors as to the availability of products manufactured from, or that contain recycled and/or biobased materials, thereby increasing the use of these products in the construction of this project.

The various sections of the specifications contain references to products to be used in the construction of this project. The listed product **may or may not** be manufactured from or contain recycled or biobased materials. Therefore, all contractors, subcontractors, equipment suppliers, and material suppliers are responsible for compliance with this specification; particularly the paragraph entitled DOD AND AIR FORCE REQUIREMENTS and those items/products listed on the GREEN PROCUREMENT REPORTING Form. Recycled and/or biobased products shall be used wherever possible subject to the exemptions as per the paragraph entitled EXEMPTIONS. Substitution of recycled/biobased materials or recycled/biobased products for specified products are subject to the provisions of the paragraph entitled SUBMITTALS.

1.11 RECYCLED OR RECOVERED PRODUCTS

Those construction materials identified on the Form at the end of this section.
1.12 QUALITY ASSURANCE

Companies specializing in the manufacture of products that comply with the requirements of this section shall have a minimum of three (3) years documented experience.

PART 2 PRODUCTS

2.1 PARTIAL LIST OF PRODUCT SOURCES & INFORMATION

The following is a partial list of companies that manufacture products using recycled/biobased materials. This partial list is presented to establish a standard of quality and does not infer that other manufacturers do not qualify. All products intended for use on this project, whether listed below or not, shall be submitted to the Contracting Officer's Representative.

GENERAL DATA

5. Information, McGraw-Hill, dialogue@mcgraw-hill.com

DIVISION 3 - CONCRETE


DIVISION 4 - MASONRY


DIVISION 6 - CARPENTRY


DIVISION 7 - THERMAL & MOSITURE PROTECTION
1. Duro-Last Roofing, recycled PVC walkway pads, 1-800-248-0280

DIVISION 8 - DOORS & WINDOWS

1. Marvin Window & Door, windows, some meeting "Energy Star Label", www.marvin.com/
2. Pella, energy efficient windows, www/pella.com/

DIVISION 9 - FINISHES

10. Environmental Stone Products, stone manufactured from 100% recycled glass, www.environmentalstone.com/
13. Isoboard Enterprises, Inc. panel made from wheat straw and non-toxic resins, 1-503-242-7345
15. The Mat Factory, Inc., interlocking roll-up tiles made from 100% postconsumer tire rubber and PVC plastic from electric cable covers, 1-949-645-3122
16. Permafirm Pad Co., carpet pads made from almost 100% recycled content, 1-800-344-6977
23. Decorative Architectural Tiles, floor, counter & wall tile made from 100 % postconsumer glass, 1-808-8857812
DIVISION 10 - SPECIALTIES

1. The Access Store, modular ramping system made from 100% recycled rubber, www.accessstoe.com/
2. BP Solar, photovoltaic modules and systems, www.bp.com/bpsolar/index
4. R Control, structural insulated panel (SIP), www.mechoshade.com/

DIVISION 12 - FURNISHINGS

2. Phenix Biocomposites, tabletops made from soy based products free of petrochemicals, 1-800-324-8187
3. Safe Solutions, LLC, furniture manufactured from waste wood, 1-970-247-3333

DIVISION 14 - CONVEYING SYSTEMS


DIVISION 16 - ELECTRICAL

3. Edison Price Lighting, track mounted metal-halide PAR 30 &38 lamps, 1-212-521-6995
6. Osram Sylvania, mercury-free lamps and energy efficient fluorescent lamps, www.osramsylvania.com/

PART 3 EXECUTION

3.1 INSTALLATION

All products shall be installed per manufacturer's instructions.
This form is to be completed by the Contractor and submitted through AFSC/PZIOC to 78 CEG/CENME. It is the responsibility of the 78 CEG/Engineering Division construction inspectors to keep this documentation in the contract file IAW E.O. 13423 Strengthening Federal Environmental, Energy, and Transportation Management.

<table>
<thead>
<tr>
<th>RECYCLED/RECOVERED/BIO-BASED PRODUCT</th>
<th>% REQUIRED (MINIMUM)</th>
<th>% AVAIL (ACTUAL)</th>
<th>QUANTITY USED/UI</th>
<th>EXEMPTED 1,2,3,4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROCK WOOL INSUL</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIBERGLASS INSUL</td>
<td>20-25%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOOSE FILL/SPRAY ON</td>
<td>75%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PELITE COMP BOARD</td>
<td>23%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLASTIC RIGID FORAM</td>
<td>9%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GLASS FIBER REINF</td>
<td>6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHENOLIC RIGID FOAM</td>
<td>5%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STRUCTURAL FIBER BD</td>
<td>80-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LAMINATED PAPER BD</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CEMENT/CONCRETE (FLYASH)</td>
<td>SEE SPEC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CARPET (PET)</td>
<td>25-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PATIO BLOCKS/RUBBER</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PATIO BLOCKS/PLASTIC</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLOOR TILES/RUBBER</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLOOR TILES/PLASTIC</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAFFIC CONES</td>
<td>50-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRAFFIC BARRICADES</td>
<td>80-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLAYGROUND SURFACES</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RUNNING TRACKS</td>
<td>90-100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COMPOST</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WOOD-BASED HYDRAULIC MULCH</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PAPER-BASED HYDRAULIC MULCH</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REPROCESSED WHITE, OFF-WHITE &amp; PASTEL COLORS</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### REPROCESSED GREY, BROWN, EARTHTONES & OTHER DARK COLORS
50-99%

### CONSOLIDATED LATEX PAINT
100%

### PLASTIC/RUBBER PARKING STOPS
100%

### CONCRETE CONTAINING COAL FLY ASH PARKING STOPS
20-40%

### CONCRETE CONTAINING GGBF PARKING STOPS
25-70%

### PLASTIC SHOWER & RESTROOM DIVIDERS/PARTITIONS
20-100%

### MOBILE EQUIPMENT HYDRAULIC FLUIDS
44-100%

### ROOF COATINGS
20-100%

### DIESEL FUEL ADDITIVES
90-100%

### PENETRATING LUBRICANTS
68-100%

**CERTIFICATION**

I hereby certify the Statement of Work/Specifications for the requisition/procurement of all materials listed on this form comply with EPA standards for recycled/recovered materials content.

__Contractor__  __Inspector__

The following exemptions may apply to the non-procurement of recycled/recovered content materials:
1) The product does not meet appropriate performance standards
2) The product is not available within a reasonable time frame
3) The product is not available competitively (from two or more sources)
4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product.)
Environmental Requirements Checklist

PART 1 - GENERAL

1.01 GENERAL:

A. General Scope: This Section provides the requirements necessary to ensure that all construction projects are in environmental compliance. Environmental Management, 78 CEG/CEIE, is the organization responsible for management of base environmental concerns. Contact program managers in 78 CEG/CEIE at (478) 327-8104. Major environmental program areas which may be affected include solid and hazardous wastes, toxics, water quality, air quality, natural resources, storage tanks, cultural resources, pollution prevention, hazardous materials and waste, and petroleum, oil, and lubricants. Bioenvironmental Engineering, BIO, 78 AMDS/SGPB (478-327-7555) is the organization responsible for Radiation, drinking water, and OSHA substance specific dust concerns.

B. Contractor Responsibility: Comply with all applicable Federal, State of Georgia, any laws and regulations from other states where disposal might occur, and local laws and regulations concerning environmental compliance and pollution prevention. Ensure all products produced or generated under contract shall meet all stated performance objectives and shall not violate in any manner the Environmental Requirements of any applicable local, state, or federal entity including the Department of Defense (DoD).

1. Environmental Management Systems (EMS) Awareness Training: All contractor personnel working on Robins Air Force Base (AFB) who perform activities on the installation are required to complete Air Force-provided initial EMS Awareness Training. It is the responsibility of the Prime Contractor to ensure that all sub-contractors, vendors, and employees complete this training prior to beginning work on Robins AFB. Failure to provide documentation of EMS Training may result in termination of the contract.

2. EMS training is provided by Environmental Management, 78 CEG/CEIE, at (478) 327-8104. Contractors have two options to satisfy the mandatory EMS Awareness Training requirement. Contractors that do not have a Computer Access Card (CAC) must exercise Option 2.

   • Option 1 (Preferred Option): The Air Force version of EMS Awareness Training is available through the Advanced Distributed Learning Service (ADLS) website: https://golearn.csd.disa.mil/kc/login/login.asp?kc_ident=kc0001#. This option is also only available to contractors who have a CAC and takes approximately 10 minutes to complete.

   • Option 2: Contractor requests a copy of the Robins EMS Awareness Training Power Point Presentation from Environmental Management. The request should be sent to the Environment Management Workflow Box at the following email address, 78ceg.cev.FrontOfc@robins.af.mil. Once the presentation is received, the contractor is responsible for ensuring that all his/her employees view the training.

3. Green Procurement Program (GPP): GPP is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable and biobased products and services. Biobased products are composed in whole or in part of biological products and are safer for the environment. GPP requirements apply to all acquisitions including services and new requirements. Federal Acquisition Requirement 23.404(b) applies and states that GPP requires 100% of Environmental Protection Agency (EPA) designated product purchases included in the Comprehensive Procurement Guidelines list containing recovered materials, unless the item cannot be acquired competitively within a reasonable timeframe, meet appropriate performance standards, or at a reasonable price.

C. Base Environmental personnel (78 CEG/CEIE) will conduct no-notice inspections to ensure compliance with all Environmental Requirements. Written documentation of any findings from such an inspection will be forwarded to the CO by the inspector. The CO will follow-up with the Contractor on all findings of non-compliance reported by the inspector. A finding of non-compliance with any of the Environmental Requirements may result in the issuance of a work stoppage by the CO until documentation of compliance is submitted and accepted by both, 78 CEG/CEIE and the CO.
## 1.02 SUBMITTALS:

A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items. The contractor may submit manufacturer’s data in lieu of the required certificate of compliance if he/she desires. The Government requires manufacturer’s data if an “X” appears under the “Mfg. Data Required” column.

B. Material Submittals: Not required under this section.

C. Other Submittals: Provide the following submittals as required by the contract or as directed by the CO.

<table>
<thead>
<tr>
<th>Inspector Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Check Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.01 B.</td>
<td>Solid Waste Handling Permit or Permit by Rule Letter</td>
<td>Within 3 days of receipt</td>
<td></td>
</tr>
<tr>
<td>3.01 C.3.</td>
<td>Landfill License</td>
<td>Prior to dumping</td>
<td></td>
</tr>
<tr>
<td>3.01 C.3.a)</td>
<td>Special Waste Acceptance Application</td>
<td>5 days prior to dumping</td>
<td></td>
</tr>
<tr>
<td>3.01 C.3.a)</td>
<td>Waste Shipment Tracking</td>
<td>Monthly by the 5th</td>
<td></td>
</tr>
<tr>
<td>3.01 C.4.</td>
<td>Commencement Notice</td>
<td>Prior to dumping</td>
<td></td>
</tr>
<tr>
<td>3.01 D.</td>
<td>Waste Management Report</td>
<td>Monthly by the 5th and</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Prior to final payment</td>
<td></td>
</tr>
<tr>
<td>3.01 F.1.</td>
<td>Solid Waste Disposal Plan</td>
<td>10 days prior pre-con. conf.</td>
<td></td>
</tr>
<tr>
<td>3.01 F.1.f)</td>
<td>Landfill Receipts</td>
<td>Monthly by the 5th</td>
<td></td>
</tr>
<tr>
<td>3.01 F.1.g)</td>
<td>Disposal Certification Letter</td>
<td>Prior to final payment</td>
<td></td>
</tr>
<tr>
<td>3.01 F.2.</td>
<td>Recycling Letter</td>
<td>Prior to final payment</td>
<td></td>
</tr>
<tr>
<td>3.02 G.5.a)</td>
<td>Refrigerant Technician Certification</td>
<td>Prior to starting work</td>
<td></td>
</tr>
<tr>
<td>3.02 G.5.b)</td>
<td>Refrigerant Appliance List</td>
<td>Within 7 days</td>
<td></td>
</tr>
<tr>
<td>3.02 G.5.c)</td>
<td>Refrigerant Maintenance Repair Log</td>
<td>Within 7 days</td>
<td></td>
</tr>
<tr>
<td>3.02 G.5.d)</td>
<td>Refrigerant Equipment Certification</td>
<td>Within 7 days</td>
<td></td>
</tr>
<tr>
<td>3.02 G.5.e)</td>
<td>Refrigerant Purchase Documentation</td>
<td>Within 7 days</td>
<td></td>
</tr>
<tr>
<td>3.11 A.1.</td>
<td>Notify CEIE of Digging</td>
<td>Beginning of project</td>
<td></td>
</tr>
<tr>
<td>3.11 A.1.</td>
<td>Notify CEIE of Digging</td>
<td>1 week before digging</td>
<td></td>
</tr>
<tr>
<td>3.11 A.1.</td>
<td>Notify CEIE of Digging</td>
<td>2 hrs before restart dig</td>
<td></td>
</tr>
<tr>
<td>3.11 B</td>
<td>Notify of Findings</td>
<td>Upon discovery</td>
<td></td>
</tr>
<tr>
<td>3.12 I.1.a)</td>
<td>Erosion, Sedimentation, and Pollution Control Plan</td>
<td>60 percent design package</td>
<td></td>
</tr>
</tbody>
</table>
PART 2 - PRODUCTS - OMITTED

PART 3 - EXECUTION

3.01 DISPOSAL OF WASTE/EXCESS MATERIAL:

A. General: The Contractor shall take a proactive, responsible role in the management of non-hazardous solid waste and require all subcontractors, vendors, and suppliers to participate in the effort. Non-hazardous Solid Waste, as defined in Code of Federal Regulations (CFR) 261.2, dispositioned for disposal shall be removed from the base in accordance with all Federal, State of Georgia, and local codes and requirements. Every effort shall be made to segregate individual waste streams and divert waste from any landfill by reusing or recycling materials. Direct all non-hazardous solid waste inquiries to 78 CEG/CEIEC Solid Waste Program Manager.

B. Solid Waste Handling: All persons engaged in solid waste handling, including solid waste collection and transportation, or operations of solid waste handling facilities or disposal sites shall have a solid waste handling permit or permit by rule letter. The provisions of Georgia Environmental Protection Department (GA EPD) regulations concerning proper handling of solid waste and applicable prohibitions shall govern. All materials must be properly removed by the end of the project. Equipment/material to be removed from the project but not turned in to the Government is the property of the contractor. Revenues or other savings obtained for salvage or recycling may accrue to the Contractor according to the Statement of Work.

C. Solid Waste Disposal: Use one or more of the following methods to divert/dispose of non-hazardous solid waste. All materials to be disposed of in other than a sanitary landfill must be kept segregated at the project site from those materials, which are allowed only in a sanitary landfill.

1. Reuse (diversion): First consideration of waste shall be given to salvage for reuse to be used in the original form. Sale or donation of waste suitable for reuse shall be considered. Salvaged materials, other than those specified in other sections to be salvaged and reinstalled, shall not be used in this project unless approved by the CO. Materials defined as “recovered materials” are excluded from regulation as solid wastes.

2. Recycling (diversion): Recycling of materials is strongly encouraged. Waste materials not suitable for reuse but have value as being recyclable materials, shall be recycled whenever economically feasible. Materials destined for recycling must meet the definition of non-hazardous wastes under federal/state solid waste regulations. Materials defined as “recovered materials” are excluded from regulation as solids wastes. Recyclable metal materials shall remain the property of the government and be included in the Robins AFB Qualified Recycling Program (QRP). To coordinate removal/collection of scrap wire and metal, please contact QRP Manager Casey Lucas at 478-327-9283 or Alt QRP Manager Darryl Mercer at 478-256-7032.

3. Sanitary Landfill (disposal): All solid waste may be disposed of in a sanitary landfill properly licensed by the State of Georgia. Provide proof that any Georgia municipal solid waste disposal facility receiving Robins AFB waste is operated by someone who has obtained the certification required by the Georgia Solid Waste Management Act, O.C.G.A. 12-8-24.1. If a landfill other than Houston County Landfill is used, provide a copy of the landfill license.

a. All non-hazardous wastes disposed of in the Houston County Landfill may require a Waste Shipment Tracking Document signed by the Contractor’s hauler certifying that no hazardous waste was introduced into the waste while in his custody. The contractor must provide a Waste Shipment Tracking Document with each disposal load when required by Houston County. If required, the contractor may need to collect a representative sample of building demolition material to be tested. The results of the test are to be provided on the Special Waste Acceptance Application (SWAA) form and submitted to 78 CEG/CEIE for approval for acceptance by the Houston County Landfill Engineer and the issuance of a Special Waste Profile Number, which must be used on the Waste Shipment Tracking Document. Attached at the end of this document are copies of both the Waste Shipment Tracking Document and SWAA. Allow a minimum of three working days for 78 CEG/CEIE to process the SWAA form to obtain the profile number.

4. Inert Waste Landfill (disposal): Materials not likely to cause production of leachate of environmental concern may be disposed of in an inert waste landfill. Only earth and earth-like products, concrete, cured asphalt concrete, rock, bricks, yard trimmings, and land clearing debris such as stumps, limbs, and leaves are acceptable for disposal in an inert waste landfill. Provide a copy of the written notice of commencement of operation by the landfill as given to the GA EPD and provide a copy of the landfill license or permit by rule letter issued by the GA EPD. Include the weights of material.
disposed of in this type of landfill in the monthly waste management report.

5. Construction/Demolition Disposal Site (disposal): Only wood, metal, wallboard, paper, cardboard, as well as materials that can go in an inert waste landfill may be disposed of in this facility. Provide a copy of the landfill license if other than Houston County Landfill.

6. Solid Waste Disposal Outside of Georgia: No solid waste can be disposed of outside the state of Georgia without prior written approval of the CO. If the contractor desires this, he shall provide sufficient information as determined by the contracting officer to allow verification of compliance with the law.

D. Reporting of Disposal and Recycling: Robins AFB is required to report to Air Force Headquarters the amount (weight) of solid waste and construction and demolition (C&D) debris which is dispositioned for reuse, recycle, or disposal. Weights shall be cumulative from the start of each month and shall reflect the total amount of material disposed or recycled during the month. Attach copies of any completed Waste Shipment Tracking Documents and Georgia Asbestos Waste Shipment Records with landfill tickets for these materials. A copy of the report shall be turned in to the contract administrator by the 5th of the following month and prior to final payment and immediately forwarded to:

78 CEG/CEIEC
Attn: Solid Waste Program Manager
775 Macon Street, Building 1555
Robins AFB GA 31098-2201

a. Each month, the Contractor shall record the amounts of reused, recycled, and disposed materials on the Waste Management Report. The report should reflect the method of disposal for the material generated from the project. Weights of material disposed of in a sanitary or C&D landfill shall be based on the weight tickets. Material disposed of in other types of landfills, which do not have weight scales, may be estimated. The weight of materials reused and or recycled may be estimated. Use a good faith effort to obtain the most accurate estimate possible.

E. Building Demolition: The Contractor must provide 10 working day notification to GA EPD prior to the start of demolition activity in accordance with Georgia Solid Waste Regulations. This may also apply to the modification of a building, and is considered demolition when the removal of a load-bearing wall occurs. To start the process, coordinate with 78 CEG/CEIEC Toxics Program Manager for guidance and assistance.

F. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

1. Solid Waste Disposal Plan: In accordance with Civil Engineering Specification (CE Spec) 01572 and CE Spec 01560, the Contractor shall provide a solid waste disposal plan stating how all materials leaving Robins AFB shall be disposed of and recycled no later than 15 days after notice to proceed and not less than 10 days before the preconstruction meeting prior to starting work.

a. The plan shall address the disposal of all solid waste and shall include a notarized letter from the contractor stating how all materials leaving Robins AFB shall be disposed of. The letter shall certify that the Contractor shall dispose of all materials in compliance with all Federal, State of Georgia, and local laws. A senior official of the company shall sign this letter. The plan shall address the disposal of each item addressed in Sections 3.01 and 3.02 as applicable. The plan shall designate an employee who shall be responsible for verifying that all materials removed from Robins AFB are disposed of in accordance with the above referenced laws. Non-hazardous solid waste shall be broken down into individual types, i.e., asphalt, concrete, wood, brick, etc. to facilitate recycling of recovered materials.

b. Provide five copies of the Disposal Plan to the CO to forward to 78 CEG/CEIE prior for review and approval 10 days prior to the Pre-construction Conference or 15 calendar days prior to the start of disposal operations if no pre-construction conference is held.

c. Identify each landfill and recycler to be used. A copy of all landfill permits shall be provided unless the Houston County landfill is used.

d. Provide a copy of a Solid Waste Handling Permit or permit-by-rule letter, issued by GA EPD, which allows the Contractor to handle solid wastes, including solid waste collection and transportation. A copy of the EPD permit-by-rule letter is required for the inert waste landfill being used.
e. Establish and maintain a Daily Waste Disposal and Recycling Log. Each load of materials that leaves Robins AFB shall be accounted for in the log. The log shall list the load number, bill of sale number/date or other record for recycling, as well as the name of the contract employee who verified that the material was disposed of properly, along with details as to how verification was accomplished.

f. Keep evidence of proper disposal and recycling of construction debris per CE Spec 01572 as well as provide this evidence to the CO. Examples of evidence include dump tickets from a licensed sanitary landfill, copies of current landfill permits from the State of Georgia (unless Houston County landfill is used), manifest, bill of sale, or other record for recycling. The evidence shall be obtained the workday after the load is carried off and provided by the 5th of each monthly Waste Management Report.

g. After contract work is completed and prior to final payment, the Contractor shall submit a notarized letter of certification signed by a senior official of the company certifying that all materials disposed, recycled, and removed from Robins AFB have been dispositioned in compliance with Federal, State of Georgia, and local laws, and 78 CEG/CEIE has received all monthly waste tracking reports. Attach a copy or duplicate of the Waste Shipment Tracking Document for each load transported for disposal and recycling.

2. Recycling: Provide a letter indicating what materials shall be treated as recovered materials under GA EPD regulations and show how the criteria for recovered materials are met. Please note that for C&D Waste, per CE Spec 01572, a minimum of 75 percent by weight of total project solid waste shall be diverted from the landfill.

3. Building Demolition: Submit copies of GA EPD demolition notification to CO and 78 CEG/CEIE Toxics Program Manager 15 days prior to starting work and prior to submittal to the GA EPD for review, and submit final copies with copy of any payment made to GA EPD.

3.02 SPECIAL WASTES OR HAZARDOUS MATERIALS:

A. General: The Contractor must comply with all applicable federal, state, and local requirements concerning use of hazardous materials and hazardous waste. If there should be a conflict between environmental regulation/ordinances/statues and the contract’s specifications, the contractor shall, in writing, contact the CO for a written determination. Disposal of all non-hazardous Special Wastes, such as asbestos, requires submittal of a SWAA to obtain a Profile Number for use on the Waste Shipment Tracking Document as described in 3.01 C.3. a).

B. Hazardous Waste: Hazardous Waste is defined as waste meeting the requirements of 40 CFR 261.3. 78 CEG/CEIEC Hazardous Waste Program Manager makes all hazardous waste determinations for waste generated on Robins AFB. The Contractor must provide all data necessary to determine the regulatory status of waste to 78 CEG/CEIEC. The Contractor must ensure personnel have completed hazardous waste training prior to generating hazardous waste. All hazardous and universal wastes generated on Robins AFB must be disposed of through 78 CEG/CEIEC at building 359. Direct all inquiries to the 78 CEG/CEIEC Hazardous Waste Program Manager.

1. Paints, sealants, solvents, rags, or any other hazardous material(s) destined for disposal must be managed as a hazardous waste unless they have been determined not to be via Material Safety Data Sheet (MSDS) or laboratory sampling. 78 CEG/CEIEC is the only organization authorized to make a hazardous waste determination.

2. High-intensity discharge (HID) and fluorescent lamps and tubes containing mercury must be recycled as universal waste. Labeled containers must be requested through 78 CEG/CEIEC at building 359 prior to job start.

3. Batteries used in emergency and exit lights that contain lead must be recycled. These batteries must be turned-in to building 359 with no cost for disposal.

4. Disposal Procedures for Hazardous and Universal Waste:

a. Payment for waste disposal will be made through your Department of Defense Activity Address Code (DODAAC) account. Since all regulated wastes must be disposed of through DLA-DS, a valid DODAAC is essential to prevent contract operation delays. This step must be completed prior to requesting waste containers and labels.

b. Obtain labels and containers from building 359 and place the labels on containers suitable for shipping per Department of Transportation (DOT) guidelines. Lamps/tubes may be placed in the original boxes the tubes came in or in boxes designed to prevent breakage.
c. Accumulate hazardous waste under either the satellite accumulation rules (<55 gallons total, no time limit, 3 day limit to turn-in full drums) or 90-day rules (no quantity limit, use up to 90 days in the field, other 40 CFR 262.34(a)(1)(i) requirements apply).

d. Take care not to break any universal waste lamps/tubes. If any are broken, they must be treated as spilled hazardous waste.

e. Turn-in containers to building 359 when full or approaching their time limit(s).

C. Asbestos Containing Materials:

1. Do not use any products containing asbestos.

2. All asbestos abatement work shall only be performed in the areas shown by the required specifications and shall be in accordance with CE Spec 01568.

3. A hazardous material survey was performed in the project area. No asbestos or lead containing materials were identified in the project area. If the contractor discovers any material he/she suspects to be asbestos, bring it to the CO’s attention immediately. Stop all work in that area until directed to proceed.

   a. Known Asbestos: If asbestos is in the area of construction, describe where it is located. There should not be any work done in the area involving asbestos if it was not written in the contract. If any asbestos is accidentally damaged, notify 78 CES/CEOE, Bioenvironmental Engineering, 78 AMDS/SGPB, at (478) 327-7555, and 78 CEG/CEIEC Toxics Program Manager at (478) 327-3976 immediately. After they inspect the damage, the contractor shall repair it and remove debris in accordance with the following regulations, at no additional cost to the Government:

      • 40 CFR 61.20 Subpart B (1985)
      • 40 CFR 61.145 (1985)
      • AFOSH Standard 161-4 (20 Jun 77)
      • Georgia Air Quality Rules, Section 391-3-1-02(9)(b)1 (1986)

D. Lead Paint:

   a. General: The contractor shall take precautions to protect his workers and government employees from exposure to lead dust hazards during C&D projects in accordance with 29 CFR 1926.62, Occupational, Safety, and Health Administration (OSHA) Lead in Construction Standard, and Specification 01569. All painted surfaces including painted surfaces covered by other materials such as wall paper may contain varying levels of lead. All lead based paint abatement work shall only be performed in the areas shown by the required specifications and shall be in accordance with CE Spec 01569.

   b. A hazardous materials survey was performed in the project area. No asbestos or lead containing materials were identified in the project area.

E. Polychlorinated Biphenyls (PCB): Do not use equipment or components containing PCB’s. This includes ballasts and capacitors for fluorescent and HID lighting.

   1. Disposal Procedures for Fluorescent lighting ballasts and HID lighting capacitors containing PCB’s:

      a. Fluorescent lighting ballasts and HID lighting capacitors must be managed and disposed of as toxic waste unless the label states they do not contain PCB’s. Ballasts and capacitors with no markings are assumed to contain PCB. Ballasts and capacitors marked as non-PCB are handled as standard solid waste.

      b. Gather HID capacitors and fluorescent ballasts into separate containers during construction and place them into
labeled, suitably sized DOT-approved containers per 49 CFR 173.202. (Typical sizes are 1, 5, 10, 30, and 55 gallons) Labels and containers may be obtained from building 359, 78 CEG/CEIEC.

c. If any are broken, they must be treated as spilled hazardous material. Contact 78 CEG/CEIEC at (478) 926-1176 for disposal instructions.

d. Dispose of sealed non-leaking capacitors through DLA-DS. Do not keep any of the full or partially full containers at the construction site for more than 30 days. Provide DD Form 1348 obtained from building 359 prior to contacting DLA-DS for disposal.

e. Disposal Procedures for all other PCB containing materials, including but not limited to: plastics (such as plastic insulation from wire or cable; radio, television and computer casings; vehicle parts; or furniture laminates); preformed or molded rubber parts and components; applied dried paints, varnishes, waxes or other similar coatings or sealants; caulking; Galbestos.

f. Prior to the start of any demolition, renovation, or digging, determine if PCB containing materials are in the area of construction. If the contractor discovers any material he/she suspects to contain PCBs or if lab results indicate PCB-containing materials, the material shall be managed as PCB hazardous waste.

g. Building 359 personnel should be notified at 926-1176 that a project area contains PCB materials. Building 359 will provide the necessary containers for collection as well as a DD Form 1348 for completion.

h. Upon completion of DD Form 1348, the containers will be picked up directly by DLA-DS. The DLA-DS POC is Darlene Smith, 926-5162. If DLA-DS is not available to pick up PCB containing materials, notify Building 359 personnel; alternate disposal procedures will be determined.

i. PCB waste will always be transported using a hazardous waste manifest which must be signed by a 78 CEG/CEIEC representative. Payment for waste disposal will be made through a valid DODAAC account. This step must be completed prior to requesting waste containers and labels. See section 5, page 12 for instructions on obtaining a DODAAC.

F. Ozone Depleting Substances (ODS) and Controlled Substances Restriction:

1. Unless the requiring activity has obtained prior Senior Acquisition Official (SAO) approval, contractors may not:
   a. Provide any service or product with any specification, standard, drawing, or other document that requires the use of a Class I ODS in the test, operation, or maintenance of any system, subsystem, item, component, or process; or
   b. Provide any specification, standard, drawing, or other document that establishes a test, operation, or maintenance requirement that can only be met by use of a Class I ODS.

   [Air Force Federal Acquisition Regulation Supplement (AFFARS) Part 5352.223-9000, Elimination of Use of Class I Ozone Depleting Substances (ODS)]

2. For the purposes of Air Force policy, the following products are Class I ODS:
   a. Halons: 1011, 1202, 1211, 1301, and 2402;
   c. Carbon Tetrachloride, Methyl Chloroform, and Methyl Bromide

   NOTE: Materials that use one or more of these Class I ODSs as minor constituents do not meet the Air Force definition of a Class I ODS. [AFFARS Part 5352.223-9000, Elimination of Use of Class I ODS]

4. Do not develop or modify any existing weapon or facility system scheduled to remain in the AF inventory beyond 01 January 2020 in any manner that requires or adds requirements for Class II ODS in their operations or maintenance.

For exceptions to this Class II ODS policy, the requiring activity must receive SAO approval, using the same process as Class I ODS Contract approvals, or, for installation Real Property air conditioning and refrigeration equipment, the requiring activity must obtain approval authority from the Base Civil Engineer (BCE). [AFI 32-7086, Hazardous Materials Management]

5. For the purposes of Air Force policy, the following products are Class II ODS:


6. The Contractor shall label products which contain or are manufactured with ozone depleting substances in the manner and to the extent required by 42 United States Code (U.S.C.) 7671j(b), (c), and (d) and 40 CFR Part 82, Subpart E, as follows:

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

* The Contractor shall insert the name of the substance(s). [FAR Part 52.223-11, ODS]
The Contractor shall comply with the applicable requirements of Sections 608 and 609 of the Clean Air Act (42 U.S.C. 7671g and 7671h) as each or both apply to this contract. [FAR Part 52.223-12, Refrigeration Equipment and Air Conditioners]

G. Hazardous Materials (HAZMAT):

1. HAZMAT Definition: The term HAZMAT includes all items (including medical supply items, but excluding drugs in their finished form and pharmaceuticals in individually-issued items) covered under Emergency Planning and Community Right-to-Know Act (or other federal, state, or local) tracking requirement, the OSHA Hazard Communication (HAZCOM) Standard, and all Class I and Class II ODS. It does not include munitions or hazardous waste.

2. HAZMAT Exemptions: The OSHA HAZCOM Standard [29 CFR 1910.1200(b)(6)(ix)] excludes “Any consumer product or hazardous substance, as those terms are defined in the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) respectively, where the employer can show that it is used in the workplace for the purpose intended by the chemical manufacturer or importer of the product, and the use results in a duration and frequency of exposure which is not greater than the range of exposures that could reasonably be experienced by consumers when used for the purpose intended.” OSHA further states in a 14 April 2005 interpretation letter that office cleaning products utilized with the same frequency and duration as that of a normal consumer would fall under the HAZCOM Standard exemption for consumer products in 29 CFR 1910.1200(b)(6)(ix). Based on the OSHA HAZCOM Standard exemption, consumer products that are used at Robins AFB in such a way that the duration and frequency of use are the same as that of a consumer are not required to be included in the employer’s HAZCOM program. If unsure if the item meets the exemption, contact the HAZMAT Cell (78 CEG/CEIEC).

3. Lead Acid Batteries: OSHA determined that lead acid batteries are hazardous chemicals because of their potential chemical exposure risks and physical hazards. As a result, lead acid batteries are classified as HAZMAT and do not fall under the article exemption because they have the potential to leak, spill or break during normal conditions of use.

4. Aerosol Products: All aerosol products are classified as HAZMAT.

5. The storage and usage of all HAZMAT must be tracked in the Air Force Standardized Tracking System. If the contractor does not have access to a government-furnished computer and cannot access the Air Force Standardized Tracking System, the contractor must report data on the HAZMAT stored and used during the performance of the contract at a minimum of weekly to the HAZMAT Cell and in the format specified. The Contractor should coordinate the submittal of HAZMAT data with the HAZMAT Cell prior to the beginning of work.
6. Each HAZMAT container must have a bar code tracking label affixed, with the exception of kits. The tracking label must be for the same manufacturer, same product and same size item. Substitutions are not allowed. HAZMAT that has been broken down into smaller “child” containers from the original “parent” container must have a packaging label affixed in addition to the bar code tracking label. If the contractor does not have access to a government-furnished computer and cannot access the Air Force Standardized Tracking System, the contractor must coordinate with the HAZMAT Cell the printing of bar code labels for all HAZMAT items.

7. All HAZMAT must be authorized prior to use. The material is authorized by stock number for specific zones for the using organization or contractor. Authorizations are good for three years. At the end of the three year period, the user must re-new the authorization. HAZMAT items cannot be issued in the Air Force Standardized Tracking System to an employee without an active, valid authorization. The contractor must submit an AF Form 3952 (or the electronic equivalent through the Air Force Standardized Tracking System) for the authorization to use the HAZMAT.

8. Contractors must submit a “Hazardous Material Purchase Request for Contractors” form prior to transporting any hazardous material onto Robins AFB. This form must be completed for all hazardous materials purchased by contractors for use on Robins AFB and approval must be granted prior to transportation onto Robins AFB. The purpose of this form is to ensure compliance with AFI 32-7086 and OSHA HAZCOM, ensuring that hazardous materials are approved for use prior to transportation onto Robins AFB and a current MSDS is available in the Air Force Standardized Tracking System. Once approval is given, the contractor is permitted to transport hazardous materials onto Robins AFB. The contractor must track the hazardous materials in the Air Force Standardized Tracking System and must send the HMMS serial numbers to the HAZMAT Cell to close the request.


10. Contractors should contact the HAZMAT Cell (78ceg.cev.hazmat@robins.af.mil) with specific HAZMAT questions.

H. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

1. Hazard Communication (HAZCOM) Program: The Contractor must submit a written HAZCOM program to the CO when hazardous materials or chemicals are to be used or demolished. This HAZCOM plan must include the following information:
   a. List of each work activity/process required to use/demolish hazardous materials/chemicals.
   b. List of hazardous materials/chemicals used.
   c. MSDS for each hazardous material/chemical used. The MSDS must be the most current MSDS available from the manufacturer. MSDSs from third party MSDS sites are not allowed.
   d. Hazardous Material Listing and AF Form 3952 for each Hazardous Material: Provide the CO with MSDSs and the list of hazardous materials/chemicals prior to starting work. Each MSDS must be accompanied with a completed AF Form 3952, detailing the intended use of the hazardous material. The same procedure should be followed for additional hazardous material brought on base during the performance of the contract. The CO will forward the list of hazardous materials, AF Form 3952s and MSDSs to the HAZMAT Cell, 78 CEG/CEIEC, for review and approval. Hazardous materials are not permitted for transportation onto Robins AFB or use on Robins AFB until approval is given by 78 CEG/CEIEC. A completed, signed, approved AF Form 3952 is required for every hazardous material used on Robins AFB.
   e. Written procedures for handling of any hazardous waste generated.

2. Asbestos Work/Removal: The Contractor shall provide 15 working day notification to the CO and 78 CEG/CEIEC Toxics Program Manager and 10 working day notification to GA EPD prior to the start of any work involving asbestos. Copies of all notifications, GA EPD approval, and landfill disposal receipts and waste shipment tracking forms must be provided to the CO and 78 CEG/CEIEC Toxics Program Manager.

3. Lead Based Paint: For maintenance, repair, and minor construction projects. Provide a written compliance program as required by OSHA Standard 29 CFR 1926.62 to the CO and the 78 CEG/CEIEC Toxics Program Manager. Provide certification that contractor personnel involved in removal and handling of lead based paint has received training in
accordance with OSHA Lead Standards. Provide results of air sample testing to demonstrate worker safety. For abatement projects only, provide submittals as specified in Section 01569 of the specifications.

4. ODS and Controlled Substances Restriction:

a. The Contractor shall provide the name, address, telephone number, and technician certification of each person who will service, repair, maintain and/or dispose of any equipment containing and/or using a refrigerant (Class I ODS, Class II ODS, or non-ozone depleting substance) to 78 CEG/CEIEC.

b. The Contractor shall provide a list of appliances located on base that have a capacity of 50 pounds or more of a Class I or Class II refrigerant to 78 CEG/CEIEC. Include the following information for each appliance:

   1) The type of appliance, i.e., commercial refrigeration appliance, industrial process refrigeration appliance, comfort cooling appliance, or other type of refrigeration appliance;
   2) The location of each appliance;
   3) The manufacturer, serial number, or other method of identification;
   4) The amount of the full charge of refrigerant, the type of refrigerant used, and the date full charge was determined.

c. For maintenance, service, repair, and/or disposal of base appliances containing 50 pounds or more of a Class I or Class II refrigerant, provide records, work logs, service tickets, invoices, and supporting documentation to 78 CEG/CEIEC. The documentation required should contain the following:

   1) The date and type of service performed, i.e., repair, maintenance and/or disposal;
   2) The date any leak was discovered;
   3) A complete, detailed description of any service performed;
   4) The amount of refrigerant added at the completion of each service performed;
   5) Dates and results of the initial and follow-up verification tests; and
   6) The name of the technician who performed the work.

d. For any equipment used to recover or recycle refrigerants on base, provide the following information to 78 CEG/CEIE:

   1) A copy of any invoice or other record documenting the purchase or rental of such equipment, including the type of equipment, the manufacturer’s name, the equipment model number, year manufactured, and any associated serial number; and
   2) A copy of the equipment certification sent to EPA.

e. For any purchases or acquisitions of refrigerant used for any service on base, provide copies of records, including, but not limited to, receipts, invoices, purchase orders, or bills of lading to 78 CEG/CEIE. The information should include the name, address and telephone number of each person, agent, or business entity from whom the facility purchased refrigerant.

5. DODAAC Account: After the Preconstruction Conference, the Contractor must have a valid DODAAC or work with the COR to obtain a DODAAC account number to pay DLA-DS for disposals.

a. After contract award, work with the 78 CEG/CEIEC Point of Contact (POC) to discuss how to obtain containers and container labels. The Contracting Official Technical Representative must apply or update a DODAAC through the AF DODAAC manager at https://dodac.wpaib.af.mil/.
b. Wait until the DODAAC account number is validated to begin generating regulated waste items to avoid long-term storage issues.

3.03 AIR QUALITY:
A. The contractor will perform value engineering for each project requiring specification or installation of equipment for control of regulated air pollutants. These analyses will ensure that the proposed control technology meets air quality compliance requirements. New sources require utilization of Maximum Achievable Control Technology to reduce emissions of hazardous air pollutants.

B. Open Burning: Open burning operations are prohibited on base and shall not be used. Open burning is any outdoor fire which emits products of combustion directly into the open air without passing through a stack, chimney, or duct.

C. Ozone depleting substances are restricted from use. Comply with paragraph 3.02.F. above.

D. Projects which will put generators into operation will require certification from the manufacturer of the unit that all Federal Standards for the performance of Stationary Compression Ignition Internal Combustion Engines are met. This certification must be submitted and approved by the CO and Environmental Management (78 CEG/CEIE) prior to ordering and delivery of the unit.

E. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:
   1. Air Permit – Emission Sources: According to GA EPD Rules for Air Quality Control, Chapter 391-3-1-.03, any person prior to beginning the construction or modification of any facility which may result in air pollution shall obtain a permit for the construction or modification of such facility. The contractor shall submit the required data to complete the permit application form as early in the planning process as possible. Since an approved permit to construct is mandatory prior to start of construction, the contractor shall not install the equipment until the permit has been approved and Government approval of the contractor’s submittal has been obtained. Contractor shall anticipate nine months to one year from air source data submittal for this to occur. Direct all inquiries to the 78 CEG/CEIEC Air Program Manager.

3.04 DUST CONTROL:
A. General: The Contractor must maintain all excavations, embankments, stockpiles, haul roads, permanent access roads, plant sites, waste areas, borrow areas, and all other work within or without the project boundaries free from dust which could cause a hazard or nuisance to others. Dust is considered minute solid particles caused to be suspended by natural forces or by mechanical processes such as, but not limited to, crushing, grinding, milling, drilling, demolishing, shoveling, conveying, covering, bagging, mixing, and sweeping.

B. Dust Control Measures: Perform dust control as the work proceeds and whenever a dust nuisance or hazard occurs. Approved temporary methods of stabilization consisting of sprinkling, chemical treatment, light bituminous treatment, or similar methods are permitted to control dust. To be approved, sprinkling must be repeated at such intervals as to keep all parts of the disturbed area damp at all times. If sprinkling is used, keep sufficient equipment on the job site at all times.

C. OSHA Substance Specific Dusts: The Contractor shall comply with safety and health requirements under Federal, State of Georgia, and Robins local regulations/policies; examples include, but are not limited to, determining and providing suitable PPE (such as disposable coveralls and nitrile gloves), personnel air monitoring, etc. Do not dry sweep or use shop vacuums when handling these dusts; use HEPA vacuums or wet methods for cleaning before any demolition activities and as needed during construction. For specific lead-only projects, consult Specification 02065, Lead-Based Paint-In Place Management. (Also, see Attachment – OSHA Substance Specific Dust Performance Requirements)

3.05 PESTICIDES (INSECTICIDES, FUNGICIDES, HERBICIDES, ETC.):
A. The Contractor shall use only EPA approved pesticides, insecticides, fungicides, herbicides, etc., and report pounds of active ingredient used for each pesticide to the 78 CEG/CEIEC Natural Resources Program Manager at the end of the project. The Contractor shall abide by the principles of Integrated Pest Management, implementing physical methods to control pests as the primary strategy. Chemical methods of control should only be used as a last resort, and the chemicals used should be the most environmentally benign available. The contractor shall contact 78 CEG/CEIEC before using pesticides, herbicides, etc., in order to ensure that the chemical they plan to use is on the list of products that have been approved for use on Robins AFB.

B. The Contractor must possess a pest control operator’s license and a list of all chemicals to be used. Use only a pest control operator licensed in the State of Georgia to apply these chemicals.
C. The Contractor must ensure proper delivery, storage, handling, and disposal of all chemicals.

D. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

1. The Contractor must submit a list of all pesticides to be used and amount (pounds) of active ingredients used to 78 CEG/CEIEC so that coordination of all pesticide usage can be coordinated with Base Entomology Shop, 78 CES/CEOIE.

2. Proof of License: The contractor must submit a copy of the pest control operator’s license to the CO and 78 CEG/CEIEC.

E. Pesticides, insecticides, fungicides, and herbicides are classified as HAZMAT and must be managed as HAZMAT.

3.06 RADIOACTIVE MATERIALS:
A. Radioactive materials are not permitted on base without the prior approval of the CO in coordination with 78 AMDS/SGPB. Common items to be aware of include equipment for roof moisture testing, soil moisture/compaction testing, and radiographic testing of welds.

B. Dispose of radioactive waste in accordance with Technical Order 00-110N-2, Radioactive Waste Disposal.

C. Comply with Attachment – “Non-Air Force Use of Radiation Sources Application Requirements”.

3.07 UNDERGROUND STORAGE TANKS (UST): The Contractor shall provide information to the CO so that 78 CEG/CEIE can submit notification to the GA EPD about the project. Allow at least 45 days after the Notice to Proceed before starting the removal process for tanks. The removal process must be completed within 90 days to comply with GA EPD regulations. Direct all inquiries to the 78 CEG/CEIEC Tanks Program Manager.

3.08 THREATENED AND ENDANGERED SPECIES OF PLANTS AND WILDLIFE: One state-protected species of plants occurs on Robins AFB, as well as eight other species considered to be rare. The Contractor shall not clear vegetation on project sites without prior approval from 78 CEG/CEIEC. Rare wildlife species such as Bald Eagles and Wood Storks are occasionally seen on base. The Contractor shall not harm wildlife of any kind. Most wildlife species found on base are protected by law, including birds, bats, land turtles, non-venomous snakes, and game species such as deer. If the Contractor encounters problems with wildlife, notify the CO. The CO shall contact the 78 CEG/CEIEC Natural Resources Program Manager to determine the best solution for each problem. The CO will ensure that the Contractor’s actions do not injure rare species and/or their habitats.

3.09 WETLANDS: Wetlands delineation has been completed on base and wetland boundaries are currently identified with markers. However, markers can, in some instances, be missing or not readily visible, and wetlands often do not contain water throughout the year, so they may not be apparent. When in doubt, verify that the site in question is or is not a wetland by contacting 78 CEG/CEIEC. These areas shall not be filled, dredged, or disturbed in any way. Comply with water and land protection sections outlined in this Specification to prevent construction site sediments and runoff from entering wetlands.

3.10 GREEN PROCUREMENT PROGRAM (GPP): The Contractor must follow the guidelines provided in 01540 Green Procurement Specification to comply with GPP requirements. Direct all inquiries to the 78 CEG/CEIEC Green Procurement Program Manager.

3.11 PRESERVING HISTORICAL AND ARCHAEOLOGICAL RESOURCES:
A. General: When a building or archaeological site determined eligible for the National Register of Historic Places is within a project area, the Contractor shall take adequate measures to prevent adverse impact to the cultural resource. This may include the development of a mitigation plan, consultation with the Georgia State Historic Preservation Office, the Advisory Council on Historic Preservation, and 12 culturally affiliated Native American tribes.

B. The Contractor shall provide 78 CEG/CEIEC with all the project information to prevent adverse impacts to the building or archaeological site. The Contractor shall contact 78 CEG/CEIEC Cultural Resources Program Manager at the beginning of the project, one week before excavation starts and at least two hours before excavation resumes during the construction period.
C. When cultural resources are inadvertently discovered during construction, project personnel are directed to avoid the site of discovery and immediately contact the 78 CEG/CEIEC Cultural Resources Program Manager. All work in the area of discovery must stop until it can be investigated. 78 CEG/CEIEC will send a qualified representative to the site and the resource will need to be recorded and evaluated and the effects mitigated as necessary.

D. Archaeological Finds: All archaeological finds are the property of Robins AFB. Do not remove or disturb finds without the CO's written authorization. Archaeological Finds are artifacts, ecofacts, or modifications to the landscape that are associated with past human activity and are a minimum of 50 years old.

### 3.12 PROTECTION OF WATER AND LAND RESOURCES:

A. General: The Contractor shall not take any action that will adversely affect the existing Water Quality Standards classification of any streams, rivers, lakes, wetlands, or reservoirs within or adjacent to the project site or which would otherwise contribute to the pollution of these water resources. No fuel, oils, bituminous, calcium chloride, acids, construction waste, or otherwise harmful materials shall be permitted to enter these water resources. Land resources shall be preserved in their present condition or restored to a condition that appears natural and does not detract from the appearance of the surrounding area. If restoration is to be accomplished, the Contractor shall submit an appropriate mitigation plan and receive base approval from 78 CEG/CEIE on the proposed mitigation procedures.

B. Stormwater Management during Construction: All land disturbances shall be conducted in accordance with the Georgia Erosion and Sediment Control Act. Additionally, the Contractor shall implement procedures and practices to eliminate or minimize stormwater pollution during construction activities in accordance with the Engineering Technical Letter (ETL) 03-1: Stormwater Construction Standards. The Contractor shall not allow any debris to get into the storm drainage system. Chemicals, fuels, oils, lubricants, greases, or scrap metal stored on construction sites shall have containment and/or cover to prevent stormwater contact. Also, no materials shall be discharged into a drain, ditch, or ground surface that could result in pollution of stormwater runoff. Minimum control measures must be implemented to prevent degradation of water quality downstream resulting from any construction activity. Activities such as concrete truck washing, cleaning of painting equipment, equipment fueling, and general site housekeeping will require implementation of specific best management practices (BMP) to prevent stormwater contamination. For information on BMPs contact the 78 CEG/CEIEC Water Quality Program Manager.

If the project will disturb one (1.0) acre or more of land surface, coverage under National Pollutant Discharge Elimination System (NPDES) General Permit GAR100001, GAR100002, or GAR100003 shall be obtained through the submission of a Notice of Intent (NOI) to the GA EPD district office. Additionally, the Contractor shall submit an Erosion, Sedimentation, and Pollution Control (ESPC) Plan to 78 CEG/CEIEC for review and approval prior to submitting the NOI to GA EPD. The ESPC Plan shall be developed using the Robins AFB template and meet or exceed the requirements of the respective applicable permit and the current edition of the Manual for Erosion and Sediment Control in Georgia. Inquiries shall be directed to the 78 CEG/CEIE Water Quality Program Manager.

C. Post Construction Stormwater Management Plan: The Contractor shall implement minimum control measures for stormwater runoff from new development and redevelopment projects that includes the creation or addition of 5,000 square feet or greater of new impervious surface area, or that involves land disturbing area activity of 5,000 square feet of land or greater in accordance with the: (i) Stormwater Local Design Manual for Houston County, Georgia (LDM); (ii) Georgia Stormwater Management Manual (GSMM); and (iii) Section 438 of the 2007 Energy Independence and Security Act (EISA) as specified in the 2010 Department of Defense Memorandum. Documentation of conformity will consist of inclusion of a Post Construction Stormwater Management Plan (i.e., Hydraulics and Hydrology Report, EISA 438 Design Narrative, etc., including required associated calculations). The Plan shall be submitted through the established design review process.

The Contractor shall use the following guidance when developing post construction stormwater management systems: (i) Unified Facilities Criteria (UFC) 3-210-10, Low Impact Development Manual; (ii) US EPA 841-B-09-001: Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act; (iii) LDM; (iv) GSMM; and (v) ETL 08-6: Design of Surface Drainage Facilities.

D. Prohibition of Illegal Discharges: The Contractor shall not discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than stormwater.

The commencement, conduct, or continuance of any illegal discharge to the storm drain system is prohibited except as described below:

1. The following discharges are exempt from discharge prohibitions established by this requirement: water line flushing or
other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising groundwater, groundwater infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, swimming pools (if dechlorinated - typically less than one part per million chlorine), firefighting activities, and any other water source not containing pollutants.

2. Discharges specified in writing by Environmental Management, 78 CEG/CEIE as being necessary to protect public health and safety.

3. Dye testing is an allowable discharge, but requires a written notification to and approval from Environmental Management, 78 CEG/CEIE prior to the time of the test.

4. The prohibition shall not apply to any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

E. Prohibition of Illicit Connections:

1. The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

2. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

3. The Contractor is considered to be in violation of this requirement if the Contractor connects a line conveying non-stormwater discharges to the stormwater conveyance system, or allows such a connection to continue.

F. Spills: Prevent the spill of chemicals, fuels, oils, grease, bituminous materials, waste washings, herbicides, cement drainage, or any other hazardous materials, including broken fluorescent or HID lamps and tubes. Immediately report all spills to the Base Fire Department, 78 CES/CEF, and emergency number 911. Ensure to report all emergency information, including name, telephone number, location of spill, and type and amount of material spilled. Notify the CO of the spill immediately following initial reporting to the Fire Department and 911. Take containment action against any spills, which threaten storm drains, waterways, ponds, and other environmental areas. Under no circumstances should anyone attempt to handle a spill they are not adequately trained for. Ensure complete and thorough clean-up of materials spilled by testing water and/or soil (full analytical tests are required).

The Contractor is responsible for the cleanup of material(s) spilled as well as any soil, grass, etc. that has absorbed spill materials. No spill residue shall be transported off Robins AFB without specific approval from the CO. Spills involving large quantities and/or requiring special protective clothing and/or breathing devices to facilitate clean up may require action by the Base Spill Response Team. When the Base Spill Response Team is utilized, the Contractor shall provide support, as appropriate, for containment and clean-up of spills. The contractor is responsible for all fees associated with the Base Spill Response Team.

G. Tree Protection and New Landscaping:

1. Trees marked for removal on approved plans and drawings shall have existing identification tags removed (if present) and forwarded to the CO. Except in areas marked on the plans to be cleared, do not deface, injure, destroy, remove, or cut trees or shrubs without authority from the CO and 78 CEG/CEIEC Natural Resources Program Manager. In cases where construction necessitates the removal of a large number of trees, 78 CEG/CEIEC will need to first evaluate whether or not a logging contract is warranted (to be arranged by CEIEC), as per AFI 32-7064 it is inappropriate to give away forest resources which have significant value.

2. In general, trees shall be protected from either excavation or filling within the root zone closer than the normal drip line of the tree. No ropes, cables, or guys shall be fastened to, or attached to any existing trees for anchorage unless specifically authorized by the CO. The contractor shall not allow vehicles to be routinely parked within the drip zone of trees which are designated for protection, nor will equipment be staged under these trees. The Contractor shall in any event be responsible for any damage resulting from such use.

3. Where, in the opinion of the CO, trees may possibly be defaced, bruised, injured, or otherwise damaged by the
Contractor's equipment, blasting, dumping, or other operations, the CO may direct the Contractor to adequately protect such trees by placing boards, planks, plastic fence, or poles around them. When directed by the CO, construct barriers to protect trees from earthwork operations. Rocks that are displaced into uncleared areas shall be removed. Monuments, markers, and works of art shall be similarly protected before beginning operations near them.

4. The Contractor shall submit all landscaping plans to the 78 CEG/CEIEC Natural Resources Program Manager for review and approval before implementation. Plans shall emphasize the use of native plant and tree species whenever possible, and shall include provisions for conserving water use and minimizing the need for pesticide and herbicide use. Brown Top Millet is not authorized for use at Robins AFB.

H. Restoration of Landscape Damage: Surface Drainage: Surface drainage from cuts and fills within the construction limits and from borrow and waste disposal areas, shall be held in suitable sedimentation ponds or shall be graded to control erosion. Temporary erosion and sediment control measures such as berms, dikes, drains, or sedimentation basins, shall be provided and maintained until permanent drainage and erosion control measures are completed and operating. The area of bare soil exposed by construction operations at any time shall be held to a minimum. Stream crossings by fording with equipment shall be limited to control turbidity. Fills and waste areas shall be constructed by select placement to eliminate adjacent streams.

Stabilization of permanent steep slopes shall be accomplished as soon as possible to establish vegetation. Apply mulch (no more than 2-3 inches in depth) immediately after finished grading is completed, regardless of season, and delay seeding and fertilizing until the season most favorable for germination.

I. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

1. Permit for Stormwater Management during Construction: If the project will disturb one (1.0) acre or more of land surface, coverage under NPDES General Permit GAR 100001, GAR 100002, or GAR 100003 shall be obtained through the submission of a NOI to the GA EPD district office. Provide the following as a minimum in complying with all applicable local, state, and federal laws:

a. The Contractor shall submit an ESPC Plan signed and stamped by a Georgia Professional Engineer with Level 2 Certification from the Georgia Soil and Water Conservation Commission to 78 CEG/CEIE for review and approval prior to submitting the NOI to GA EPD. The ESPC Plan shall be developed using the Robins AFB ESPC Plan Template and meet or exceed the requirements of the respective applicable permit and the current edition of the Manual for Erosion and Sediment Control in Georgia.

b. The Contractor shall submit a completed NOI to be covered by a NPDES Permit for stormwater discharge associated with construction activity to 78 CEG/CEIE for review and approval prior to submitting the NOI to GA EPD. After 78 CEG/CEIE approval of the ESPC Plan, the Contractor shall submit the NOI form and pay permit fees to both GA EPD and Houston County Public Works Department, at least 14 days prior to any site work.

c. The Contractor is responsible for compliance with the NPDES Permit and shall perform all permit-required tasks, including inspections, monitoring, and recordkeeping until such time the site achieves final stabilization. Final payment shall not be performed until the site achieves final stabilization as defined by the NPDES Permit. Special attention must be provided to consider the timing of project completion to ensure permanent vegetation is established (i.e., projects may require over-wintering with temporary grass until the spring growing season, when permanent grass (Bermuda/Centipede) shall be applied to the site after raking and fertilization. The Contractor shall submit a 78 CEG/CEIE reviewed and approved Notice of Termination (NOT) to the GA EPD after final stabilization is achieved and there is no discharge associated with construction activities. All records shall be maintained for a period of three years from the date the NOT is submitted. All NPDES Permit-required records shall be provided to 78 CEG/CEIEC Water Quality Program Manager.

2. Plans for Post Construction Stormwater Management: Post Construction Stormwater Management Plan narrative and calculations for sizing of all post construction BMPs shall be submitted for all new development or redevelopment greater than 5,000 ft2 (of impervious area or land disturbance). This Plan typically includes a Hydraulic and Hydrology Report and EISA Compliance requirements, as well as related narrative, figures, and drawings. The design shall meet the minimum stormwater management standards of the GSMM and Section 438 of EISA. The Plan shall be submitted as part of the project design documents for the 60 percent design (i.e., intermediate design) submittal.
3.13 BACKFLOW PREVENTION DEVICES (BPDs):

A. General: All BPDs must be installed in accordance with current Uniform Plumbing Code (Section 603.3.4) and AFI 32-1066. BPDs must be selected to address the level of hazard and installed in locations that are readily accessible for inspection and maintenance. All BPDs must be installed by Georgia-certified BPD technicians. Direct all inquiries to Bioenvironmental Engineering, 78 AMDS/SGPB, 478-327-7555.

B. The Contractor shall coordinate with Government Project Manager to ensure Bioenvironmental Engineering has assigned the level of hazard and identified the appropriate BPD for the application prior to purchase of BPDs.

C. The Contractor shall coordinate the BPD installation location with the Government Project Manager to ensure the installation location is accessible and meets space requirements for inspection and maintenance.

D. The Contractor shall provide an inspection/testing of the BPD(s) in accordance with the manufacturer’s instructions for the particular device or using procedures recognized by the tester’s certifying agency. At a minimum, all devices shall be tested after installation, cleaning, repair, or relocation.

E. Submittals, Notifications, and Approvals: The following submittals, notifications, and approvals are required to maintain compliance:

1. The Contractor must coordinate location of BPDs with the Backflow Prevention Program Manager prior to installation.

2. The Contractor must submit a copy of BPD Test Report to the Backflow Prevention Program Manager.

3. The Contractor must obtain approval to use fire hydrants or to penetrate water mains from SGPB, Bioenvironmental Engineering at 478-327-7555 and Civil Engineering Plumbing Shop (478-468-2399 or 478-327-8969). Use only lead free materials with the drinking water system, for solder no more than 0.2% and for pipes/fittings no more than 8% per 40 CFR 141.43.

---- END OF NARRATIVE SECTION ----

NOTE: Copies of the SWAA form, its tracking document, and monthly waste management report form follow.
Generator Name: ____________________________________________  Contact: ___________________
Address: ___________________________________________________________________________________
Telephone: ___________________________________   Fax:   ____________________________________

Description of Waste: _______________________________________________________________________
Source / Location of Waste:  ______________________________________________
Waste Quantity: _______ Cubic Yards ☐   Tons ☐
Frequency of Disposal:          Daily ☐   Weekly ☐           Monthly ☐

LABORATORY DATA (Please attach a hard copy of laboratory test data)

<table>
<thead>
<tr>
<th>Physical Properties:</th>
<th>Physical State:</th>
<th>Solid ☐   Semisolid ☐   Liquid ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halogenated Organics:</td>
<td>mg/kg Flash Point:</td>
<td>☐F Odor: Yes ☐ No ☐</td>
</tr>
<tr>
<td>Water Content:</td>
<td>% by Weight</td>
<td>Paint Filter Test</td>
</tr>
<tr>
<td>Reactive:</td>
<td>No ☐   Yes ☐   With H2S ___ mg/</td>
<td></td>
</tr>
<tr>
<td>pH Value:</td>
<td>(S.U.)</td>
<td>Infectious: Yes ☐   No: ☐</td>
</tr>
</tbody>
</table>

Chemical Properties (TCLP): (Concentrations in mg/l)

<table>
<thead>
<tr>
<th>Arsenic</th>
<th>m-Cresol</th>
<th>Hexachlorobenzene</th>
<th>Pyridine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium</td>
<td>p-Cresol</td>
<td>Hexachlorobutadiene</td>
<td>Selenium</td>
</tr>
<tr>
<td>Benzene</td>
<td>Total Cresol</td>
<td>Hexachloroethane</td>
<td>Silver</td>
</tr>
<tr>
<td>Cadmium</td>
<td>2,4-D</td>
<td>Lead</td>
<td>Tetrachloroethene</td>
</tr>
<tr>
<td>Carbon Tetrachloride</td>
<td>1,4 Dichlorobenzene</td>
<td>Lindane</td>
<td>Toxaphene</td>
</tr>
<tr>
<td>Chlordane</td>
<td>1,2 Dichloroethane</td>
<td>Mercury</td>
<td>Trichloroethene</td>
</tr>
<tr>
<td>Chlorobenzene</td>
<td>1,1 Dichloroethylene</td>
<td>Methoxychlor</td>
<td>2,4,5 Trichlorophenol</td>
</tr>
<tr>
<td>Chloroform</td>
<td>2,4 Dinitrotoluene</td>
<td>Methyl Ethyl Ketone</td>
<td>2,4,6 Trichlorophenol</td>
</tr>
<tr>
<td>Chromium</td>
<td>Endrin</td>
<td>Nitrobenzene</td>
<td>2,4,5TP (Silvex)</td>
</tr>
<tr>
<td>o-Cresol</td>
<td>Heptachlor (a hydroxide)</td>
<td>Pentachlorophenol</td>
<td>Vinyl Chloride</td>
</tr>
</tbody>
</table>

None of the above constituents exceed TCLP disposal limits ________________

Others (List)

<table>
<thead>
<tr>
<th>Other Information:</th>
<th>Delivery method: Bulk ☐   Other ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory Agency Approval Received:</td>
<td>Yes ☐   No ☐   Permit Number</td>
</tr>
<tr>
<td>Material Safety Data Sheet Provided:</td>
<td>Yes ☐   No ☐</td>
</tr>
</tbody>
</table>

Generator's Certification Statement

"I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. To the best of my knowledge, the material described above is not classified as hazardous waste under current regulations, and I agree to notify Houston County MSW Landfill if such classification changes. The attached information provided is true and accurate to the best of my knowledge."

Signature of Authorizing Agent ____________________________  Date ______________

Name of Agent (Typed or Printed) ____________________________  Title ____________________________
Houston County MSW Landfill                                                                 Profile No. _________________
2018 Kings Chapel Road  (Assigned to SWAA)
Perry, Georgia  31069
Telephone:  (912) 987-0089

WASTE SHIPMENT TRACKING DOCUMENT

Generator Name:______________________________ Contact: ________________
Address: __________________________
Telephone: __________________________ Fax: ________________

Description of Waste: __________________________
Location of Waste: __________________________

Date Shipped: __________________________ Quantity Shipped: __________

Certification: I certify the waste described above is the waste represented by the Special Waste Acceptance Application (SWAA) of
the same Profile Number and no regulated hazardous waste has been introduced into the waste.

Generator's Signature: __________________________ Date: ________________

Transporter: __________________________
Address: __________________________ Contact: ________________
Telephone: __________________________

Certification: I certify no regulated hazardous waste was introduced into the waste while in my custody:

Hauler's Signature: __________________________ Date: ________________

Waste Disposal Site: Houston County MSW Landfill

Quantity Received: ________________

Certification: I certify receipt and proper disposal of the Special Waste Profiled materials covered by this manifest.

Operator’s Printed Name: __________________________
Operator’s Signature: __________________________ Date: ________________

Waste Management Report (Monthly)

Contract Number: __________________________ Government Inspector: ________________
Contractor: __________________________ Project # Title: ________________
Contractor POC: __________________________ Date: ________________
Phone No: __________________________
I. MSW Landfill Disposal

<table>
<thead>
<tr>
<th>Quantity (tons): __________</th>
<th>Landfill Site: ___________________</th>
<th>Tip fee/ton ($/ton): ______________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost of disposal ($)</th>
<th>__________</th>
<th>Total cost of disposal ($)</th>
<th>__________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost/ton ($/ton): __________</th>
<th>Total cost/ton ($/ton): __________</th>
</tr>
</thead>
</table>

II. C&D Landfill Disposal

<table>
<thead>
<tr>
<th>Quantity (tons): __________</th>
<th>Landfill Site: ___________________</th>
<th>Tip fee/ton ($/ton): ______________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost of disposal ($)</th>
<th>__________</th>
<th>Total cost of disposal ($)</th>
<th>__________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost/ton ($/ton): __________</th>
<th>Total cost/ton ($/ton): __________</th>
</tr>
</thead>
</table>

III. Inert Landfill Disposal

<table>
<thead>
<tr>
<th>Quantity (tons): __________</th>
<th>Landfill Site: ___________________</th>
<th>Tip fee/ton ($/ton): ______________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost of disposal ($)</th>
<th>__________</th>
<th>Total cost of disposal ($)</th>
<th>__________</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Total cost/ton ($/ton): __________</th>
<th>Total cost/ton ($/ton): __________</th>
</tr>
</thead>
</table>

IV. Alternatives to Landfilling (Recycling Strongly Encouraged)

<table>
<thead>
<tr>
<th>Type of Material</th>
<th>Quantity (pounds or tons)</th>
<th>Destination</th>
<th>* Handling &amp; Transportation Cost ($)</th>
<th>*Expected Revenue &amp; Tip Fee Earnings ($)</th>
<th>* Net Cost ($)</th>
<th>* Cost if Landfilled ($)</th>
<th>* Comparison Cost (+)/Savings (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensional wood</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beverage containers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land debris</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metals - all types</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gypsum board</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carpet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cast stone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wood materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electric cable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PVC piping</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rubber flooring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raised flooring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IV. Total net cost (+) or savings (-) from all alternatives to landfilling all project waste</th>
</tr>
</thead>
</table>

| V. Means of keeping recyclables free of contamination                                      |
| All similar materials will be grouped together based on the requirements of the recycling center. |
| All dissimilar materials will be kept in separate containers/bins in order to avoid contamination. |

| VI. Meetings to be held to address waste management                                        |
| At regularly scheduled job site coordination/progress meetings and at job safety meetings, waste management requirements will be discussed to clarify any confusion with craftspeople. |

* Optional

NON-AIR FORCE USE OF RADIATION SOURCES APPLICATION REQUIREMENTS

A2.1. USE OF RADIOACTIVE MATERIALS (RAM):

A2.1.1. Air Force Instruction 40-201, Managing Radioactive Materials in the US Air Force, sets Air Force policy for using radioactive material. It applies to all civilian, civilian contractor, Department of Defense, Department of Energy (DOE), and DOE
prime contractor personnel bringing radioactive materials onto Air Force installations.

A2.1.2. Non-Air Force organizations that bring radioactive materials onto Air Force installations, or conduct operations involving radioactive material on Air Force installations, obtain the approval in writing of the Installation Commander or his designee. To obtain this approval, the contractor must forward an application to the base RSO, 78 AMDS/SGPB, building 207, 655 7th Street, Robins AFB GA 31098; (478) 327-7555, with a courtesy copy to the contracting officer at least 30 calendar days before the planned date for commencement of activities on the installation. Non-Air Force organizations possessing Agreement State Licenses must also submit an NRC Form 241, Report of Proposed Activities in Non-Agreement States, to the NRC in compliance with 10 CFR 150.20. Organizations requiring more than 180 days of operation per calendar year on the installation must possess a NRC license. Requests must include:

A2.1.2.1. A description of the proposed activities on NRC Form 241 (the 180-day limitation on the form does not apply to organizations holding an NRC license).

A2.1.2.2. The procedures established to ensure radiological health and safety of Air Force personnel and the public while on Air Force installations; the name, local address, and telephone number for the responsible local representative; and the name, address, and telephone number of the RSO named on their license.

A2.1.2.3. 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.

A2.1.2.4. The part of the Air Force contract describing work to be done at the base and the inclusive dates of such work. A2.1.2.5. An acknowledgement that the Base RSO can make periodic checks to ensure the contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Air Force personnel and prevent potential contamination of government property. The base RSO must identify deficiencies to the contracting officer for corrective actions. In addition, the installation RSO has authority to suspend contractor operations believed to be unsafe. A2.1.2.6. Copies of the most recent leak test results (not over 180 days old) for sealed sources. A2.1.2.7. Copies of training certificates for authorized users.

A2.2. Contractors will adhere to 10 CFR and 49 CFR sections pertaining to transportation of radioactive material.

A2.3. Contractors must notify the base RSO when RAM arrives on base, and when the RAM is removed from the base.

A2.4. USE OF LASERS:

A2.4.1. Non-Air Force organizations required to use lasers on Robins AFB must submit a written request for approval at least 30 calendar days before commencement of activities which require the use of a laser.

A2.4.2. Contractors must submit their request to 78 AMDS/SGPB, building 207, 655 7th Street, Robins AFB GA 31098, (478) 327-7555, with a courtesy copy to the contracting officer, and will include:

A2.4.2.1. Description/Characteristics:
• Manufacturer.
• Model.
• Number of same units.
• Serial numbers.
• Laser medium.
• Mod14484122e14484122 of operation (i.e. continuous wave (CW), single pulse, multiple pulse). Maximum exposure time (train length).
• Time (sec) & wave length.
• Energy/pulse (J) or CW power (W).
• Pulse repetition frequency.
• Pulse width.
• Beam diameter (at 1/e point).
• Beam divergence (at 1/e point).

A2.4.2.2. The part of the Air Force contract describing work to be done at the base and the inclusive dates of such work. Additional
information required to be included: where the laser will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of

A2.4.2.3. An acknowledgement that the base RSO can make initial and periodic checks to ensure the contractor is following
applicable radiological health and safety practices which prevent unnecessary exposures to Air Force personnel.

A2.5. USE OF RADIO FREQUENCY RADIATION (RFR):

A2.5.1. Non Air Force organizations required to use equipment generating RFR in excess of 7 watts peak power and a frequency
of 100 Mhz or greater on Robins AFB must submit a written request for approval at least 30 calendar days before commencement of
activities which require the use of the RF generating device.

A2.5.2. Contractors must submit their request to 78 AMDS/SGPB, building 207, 655 7th Street, Rob-ins AFB GA 31098, (478) 327-
7555, with a courtesy copy to the contracting officer; and will include:

A2.5.2.1. Description/Characteristics:
•Description.
•Nomenclature.
•Location of emitters.
•Quantity.
•Frequency (Mhz).
•Pulse width (microsec.).
•Pulse repetition freq. (pps).
•Peak power (kW).
•Antenna size (feet--horizontal/vertical).
•Antenna band width (degrees--horizontal/vertical).
•Antenna gain (dB).
•Scan rate (rpm).

A2.5.2.2. The part of the Air Force contract describing work to be done at the base and the inclusive dates of such work. Additional
information required to be included where the RFR generating device will be used (location, indoors, outdoors, enclosures, etc.), and
the safety features of the device.

A2.5.2.3. An acknowledgement the base RSO can make initial and periodic checks to ensure the contractor is following
applicable radiological health and safety practices which prevent unnecessary exposures to Air Force personnel.

A2.6. USE OF IONIZING RADIATION:

A2.6.1. Non-Air Force organizations required to use ionizing radiation generating devices (for RAM, see section 1) on Robins AFB
must submit a written request for approval at least 30 calendar days before commencement of activities which require the use of
ionizing radiation generating devices.

A2.6.2. Contractors must submit their request to 78 AMDS/SGPB, building 207, 655 7th Street, Rob-ins AFB GA 31098, (478) 327-
7555, with a courtesy copy to the contracting officer; and will include:

A2.6.2.1. Description/Characteristics:
•X-ray unit manufacturer.
•Model number.
•Serial number. •Maximum kVp, mA, Sec.
•Ionizing radiation source/emitter (electron tube).

A2.6.2.2. The part of the Air Force contract describing work to be done at the base and the inclusive dates of such work. Additional
information required to be included: where the ionizing radiation producing device will be used (location, indoors, outdoors,
enclosures, etc.), and the safety features of the device.

A2.6.2.3. An acknowledgement that the base RSO can make initial and periodic checks to ensure the contractor is following
applicable radiological health and safety practices which prevent unnecessary exposures to Air Force personnel.
A2.7. USE OF ULTRAVIOLET (UV) RADIATION:

A2.7.1. Non-Air Force organizations required to use UV generating devices on Robins AFB must submit a written request for approval at least 30 calendar days before commencement of activities which require the use of UV generating devices.

A2.7.2. Contractors must submit their request to 78 AMDS/SGPB, building 207, 655 7th Street, Robins AFB GA 31098, (478) 327-7555, with a courtesy copy to the contracting officer; and will include:

A2.7.2.1. Description/Characteristics:
• Description.
• Nomenclature.
• Location of devices.
• Quantity.
• Wavelength.
• Effective Irradiance.

A2.7.2.2. The part of the Air Force contract describing work to be done at the base and the inclusive dates of such work. Additional information required to be included: where the UV generating device will be used (location, indoors, outdoors, enclosures, etc.), and the safety features of the device.

A2.7.2.3. An acknowledgement that the base RSO can make initial and periodic checks to ensure the contractor is following applicable radiological health and safety practices which prevent unnecessary exposures to Air Force personnel.
OSHA Substance Specific Dust Performance Requirements

1. OSHA Substance Specific Dusts:
   a. Operations in many buildings have potential to produce varying levels of dusts potentially containing lead, hexavalent chromium, cadmium, beryllium and similar heavy metals. While airborne samples generally do not indicate an airborne hazard, some dusts may have settled on various surfaces over the years and any work may disturb these dusts and create both an inhalation and subsequent contact hazard. The Contractor shall comply with safety and health requirements under Federal, State of Georgia, and Robins local regulations/policies; examples include, but are not limited to, determining and providing suitable PPE (such as disposable coveralls and nitrile gloves), personnel air monitoring, etc. Do not dry sweep or use shop vacuums when handling these dusts; use HEPA vacuums or wet methods for cleaning before any demolition activities and as needed during construction. Comply with applicable separate Environmental Management (EM) requirements for disposal of hazardous waste which is found in a separate specification. For specific lead-only projects, consult Specification 02065, Lead-Based Paint-In Place Management.
   
   b. The Contractor shall take its own dust samples for certified laboratory analysis (pre-work and post-cleaning). The Contractor shall determine its own needs, but the Government requires a minimum of 3 samples in each separate phase of the work if more than one work area is necessary.
   
   c. The Contractor is responsible for determining the method of cleaning, the appropriate PPE for cleaning, and any PPE required after cleaning. The Contractor is explicitly cautioned that these heavy metal dusts are of concern to OSHA/EPA/GA-EPD and compliance to all regulatory standards is required.
   
   d. It is preferable that the Contractor conduct all work when no Government employees are present. Daily Contractor clean-up is necessary prior to start of Government duty day. Daily visual inspections will be performed to determine cleanliness of areas where Contractors have worked.
   
   e. Any wipe or swipe samples collected to determine effectiveness of cleaning will use the following as guidance for limits to achieve:

   4. For cadmium, hexavalent chromium, lead - achieve either a 90% reduction of pre-cleaning results or below detection limit (see definition below).

2. Analytical Laboratory Capabilities:
   a. As evidenced from the OSHA standards for cadmium, lead, and hexavalent chromium, there is no specified method of swipe sampling and analysis that has been required. The laboratory at Robins AFB has conducted an in-house study to develop sampling and analytical procedures with satisfactory precision that enable BIO (SGPB) to determine a level of cleanliness. The sampling and analytical method is based on ASTM D6966 (Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals) and Method 6020A (Inductively Coupled Plasma-Mass Spectrometry) as documented by NIOSH and CDC, Kevin Ashley, Ph.D. Results indicate recoveries are within the ASTM D6966 requirements.
   
   b. **Definition of Detection limits** for the heavy metals are as follows:

      Cadmium - 1 µg; Chromium - 0.3 µg; Lead - 0.5 µg.
   
   c. XRF direct reading devices, instant reading and/or color change heavy metal test kits are generally not acceptable for negative determination of heavy metals due to their detection limits being above RAFB’s OSHA requirements. If applicable, these testing devices may be used for positive determination screening purposes. No quantitative values will be recognized resulting from the use of these test methods.
PART 1  GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM E 1609  (1994; R 2001) Development and Implementation of a Pollution Prevention Program

1.2  GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy the Contractor shall: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. A minimum of 75 percent by weight of total project solid waste shall be diverted from the landfill.

1.3  MANAGEMENT

Develop and implement a waste management program in accordance with ASTM E 1609 and as specified. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. The Environmental Manager, as specified in Section 01 35 40.00 20 Environmental Management, shall be responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the project. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor is responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

1.4  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. 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 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals; Waste Management Plan.
1.5 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Waste Management Plan and to develop a mutual understanding relative to the details of waste management. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

a. Pre-bid meeting.

1.6 WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within **15 days after notice to proceed and not less than 10 days before the preconstruction meeting**. The plan shall demonstrate how the project waste diversion goal shall be met and shall include the following:

a. Name of individuals on the Contractor's staff responsible for waste prevention and management.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of wastes.

e. Characterization, including estimated types and quantities, of the waste to be generated.

f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.

g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Recycling facilities that will be used shall be identified by name, location, and phone number, including a copy of the permit or license for each facility.

i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.
j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.

k. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.7 RECORDS
Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.8 REPORTS
Provide quarterly reports and a final report to the Contracting Officer. Quarterly and final reports shall include project name, information for waste generated this quarter, and cumulative totals for the project. Each report shall include supporting documentation to include manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. Include timber harvest and demolition information, if any.

1.9 COLLECTION
Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance
with applicable regulations and coordinate with Section 01560 ENVIRONMENTAL REQUIREMENTS CHECKLIST and 01572 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT. Separate materials by one of the following methods:

1.9.1 Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted as described below into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

a. Land clearing debris.

b. Asphalt.

c. Concrete and masonry.

d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
   
   (1) Ferrous.
   
   (2) Non-ferrous.

e. Wood (nails and staples allowed).

f. Debris.

g. Glass (colored glass allowed).

h. Paper.

   (1) Bond.

   (2) Newsprint.

   (3) Cardboard and paper packaging materials.

i. Plastic.

   (1) Type 1: Polyethylene Terephthalate (PET, PETE).

   (2) Type 2: High Density Polyethylene (HDPE).

   (3) Type 3: Vinyl (Polyvinyl Chloride or PVC).
(4) Type 4: Low Density Polyethylene (LDPE).

(5) Type 5: Polypropylene (PP).

(6) Type 6: Polystyrene (PS).

(7) Type 7: Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

j. Gypsum.

k. Non-hazardous paint and paint cans.

l. Carpet.

m. Ceiling tiles.

n. Insulation.

o. Beverage containers.

1.9.2 Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.9.3 Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures. Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.10.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Sale or donation of waste suitable for reuse shall be considered.
1.10.2 Recycle.
Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling. All fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site shall be recycled. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.10.3 Compost
Consider composting on site if a reasonable amount of compostable material will be available. Compostable materials include plant material, sawdust, and certain food scraps.

1.10.4 Waste.
Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

1.10.5 Return
Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS
Not used.

PART 3 EXECUTION
Not used.

<<<<<<END OF SECTION>>>>>
PART 1 - GENERAL

1.01 CONTRACTOR OPERATIONS: This section establishes requirements to ensure the safety of Government and other personnel not directly or indirectly under the employment of the Contractor. Comply with standards maintained by Occupational Safety and Health Administration (OSHA), Corps of Engineers Safety Manual (EM 385-1-1), Air Force Occupational Safety and Health (AFOSH) Standards, and National Fire Protection Association (NFPA). Copies of the Corps of Engineers Safety and Health Requirements Manual, EM 385-1-1, may be obtained from the local Corps of Engineers office, Department of the Army, US Army Corps of Engineers, Washington, DC 20314-1000, or US Government Printing Office, Washington, DC 20314.

   A. CONTRACTOR EMPLOYEES: Compliance with OSHA and other applicable laws and regulations for the protection of Contractor employees is the obligation of the Contractor. This contract is not intended in any way to require persons to work in surroundings or under working conditions that are unsafe or dangerous to their health.

   B. Coordinate and perform work so as not to impact the safety of Government or non-Contractor personnel, or cause damage to government property. This requires providing appropriate safety devices to be utilized in and around the work areas to perform the job safely and protect others from hazards generated by the work.

1.02 SUBMITTALS:

   A. General: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items.

   B. Material Submittals: None required under this section.

   C. Other Submittals: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

<table>
<thead>
<tr>
<th>Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Inspector Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.01.c.</td>
<td>Fire Reporting</td>
<td>If Fire</td>
<td></td>
</tr>
<tr>
<td>3.02</td>
<td>AF Form 592, Weld/Cut Permit</td>
<td>Before Work</td>
<td></td>
</tr>
<tr>
<td>3.09</td>
<td>Hazard Communication</td>
<td>Before Work</td>
<td></td>
</tr>
<tr>
<td>3.11</td>
<td>Injury/Mishap Reports</td>
<td>By 1 hour after</td>
<td></td>
</tr>
</tbody>
</table>

1.03 OSHA INSPECTIONS: Department of Labor (DOL) OSHA inspectors may arrive at Contractor work sites without formal notification in the event of an employee complaint or a no-notice inspection. The DOL has the right to stop or delay work and/or issue costly fines due to noncompliance with safety requirements. Any costs borne by such actions are the sole responsibility of the Contractor.

PART 2- PRODUCTS: Omitted

PART 3- EXECUTION
3.01 **FIRE REPORTING**: Report all fires as soon as discovered. The fire reporting number on or off Base is 911. The caller should give his or her name and location of what is on fire. Also, give any other information that may be requested by the Fire Department dispatcher. Stay on the telephone until the dispatcher has obtained all necessary information.

3.02 **OPERATIONS INVOLVING WELDING, CUTTING, BRAZING, AND OPEN FLAME** are carefully controlled at Robins AFB due to several fires caused by such operations.

   A. Start no such work until the Technical Representative of the Contracting Officer has been notified, the site has been inspected, the operation approved by the authorized Fire Inspector, and an AF Form 592 (Welding, Cutting, and Brazing Permit) has been approved by the Fire Inspector. Do not contact the Fire Department directly.

   B. Observe caution and provide welding, cutting, brazing, and open flame equipment in accordance with NFPA 51B, OSHA 1926.350 through 1926.354, and AFOSH Standard 91-5. The foreman at the work area must retain the AF Form 592 for the duration of the work.

   C. Perform a fire watch to inspect the work area and adjacent areas for the evidence of fire for at least one-half hour after completion of the welding, cutting, brazing, or open flame. More than one fire watch may be required. Fire watch personnel shall sign the AF Form 592 acknowledging the completion of the inspection for each occurrence of welding, cutting, and brazing work. The AF Form 592 shall be returned to the Fire Department, Bldg 377, by one hour after the fire watch is completed. If "after inspection" is required by the Fire Department, call (478)926-2145 or 926-3487 before leaving the site. Two "after-inspections" will be made by the Fire Department for work involving roofs.

   D. No tar pots or kettles shall be used until checked and approved by the Fire Department. After Fire Department approval is obtained, the pots or kettles shall be under constant supervision by a qualified operator when operated. The pots or kettles shall be positioned at least 25 feet from the building where work is being performed. Adequate fire extinguishers shall be placed within 25 feet and accessible to each pot or kettle. Base fire department also requires a minimum of two 20 lb multi-purpose dry chemical extinguishers at each area of tar application.

   E. Roofing mops have been implicated in some roofing fires. The suspected cause is spontaneous combustion of the mop after immersing in hot asphalt/tar because of chemicals used in the manufacture of the mop. Because of this, Contractors shall store all mops or rags soaked in roofing materials away from the building and any other combustible materials so that no damage may result from an incident of this type. At no time, shall mops or rags soaked with tar be left unattended on the roof. Used mops and rags shall be removed from the premises at the end of each daily work period.

   F. Smoking shall not be permitted on the roof or within the vicinity of the tar kettle, fuel source, or any combustible material. Refer to NFPA 1, NFPA 241, and RAFBI 32-2001 for further instructions on tar kettle operations and torch applied roofing material operations.

3.03 **FIRE HYDRANTS/HOSES**

   A. Fire hydrants shall not be used without prior approval of the Plumbing Shop, 926-2215. If permission is granted for use of a fire hydrant, the Contractor must furnish a gate valve to fit the
2 1/2" outlet and a proper hydrant wrench. Each time a hydrant is to be opened or used, it must be opened slowly to prevent a water surge, and it must be opened to the full "open" position. When closing the hydrant, close it slowly to prevent a water surge. (The Plumbing Shop will advise the Fire Department that the hydrant is being used).

B. The Fire Department will not loan equipment; e.g., fire hoses, nozzles, or hydrant wrenches.

C. No vehicles or equipment shall be parked or stored within 15 feet of a fire hydrant.

3.04 FIRE PROTECTION ALARM SYSTEMS

A. Extreme care must be taken when working around or near any fire protection/detection alarm systems. Accidental contact with components of these systems or the production of steam, smoke, vapors, or dust could cause activation, damage, or false alarm by the Fire Department.

B. At any time a fire protection/detection alarm system hampers the accomplishment of contract work, call 926-5098 and 926-3487 for assistance.

3.05 DEBRIS

A. The accumulation of all debris inside a building shall be kept to a minimum during construction.

B. Piles of debris awaiting removal outside any facility shall not be placed in fire lanes or within 25 feet of the facility.

C. When debris is dropped through holes, from roofs, etc., protective chutes or proper barricades shall be used to protect personnel. Signs warning of the hazards of falling material shall be posted at each level. Warning signs and barricades must be erected before the work requiring the signs/barricades begins.

D. Walkways, roadways and sidewalks shall be kept clear of building material, equipment, or other obstructions caused by the Contractor operation. Protective barriers and warning signs shall be installed.

3.06 PORTABLE HEATERS AND LIGHTING

A. All temporary heat that is provided by portable electric heaters must be approved by Factory Mutual (FM) or Underwriters Laboratory (UL). Heaters shall be kept away from combustible or flammable materials.

B. All extension cords used must be of sufficient gauge to operate heaters and lighting without heating the cord or plug.

C. All unnecessary electrical appliances shall be unplugged at the end of the workday.

D. Only explosion proof electrical fixtures and appliances shall be used in areas where flammable vapors are present.
3.07 FLAMMABLE AND COMBUSTIBLE LIQUIDS

A. All flammable liquids shall be stored in suitable metal containers only.

B. Store other flammable materials properly.

C. Gasoline or any other low flash point flammable liquid shall not be used for cleaning purposes or to start fires.

D. Static bonding wires shall be properly attached before combustible or flammable liquid is transferred from one vessel to another. This includes vehicles, portable gasoline driven equipment, etc.

E. Smoking or the use of spark or flame producing equipment in areas where flammable liquids are being used or stored is strictly prohibited.

3.08 FIRE EXTINGUISHERS: The Contractor is responsible for providing an adequate number of fire extinguishers. Extinguishers shall be suitably placed, distinctly marked, readily accessible, and maintained in a fully charged and operable condition.

3.09 HAZARD COMMUNICATION: In any contract where hazardous materials are involved, the Contractor must comply with 29CFR 1910.1200, Hazard Communication. Contractors must provide 78 AMDS/SGPB the Material Safety Data Sheets (MSDSs) for each chemical used at least 5 working days prior to start date. This includes, but is not limited to, all solvents, paints, adhesives, sealants, coatings, primers, mastics, etc. MSDSs must be the most current available. MSDS’s are available for hazardous materials that Contractor personnel may come into contact with on RAFB. Contact your Contracting Officer for assistance.

3.10 CONFINED SPACE ENTRY: In recent years, there have been increased injuries and mishaps in confined spaces. The Contractor assumes full responsibility for performing all work in and around a confined space in a safe manner and IAW CFR 1910.146. Protect Robins Air Force Base and other personnel by supplying barricades, warning signs, and traffic control measures as necessary.

3.11 INJURIES/MISHAP REPORTING: The Contractor shall report mishaps or incidents exceeding $1,000 (material + labor) and all injuries to any personnel, including Contractor employees, within one (1) hour by phone to the Contracting Officer during normal day shift hours. This report shall contain all available facts. Mishaps/Incidents occurring at other times of the day shall be reported as soon as possible the next normal workday. Immediately secure the mishap scene and damaged property, then impound pertinent maintenance and training records until released through the Contracting Officer by the WR-ALC Safety Office, whose sole function in such cases is to ensure the safety of Government property and non-Contractor personnel.

3.12 MOTOR VEHICLES: The Contractor shall comply with AFI 91–207 regarding the use of safety belts and other protective devices during vehicle operations while on Base. No vehicle shall be stopped, parked, or left standing on any road or adjacent thereto or in any area in such a manner as to endanger the vehicle, other vehicles, equipment, or personnel using or passing that road or area. Roads shall be swept if spillage occurs during hauling. For chemical spills, see the Environmental Requirements section of the specifications. Ensure safe operating condition of all Contractor-owned vehicles. Unsafe and unserviceable vehicles shall be removed from service immediately. Personnel engaged in vehicle
operations on the Flightline and industrial areas shall be trained and certified in Flightline procedures by 78 OSS/OSAB at 926-2114. Schedule this training with adequate lead-time so as not to interfere with contract schedules. Certification shall be annotated on AF Form 483, Certificate of Competency, and must be in the possession of the vehicle operator when operating a vehicle on the Flightline or industrial areas. Furnish a trained and certified vehicle operator/escort for all infrequent vehicle operations such as material deliveries. The certified escort can be a passenger or operate a lead vehicle no further than three (3) vehicle lengths in front of the escorted vehicle. Ensure that all Subcontractors comply with these requirements.

3.13 EXCAVATIONS: In all excavations where any personnel may be exposed to danger from moving ground, protection shall be provided by means of a shoring system, sloping of the ground, or some other equivalent means. All trenches over five feet deep in either hard and compact or soft and unstable soil shall be sloped, shored, sheeted braced or otherwise supported. Trenches less than five feet in depth shall also be effectively protected when hazardous ground movement may be expected. Additional information/requirements may be found in 29 CFR 1926 and EM 385-1-1.

3.14 PROTECTIVE BARRIERS/WARNING SIGNS: When it is necessary to barricade an area for excavation, open manholes, overhead work, or the protection of personnel from hazardous operations, moving equipment or cranes, barricades are to be provided by the Contractor. Barricades must be erected before the work begins. If the barricades are in a roadway or walkway, blinking lights must be used during the hours of darkness. Barricades and associated equipment shall be kept neat and orderly at all times. When the work is complete, the barricades must be removed immediately from the job site. Kerosene lamps and open flame pots shall not be used for or with warning signs or devices. Additional information/requirements may be found in 29 CFR 1926 and EM 385-1-1. Provide as required safety signs at job sites, such as MEN WORKING ABOVE, DO NOT WATCH WELDER, and NO SMOKING.

3.15 PROTECTIVE EQUIPMENT: The Contractor is responsible for the use of appropriate personal protective equipment by his and subcontractor employees and guests. The Government recommends voluntary use of the standards in EM 385-1-1.

3.16 TOOLS AND EQUIPMENT

A. LADDERS/SCAFFOLDS: Use standard ladders that are structurally rigid, sound, equipped with approved safety shoes, and free of cracks. Metal ladders shall not be used near or for electric service. All ladders shall be tied off at the top and bottom as necessary. Special purpose job ladders may be constructed if they are properly designed and built IAW 29 CFR 1926. Scaffolds and platforms shall have handrails and toe boards. Additional information/requirements may be found in EM 385-1-1.

B. HAND TOOLS/ELECTRICAL TOOLS, PNEUMATIC TOOLS/COMPRESSED AIR: The Contractor is responsible for ensuring that all hand tools used by his or subcontractor personnel are used IAW applicable safety standards, especially 29 CFR 1910 and 1926.

C. ELECTRICAL WIRING AND EQUIPMENT: All electrical wiring and equipment shall be a type listed by UL or another recognized listing agent. All temporary electrical wiring shall be adequately installed and placed to avoid physical damage from other operations and comply with 29 CFR 1926.405. Temporary wiring shall be removed immediately upon completion of construction or the purpose for which the wiring was installed. All extension cords shall be of
the three-wire type and kept in a good state of repair. Splices shall be avoided, but if they are made, they must comply with 29 CFR 1926.405. All portable electrical appliances and equipment shall be unplugged at the end of each workday. Only explosion-proof electrical fixtures and appliances shall be used in areas where explosive vapors might be present. Additional information/requirements may be found in EM 385-1-1.

3.17 CONTROL OF HAZARDOUS ENERGY (Lockout/Tagout): Authorized personnel shall ensure the control of all hazardous energy (active or stored) when servicing and maintaining equipment or machines. Power shall be disconnected and all energy isolating devices will be locked out and/or tagged out before starting work. The authorized person will verify the isolation and deenergization.

3.18 FOREIGN OBJECT DAMAGE (FOD) PREVENTION FOR FLIGHTLINE PROJECTS: Air Force aircraft are easily damaged by loose objects on the Flightline. When working or driving through such areas, the Contractor shall establish and maintain an effective FOD prevention program. The program must be followed as an integral part of the overall project execution to prevent damage from construction-generated debris to aircraft operating near or within the construction area. Prevent the spread of debris to areas outside of the construction site as well as controlling and removing debris within the site as required by aircraft operations. Also, all vehicles must stop at FOD checkpoints. The vehicle operator will visually inspect all tires (check the tire threads for rocks or other debris) to ensure all trapped items between the tire threads are removed and disposed of properly to prevent the loose objects from being carried onto the Flightline.

<<<< END OF SECTION >>>>>
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.
B. Product delivery requirements.
C. Product storage and handling requirements.
D. Product options.
E. Product substitution procedures.
F. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products in accordance with manufacturer's instructions.
B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.
B. Store with seals and labels intact and legible.
C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
D. For exterior storage of fabricated products, place on sloped supports above ground.
E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.

B. Substitutions may be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that Bidder:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Will reimburse Government for review or redesign services associated with re-approval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

F. Substitution Submittal Procedure:
1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
2. Submit Shop Drawings, Product Data, and certified test results attesting to proposed product equivalence. Burden of proof is on proposer.
3. Contracting Officer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

PART 3 EXECUTION

Not Used.

<<<<<<END OF SECTION>>>>>
PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.
B. Final cleaning.
C. Starting of systems.
D. Demonstration and instructions.
E. Testing, adjusting and balancing.
F. Protecting installed construction.
G. Project record documents.
H. Operation and maintenance data.
I. Manual for materials and finishes.
J. Manual for equipment and systems.
K. Spare parts and maintenance products.
L. Product warranties and product bonds.
M. Maintenance service.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
B. Provide submittals to Contracting Officer required by authorities having jurisdiction.
C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
D. Owner will occupy all portions of building as specified in Section 01100.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.
B. Polish transparent and glossy surfaces.
C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace filters of operating equipment.

E. Clean debris from drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Contracting Officer seven days prior to start-up of each item.

C. Verify 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 equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable 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 01300 that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

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

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time at equipment location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

F. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

A. Independent firm will perform Testing and Balancing services specified.

B. Reports will be submitted by independent firm to Contracting Officer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.
B. Ensure entries are complete and accurate, enabling future reference by Contracting Officer’s Representative.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

G. Submit documents to Contracting Officer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

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 INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.10 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.
C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

D. Submit two sets of revised final volumes in final form within 10 days after final inspection.

E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Include color coded wiring diagrams as installed.

G. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.

H. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

I. Include servicing and lubrication schedule, and list of lubricants required.

J. Include manufacturer's printed operation and maintenance instructions.

K. Include sequence of operation by controls manufacturer.

L. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

M. Include control diagrams by controls manufacturer as installed.

N. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

O. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

P. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

Q. Include test and balancing reports as specified.

R. Additional Requirements: As specified in individual product specification sections.

S. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.
1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

1.12 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time Of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.
PART 1 GENERAL

1.01 NOT USED

1.02 SUBMITTALS:

A. GENERAL: Provide the following submittals in accordance with instructions found in Section 01300, Submittals and Contractor Furnished Items. The contractor may submit manufacturer’s data in lieu of the required certificate of compliance if he desires. Manufacturer’s data is required by the government if an “X” appears under the “Mfg. Data Required” column.

B. MATERIAL SUBMITTALS: Not required under this section.

C. OTHER SUBMITTALS: Provide the following submittals as required by the contract or as directed by the Contracting Officer.

<table>
<thead>
<tr>
<th>Para #</th>
<th>Description</th>
<th>Date Required</th>
<th>Check</th>
<th>Inspector’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.51</td>
<td>Data Package</td>
<td>As Directed</td>
<td>_____</td>
<td></td>
</tr>
</tbody>
</table>

1.03 SUBMISSION OF OPERATION AND MAINTENANCE DATA:

A. Submit operation and maintenance (O&M) data which is specifically applicable to this contract and a complete and concise depiction of the provided equipment or product. Data containing extraneous information to be sorted through to find applicable instructions will not be accepted. Present information in sufficient detail to clearly explain user O&M requirements at the system, equipment, component, and subassembly level. Include an index preceding each submittal. Submit in accordance with Section 01300, "Submittals."

B. Quantity: Unless specified otherwise in the AF Form 66, submit four CD’s with of the manufacturers’ information in PDF format, specified herein for the components, assemblies, subassemblies, attachments, and accessories. The items for which O&M data is required are listed in the technical sections which specify that particular item.

C. Package Content: For each product, system, or piece of equipment requiring submission of O&M data, submit the package required in the individual technical section. Package content shall be as required in the paragraph herein entitled "Schedule of Operations and Maintenance Data Packages."

1.03.1 Delivery:

Submit O&M data to the Contracting Officer for review and acceptance; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

1.03.2 Changes to Submittals
Manufacturer-originated changes or revisions to submitted data shall be furnished by the Contractor if a component of an item is so affected subsequent to acceptance of the O&M data. Changes, additions, or revisions required by the Contracting Officer for final acceptance of submitted data, shall be submitted by the Contractor within 30 calendar days of the notification of this change requirement.

1.04 TYPES OF INFORMATION REQUIRED IN O&M DATA PACKAGES

1.04.1 Operating Instructions

Include specific instructions, procedures, and illustrations for the following phases of operation:

1.04.1.1 Safety Precautions

List personnel hazards and equipment or product safety precautions for all operating conditions.

1.04.1.2 Operator Prestart

Include requirements to set up and prepare each system for use.

1.04.1.3 Startup, Shutdown, and Postshutdown Procedures

Include a control sequence for each of these operations.

1.04.1.4 Normal Operations

Include control diagrams with data to explain operation and control of systems and specific equipment.

1.04.1.5 Emergency Operations

Include emergency procedures for equipment malfunctions to permit a short period of continued operation or to shut down the equipment to prevent further damage to systems and equipment. Include emergency shutdown instructions for fire, explosion, spills, or other foreseeable contingencies. Provide guidance on emergency operations of all utility systems including valve locations and portions of systems controlled.

1.04.1.6 Operator Service Requirements

Include instructions for services to be performed by the operator such as lubrication, adjustments, and inspection.

1.04.1.7 Environmental Conditions

Include a list of environmental conditions (temperature, humidity, and other relevant data) which are best suited for each product or piece of equipment and describe conditions under which equipment should not be allowed to run.
1.04.2 Preventive Maintenance

Include the following information for preventive and scheduled maintenance to minimize corrective maintenance and repair.

1.04.2.1 Lubrication Data

Include lubrication data, other than instructions for lubrication in accordance with paragraph entitled "Operator Service Requirements":

a. A table showing recommended lubricants for specific temperature ranges and applications.

b. Charts with a schematic diagram of the equipment showing lubrication points, recommended types and grades of lubricants, and capacities.

c. A lubrication schedule showing service interval frequency.

1.04.2.2 Preventive Maintenance Plan and Schedule

Include manufacturer's schedule for routine preventive maintenance, inspections, tests and adjustments required to ensure proper and economical operation and to minimize corrective maintenance and repair. Provide manufacturer's projection of preventive maintenance man-hours on a daily, weekly, monthly, and annual basis including craft requirements by type of craft.

1.04.3 Corrective Maintenance

Include manufacturer's recommendations on procedures and instructions for correcting problems and making repairs.

1.04.3.1 Troubleshooting Guides and Diagnostic Techniques

Include step-by-step procedures to promptly isolate the cause of typical malfunctions. Describe clearly why the checkout is performed and what conditions are to be sought. Identify tests or inspections and test equipment required to determine whether parts and equipment may be reused or require replacement.

1.04.3.2 Wiring Diagrams and Control Diagrams

Wiring diagrams and control diagrams shall be point-to-point drawings of wiring and control circuits including factory-field interfaces. Provide a complete and accurate depiction of the actual job specific wiring and control work. On diagrams number electrical and electronic wiring and pneumatic control tubing and the terminals for each type, identically to actual installation numbering.

1.04.3.3 Maintenance and Repair Procedures
Include instructions and list tools required to restore product or equipment to proper condition or operating standards.

1.04.3.4 Removal and Replacement Instructions

Include step-by-step procedures and list required tools and supplies for removal, replacement, disassembly, and assembly of components, assemblies, subassemblies, accessories, and attachments. Provide tolerances, dimensions, settings and adjustments required. Instructions shall include a combination of text and illustrations.

1.04.3.5 Spare Parts and Supply Lists

Include lists of spare parts and supplies required for maintenance and repair to ensure continued service or operation without unreasonable delays. Special consideration is required for facilities at remote locations. List spare parts and supplies that have a long lead time to obtain.

1.04.3.6 Corrective Maintenance Man-Hours

Include manufacturer's projection of corrective maintenance man-hours including craft requirements by type of craft. Corrective maintenance that requires participation of the equipment manufacturer shall be identified and tabulated separately.

1.04.4 Appendices

Provide information required below and information not specified in the preceding paragraphs but pertinent to the maintenance or operation of the product or equipment. Include the following:

1.04.4.1 Parts Identification

Provide identification and coverage for all parts of each component, assembly, subassembly, and accessory of the end items subject to replacement. Include special hardware requirements, such as requirement to use high-strength bolts and nuts. Identify parts by make, model, serial number, and source of supply to allow reordering without further identification. Provide clear and legible illustrations, drawings, and exploded views to enable easy identification of the items. When illustrations omit the part numbers and description, both the illustrations and separate listing shall show the index, reference, or key number which will cross-reference the illustrated part to the listed part. Parts shown in the listings shall be grouped by components, assemblies, and subassemblies.

a. Manufacturer's Standard Commercial Practice: The parts data may cover more than one model or series of equipment, components, assemblies, subassemblies, attachments, or accessories, such as a master parts catalog, in accordance with the manufacturer's standard commercial practice.

b. Other Than Manufacturer's Standard Commercial Practice: End item manufacturer may add a cross-reference to implement components' assemblies and parts requirements when implementation in manual form varies significantly from the style, format, and method of manufacturer's standard commercial practice. Use the format in the following example:
End Item | Actual Manufacturer's Alphanumeric Sequence | Manufacturer's Name and FSCM | Actual Manufacturer Part No.
--- | --- | --- | ---
100001 | John Doe & Co. 00000 | 2000002

1.04.4.2 Warranty Information

List and explain the various warranties and include the servicing and technical precautions prescribed by the manufacturers or contract documents to keep warranties in force.

1.04.4.3 Personnel Training Requirements

Provide information available from the manufacturers to use in training designated personnel to operate and maintain the equipment and systems properly.

1.04.4.4 Testing Equipment and Special Tool Information

Include information on test equipment required to perform specified tests and on special tools needed for the operation, maintenance, and repair of components.

1.04.4.5 Contractor Information

Provide a list that includes the name, address, and telephone number of the General Contractor and each subcontractor installing the product or equipment. Include local representatives and service organizations most convenient to the project site. Provide the name, address, and telephone number of the product or equipment manufacturers.

1.05 SCHEDULE OF OPERATION AND MAINTENANCE DATA PACKAGES

Furnish the O&M data packages specified in individual technical sections. The required information for each O&M data package is as follows:

1.05.1 Data Package

a. Safety precautions

b. Normal operations

c. Emergency operations

d. Environmental conditions

e. Lubrication data

f. Preventive maintenance plan and schedule
g. Trouble shooting guides and diagnostic techniques

h. Wiring diagrams and control diagrams

i. Maintenance and repair procedures

j. Removal and replacement instructions

k. Spare parts and supply list

l. Parts identification

m. Warranty information

n. Testing equipment and special tool information

o. Contractor information

<<<<<<END OF SECTION>>>>>
PART 1   GENERAL

1.1 REFERENCES

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

**AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)**


AASHTO T 180 (2015) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

**AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)**

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

**CARPET AND RUG INSTITUTE (CRI)**

CRI CIS (2011) Carpet Installation Standard

**U.S. ARMY CORPS OF ENGINEERS (USACE)**


**U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)**

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

1.2 PROJECT DESCRIPTION

1.2.1 Demolition/Deconstruction Plan

Prepare a Demolition Plan and submit proposed salvage, demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress, a disconnection schedule of utility services, a detailed description of methods and equipment to be used for each operation and of the sequence of operations. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities,
condition, destination, and end use. Coordinate with Waste Management Plan. Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

1.2.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes the value derived from the salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the building. The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Contracting Officer.

In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged
during the work under this contract with like-kind or as approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Government and disconnected and sealed by the Contractor.

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals

Demolition Plan; G
Existing Conditions

SD-07 Certificates

Notification; G

1.6 QUALITY ASSURANCE

Submit timely notification of demolition and renovation projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the State's environmental protection agency and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.
1.6.1 Dust and Debris Control

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Vacuum and dust the work area daily.

1.7 PROTECTION

1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Notify the Contracting Officer prior to beginning such work.

1.7.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

1.8 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.9 EXISTING CONDITIONS

Before beginning any demolition work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill voids, depressions or excavations resulting from demolition of structures.

b. Fill material shall conform to the definition of satisfactory soil
material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

c. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

<table>
<thead>
<tr>
<th>Soil classification</th>
<th>AASHTO M 145</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moisture-density relations</td>
<td>AASHTO T 180, Method B or D</td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Structures

a. Remove sidewalks, curbs, gutters and street light bases as indicated.
   b. Demolish structures in a systematic manner. Demolish concrete and masonry walls in small sections.
   c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area.

3.1.3 Paving and Slabs

Remove sawcut concrete and asphaltic concrete paving and slabs as indicated. Provide neat sawcuts at limits of slab removal as indicated.
3.1.4 Roofing

Remove single-ply roofing to effect the connections with new flashing or roofing. Cut existing membrane and insulation along straight lines. Sequence work to minimize building exposure between demolition and new roof materials installation.

3.1.4.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary work prior to installation of permanent roof system materials unless approved otherwise by the Contracting Officer. Make provisions for worker safety during demolition, deconstruction, and installation of new materials as described in paragraphs entitled "Statements" and "Regulatory and Safety Requirements."

3.1.5 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain and to facilitate the installation of new work. Where new masonry adjoins existing, the new work shall abut or tie into the existing construction as indicated. Provide square, straight edges and corners where existing masonry adjoins new work and other locations.

3.1.6 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete.

3.1.7 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. Scrap metal shall become the Contractor's property. Recycle scrap metal as part of demolition operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.8 Carpentry

Salvage for recycle lumber, millwork items, and finished boards, and sort by type and size. Chip or shred and recycle salvaged wood unfit for reuse, except stained, painted, or treated wood. Remove windows, doors, frames, and cabinets, and similar items as whole units, complete with trim and accessories. Brace the open end of door frames to prevent damage.

3.1.9 Carpet

Remove existing carpet for reclamation in accordance with manufacturer recommendations and as follows. Remove used carpet in large pieces, roll tightly, and pack neatly in a container. Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI). Adhesive removal solvents shall comply with CRI CIS. Recycle removed carpet cushion.

3.1.10 Acoustic Ceiling Tile

Remove, neatly stack, and recycle acoustic ceiling tiles. Recycling may
be available with manufacturer. Otherwise, priority shall be given to a local recycling organization. Recycling is not required if the tiles contain or may have been exposed to asbestos material.

3.1.11 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

a. Concrete and Masonry: Completely fill holes and depressions, caused by previous physical damage or left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

3.1.12 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Turn in salvaged Class I ODS refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.13 Locksets on Swinging Doors

Remove all locksets from all swinging doors indicated to be removed and disposed of. Deliver the locksets and related items to a designated location for receipt by the Contracting Officer after removal.

3.1.14 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved.

3.1.14.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; tanks, piping and fixtures shall be drained; interiors, if previously used to store flammable, explosive, or other dangerous liquids, shall be steam cleaned. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the unit.

3.1.14.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains
can become pressurized due to upstream valve failure, end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve shall be attached to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.14.3 Ducts

Classify removed duct work as scrap metal.

3.1.14.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify non-porcelain broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor. Salvage and crush porcelain plumbing fixtures unsuitable for reuse.

3.1.15 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.15.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.15.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.15.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.
3.1.15.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.1.16 Items With Unique/Regulated Disposal Requirements

Remove and dispose of items with unique or regulated disposal requirements in the manner dictated by law or in the most environmentally responsible manner.

3.2 DISPOSITION OF MATERIAL

3.2.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.2.2 Reuse of Materials and Equipment

Remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.2.3 Salvaged Materials and Equipment

Remove materials and equipment that are listed in the Demolition Plan indicated to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site, as directed.

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. On site sales of salvaged material is prohibited.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.

c. Remove and capture all Class I ODS refrigerants in accordance with the Clean Air Act Amendment of 1990, and turn in as directed by the Contracting Officer.
3.2.4 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material in a disposal area located off site. Dispose of unsalvageable and non-recyclable combustible material in the sanitary fill area located off the site.

3.3 CLEANUP

Remove debris and rubbish from excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.4 DISPOSAL OF REMOVED MATERIALS

3.4.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan. Storage of removed materials on the project site is prohibited.

3.4.2 Burning on Government Property

Burning of materials removed from demolished structures will not be permitted on Government property.

3.4.3 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

-- End of Section --
SECTION 02 42 51
CARPET REMOVAL AND RECLAMATION

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

40 CFR 247 Comprehensive Procurement Guideline for Products Containing Recovered Materials

40 CFR 61-SUBPART M National Emission Standard for Asbestos

1.2 SUMMARY

Furnish a contract for used carpet reclamation, including planned procedures for removal and reclamation of used carpet.

Refer to related Section 09 68 00 CARPET for floor preparation prior to installation of new carpet.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals

Proposed Dust-Control Measures; G,
Proposed Packing And Transportation Measures; G,
Schedule of Carpet Reclamation Activities; G,
Carpet Reclamation Agency Records; G,
1.4 QUALITY ASSURANCE

1.4.1 Carpet Reclamation Agency

Provide documentation of being a Carpet America Recovery Efforts (CARE) approved carpet removal contractor (or designated agent firm) providing used carpet recycling under the most current EPA recognized Carpet Reclamation Program, or equivalent from alternate recycling agent.

1.4.2 Carpet Remover Requirements

Submit details for the following:

- Proposed dust-control measures
- Proposed packing and transportation measures

1.4.3 Carpet Reclamation Agency Submittal

Submit a copy of carpet reclamation agency records verifying receipt and disposition of used carpet.

1.4.4 Regulatory Requirements

Comply with governing regulations; including, but not limited to:

- EPA 340/1-90/018
- EPA AP-42
- 40 CFR 61-SUBPART M
- ASSE/SAFE A10.6
- 40 CFR 247

Comply with hauling and disposal regulations of authorities having jurisdiction. Record and maintain records of all off-site removal of debris and materials.

Provide the following information regarding the removed materials within the schedule of carpet reclamation activities:

- a. Time and Date of Removal.
- b. Type of Material.
- c. Weight and Quantity of Materials.
- d. Final Destination of Materials.

1.4.4.1 Carpet Reclamation Agency and Carpet Remover Certification

Certify in writing that used carpet was removed and recycled in accordance with the most current EPA recognized Carpet Reclamation Program. Do not place removed carpet and associated materials in a landfill.
1.5 PROJECT CONDITIONS

1.5.1 Environmental Requirements

Obtain approval of Owner before performing operations which generate contaminants.

PART 2 PRODUCTS

2.1 CARPET RECLAMATION AGENCY

The current approved reclamation agency is Carpet America Recovery Effort (CARE).

2.2 CARPET REMOVERS

Submit documentation of being a CARE approved carpet removal contractor.

2.3 MATERIALS

2.3.1 Adhesive Removal Solvents

Comply with Carpet and Rug Institute Publication 104.

2.3.2 Used Carpet

Maintain possession of removed used carpet. Immediately remove from site and place in container or trailer.

Carefully remove, store, and protect designated materials and equipment for re-installation under other Sections or for retention by Owner.

2.3.3 Carpet Pad

Provide recycling of carpet padding where locally available or as designated by Carpet Reclamation Agency.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Verification of Conditions

Examine areas and conditions under which work is to be performed; identify conditions detrimental to proper or timely completion. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

Provide, erect, and maintain barricades, lighting, and guardrails as required to protect general public, workers, and adjoining property.

Vacuum used carpet before removal.

3.3 CARPET REMOVAL

Remove used carpets in large pieces, roll tightly, and pack neatly in container. Include carpet scrap and waste from new installation.
Deposit only clean, dry carpet in containers. "Clean" is defined as free from demolition debris, asbestos contamination, garbage, and tack strips.

Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI).

3.4 CONTAINER DISPOSAL

Place used carpet in fully-enclosed, front loading 40-yard container supplied by Carpet Reclamation Agency. Place only used commercial carpeting in collection container. Keep container locked or supervised.

Use effective packing techniques to maximize the amount of material in the container. On average, a container holds 2,000-3,000 square yards. Neatly stack carpet tiles or repack in cardboard boxes before placing in container.

When container is full, contact Carpet Reclamation Agency to coordinate pickup and drop-off of replacement container. If container is locked for security purposes, remove lock before pickup.

3.5 INTERIOR OPERATIONS

Seal doors and other openings with duct tape at heads, jambs, and sills to contain contaminants from work which occurs within a single room.

Damp mop hard surface floors in work area daily to minimize tracking of contaminants from work area. In carpeted areas, protect carpet with plastic and plywood. Provide hard-surfaced area at entrances for daily damp mopping.

-- End of Section --
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1   GENERAL

1.1   REFERENCES

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

ACI INTERNATIONAL (ACI)


AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182 (2005; R 2012) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats
AASHTO M 322/M 322 (2007) Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement

AMERICAN HARDBOARD ASSOCIATION (AHA)

AHA A135.4 (1995; R 2004) Basic Hardboard

ASTM INTERNATIONAL (ASTM)

ASTM A 615/A 615M (2009b) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A 706/A 706M (2009b) Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
<table>
<thead>
<tr>
<th>ASTM Specification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A 775/A 775M</td>
<td>(2007b) Standard Specification for Epoxy-Coated Steel Reinforcing Bars</td>
</tr>
<tr>
<td>ASTM A 996/A 996M</td>
<td>(2009b) Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement</td>
</tr>
<tr>
<td>ASTM C 311</td>
<td>(2007) Sampling and Testing Fly Ash or Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete</td>
</tr>
</tbody>
</table>
Compressive Strength of Cylindrical Concrete Specimens


ASTM C 618 (2008a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete


ASTM E 329 (2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in

SECTION 03 30 00 Page 3
1.2 DEFINITIONS

a. "Cementitious material" as used herein must include all portland cement, pozzolan, fly ash, ground granulated blast-furnace slag, and .

b. "Exposed to public view" means situated so that it can be seen from eye level from a public location after completion of the building. A public location is accessible to persons not responsible for operation or maintenance of the building.

c. "Chemical admixtures" are materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not obtainable with plain concrete mixes.

d. "Workability (or consistence)" is the ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Fabrication Drawings for concrete formwork must be submitted by the Contractor in accordance with paragraph entitled, "Shop Drawings," of this section, to include the following:
Reinforcing steel; G

Reproductions of contract drawings are unacceptable.

Provide erection drawings for concrete Formwork that show placement of reinforcement and accessories, with reference to the contract drawings.

SD-03 Product Data

Materials for curing concrete
Joint sealants

Submit manufacturer's product data, indicating VOC content. Manufacturer's catalog data for the following items must include printed instructions for admixtures, bonding agents, epoxy-resin adhesive binders, waterstops, and liquid chemical floor hardeners.

Joint filler
Plastic Forms
Recycled Aggregate Materials
Cement
Portland Cement
Ready-Mix Concrete
Vapor retarder
Bonding Materials
Floor Finish Materials
Concrete Curing Materials
Reinforcement
Reinforcement Materials

Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

Vapor retarder
Waterstops

SD-04 Samples

Slab finish sample

Submit the following samples:

Three samples of each type waterstop, 1/2 inch long.

Dumbbell Type
Rubber
Polyvinylchloride (PVC)

SD-05 Design Data

Concrete mix design; G

Thirty days minimum prior to concrete placement, submit a mix design for each strength and type of concrete. Submit a complete list of materials including type; brand; source and amount of
cement, fly ash, pozzolans, ground slag, and admixtures; and applicable reference specifications. Provide mix proportion data using at least three different water-cement ratios for each type of mixture, which produce a range of strength encompassing those required for each class and type of concrete required. If source material changes, resubmit mix proportion data using revised source material. Provide only materials that have been proven by trial mix studies to meet the requirements of this specification, unless otherwise approved in writing by the Contracting Officer. Indicate clearly in the submittal where each mix design is used when more than one mix design is submitted. Submit additional data regarding concrete aggregates if the source of aggregate changes. Submit copies of the fly ash, and pozzolan test results, in addition. The approval of fly ash, and pozzolan test results must be within 6 months of submittal date. Obtain acknowledgement of receipt prior to concrete placement.

SD-06 Test Reports
Concrete mix design; G
Fly ash
Pozzolan
Ground granulated blast-furnace slag
Aggregates
Compressive strength tests
Slump

SD-07 Certificates
Curing concrete elements
Pumping concrete
Material Safety Data Sheets

SD-08 Manufacturer's Instructions
Fly ash
Ground granulated blast-furnace slag

Submit mill certificates for Steel Bar according to the paragraph entitled, "Fabrication," of this section.

Provide certificates for concrete that are in accordance with the paragraph entitled, "Classification and Quality of Concrete," of this section. Provide certificates that contain project name and number, date, name of Contractor, name of concrete testing service, source of concrete aggregates, material manufacturer, brand name of manufactured materials, material name, values as specified for each material, and test results. Provide certificates for Welder Qualifications that are in accordance with the paragraph entitled, "Qualifications for Welding Work," of this section.
SD-11 Closeout Submittals

1.4 MODIFICATION OF REFERENCES

Accomplish work in accordance with ACI publications except as modified herein. Consider the advisory or recommended provisions to be mandatory. Interpret reference to the "Building Official," the "Structural Engineer," and the "Architect/Engineer" to mean the Contracting Officer.

1.5 DELIVERY, STORAGE, AND HANDLING

Do not deliver concrete until vapor retarder, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. ACI/MCP-2 for job site storage of materials. Protect materials from contaminants such as grease, oil, and dirt. Ensure materials can be accurately identified after bundles are broken and tags removed. Do not store concrete curing compounds or sealers with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store concrete curing compounds or sealers in occupied spaces.

1.5.1 Reinforcement

Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground. Protect from contaminants such as grease, oil, and dirt. Ensure bar sizes can be accurately identified after bundles are broken and tags removed.

1.6 QUALITY ASSURANCE

1.6.1 Drawings

1.6.1.1 Shop Drawings

1.6.1.2 Reinforcing Steel

ACI/MCP-4. Indicate bending diagrams, assembly diagrams, splicing and laps of bars, shapes, dimensions, and details of bar reinforcing, accessories, and concrete cover. Do not scale dimensions from structural drawings to determine lengths of reinforcing bars.

1.6.2 Control Submittals

1.6.2.1 Curing Concrete Elements

Submit proposed materials and methods for curing concrete elements.

1.6.2.2 Pumping Concrete

Submit proposed materials and methods for pumping concrete. Submittal must include mix designs, pumping equipment including type of pump and size and material for pipe, and maximum length and height concrete is to be pumped.

1.6.2.3 Material Safety Data Sheets

Submit Material Safety Data Sheets (MSDS) for all materials that are regulated for hazardous health effects. Prominently post the MSDS at the construction site.
1.6.3 Test Reports

1.6.3.1 Concrete Mix Design

Submit copies of laboratory test reports showing that the mix has been successfully tested to produce concrete with the properties specified and that mix must be suitable for the job conditions. Include mill test and all other test for cement, aggregates, and admixtures in the laboratory test reports. Provide maximum nominal aggregate size, gradation analysis, percentage retained and passing sieve, and a graph of percentage retained verses sieve size. Submit test reports along with the concrete mix design. Obtain approval before concrete placement.

1.6.3.2 Fly Ash and Pozzolan

Submit test results in accordance with ASTM C 618 for fly ash and pozzolan. Submit test results performed within 6 months of submittal date. Submit manufacturer's policy statement on fly ash use in concrete.

1.6.3.3 Ground Granulated Blast-Furnace Slag

Submit test results in accordance with ASTM C 989 for ground granulated blast-furnace slag. Submit test results performed within 6 months of submittal date. Submit manufacturer's policy statement on slag use in concrete.

1.7 ENVIRONMENTAL REQUIREMENTS

Provide space ventilation according to manufacturer recommendations, at a minimum, during and following installation of concrete curing compound and sealer. Maintain one of the following ventilation conditions during the curing compound/sealer curing period or for 72 hours after installation:

a. Supply 100 percent outside air 24 hours a day.

b. Supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 84 degrees F and humidity is between 30 percent and 60 percent.

c. Supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated above.

1.7.1 Submittals for Environmental Performance

a. Provide data indication the percentage of post-industrial pozzolan (fly ash, blast furnace slag) cement substitution as a percentage of the full product composite by weight.

b. Provide data indicating the percentage of post-industrial and post-consumer recycled content aggregate.

c. Provide product data indicating the percentage of post-consumer recycled steel content in each type of steel reinforcement as a percentage of the full product composite by weight.

d. Provide product data stating the location where all products were manufactured

e. For projects using FSC certified formwork, provide chain-of-custody
documentation for all certified wood products.

f. For projects using reusable formwork, provide data showing how formwork is reused.

g. Provide MSDS product information data showing that form release agents meet any environmental performance goals such as using vegetable and soy based products.

h. Provide MSDS product information data showing that concrete adhesives meet any environmental performance goals including low emitting, low volatile organic compound products.

1.8 QUALIFICATIONS FOR CONCRETE TESTING SERVICE

Perform concrete testing by an approved laboratory and inspection service experienced in sampling and testing concrete. Testing agency must meet the requirements of ASTM E 329.

1.9 CONCRETE SAMPLING AND TESTING

Testing by the Contractor must include sampling and testing concrete materials proposed for use in the work and testing the design mix for each class of concrete. Perform quality control testing during construction.

Sample and test concrete aggregate materials proposed for use in the work in accordance with ASTM C 33/C 33M.

Sample and test portland cement in accordance with ASTM C 150/C 150M.

Sample and test air-entraining admixtures in accordance with ASTM C 233.

Testing must be performed by a Grade I Testing Technician.

PART 2 PRODUCTS

2.1 MATERIALS FOR FORMS

Provide wood, plywood, plastic, or steel. Use plywood or steel forms where a smooth form finish is required.

2.1.1 Wood Forms

Provide lumber that is square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects. Provide plywood that complies with DOC/NIST PS1, B-B concrete form panels or better or AHA A135.4, hardboard for smooth form lining.

2.1.1.1 Concrete Form Plywood (Standard Rough)

Provide plywood that conforms to NIST PS 1, B-B, concrete form, not less than 5/8-inch thick.

2.1.1.2 Overlaid Concrete Form Plywood (Standard Smooth)

Provide plywood that conforms to NIST PS 1, B-B, high density form overlay, not less than 5/8-inch thick.
2.1.2 Plastic Forms

Provide plastic forms that contain a minimum of 50 percent post-consumer recycled content, or a minimum of 50 percent post-industrial recycled content.

2.1.3 Steel Forms

Provide steel form surfaces that do not contain irregularities, dents, or sags.

2.2 FORM TIES AND ACCESSORIES

The use of wire alone is prohibited. Provide form ties and accessories that do not reduce the effective cover of the reinforcement.

2.2.1 Dovetail Anchor Slot

Preformed metal slot approximately 1 by 1 inch of not less than 22 gage galvanized steel cast in concrete. Coordinate actual size and throat opening with dovetail anchors and provide with removable filler material.

2.3 CONCRETE

2.3.1 Ready-Mix Concrete

Provide concrete that meets the requirements of ASTM C 94/C 94M.

Ready-mixed concrete manufacturer must provide duplicate delivery tickets with each load of concrete delivered. Provide delivery tickets with the following information in addition to that required by ASTM C 94/C 94M:

- Type and brand cement
- Cement content in 95-pound bags per cubic yard of concrete
- Maximum size of aggregate
- Amount and brand name of admixtures
- Total water content expressed by water/cement ratio

2.3.2 Concrete Curing Materials

2.3.2.1 Absorptive Cover

Provide burlap cloth cover for curing concrete made from jute or kenaf, weighing 10 ounces plus or minus 5 percent per square yard when clean and dry, conforming to ASTM C 171, Class 3; or cover may be cotton mats as approved.

2.3.2.2 Moisture-Retaining Cover

Provide waterproof paper cover for curing concrete conforming to ASTM C 171, regular or white, or polyethylene sheeting conforming to ASTM C 171, or polyethylene-coated burlap consisting of a laminate of burlap and a white opaque polyethylene film permanently bonded to the burlap; burlap must conform to ASTM C 171, Class 3, and polyethylene film must conform to ASTM C 171. When tested for water retention in accordance with ASTM C 156,
weight of water lost 72 hours after application of moisture retaining covering material must not exceed 0.039 gram per square centimeter of the mortar specimen surface.

2.3.2.3 Membrane-Forming Curing Compound

Provide liquid type compound conforming to ASTM C 309, Type 1, clear, Type 1D with fugitive dye for interior work and Type 2, white, pigmented for exterior work.

2.4 MATERIALS

2.4.1 Cement

ASTM C 150/C 150M, Type I or II or ASTM C 595/C 595M, Type blended cement except as modified herein. Provide blended cement that consists of a mixture of ASTM C 150/C 150M, Type II, cement and one of the following materials: ASTM C 618 pozzolan or fly ash, ASTM C 989 ground granulated blast-furnace slag. For portland cement manufactured in a kiln fueled by hazardous waste, maintain a record of source for each batch. For exposed concrete, use one manufacturer for each type of cement, ground slag, fly ash, and pozzolan.

2.4.1.1 Fly Ash and Pozzolan

ASTM C 618, Type N, F, or C, except that the maximum allowable loss on ignition must be 6 percent for Types N and F. Add with cement. Fly ash content must be a minimum of 20 percent by weight of cementitious material, provided the fly ash does not reduce the amount of cement in the concrete mix below the minimum requirements of local building codes. Where the use of fly ash cannot meet the minimum level, provide the maximum amount of fly ash permissible that meets the code requirements for cement content. Report the chemical analysis of the fly ash in accordance with ASTM C 311. Evaluate and classify fly ash in accordance with ASTM D 5759.

High contents of supplementary cementitious materials can have some detrimental effects on the concrete properties, such as slowing excessively the strength gain rate, and delaying and increasing the difficulty of finishing. The recommended maximum content (by weight of the total cementitious material) for these materials are:

1. For GGBF slag: 50 percent
2. For fly ash or natural pozzolan: 40 percent (25 percent in cold climates)

2.4.1.2 Ground Granulated Blast-Furnace Slag

ASTM C 989, Grade 80. Use of slag is optional.

2.4.1.3 Portland Cement

Provide cement that conforms to ASTM C 150/C 150M, Type I, IA, II, or IIA. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.
2.4.2 Water

Minimize the amount of water in the mix. In general, improve workability by adjusting the grading rather than by adding water. Water must be fresh, clean, and free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete.

2.4.3 Aggregates

ASTM C 33/C 33M, except as modified herein. Furnish aggregates for exposed concrete surfaces from one source. Provide aggregates that do not contain any substance which may be deleteriously reactive with the alkalies in the cement.

2.4.4 Nonshrink Grout

ASTM C 1107/C 1107M.

2.4.5 Admixtures

ASTM C 494/C 494M: Type A, water reducing; Type B, retarding; Type C, accelerating; Type D, water-reducing and retarding; and Type E, water-reducing and accelerating admixture. Do not use calcium chloride admixtures.

2.4.5.1 High Range Water Reducer (HRWR) (Superplasticizers)

ASTM C 494/C 494M, Type F and Type G (HRWR retarding admixture) and ASTM C 1017/C 1017M.

2.4.5.2 Pozzolan

Provide fly ash or other pozzolans used as admixtures that conform to ASTM C 618.

2.4.6 Vapor Retarder

2.4.7 Materials for Curing Concrete

Consider the use of water based or vegetable or soy based curing agents in lieu of petroleum based products. Consider agents that are not toxic and emit low or no Volatile Organic Compounds (VOC). Consider the use of admixtures that offer high performance to increase durability of the finish product but also have low toxicity and are made from bio-based materials such as soy, and emit low levels of Volatile Organic Compounds (VOC).

2.4.7.1 Impervious Sheeting

ASTM C 171; waterproof paper, clear or white polyethylene sheeting, or polyethylene-coated burlap.

2.4.7.2 Pervious Sheeting

AASHTO M 182.

2.4.7.3 Liquid Membrane-Forming Compound

ASTM C 309, white-pigmented, Type 2, Class B.
2.4.8 Liquid Chemical Sealer-Hardener Compound

Provide surface treatments containing certain chemicals, including sodium silicate and the fluosilicates of magnesium and zinc. Provide compound that does not reduce the adhesion of resilient flooring, tile, paint, roofing, waterproofing, or other material applied to concrete.

2.4.9 Expansion/Contraction Joint Filler

ASTM D 1751, ASTM D 1752, cork or 100 percent post-consumer paper meeting ASTM D 1752 (subparagraphs 5.1 to 5.4). Material must be 1/2 inch thick, unless otherwise indicated.

2.4.9.1 Preformed Joint Filler Strips

Provide nonextruding and resilient bituminous type filler strips conforming to ASTM D 1751.

2.4.10 Joint Sealants

2.4.10.1 Horizontal Surfaces, 3 Percent Slope, Maximum

ASTM D 6690 or ASTM C 920, Type M, Class 25, Use T. ASTM D 7116 for surfaces subjected to jet fuel.

2.4.10.2 Vertical Surfaces Greater Than 3 Percent Slope

ASTM C 920, Type M, Grade NS, Class 25, Use T.

2.4.10.3 Waterstops

Provide waterstops made of rubber and that conform to ASTM D 1752.

2.4.10.4 Joint Sealant Compound

Provide cold-applied, two-component, elastomeric polymer type compound conforming to FS SS-S-200.

2.4.11 Epoxy Bonding Compound

ASTM C 881/C 881M. Provide Type I for bonding hardened concrete to hardened concrete; Type II for bonding freshly mixed concrete to hardened concrete; and Type III as a binder in epoxy mortar or concrete, or for use in bonding skid-resistant materials to hardened concrete. Provide Grade 1 or 2 for horizontal surfaces and Grade 3 for vertical surfaces. Provide Class A if placement temperature is below 40 degrees F; Class B if placement temperature is between 40 and 60 degrees F; or Class C if placement temperature is above 60 degrees F.

2.5 REINFORCEMENT

2.5.1 Reinforcing Bars

ACI/MCP-2 unless otherwise specified. Use deformed steel. ASTM A 615/A 615M and AASHTO M 322/M 322 with the bars marked A, S, W, Grade 60; or ASTM A 996/A 996M with the bars marked R, Grade 60, or marked A, Grade 60.
2.5.1.1 Galvanized Reinforcing Bars

Provide galvanized reinforcing bars that conform to ASTM A 767/A 767M, Class II with galvanizing before fabrication.

2.5.1.2 Weldable Reinforcing Bars

Provide weldable reinforcing bars that conform to ASTM A 706/A 706M and ASTM A 615/A 615M and Supplement S1, Grade 60, except that the maximum carbon content must be 0.55 percent.

2.5.1.3 Epoxy-Coated Reinforcing Bars

Provide epoxy-coated reinforcing bars that conform to ASTM A 775/A 775M, Grade 40 or Grade 60.

2.5.2 Mechanical Reinforcing Bar Connectors

ACI/MCP-2. Provide 125 percent minimum yield strength of the reinforcement bar.

2.5.3 Wire

ASTM A 82/A 82M or ASTM A 496/A 496M.

2.5.3.1 Welded Wire Fabric

ASTM A 185/A 185M or ASTM A 497/A 497M. Provide flat sheets of welded wire fabric for slabs and toppings.

2.5.3.2 Steel Wire

Wire must conform to ASTM A 82/A 82M.

2.5.4 Reinforcing Bar Supports

Provide bar ties and supports of coated or non-corrodible material. Use recycled plastic with 100 percent recycled content.

2.5.5 Chairs and Bolsters: Steel

2.5.6 Supports for Reinforcement

Supports include bolsters, chairs, spacers, and other devices necessary for proper spacing, supporting, and fastening reinforcing bars and wire fabric in place.

Provide wire bar type supports conforming to ACI/MCP-3, ACI/MCP-4 and CRSI 10MSP.

Legs of supports in contact with formwork must be hot-dip galvanized, or plastic coated after fabrication, or stainless-steel bar supports.

2.6 BONDING MATERIALS

2.6.1 Concrete Bonding Agent

Provide aqueous-phase, film-forming, nonoxidizing, freeze and thaw-resistant compound agent suitable for brush or spray application.
conforming to ASTM C 932.

2.6.2 Epoxy-Resin Adhesive Binder

Provide two-component, epoxy-polysulfide polymer type binder with an amine-type curing-agent conforming to FS MMM-A-001993, Type I or ASTM C 881/C 881M.

2.7 CLASSIFICATION AND QUALITY OF CONCRETE

2.7.1 Concrete Classes and Usage

Provide concrete classes, compressive strength, requirements for air entrainment, and usage as indicated on the drawings.

2.7.2 Maximum Size of Aggregate

Size of aggregate, designated by the sieve size on which maximum amount of retained coarse aggregate is 5 to 10 percent by weight, must be as follows:

<table>
<thead>
<tr>
<th>MAXIMUM SIZE OF AGGREGATE</th>
<th>ASTM C 33/C 33M SIZE NUMBER</th>
<th>TYPE OF CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/2 inches</td>
<td>467</td>
<td>Monolithic slabs on ground, concrete fill, and other flatwork having a depth of not less than 5 inches and a clear distance between reinforcing bars of not less than 2 inches</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>67</td>
<td>Reinforced walls, columns, girders, beams, and other formed sections having a dimension between forms of not less than 6 inches and clear distance between reinforcing bars or reinforcing bar and face of form of not less than 1 inch</td>
</tr>
<tr>
<td>3/4 inch</td>
<td>67</td>
<td>Monolithic concrete slabs and other flatwork having a depth of not less than 2-1/2 inches and a clear distance between reinforcing bars of not less than 1 inch</td>
</tr>
<tr>
<td>3/8 inch</td>
<td>8</td>
<td>Nonreinforced slabs and other flatwork having a depth of less than 2-1/2 inches</td>
</tr>
</tbody>
</table>

Maximum size of aggregate may be that required for most critical type of construction using that concrete class.

Specify gradation of aggregates for separate floor topping.
2.7.3 Slump

Provide slump for concrete at time and in location of placement as indicated on the approved mix design.

PART 3 EXECUTION

3.1 EXAMINATION

Do not begin installation until substrates have been properly constructed; verify that substrates are plumb and true.

If substrate preparation is the responsibility of another installer, notify Architect/Engineer of unsatisfactory preparation before processing.

Check field dimensions before beginning installation. If dimensions vary too much from design dimensions for proper installation, notify Architect/Engineer and wait for instructions before beginning installation.

3.2 PREPARATION

Determine quantity of concrete needed and minimize the production of excess concrete. Designate locations or uses for potential excess concrete before the concrete is poured.

3.2.1 General

Surfaces against which concrete is to be placed must be free of debris, loose material, standing water, snow, ice, and other deleterious substances before start of concrete placing.

Remove standing water without washing over freshly deposited concrete. Divert flow of water through side drains provided for such purpose.

3.2.2 Subgrade Under Foundations and Footings

When subgrade material is semiporous and dry, sprinkle subgrade surface with water as required to eliminate suction at the time concrete is deposited. When subgrade material is porous, seal subgrade surface by covering surface with specified vapor retarder; this may also be used over semiporous, dry subgrade material instead of water sprinkling.

3.2.3 Subgrade Under Slabs on Ground

Before construction of slabs on ground, have underground work on pipes and conduits completed and approved.

Previously constructed subgrade or fill must be cleaned of foreign materials and inspected by the Contractor for adequate compaction and surface tolerances as specified.

Actual density of top 12 inches of subgrade soil material-in-place must be as indicated in the Final Geotechnical Investigation. Finish surface of capillary water barrier under interior slabs on ground must not show deviation in excess of 1/4 inch when tested with a 10-foot straightedge parallel with and at right angles to building lines.

Finished surface of subgrade or fill under exterior slabs on ground must not be more than 0.02-foot above or 0.10-foot below elevation indicated.
Prepare subgrade or fill surface under exterior slabs on ground as specified for subgrade under foundations and footings.

3.2.4  Formwork

Complete and approve formwork. Remove debris and foreign material from interior of forms before start of concrete placing.

3.2.5  Edge Forms and Screed Strips for Slabs

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain indicated elevations and contours in finished slab surface and must be strong enough to support vibrating bridge screeds or roller pipe screeds if nature of specified slab finish requires use of such equipment. Align concrete surface to elevation of screed strips by use of strike-off templates or approved compacting-type screeds.

3.2.6  Reinforcement and Other Embedded Items

Secure reinforcement, joint materials, and other embedded materials in position, inspected, and approved before start of concrete placing.

3.3  FORMS

ACI/MCP-2. Provide forms, shoring, and scaffolding for concrete placement. Set forms mortar-tight and true to line and grade. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch unless otherwise indicated. Provide formwork with clean-out openings to permit inspection and removal of debris. Forms submerged in water must be watertight.

3.3.1  General

Construct forms to conform, within the tolerances specified, to shapes dimensions, lines, elevations, and positions of cast-in-place concrete members as indicated. Forms must be supported, braced, and maintained sufficiently rigid to prevent deformation under load.

3.3.2  Design and Construction of Formwork

Provide formwork design and construction that conforms to ACI/MCP-2, Chapter 4.

Provide forms that are tight to prevent leakage of cement paste during concrete placing.

Support form facing materials by structural members spaced close to prevent deflection of form facing material. Fit forms placed in successive units for continuous surfaces to accurate alignment to ensure a smooth completed surface within the tolerances specified. Where necessary to maintain the tolerances specified, such as long spans where immediate supports are not possible, camber formwork for anticipated deflections in formwork due to weight and pressure of fresh concrete and to construction loads.

Chamfer exposed joints, edges, and external corners a minimum of 3/4 inch by moldings placed in corners of column, beam, and wall forms.
Provide shores and struts with a positive means of adjustment capable of taking up formwork settlement during concrete placing operations. Obtain adjustment with wedges or jacks or a combination thereof. When adequate foundations for shores and struts cannot be secured, provide trussed supports.

Provide temporary openings in wall forms, column forms, and at other points where necessary to permit inspection and to facilitate cleaning.

Provide forms that are readily removable without impact, shock, or damage to concrete.

3.3.3 Coating

Before concrete placement, coat the contact surfaces of forms with a nonstaining mineral oil, nonstaining form coating compound, or two coats of nitrocellulose lacquer. Do not use mineral oil on forms for surfaces to which adhesive, paint, or other finish material is to be applied.

3.3.4 Reuse

Reuse forms providing the structural integrity of concrete and the aesthetics of exposed concrete are not compromised.

3.3.5 Forms for Standard Rough Form Finish

Give rough form finish concrete formed surfaces that are to be concealed by other construction, unless otherwise specified.

Form facing material for standard rough form finish must be the specified concrete form plywood or other approved form facing material that produces concrete surfaces equivalent in smoothness and appearance to that produced by new concrete form plywood panels.

For concrete surfaces exposed only to the ground, undressed, square-edge, 1-inch nominal thickness lumber may be used. Provide horizontal joints that are level and vertical joints that are plumb.

3.3.6 Forms for Standard Smooth Form Finish

Give smooth form finish concrete formed surfaces that are to be exposed to view or that are to be covered with coating material applied directly to concrete or with covering material bonded to concrete, such as waterproofing, dampproofing, painting, or other similar coating system.

Form facing material for standard smooth finish must be the specified overlaid concrete form plywood or other approved form facing material that is nonreactive with concrete and that produce concrete surfaces equivalent in smoothness and appearance to that produced by new overlaid concrete form plywood panels.

Maximum deflection of form facing material between supports and maximum deflection of form supports such as studs and wales must not exceed 0.0025 times the span.

Provide arrangement of form facing sheets that are orderly and symmetrical, and sheets that are in sizes as large as practical.

Arrange panels to make a symmetrical pattern of joints. Horizontal and
vertical joints must be solidly backed and butted tight to prevent leakage and fins.

3.3.7 Form Ties

Provide ties that are factory fabricated metal, adjustable in length, removable or snap-off type that do allow form deflection or do not spall concrete upon removal. Portion of form ties remaining within concrete after removal of exterior parts must be at least 1-1/2 inches back from concrete surface. Provide form ties that are free of devices that leave a hole larger than 7/8 inch or less than 1/2 inch in diameter in concrete surface. Form ties fabricated at the project site or wire ties of any type are not acceptable.

3.3.8 Tolerances for Form Construction

Construct formwork to ensure that after removal of forms and prior to patching and finishing of formed surfaces, provide concrete surfaces in accordance with tolerances specified in ACI/MCP-1 and ACI/MCP-2.

3.3.9 Removal of Forms and Supports

After placing concrete, forms must remain in place for the time periods specified in ACI/MCP-4. Do not remove forms and shores (except those used for slabs on grade and slip forms) until the client determines that the concrete has gained sufficient strength to support its weight and superimposed loads.

Prevent concrete damage during form removal. Clean all forms immediately after removal.

3.3.9.1 Special Requirements for Reduced Time Period

Forms may be removed earlier than specified if ASTM C 39/C 39M test results of field-cured samples from a representative portion of the structure indicate that the concrete has reached a minimum of 85 percent of the design strength.

3.4 WATERSTOP SPLICES

Fusion weld in the field.

3.5 FORMED SURFACES

3.5.1 Preparation of Form Surfaces

Coat contact surfaces of forms with form-coating compound before reinforcement is placed. Provide a commercial formulation form-coating compound that does not bond with, stain, nor adversely affect concrete surfaces and impair subsequent treatment of concrete surfaces that entails bonding or adhesion nor impede wetting of surfaces to be cured with water or curing compounds. Do not allow excess form-coating compound to stand in puddles in the forms nor to come in contact with concrete against which fresh concrete is placed. Make thinning of form-coating compound with thinning agent of the type, in the amount, and under the conditions recommended by form-coating compound manufacturer's printed or written directions.
3.5.2   Tolerances

ACI/MCP-4 and as indicated.

3.5.3   As-Cast Form

Provide form facing material producing a smooth, hard, uniform texture on the concrete. Arrange facing material in an orderly and symmetrical manner and keep seams to a practical minimum. Support forms as necessary to meet required tolerances. Do not use material with raised grain, torn surfaces, worn edges, patches, dents, or other defects which can impair the texture of the concrete surface.

3.6   PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

ACI/MCP-2. Provide bars, wire fabric, wire ties, supports, and other devices necessary to install and secure reinforcement. Reinforcement must not have rust, scale, oil, grease, clay, or foreign substances that would reduce the bond. Rusting of reinforcement is a basis of rejection if the effective cross-sectional area or the nominal weight per unit length has been reduced. Remove loose rust prior to placing steel. Tack welding is prohibited.

3.6.1   General

Provide details of reinforcement that are in accordance with ACI/MCP-3 and ACI/MCP-4 and as specified.

3.6.2   Vapor Retarder

Provide beneath the on-grade concrete floor slab. Use the greatest widths and lengths practicable to eliminate joints wherever possible. Lap joints a minimum of 12 inches and tape or cement joints. Remove torn, punctured, or damaged vapor retarder material and provide with new vapor retarder prior to placing concrete. Concrete placement must not damage vapor retarder.

3.6.3   Reinforcement Supports

Place reinforcement and secure with galvanized or non corrodirble chairs, spacers, or metal hangers. For supporting reinforcement on the ground, use concrete or other non corrodirble material, having a compressive strength equal to or greater than the concrete being placed.

3.6.4   Splicing

As indicated. For splices not indicated ACI/MCP-2. Do not splice at points of maximum stress. Overlap welded wire fabric the spacing of the cross wires, plus 2 inches.

3.6.5   Future Bonding

Plug exposed, threaded, mechanical reinforcement bar connectors with a greased bolt. Provide bolt threads that match the connector. Countersink the connector in the concrete. Calk the depression after the bolt is installed.
3.6.6 Cover

ACI/MCP-2 for minimum coverage, unless otherwise indicated.

3.6.7 Setting Miscellaneous Material

Place and secure anchors and bolts, pipe sleeves, conduits, and other such items in position before concrete placement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete.

3.6.8 Construction Joints

Locate joints to least impair strength. Continue reinforcement across joints unless otherwise indicated.

3.6.9 Expansion Joints and Contraction Joints

Provide expansion joint at edges of interior floor slabs on grade abutting vertical surfaces, and as indicated. Make expansion joints 1/2 inch wide unless indicated otherwise. Fill expansion joints not exposed to weather with preformed joint filler material. Completely fill joints exposed to weather with joint filler material and joint sealant. Do not extend reinforcement or other embedded metal items bonded to the concrete through any expansion joint unless an expansion sleeve is used. Provide contraction joints, either formed or saw cut or cut with a jointing tool, to the indicated depth after the surface has been finished. Complete saw joints within 4 to 12 hours after concrete placement. Protect joints from intrusion of foreign matter.

3.6.10 Fabrication

Shop fabricate reinforcing bars to conform to shapes and dimensions indicated for reinforcement, and as follows:

Provide fabrication tolerances that are in accordance with ACI/MCP-1, ACI/MCP-2 and ACI/MCP-3.

Provide hooks and bends that are in accordance with ACI/MCP-3 and ACI/MCP-4.

Reinforcement must be bent cold to shapes as indicated. Bending must be done in the shop. Rebending of a reinforcing bar that has been bent incorrectly is not be permitted. Bending must be in accordance with standard approved practice and by approved machine methods.

Tolerance on nominally square-cut, reinforcing bar ends must be in accordance with ACI/MCP-3.

Deliver reinforcing bars bundled, tagged, and marked. Tags must be metal with bar size, length, mark, and other information pressed in by machine. Marks must correspond with those used on the placing drawings.

Do not use reinforcement that has any of the following defects:

a. Bar lengths, depths, and bends beyond specified fabrication tolerances

b. Bends or kinks not indicated on drawings or approved shop drawings
Bars with reduced cross-section due to rusting or other cause

Replace defective reinforcement with new reinforcement having required shape, form, and cross-section area.

3.6.11 Placing Reinforcement

Place reinforcement in accordance with ACI/MCP-3 and ACI/MCP-4.

For slabs on grade (over earth or over capillary water barrier) and for footing reinforcement, support bars or welded wire fabric on precast concrete blocks, spaced at intervals required by size of reinforcement, to keep reinforcement the minimum height specified above the underside of slab or footing.

Contractor must cooperate with other trades in setting of anchor bolts, inserts, and other embedded items. Where conflicts occur between locating reinforcing and embedded items, the Contractor must notify the Contracting Officer so that conflicts may be reconciled before placing concrete. Anchors and embedded items must be positioned and supported with appropriate accessories.

Provide reinforcement that is supported and secured together to prevent displacement by construction loads or by placing of wet concrete, and as follows:

Provide supports for reinforcing bars that are sufficient in number and sufficiently heavy to carry the reinforcement they support, and in accordance with ACI/MCP-3, ACI/MCP-4 and CRSI 10MSP. Do not use supports to support runways for concrete conveying equipment and similar construction loads.

Equip supports on ground and similar surfaces with sand-plates.

Support welded wire fabric as required for reinforcing bars.

Secure reinforcements to supports by means of tie wire. Wire must be black, soft iron wire, not less than 16 gage.

With the exception of temperature reinforcement, tied to main steel approximately 24 inches on center, reinforcement must be accurately placed, securely tied at intersections with 18-gage annealed wire, and held in position during placing of concrete by spacers, chairs, or other approved supports. Point wire-tie ends away from the form. Unless otherwise indicated, numbers, type, and spacing of supports must conform to ACI/MCP-3.

Bending of reinforcing bars partially embedded in concrete is permitted only as specified in ACI/MCP-3 and ACI/MCP-4.

3.6.12 Spacing of Reinforcing Bars

Spacing must be as indicated. If not indicated, spacing must be in accordance with the ACI/MCP-3 and ACI/MCP-4.

Reinforcing bars may be relocated to avoid interference with other reinforcement, or with conduit, pipe, or other embedded items. If any reinforcing bar is moved a distance exceeding one bar diameter or
specified placing tolerance, resulting rearrangement of reinforcement is subject to approval.

3.6.13 Concrete Protection for Reinforcement

Concrete protection must be in accordance with the ACI/MCP-3 and ACI/MCP-4.

3.7 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

ASTM C 94/C 94M, and ACI/MCP-2, except as modified herein. Batching equipment must be such that the concrete ingredients are consistently measured within the following tolerances: 1 percent for cement and water, 2 percent for aggregate, and 3 percent for admixtures. Furnish mandatory batch ticket information for each load of ready mix concrete.

3.7.1 Measuring

Make measurements at intervals as specified in paragraphs entitled "Sampling" and "Testing."

3.7.2 Mixing

ASTM C 94/C 94M and ACI/MCP-2. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than 84 degrees F. Reduce mixing time and place concrete within 60 minutes if the air temperature is greater than 84 degrees F except as follows: if set retarding admixture is used and slump requirements can be met, limit for placing concrete may remain at 90 minutes. Additional water may be added, provided that both the specified maximum slump and water-cement ratio are not exceeded. When additional water is added, an additional 30 revolutions of the mixer at mixing speed is required. Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch.

3.7.3 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

3.8 PLACING CONCRETE

Place concrete as soon as practicable after the forms and the reinforcement have been inspected and approved. Do not place concrete when weather conditions prevent proper placement and consolidation; in uncovered areas during periods of precipitation; or in standing water. Prior to placing concrete, remove dirt, construction debris, water, snow, and ice from within the forms. Deposit concrete as close as practicable to the final position in the forms. Do not exceed a free vertical drop of 3 feet from the point of discharge. Place concrete in one continuous operation from one end of the structure towards the other. Position grade stakes on 10 foot centers maximum in each direction when pouring interior slabs and on 20 foot centers maximum for exterior slabs.
3.8.1 General Placing Requirements

Deposit concrete continuously or in layers of such thickness that no concrete is placed on concrete which has hardened sufficiently to cause formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as specified. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic. Deposit concrete as nearly as practical in its final position to avoid segregation due to rehandling or flowing. Do not subject concrete to procedures which cause segregation.

Concrete to receive other construction must be screeded to proper level to avoid excessive skimming or grouting.

Do not use concrete which becomes nonplastic and unworkable or does not meet quality control limits as specified or has been contaminated by foreign materials. Use of retempered concrete is permitted. Remove rejected concrete from the site.

3.8.2 Footing Placement

Concrete for footings may be placed in excavations without forms upon inspection and approval by the Contracting Officer. Excavation width must be a minimum of 4 inches greater than indicated.

3.8.3 Vibration

ACI/MCP-2 and ASTM A 934/A 934M. Furnish a spare, working, vibrator on the job site whenever concrete is placed. Consolidate concrete slabs greater than 4 inches in depth with high frequency mechanical vibrating equipment supplemented by hand spading and tamping. Consolidate concrete slabs 4 inches or less in depth by wood tampers, spading, and settling with a heavy leveling straightedge. Operate internal vibrators with vibratory element submerged in the concrete, with a minimum frequency of not less than 6000 impulses per minute when submerged. Do not use vibrators to transport the concrete in the forms. Insert and withdraw vibrators approximately 20 inches apart. Penetrate the previously placed lift with the vibrator when more than one lift is required. Place concrete in 20 inch maximum vertical lifts. Use external vibrators on the exterior surface of the forms when internal vibrators do not provide adequate consolidation of the concrete.

3.8.4 Application of Epoxy Bonding Compound

Apply a thin coat of compound to dry, clean surfaces. Scrub compound into the surface with a stiff-bristle brush. Place concrete while compound is stringy. Do not permit compound to harden prior to concrete placement. Follow manufacturer's instructions regarding safety and health precautions when working with epoxy resins.

3.8.5 Pumping

ACI/MCP-2. Pumping must not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment must not exceed 2 inches. Do not convey concrete through pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of course aggregate to 33 percent of the diameter of the pipe. Limit maximum
size of well rounded aggregate to 40 percent of the pipe diameter. Take samples for testing at both the point of delivery to the pump and at the discharge end.

3.8.6 Cold Weather

ACI/MCP-2. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when the ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 37 degrees F in any 1 hour and 50 degrees F per 24 hours after heat application.

3.8.7 Hot Weather

Maintain required concrete temperature using Figure 2.1.5 in ACI/MCP-2 to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. Cool ingredients before mixing or use other suitable means to control concrete temperature and prevent rapid drying of newly placed concrete. Shade the fresh concrete as soon as possible after placing. Start curing when the surface of the fresh concrete is sufficiently hard to permit curing without damage. Provide water hoses, pipes, spraying equipment, and water hauling equipment, where job site is remote to water source, to maintain a moist concrete surface throughout the curing period. Provide burlap cover or other suitable, permeable material with fog spray or continuous wetting of the concrete when weather conditions prevent the use of either liquid membrane curing compound or impervious sheets. For vertical surfaces, protect forms from direct sunlight and add water to top of structure once concrete is set.

3.8.8 Follow-up

Check concrete within 24 hours of placement for flatness, levelness, and other specified tolerances. Adjust formwork and placement techniques on subsequent pours to achieve specified tolerances.

3.8.9 Placing Concrete in Forms

Deposit concrete placed in forms in horizontal layers not exceeding 24 inches.

Remove temporary spreaders in forms when concrete placing has reached elevation of spreaders.

Consolidate concrete placed in forms by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Design vibrators to operate with vibratory element submerged in concrete and maintain a speed of not less than 9,000 impulses per minute when submerged in concrete. Provide vibrating equipment adequate in number of units and power of each unit to properly consolidate concrete. Vibration of forms and reinforcement is not be permitted. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced points not farther apart than visible effectiveness of machine. Do not insert vibrator into lower courses of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of concrete mix.

Do not start placing of concrete in supporting elements until concrete previously placed in columns and walls is no longer plastic and has been
in place a minimum of 2 hours.

3.8.10 Placing Concrete Slabs

Place and consolidate concrete for slabs in a continuous operation, within the limits of approved construction joints until placing of panel or section is completed.

During concrete placing operations, consolidate concrete by mechanical vibrating equipment so that concrete is worked around reinforcement and other embedded items and into corners. Consolidate concrete placed in beams and girders of supported slabs and against bulkheads of slabs on ground by mechanical vibrators as specified. Consolidate concrete in remainder of slabs by vibrating bridge screeds, roller pipe screeds, or other approved method. Limit consolidation operations to time necessary to obtain consolidation of concrete without bringing an excess of fine aggregate to the surface. Concrete to be consolidated must be as dry as practical and surfaces thereof must not be manipulated prior to finishing operations. Bring concrete correct level with a straightedge and struck-off. Use bull floats or darbies to smooth surface, leaving it free of humps or hollows. Sprinkling of water on plastic surface is not permitted.

Provide finish of slabs as specified.

3.8.11 Bonding

Surfaces of set concrete at joints (unless bond breaker is indicated on the drawings), except where bonding is obtained by use of concrete bonding agent, must be roughened and cleaned of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, nor damaged concrete at the surface.

Obtain bonding of fresh concrete that has set as follows:

At joints between footings and walls or columns, between walls or columns and the beams or slabs they support, and elsewhere unless otherwise specified; roughened and cleaned surface of set concrete must be dampened, but not saturated, immediately prior to placing of fresh concrete.

At joints in exposed-to-view work; at vertical joints in walls; at joints near midpoint of span in girders, beams, supported slabs, other structural members; in work designed to contain liquids; the roughened and cleaned surface of set concrete must be dampened but not saturated and covered with a cement grout coating.

Provide cement grout that consists of equal parts of portland cement and fine aggregate by weight with not more than 6 gallons of water per sack of cement. Apply cement grout with a stiff broom or brush to a minimum thickness of 1/16 inch. Deposit fresh concrete before cement grout has attained its initial set.

Bonding of fresh concrete to concrete that has set may be obtained by use of a concrete bonding agent. Apply such bonding material to cleaned concrete surface in accordance with approved printed instructions of bonding material manufacturer.
3.9 SURFACE FINISHES EXCEPT FLOOR, SLAB, AND PAVEMENT FINISHES

3.9.1 Defects

Repair formed surfaces by removing minor honeycombs, pits greater than 1 square inch surface area or 0.25 inch maximum depth, or otherwise defective areas. Provide edges perpendicular to the surface and patch with nonshrink grout. Patch tie holes and defects when the forms are removed. Concrete with extensive honeycomb including exposed steel reinforcement, cold joints, entrapped debris, separated aggregate, or other defects which affect the serviceability or structural strength will be rejected, unless correction of defects is approved. Obtain approval of corrective action prior to repair. The surface of the concrete must not vary more than the allowable tolerances of ACI/MCP-4. Exposed surfaces must be uniform in appearance and finished to a smooth form finish unless otherwise specified.

3.9.2 Not Against Forms (Top of Walls)

Surfaces not otherwise specified must be finished with wood floats to even surfaces. Finish must match adjacent finishes.

3.9.3 Formed Surfaces

3.9.3.1 Tolerances

ACI/MCP-1 and as indicated.

3.9.3.2 As-Cast Rough Form

Provide for surfaces not exposed to public view. Patch these holes and defects and level abrupt irregularities. Remove or rub off fins and other projections exceeding 0.25 inch in height.

3.9.3.3 Standard Smooth Finish

Finish must be as-cast concrete surface as obtained with form facing material for standard smooth finish. Repair and patch defective areas as specified; and all fins and remove other projections on surface.

3.10 FLOOR, SLAB, AND PAVEMENT FINISHES AND MISCELLANEOUS CONSTRUCTION

ACI/MCP-2, unless otherwise specified. Slope floors uniformly to drains where drains are provided. Depress the concrete base slab where quarry tile, ceramic tile, are indicated. Steel trowel and fine-broom finish concrete slabs that are to receive quarry tile, ceramic tile, or paver tile. Where straightedge measurements are specified, Contractor must provide straightedge.

3.10.1 Finish

Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleedwater appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. If bleedwater is present prior to floating the surface, drag the excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleedwater.
3.10.1.1 Scratched

Use for surfaces intended to receive bonded applied cementitious applications. After the concrete has been placed, consolidated, struck off, and leveled to a Class C tolerance as defined below, roughen the surface with stiff brushes of rakes before final set.

3.10.1.2 Floated

Use for exterior slabs where not otherwise specified. After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further, until ready for floating. Whether floating with a wood, magnesium, or composite hand float, with a bladed power trowel equipped with float shoes, or with a powered disc, float must begin when the surface has stiffened sufficiently to permit the operation. During or after the first floating, check surface with a 10 foot straightedge applied at no less than two different angles, one of which is perpendicular to the direction of strike off. Cut down high spots and fill low spots during this procedure to produce a surface level within 1/4 inch in 10 feet.

3.10.1.3 Steel Troweled

Use for floors intended as walking surfaces, and for reception of floor coverings. First, provide a floated finish. Next, the finish must be power troweled two times, and finally hand troweled. The first troweling after floating needs to produce a smooth surface which is relatively free of defects but which may still show some trowel marks. Perform additional trowelings done by hand after the surface has hardened sufficiently. The final troweling is done when a ringing sound is produced as the trowel is moved over the surface. Thoroughly consolidate the surface by the hand troweling operations. The finished surface must be essentially free of trowel marks and uniform in texture and appearance. The finished surface must produce a surface level to within 1/4 inch in 10 feet. On surfaces intended to support floor coverings, remove any defects of sufficient magnitude to show through the floor covering by grinding.

3.10.1.4 Broomed

Use on surfaces of exterior walks, platforms, patios, and ramps, unless otherwise indicated. Perform a floated finish, then draw a broom or burlap belt across the surface to produce a coarse scored texture. Permit surface to harden sufficiently to retain the scoring or ridges. Broom transverse to traffic or at right angles to the slope of the slab.

3.10.1.5 Pavement

Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally. Use a straightedge to check slope and flatness; correct and refloat as necessary. Obtain final finish by belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty nonslip surface is obtained. a burlap drag. Drag a strip of clean, wet burlap from 3 to 10 feet wide and 2 feet longer than the pavement width across the slab. Produce a fine, granular, sandy textured surface without disfiguring marks. Round edges and joints with an edger having a radius of 1/8 inch.
3.10.2 Concrete Walks

Provide 4 inches thick minimum. Provide contraction joints spaced every 5 linear feet unless otherwise indicated. Cut contraction joints one inch deep with a jointing tool after the surface has been finished. Provide 0.5 inch thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet maximum. Give walks a broomed finish. Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 1/4 inch in 5 feet.

3.10.3 Pits and Trenches

Place bottoms and walls monolithically or provide waterstops and keys.

3.10.4 Curbs and Gutters

Provide contraction joints spaced every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2 inch thick and spaced every 100 feet maximum unless otherwise indicated. Perform pavement finish.

3.10.5 Splash Blocks

Provide at outlets of downspouts emptying at grade. Splash blocks may be precast concrete, and must be 24 inches long, 12 inches wide and 4 inches thick, unless otherwise indicated, with smooth-finished countersunk dishes sloped to drain away from the building.

3.11 CURING AND PROTECTION

ACI/MCP-2 unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, and any other activity resulting in ground vibrations. Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the specified curing period. Do not use membrane-forming compound on surfaces where appearance would be objectionable, on any surface to be painted, where coverings are to be bonded to the concrete, or on concrete to which other concrete is to be bonded. If forms are removed prior to the expiration of the curing period, provide another curing procedure specified herein for the remaining portion of the curing period. Provide moist curing for those areas receiving liquid chemical sealer-hardener or epoxy coating. Allow curing compound/sealer installations to cure prior to the installation of materials that adsorb VOCs, including.

3.11.1 General

Protect freshly placed concrete from premature drying and cold or hot temperature and maintain without drying at a relatively constant temperature for the period of time necessary for hydration of cement and proper hardening of concrete.

Start initial curing as soon as free water has disappeared from surface of concrete after placing and finishing. Keep concrete moist for minimum 72
Final curing must immediately follow initial curing and before concrete has dried. Continue final curing until cumulative number of hours or fraction thereof (not necessarily consecutive) during which temperature of air in contact with the concrete is above 50 degrees F has totaled 168 hours. Alternatively, if tests are made of cylinders kept adjacent to the structure and cured by the same methods, final curing may be terminated when the average compressive strength has reached 70 percent of the 28-day design compressive strength. Prevent rapid drying at end of final curing period.

3.11.2 Moist Curing

Remove water without erosion or damage to the structure. Prevent water run-off.

3.11.2.1 Ponding or Immersion

Continually immerse the concrete throughout the curing period. Water must not be more than 50 degrees F less than the temperature of the concrete. For temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.11.2.2 Fog Spraying or Sprinkling

Apply water uniformly and continuously throughout the curing period. For temperatures between 40 and 50 degrees F, increase the curing period by 50 percent.

3.11.2.3 Pervious Sheeting

Completely cover surface and edges of the concrete with two thicknesses of wet sheeting. Overlap sheeting 6 inches over adjacent sheeting. Provide sheeting that is at least as long as the width of the surface to be cured. During application, do not drag the sheeting over the finished concrete nor over sheeting already placed. Wet sheeting thoroughly and keep continuously wet throughout the curing period.

3.11.2.4 Impervious Sheeting

Wet the entire exposed surface of the concrete thoroughly with a fine spray of water and cover with impervious sheeting throughout the curing period. Lay sheeting directly on the concrete surface and overlap edges 12 inches minimum. Provide sheeting not less than 18 inches wider than the concrete surface to be cured. Secure edges and transverse laps to form closed joints. Repair torn or damaged sheeting or provide new sheeting. Cover or wrap columns, walls, and other vertical structural elements from the top down with impervious sheeting; overlap and continuously tape sheeting joints; and introduce sufficient water to soak the entire surface prior to completely enclosing.

3.11.3 Liquid Membrane-Forming Curing Compound

Seal or cover joint openings prior to application of curing compound. Prevent curing compound from entering the joint. Apply in accordance with the recommendations of the manufacturer immediately after any water sheen which may develop after finishing has disappeared from the concrete surface. Provide and maintain compound on the concrete surface throughout
the curing period. Do not use this method of curing where the use of Figure 2.1.5 in ACI/MCP-2 indicates that hot weather conditions cause an evaporation rate exceeding 0.2 pound of water per square foot per hour.

3.11.3.1 Application

Unless the manufacturer recommends otherwise, apply compound immediately after the surface loses its water sheen and has a dull appearance, and before joints are sawed. Mechanically agitate curing compound thoroughly during use. Use approved power-spraying equipment to uniformly apply two coats of compound in a continuous operation. The total coverage for the two coats must be 200 square feet maximum per gallon of undiluted compound unless otherwise recommended by the manufacturer's written instructions. The compound must form a uniform, continuous, coherent film that does not check, crack, or peel. Immediately apply an additional coat of compound to areas where the film is defective. Re-spray concrete surfaces subjected to rainfall within 3 hours after the curing compound application.

3.11.3.2 Protection of Treated Surfaces

Prohibit pedestrian and vehicular traffic and other sources of abrasion at least 72 hours after compound application. Maintain continuity of the coating for the entire curing period and immediately repair any damage.

3.11.4 Curing Periods

ACI/MCP-2 except 10 days for retaining walls, pavement or chimneys, 21 days for concrete that is in full-time or intermittent contact with seawater, salt spray, alkali soil or waters. Begin curing immediately after placement. Protect concrete from premature drying, excessively hot temperatures, and mechanical injury; and maintain minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing are subject to approval by the Contracting Officer.

3.11.5 Curing Methods

Accomplish curing by moist curing, by moisture-retaining cover curing, by membrane curing, and by combinations thereof, as specified.

Moist curing:

Accomplish moisture curing by any of the following methods:

   Keeping surface of concrete wet by covering with water

   Continuous water spraying

   Covering concrete surface with specified absorptive cover for curing concrete saturated with water and keeping absorptive cover wet by water spraying or intermittent hosing. Place absorptive cover to provide coverage of concrete surfaces and edges with a slight overlap over adjacent absorptive covers.

Moisture-cover curing:

Accomplish moisture-retaining cover curing by covering concrete surfaces with specified moisture-retaining cover for curing concrete. Place cover directly on concrete in widest practical width, with sides and
ends lapped at least 3 inches. Weight cover to prevent displacement; immediately repair tears or holes appearing during curing period by patching with pressure-sensitive, waterproof tape or other approved method.

Membrane curing:

Accomplish membrane curing by applying specified membrane-forming curing compound to damp concrete surfaces as soon as moisture film has disappeared. Apply curing compound uniformly in a two-coat operation by power-spraying equipment using a spray nozzle equipped with a wind guard. Apply second coat in a direction at right angles to direction of first coat. Total coverage for two coats must be not more than 200 square feet per gallon of curing compound. Respray concrete surfaces which are subjected to heavy rainfall within 3 hours after curing compound has been applied by method and at rate specified. Maintain continuity of coating for entire curing period and immediately repair damage to coating during this period.

Membrane-curing compounds must not be used on surfaces that are to be covered with coating material applied directly to concrete or with a covering material bonded to concrete, such as other concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, painting, and other coatings and finish materials.

3.11.6 Curing Formed Surfaces

Accomplish curing of formed surfaces, including undersurfaces of girders, beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed before end of curing period, accomplish final curing of formed surfaces by any of the curing methods specified above, as applicable.

3.11.7 Curing Unformed Surfaces

Accomplish initial curing of unformed surfaces, such as monolithic slabs, floor topping, and other flat surfaces, by membrane curing.

Unless otherwise specified, accomplish final curing of unformed surfaces by any of curing methods specified above, as applicable.

Accomplish final curing of concrete surfaces to receive liquid floor hardener of finish flooring by moisture-retaining cover curing.

3.11.8 Temperature of Concrete During Curing

When temperature of atmosphere is 41 degrees F and below, maintain temperature of concrete at not less than 55 degrees F throughout concrete curing period or 45 degrees F when the curing period is measured by maturity. When necessary, make arrangements before start of concrete placing for heating, covering, insulation, or housing as required to maintain specified temperature and moisture conditions for concrete during curing period.

When the temperature of atmosphere is 80 degrees F and above or during other climatic conditions which cause too rapid drying of concrete, make arrangements before start of concrete placing for installation of wind breaks, of shading, and for fog spraying, wet sprinkling, or
moisture-retaining covering of light color as required to protect concrete during curing period.

Changes in temperature of concrete must be uniform and not exceed 37 degrees F in any 1 hour nor 80 degrees F in any 24-hour period.

3.11.9 Protection from Mechanical Injury

During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration and from damage caused by rain or running water.

3.11.10 Protection After Curing

Protect finished concrete surfaces from damage by construction operations.

3.12 FIELD QUALITY CONTROL

3.12.1 Sampling

ASTM C 172. Collect samples of fresh concrete to perform tests specified. ASTM C 31/C 31M for making test specimens.

3.12.2 Testing

3.12.2.1 Slump Tests

ASTM C 143/C 143M. Take concrete samples during concrete placement. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cement ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made, and for each batch (minimum) or every 20 cubic yards (maximum) of concrete.

3.12.2.2 Temperature Tests

Test the concrete delivered and the concrete in the forms. Perform tests in hot or cold weather conditions (below 50 degrees F and above 80 degrees F) for each batch (minimum) or every 20 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

3.12.2.3 Compressive Strength Tests

ASTM C 39/C 39M. Make five test cylinders for each set of tests in accordance with ASTM C 31/C 31M. Take precautions to prevent evaporation and loss of water from the specimen. Test two cylinders at 7 days, two cylinders at 28 days, and hold one cylinder in reserve. Take samples for strength tests of each mix design of and for concrete placed each day not less than once a day, nor less than once for each 160 cubic yards of concrete, nor less than once for each 5400 square feet of surface area for slabs or walls. For the entire project, take no less than five sets of samples and perform strength tests for each mix design of concrete placed. Each strength test result must be the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength test results is less than f'c or if any strength test result falls below f'c by more than 450 psi, take a minimum of three ASTM C 42/C 42M core samples from the in-place work represented by the low test cylinder results and test. Concrete represented by core
test is considered structurally adequate if the average of three cores is equal to at least 85 percent of $f'c$ and if no single core is less than 75 percent of $f'c$. Retest locations represented by erratic core strengths. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with nonshrink grout. Match color and finish of adjacent concrete.

3.12.2.4 Strength of Concrete Structure

Compliance with the following is considered deficient if it fails to meet the requirements which control strength of structure in place, including following conditions:

- Failure to meet compressive strength tests as evaluated
- Reinforcement not conforming to requirements specified
- Concrete which differs from required dimensions or location in such a manner as to reduce strength
- Concrete curing and protection of concrete against extremes of temperature during curing, not conforming to requirements specified
- Concrete subjected to damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration
- Poor workmanship likely to result in deficient strength

3.12.2.5 Testing Concrete Structure for Strength

When there is evidence that strength of concrete structure in place does not meet specification requirements, make cores drilled from hardened concrete for compressive strength determination in accordance with ASTM C 42/C 42M, and as follows:

- Take at least three representative cores from each member or area of concrete-in-place that is considered potentially deficient. Location of cores will be determined by the Contracting Officer.
- Test cores after moisture conditioning in accordance with ASTM C 42/C 42M if concrete they represent is more than superficially wet under service.
- Air dry cores, (60 to 80 degrees F with relative humidity less than 60 percent) for 7 days before test and test dry if concrete they represent is dry under service conditions.
- Strength of cores from each member or area are considered satisfactory if their average is equal to or greater than 85 percent of the 28-day design compressive strength of the class of concrete.
- Core specimens will be taken and tested by the Government. If the results of core-boring tests indicate that the concrete as placed does not conform to the drawings and specification, the cost of such tests and restoration required must be borne by the Contractor.

Fill core holes solid with patching mortar and finished to match adjacent concrete surfaces.
Correct concrete work that is found inadequate by core tests in a manner approved by the Contracting Officer.

3.13 WASTE MANAGEMENT

As specified in the Waste Management Plan and as follows.

3.13.1 Mixing Equipment

Before concrete pours, designate on-site area to be paved later in project for cleaning out concrete mixing trucks. Minimize water used to wash equipment.

3.13.2 Hardened, Cured Waste Concrete

3.13.3 Reinforcing Steel

Collect reinforcing steel and place in designated area for recycling.

3.13.4 Other Waste

Identify concrete manufacturer's or supplier's policy for collection or return of construction waste, unused material, deconstruction waste, and/or packaging material.

3.14 JOINTS

3.14.1 Construction Joints

Make and locate joints not indicated so as not to impair strength and appearance of the structure, as approved. Locate construction joints as follows:

   a. In walls at not more than 60 feet in any horizontal direction; at top of footing; at top of slabs on ground; at top and bottom of door and window openings or where required to conform to architectural details; and at underside of deepest beam or girder framing into wall

   b. In columns or piers, at top of footing; at top of slabs on ground; and at underside of deepest beam or girder framing into column or pier

   c. Near midpoint of spans for supported slabs, beams, and girders unless a beam intersects a girder at the center, in which case construction joints in girder must offset a distance equal to twice the width of the beam. Make transfer of shear through construction joint by use of inclined reinforcement.

   d. In slabs on ground, so as to divide slab into areas not in excess of 1,200 square feet

Provide keyways at least 1-1/2-inches deep in construction joints in walls and slabs and between walls and footings; approved bulkheads may be used for slabs.

Joints must be perpendicular to main reinforcement. Reinforcement must be continued across construction joints.
3.14.2 Waterstops

Provide waterstops in construction joints as indicated.

Install waterstops to form a continuous diaphragm in each joint. Make adequate provisions to support and protect waterstops during progress of work. Make field joints in waterstops in accordance with waterstop manufacturer's printed instructions, as approved. Protect waterstops protruding from joints from damage.

3.14.3 Isolation Joints in Slabs on Ground

Provide joints at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

Fill joints with premolded joint filler strips 1/2 inch thick, extending full slab depth. Install filler strips at proper level below finish floor elevation with a slightly tapered, dress-and-oiled wood strip temporarily secured to top of filler strip to form a groove not less than 3/4 inch in depth where joint is sealed with sealing compound and not less than 1/4 inch in depth where joint sealing is not required. Remove wood strip after concrete has set. Contractor must clean groove of foreign matter and loose particles after surface has dried.

3.14.4 Control Joints in Slabs on Ground

Provide joints to form panels as indicated.

Under and on exact line of each control joint, cut 50 percent of welded wire fabric reinforcement before placing concrete.

Joints must be 1/8-inch wide by 1/5 to 1/4 of slab depth and formed by inserting hand-pressed fiberboard strip into fresh concrete until top surface of strip is flush with slab surface or by cutting the concrete with a saw after the concrete has set. After concrete has cured for at least 7 days, the Contractor must remove inserts and clean groove of foreign matter and loose particles.

In Hawaii, sawcutting will be limited to within 12 hours after set and at 1/4 slab depth.

3.14.5 Sealing Joints in Slabs on Ground

Isolation and control joints which are to receive finish flooring material must be sealed with joint sealing compound after concrete curing period. Slightly underfill groove with joint sealing compound to prevent extrusion of compound. Remove excess material as soon after sealing as possible.

Sealing is not required for isolation and control joints to be covered with finish flooring material. Groove must be left ready to receive filling material that is provided as part of finish floor covering work.

3.15 INSTALLATION OF ANCHORAGE DEVICES

3.15.1 General

Anchorage devices and embedded items required for other work that is attached to, or supported by, set and build in cast-in-place concrete as
part of the work of this section, using setting drawings, instructions, and directions for work to be attached thereto.

3.15.2 Placing Anchorage Devices

Anchorage devices and embedded items must be positioned accurately and supported against displacement. Fill openings in anchorage devices such as slots and threaded holes with an approved, removable material to prevent entry of concrete into openings.

3.16 CONCRETE CONVEYING

3.16.1 Transfer of Concrete At Project Site

Handle concrete from point of delivery and transfer to concrete conveying equipment and to locations of final deposit as rapidly as practical by methods which prevent segregation and loss of concrete mix materials.

3.16.2 Mechanical Equipment for Conveying Concrete

Equipment must ensure a continuous flow of concrete at delivery end, as approved. Provide runways for wheeled concrete-conveying equipment from concrete delivery point to locations of final deposit. Interior surfaces of concrete conveying equipment must be free of hardened concrete, debris, water, snow, ice, and other deleterious substances.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

**AMERICAN CONCRETE INSTITUTE INTERNATIONAL (ACI)**


**ASTM INTERNATIONAL (ASTM)**


ASTM A615/A615M (2015a) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement


ASTM C593  (2006; R 2011) Fly Ash and Other Pozzolans for Use with Lime for Soil Stabilization
ASTM C641  (2009) Staining Materials in Lightweight Concrete Aggregates
ASTM C780  (2014b) Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry
ASTM C90  (2014) Loadbearing Concrete Masonry Units
ASTM D2287  (2012) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds

INTERNATIONAL CODE COUNCIL (ICC)


U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-310-04  (2013) Seismic Design for Buildings
1.2 SYSTEM DESCRIPTION

1.2.1 Plastic Identification

Verify that plastic products to be incorporated into the project are labeled in accordance with ASTM D7611/D7611M. Where products are not labeled, submit product data indicating polymeric information in the Operation and Maintenance Manual.

<table>
<thead>
<tr>
<th>Type</th>
<th>Plastic Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Polyethylene Terephthalate (PET, PETE)</td>
</tr>
<tr>
<td>2</td>
<td>High Density Polyethylene (HDPE)</td>
</tr>
<tr>
<td>3</td>
<td>Vinyl (Polyvinyl Chloride or PVC)</td>
</tr>
<tr>
<td>4</td>
<td>Low Density Polyethylene (LDPE)</td>
</tr>
<tr>
<td>5</td>
<td>Polypropylene (PP)</td>
</tr>
<tr>
<td>6</td>
<td>Polystyrene (PS)</td>
</tr>
<tr>
<td>7</td>
<td>Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.</td>
</tr>
</tbody>
</table>

1.2.2 Design Requirements

1.2.2.1 Unit Strength Method

Compute compressive strength of masonry system "Unit Strength Method", ACI 530/530.1. Submit calculations and certifications of unit and mortar strength.

1.2.2.2 Seismic Requirement

In addition to design requirements of ICC IBC, provide additional seismic reinforcement in accordance with UFC 3-310-04 and as detailed on the drawings. The total minimum reinforcing percentage for structural walls shall be 0.20 percent and non-structural walls shall be 0.15 percent. The maximum spacing of reinforcing bars shall be as follows:

<table>
<thead>
<tr>
<th>Wall Type</th>
<th>Vertical</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural</td>
<td>24 inches</td>
<td>16 inches</td>
</tr>
<tr>
<td>Non-structural</td>
<td>48 inches</td>
<td>24 inches</td>
</tr>
</tbody>
</table>

Bond beams are required at the top of footings, at the bottom and top of openings at roof and floor levels, and at the top of parapet walls.
1.2.2.3 Masonry Strength

Determine masonry strength in accordance with ACI 530/530.1; submit test reports on three prisms as specified in ACI 530/530.1. The cost of testing shall be paid by the Contractor.

1.2.3 Additional Requirements

a. Maintain at least one spare vibrator on site at all times.

b. Provide bracing and scaffolding necessary for masonry work. Design bracing to resist wind pressure as required by local code.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Detail Drawings; G

SD-03 Product Data
   Cement; G
   Insulation; G
   Cold Weather Installation; G
   Water-Repellant Admixture; G

SD-04 Samples
   Split Faced Concrete Masonry Units (CMU); G
   Anchors, Ties, and Bar Positioners; G
   Joint Reinforcement; G
   Portable Panel; G

SD-05 Design Data
   Pre-Mixed Mortar; G
   Unit Strength Method; G

SD-06 Test Reports
   Field Testing of Mortar; G
   Field Testing of Grout; G
   Masonry Cement; G
   Masonry Inspector Qualifications; G

SD-07 Certificates
   Admixtures for Grout
   Insulation

SD-08 Manufacturer's Instructions
1.4 QUALITY ASSURANCE

1.4.1 Sample Masonry Panels

After material samples are approved and prior to starting masonry work, construct a portable panel of Split Faced CMU and 8" CMU cavity wall construction for each type and color of masonry required. At least 48 hours prior to constructing the sample panel or panels, submit written notification to the Contracting Officer. Submit one panel 6'0" x 4'0"h, 2 by 2 feet, to establish range of color and texture. Sample panels shall not be built in, or as part of the structure, but shall be located where directed.

1.4.1.1 Configuration

Panels shall be configured to represent all of the wall elements. Panels shall be of the size necessary to demonstrate the acceptable level of workmanship for each type of masonry represented on the project.

1.4.1.2 Composition

Panels shall show full color range, texture, and bond pattern of the masonry work. The Contractor's method for mortar joint tooling; grouting of reinforced vertical cores, collar joints, bond beams, and lintels; positioning, securing, and lapping of reinforcing steel; positioning and lapping of joint reinforcement (including prefabricated corners); and cleaning of masonry work shall be demonstrated during the construction of the panels. Installation or application procedures for anchors, wall ties, CMU control joints, expansion joints, insulation, flashing, row lock courses and weep holes shall be shown in the sample panels. The panels shall contain a masonry bonded corner that includes a bond beam corner. Panels shall show installation of electrical boxes and conduit. Panels that represent reinforced masonry shall contain a 2 by 2 foot opening placed at least 16 inches above the panel base and 16 inches away from all free edges, corners, and control joints. Required reinforcing shall be provided around this opening as well as at wall corners and control joints.

1.4.1.3 Construction Method

Where anchored veneer walls are required, demonstrate and receive approval for the method of construction; i.e., either bring up the two wythes together or separately, with the insulation and appropriate ties placed within the specified tolerances across the cavity. Temporary provisions shall be demonstrated to preclude mortar or grout droppings in the cavity and to provide a clear open air space of the dimensions shown on the drawings. Where masonry is to be grouted, demonstrate and receive approval on the method that will be used to bring up the masonry wythes; support the reinforcing bars; and grout cells, bond beams, lintels, and collar joints using the requirements specified herein. If sealer is specified to be applied to the masonry units, sealer shall be applied to the sample panels. Panels shall be built on a properly designed concrete...
1.4.1.4 Usage

The completed panels shall be used as the standard of workmanship for the type of masonry represented. Masonry work shall not commence until the sample panel for that type of masonry construction has been completed and approved. Panels shall be protected from the weather and construction operations until the masonry work has been completed and approved. After completion of the work, the sample panels, including all foundation concrete, shall become the property of the Contractor and shall be removed from the construction site.

1.4.2 Masonry Inspector Qualifications

A qualified masonry inspector approved by the Contracting Officer shall perform inspection of the masonry work. Minimum qualifications for the masonry inspector shall be 5 years of reinforced masonry inspection experience or acceptance by a State, municipality, or other governmental body having a program of examining and certifying inspectors for reinforced masonry construction. The masonry inspector shall be present during preparation of masonry prisms, sampling and placing of masonry units, placement of reinforcement (including placement of dowels in footings and foundation walls), inspection of grout space, immediately prior to closing of cleanouts, and during grouting operations. The masonry inspector shall assure compliance with the drawings and specifications. The masonry inspector shall keep a complete record of all inspections and shall submit daily written reports to the Quality Control Supervisory Representative reporting the quality of masonry construction. Submit copies of masonry inspector reports.

1.4.3 Detail Drawings

Submit detail drawings showing bar splice locations. Bent bars shall be identified on a bending diagram and shall be referenced and located on the drawings. Wall dimensions, bar clearances, and wall openings greater than one masonry unit in area shall be shown. No approval will be given to the shop drawings until the Contractor certifies that all openings, including those for mechanical and electrical service, are shown. If, during construction, additional masonry openings are required, the approved shop drawings shall be resubmitted with the additional openings shown along with the proposed changes. Location of these additional openings shall be clearly highlighted. The minimum scale for wall elevations shall be 1/4 inch per foot. Reinforcement bending details shall conform to the requirements of ACI SP-66. Submit drawings including plans, elevations, and details of wall reinforcement; details of reinforcing bars at corners and wall intersections; offsets; tops, bottoms, and ends of walls; control and expansion joints; lintels; and wall openings.

1.5 DELIVERY, STORAGE, AND HANDLING

Materials shall be delivered, stored, handled, and protected to avoid chipping, breakage, and contact with soil or contaminating material. Store and prepare materials in already disturbed areas to minimize project site disturbance and size of project site.
1.5.1 Masonry Units

Cover and protect moisture-controlled concrete masonry units and cementitious materials from precipitation. Conform to all handling and storage requirements of ASTM C90. Mark prefabricated lintels on top sides to show either the lintel schedule number or the number and size of top and bottom bars.

1.5.2 Reinforcement, Anchors, and Ties

Steel reinforcing bars, coated anchors, ties, and joint reinforcement shall be stored above the ground. Steel reinforcing bars and uncoated ties shall be free of loose mill scale and rust.

1.5.3 Cementitious Materials, Sand and Aggregates

Cementitious and other packaged materials shall be delivered in unopened containers, plainly marked and labeled with manufacturers' names and brands. Cementitious material shall be stored in dry, weathertight enclosures or be completely covered. Cement shall be handled in a manner that will prevent the inclusion of foreign materials and damage by water or dampness. Store sand and aggregates in a manner to prevent contamination or segregation.

1.6 PROJECT/SITE CONDITIONS

Conform to ACI 530/530.1 for hot and cold weather masonry erection.

1.6.1 Hot Weather Installation

Take the following precautions if masonry is erected when the ambient air temperature is more than 99 degrees F in the shade and the relative humidity is less than 50 percent or the ambient air temperature exceeds 90 degrees F and the wind velocity is more than 8 mph. All masonry materials shall be shaded from direct sunlight; mortar beds shall be spread no more than 4 feet ahead of masonry; masonry units shall be set within one minute of spreading mortar; and after erection, masonry shall be protected from direct exposure to wind and sun for 48 hours.

1.6.2 Cold Weather Installation

Before erecting masonry when ambient temperature or mean daily air temperature falls below 40 degrees F or temperature of masonry units is below 40 degrees F, submit a written statement of proposed cold weather construction procedures for approval.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

The source of materials which will affect the appearance of the finished work shall not be changed after the work has started except with Contracting Officer's approval. Submit sample of colored mortar with applicable masonry unit and color samples of three stretcher units and one unit for each type of special shape. Units shall show the full range of color and texture. Submit test reports from an approved independent laboratory. Test reports on a previously tested material shall be certified as the same as that proposed for use in this project. Submit certificates of compliance stating that the materials meet the specified...
requirements.

2.2 CONCRETE MASONRY UNITS (CMU)

Submit samples and certificates as specified. Cement shall have a low alkali content and be of one brand. Units shall contain a minimum of 10 percent post-consumer recycled content, or a minimum of 20 percent post-industrial recycled content. Units shall be of modular dimensions and air, water, or steam cured. Exposed surfaces of units shall be smooth and of uniform texture. Exterior Split Faced concrete masonry units shall have water-repellant admixture added during manufacture.


2.2.1 Aggregates

Lightweight aggregates and blends of lightweight and heavier aggregates in proportions used in producing the units, shall comply with the following requirements when tested for stain-producing iron compounds in accordance with ASTM C641: by visual classification method, the iron stain deposited on the filter paper shall not exceed the "light stain" classification. Use industrial waste by-products (air-cooled slag, cinders, or bottom ash), ground waste glass and concrete, granulated slag, and expanded slag in aggregates. Slag shall comply with ASTM C989/C989M; Grade 80.

2.2.2 Kinds and Shapes

Units shall be modular in size and shall include closer, jamb, header, lintel, and bond beam units and special shapes and sizes to complete the work as indicated. Units used in exposed masonry surfaces in any one building shall have a uniform fine to medium texture and a uniform color.

2.2.2.1 Architectural Units

Units shall have patterned face shell. Face shell pattern shall be Split Faced. Cull Split Faced CMU exhibiting excessive cups or bows. Units shall be integrally colored during manufacture. Color shall be per Robins base standards as indicated in the drawings. Patterned face shell shall be properly aligned in the completed wall.

2.3 WINDOW SILLS

2.3.1 Window Sills

Window sills shall provided by Split Faced CMU manufacturer in configuration indicated to match exterior wall color.

2.4 MORTAR FOR STRUCTURAL MASONRY

ASTM C270, Type M below grade and S at building exterior. Strength (f' \text{m}) as indicated. Test in accordance with ASTM C780. Use Type I portland cement. Use Type IS blended hydraulic cement for inner wythe structural CMU. Do not use admixtures containing chlorides. When structural reinforcement is incorporated, maximum air-content shall be 12 percent in cement-lime mortar. Fly ash shall comply with ASTM C593.
2.5  MASONRY MORTAR

Type M mortar shall conform to ASTM C270 and shall be used for foundation walls. Mortar Type S shall conform to the proportion specification of ASTM C270 except Type S cement-lime mortar proportions shall be 1 part cement, 1/2 part lime and 4-1/2 parts aggregate. Type S mortar shall be used for non-load-bearing, non-shear-wall interior masonry; and remaining masonry work; except where higher compressive strength is indicated on structural drawings. Cement shall have a low alkali content and be of one brand. Aggregates shall be from one source.

2.5.1  Colored Mortar

Mortar coloring shall be added to the mortar used for exposed masonry surfaces to produce a uniform color matching the Split Faced CMU. Quantity of pigment to cementitious content of the masonry cement shall not exceed 5 by weight; carbon black shall not exceed 1 percent by weight. Quantity of pigment to cementitious content of cement-lime mix shall not exceed 10 percent by weight, carbon black no more than 2 percent by weight. Mortar coloring shall be chemically inert, of finely ground limeproof pigment, and furnished in accurately pre-measured and packaged units that can be added to a measured amount of cement. Compressive strength of colored mortar shall be as indicated on the drawings.

2.5.2  Hydrated Lime and Alternates

Hydrated lime shall conform to ASTM C207, Type S.

2.5.3  Cement

Portland cement shall conform to ASTM C150/C150M, Type I,. Masonry cement shall conform to ASTM C91/C91M, Type S and M. Containers shall bear complete instructions for proportioning and mixing to obtain the required types of mortar. Incorporate to the maximum extent, without conflicting with other requirements of this section, up to 40 percent fly ash, up to 70 percent slag, up to 10 percent cenospheres, and up to 10 percent silica fume. When masonry cement is used, submit the manufacturer's printed instructions on proportions of water and aggregates and on mixing to obtain the type of mortar required. Additives shall conform to requirements in Section 03 30 00 CAST IN PLACE CONCRETE.

2.5.4  Pre-Mixed Mortar

Pre-mixed mortar shall conform to ASTM C1142, Type RS and RM. Submit pre-mixed mortar composition.

2.5.5  Sand and Water

Sand shall conform to ASTM C144. Water shall be clean, potable, and free from substances which could adversely affect the mortar.

2.6  WATER-REPELLENT ADMIXTURE

Required at exterior Split Faced CMU and to be polymeric type formulated to reduce porosity and water penetration and water absorption of the mortar and masonry units.
2.7 GROUT AND READY-MIXED GROUT

Grout shall conform to ASTM C476, fine. Cement used in grout shall have a low alkali content. Grout slump shall be between 8 and 10 inches. Minimum grout strength shall be 3000 psi in 28 days, as tested by ASTM C1019. Use grout subject to the limitations of Table III. Do not change proportions and do not use materials with different physical or chemical characteristics in grout for the work unless additional evidence is furnished that the grout meets the specified requirements. Ready-Mixed grout shall conform to ASTM C94/C94M.

2.7.1 Admixtures for Grout

In cold weather, a non-chloride based accelerating admixture may be used subject to approval; accelerating admixture shall be non-corrosive, shall contain less than 0.2 percent chlorides, and shall conform to ASTM C494/C494M, Type C. In general, air-entrainment, anti-freeze or chloride admixtures shall not be used except as approved by the Contracting Officer. Submit required certifications.

2.7.2 Grout Barriers

Grout barriers for vertical cores shall consist of fine mesh wire, fiberglass, or expanded metal.

2.8 ANCHORS, TIES, AND BAR POSITIONERS

Anchors and ties shall be fabricated without drips or crimps and shall be zinc-coated in accordance with ASTM A153/A153M, Class B-2. Steel wire used for anchors and ties shall be fabricated from steel wire conforming to ASTM A1064/A1064M. Wire ties or anchors in exterior walls shall conform to ASTM A641/A641M. Joint reinforcement in interior walls, and in exterior or interior walls exposed to moist environment shall conform to ASTM A641/A641M; coordinate with paragraph JOINT REINFORCEMENT below. Anchors and ties shall be sized to provide a minimum of 5/8 inch mortar cover from either face. Submit two anchors, ties and bar positioners of each type used, as samples.

2.8.1 Wire Mesh Ties

Wire mesh for tying 4 inch thick concrete masonry unit partitions to other intersecting masonry partitions shall be 1/2 inch mesh of minimum 16 gauge steel wire. Minimum lengths shall be not less than 12 inches.

2.8.2 Wall Ties

Provide wall ties rectangular-shaped or Z-shaped fabricated of 3/16 inch diameter zinc-coated steel wire. Rectangular wall ties shall be no less than 4 inches wide. Wall ties may also be of a continuous type conforming to paragraph JOINT REINFORCEMENT. Adjustable type wall ties, if approved for use, shall consist of two essentially U-shaped elements fabricated of 3/16 inch diameter zinc-coated steel wire. Adjustable ties shall be of the double pintle to eye type and shall allow a maximum of 1/2 inch eccentricity between each element of the tie. Play between pintle and eye opening shall be not more than 1/16 inch. The pintle and eye elements shall be formed so that both can be in the same plane.
2.8.3 Adjustable Anchors

Adjustable anchors shall be 3/16 inch diameter steel wire, triangular-shaped. Anchors attached to steel shall be 5/16 inch diameter steel bars placed to provide 1/16 inch play between flexible anchors and structural steel members. Spacers shall be welded to rods and columns. Equivalent welded-on steel anchor rods or shapes standard with the flexible-anchor manufacturer may be furnished when approved. Welds shall be cleaned and given one coat of zinc-rich touch up paint.

2.8.4 Bar Positioners

Bar positioners, used to prevent displacement of reinforcing bars during the course of construction, shall be factory fabricated from 9 gauge steel wire or equivalent, and coated with a hot-dip galvanized finish. Not more than one wire shall cross the cell. Telescoping bar positioner shall be manufactured from AISI 1065 spring steel and coated in accordance with ASTM B633.

2.9 JOINT REINFORCEMENT

Joint reinforcement shall be factory fabricated from steel wire conforming to ASTM A1064/A1064M, welded construction. Tack welding will not be acceptable in reinforcement used for wall ties. Wire shall have zinc coating conforming to ASTM A153/A153M, Class B-2. All wires shall be a minimum of 9 gauge. Reinforcement shall be ladder type design, having one longitudinal wire in the mortar bed of each face shell for hollow units and one wire for solid units. Joint reinforcement shall be placed a minimum of 5/8 inch cover from either face. The distance between crosswires shall not exceed 16 inches. Joint reinforcement for straight runs shall be furnished in flat sections not less than 10 feet long. Joint reinforcement shall be provided with factory formed corners and intersections. If approved for use, joint reinforcement may be furnished with adjustable wall tie features. Submit one piece of each type used, including corner and wall intersection pieces, showing at least two cross wires.

2.10 REINFORCING STEEL BARS AND RODS

Reinforcing steel bars and rods shall conform to ASTM A615/A615M, Grade 60.

2.11 CONTROL JOINT KEYS

Control joint keys shall be a factory fabricated solid section of natural or synthetic rubber (or combination thereof) conforming to ASTM D2000 or polyvinyl chloride conforming to ASTM D2287. The material shall be resistant to oils and solvents. The control joint key shall be provided with a solid shear section not less than 5/8 inch thick and 3/8 inch thick flanges, with a tolerance of plus or minus 1/16 inch. The control joint key shall fit neatly, but without forcing, in masonry unit jamb sash grooves. The control joint key shall be flexible at a temperature of minus 30 degrees F after five hours exposure, and shall have a durometer hardness of not less than 70 when tested in accordance with ASTM D2240.

2.12 RIGID BOARD-TYPE INSULATION

Provide rigid board-type insulation as specified in Section 07 21 13 BOARD AND BLOCK INSULATION. Submit certificate attesting that the polyisocyanurate insulation furnished for the project contains recovered
material, and showing an estimated percent of such recovered material.

2.13 THROUGH WALL FLASHING

Provide Through Wall Flashing as specified herein.

2.13.1 Coated-Copper Flashing

7 ounce, electrolytic copper sheet, uniformly coated on both sides with acidproof, alkali-proof, elastic bituminous compound. Factory apply coating to a weight of not less than 6 ounces/square foot (approximately 3 ounces/square foot on each side).

2.13.2 Copper or Stainless Steel Flashing

Copper, ASTM B370, minimum 16 ounce weight; stainless steel, ASTM A167, Type 301, 302, 304, or 316, 0.015 inch thick, No. 2D finish. Provide with factory-fabricated deformations that mechanically bond flashing against horizontal movement in all directions. Deformations shall consist of dimples, diagonal corrugations, or a combination of dimples and transverse corrugations.

2.14 WEEP HOLE VENTILATORS

Weep hole ventilators shall be prefabricated aluminum, plastic or wood blocking sized to form the proper size opening in head joints. Provide aluminum and plastic inserts with grill or screen-type openings designed to allow the passage of moisture from cavities and to prevent the entrance or insects. Ventilators shall be sized to match modular construction with a standard 3/8 inch mortar joint.

PART 3 EXECUTION

3.1 PREPARATION

Prior to start of work, masonry inspector shall verify the applicable conditions as set forth in ACI 530/530.1, inspection. The Contracting Officer will serve as inspector or will select a masonry inspector.

3.1.1 Protection

Ice or snow formed on the masonry bed shall be thawed by the application of heat. Heat shall be applied carefully until the top surface of the masonry is dry to the touch. Sections of masonry deemed frozen and damaged shall be removed before continuing construction of those sections.

3.1.1.1 Air Temperature 40 to 32 Degrees F

Heat sand or mixing water to produce mortar temperatures between 40 and 120 degrees F

3.1.1.2 Air Temperature 32 to 25 Degrees F

Heat sand and mixing water to produce mortar temperatures between 40 and 120 degrees F. Maintain temperature of mortar on boards above freezing.

3.1.1.3 Air Temperature 25 to 20 Degrees F

Heat sand and mixing water to provide mortar temperatures between 40 and
120 degrees F. Maintain temperature of mortar on boards above freezing. Use sources of heat on both sides of walls under construction. Employ windbreaks when wind is in excess of 15 mph.

3.1.1.4 Air Temperature 20 Degrees F and Below

Heat sand and mixing water to provide mortar temperatures between 40 and 120 degrees F. Provide enclosure and auxiliary heat to maintain air temperature above 32 degrees F. Temperature of units when laid must not be less than 20 degrees F.

3.1.2 Completed Masonry and Masonry Not Being Worked On

3.1.2.1 Mean Daily Air Temperature 40 to 32 Degrees F

Protect masonry from rain or snow for 24 hours by covering with weather-resistant membrane.

3.1.2.2 Mean Daily Air Temperature 32 to 25 Degrees F

Completely cover masonry with weather-resistant membrane for 24 hours.

3.1.2.3 Mean Daily Air Temperature 25 to 20 Degrees F

Completely cover masonry with insulating blankets or equally protected for 24 hours.

3.1.2.4 Mean Daily Temperature 20 Degrees F and Below

Maintain masonry temperature above 32 degrees F for 24 hours by enclosure and supplementary heat, by electric heating blankets, infrared heat lamps, or other approved methods.

3.1.3 Stains

Protect exposed surfaces from mortar and other stains. When mortar joints are tooled, remove mortar from exposed surfaces with fiber brushes and wooden paddles. Protect base of walls from splash stains by covering adjacent ground with sand, sawdust, or polyethylene.

3.1.4 Loads

Do not apply uniform loads for at least 12 hours or concentrated loads for at least 72 hours after masonry is constructed. Provide temporary bracing as required.

3.1.5 Surfaces

Clean surfaces on which masonry is to be placed of laitance, dust, dirt, oil, organic matter, or other foreign materials and slightly roughen to provide a surface texture with a depth of at least 1/8 inch. Sandblast, if necessary, to remove laitance from pores and to expose the aggregate.

3.2 LAYING MASONRY UNITS

a. Coordinate masonry work with the work of other trades to accommodate built-in items and to avoid cutting and patching. Masonry units shall be laid in running bond pattern. Facing courses shall be level with back-up courses, unless the use of adjustable ties has been approved.
in which case the tolerances shall be plus or minus 1/2 inch. Each unit shall be adjusted to its final position while mortar is still soft and plastic.

b. Units that have been disturbed after the mortar has stiffened shall be removed, cleaned, and relaid with fresh mortar. Air spaces, cavities, chases, expansion joints, and spaces to be grouted shall be kept free from mortar and other debris. Units used in exposed masonry surfaces shall be selected from those having the least amount of chipped edges or other imperfections detracting from the appearance of the finished work. Vertical joints shall be kept plumb.

c. Units being laid and surfaces to receive units shall be free of water film and frost. Solid units shall be laid in a nonfurrowed full bed of mortar. Mortar for veneer wythes shall be beveled and sloped toward the center of the wythe from the cavity side. Units shall be shoved into place so that the vertical joints are tight. Vertical joints of brick and the vertical face shells of concrete masonry units, except where indicated at control, expansion, and isolation joints, shall be completely filled with mortar. Mortar will be permitted to protrude up to 1/2 inch into the space or cells to be grouted. Means shall be provided to prevent mortar from dropping into the space below.

d. In double wythe construction, the inner wythe may be brought up not more than 16 inches ahead of the outer wythe. Collar joints shall be filled with mortar or grout during the laying of the facing wythe, and filling shall not lag the laying of the facing wythe by more than 8 inches.

3.2.1 Forms and Shores

Provide bracing and scaffolding as required. Design bracing to resist wind pressure as required by local codes. Forms and shores shall be sufficiently rigid to prevent deflections which may result in cracking or other damage to supported masonry and sufficiently tight to prevent leakage of mortar and grout. Supporting forms and shores shall not be removed in less than 10 days.

3.2.2 Reinforced Concrete Masonry Units Walls

Where vertical reinforcement occurs, fill cores solid with grout. Lay units in such a manner as to preserve the unobstructed vertical continuity of cores to be filled. Embed the adjacent webs in mortar to prevent leakage of grout. Remove mortar fins protruding from joints before placing grout. Minimum clear dimensions of vertical cores shall be 2 by 3 inches. Position reinforcing accurately as indicated before placing grout. As masonry work progresses, secure vertical reinforcing in place at vertical intervals not to exceed 160 bar diameters. Use puddling rod or vibrator to consolidate the grout. Minimum clear distance between masonry and vertical reinforcement shall be not less than 1/2 inch. Unless indicated or specified otherwise, form splices by lapping bars not less than 40 bar diameters and wire tying them together.

3.2.3 Concrete Masonry Units

Units in piers, pilasters, columns, starting courses on footings, solid foundation walls, lintels, and beams, and where cells are to be filled with grout shall be full bedded in mortar under both face shells and
webs. Other units shall be full bedded under both face shells. Head joints shall be filled solidly with mortar for a distance in from the face of the unit not less than the thickness of the face shell. Foundation walls below grade shall be grouted solid. Jamb units shall be of the shapes and sizes to conform with wall units. Solid units may be incorporated in the masonry work where necessary to fill out at corners, gable slopes, and elsewhere as approved. Double walls shall be stiffened at wall-mounted plumbing fixtures by use of strap anchors, two above each fixture and two below each fixture, located to avoid pipe runs, and extending from center to center of the double wall. Walls and partitions shall be adequately reinforced for support of wall-hung plumbing fixtures when chair carriers are not specified.

3.2.4 Clay or Shale Brick Units

3.2.4.1 Solid Units

Completely fill bed, head, and collar joints with mortar.

3.2.4.2 Hollow Units

Lay hollow units as specified for concrete masonry units.

3.2.4.3 Cavity Walls

Provide a continuous cavity as indicated. Securely tie the two wythes together with horizontal joint reinforcement. Bevel mortar beds away from cavity to prevent projection into cavity when bricks are shoved in place. Keep cavities clear and clean of mortar droppings. At the bottom of cavity walls, in the course immediately above the through-wall flashing, temporarily omit one Split Faced CMU every 4 feet. With a hose and clean water, wash all mortar droppings and debris out of the cavity through the temporary openings at least twice each day masonry is laid, and more often when required to keep the cavities clean. Fill in the openings with Split Faced CMU and mortar after the wall is complete and the cavity has been inspected and found clean. Provide weep holes of open head joints spaced 32 inches o.c. wherever the cavity is interrupted at base of wall and vertical obstructions (e.g. lintels). Cavity face of interior wythe shall be dampproofed in accordance with Section 07 11 13 BITUMINOUS DAMPPROOFING.

3.2.5 Tolerances

Lay masonry plumb, true to line, with courses level. Keep bond pattern plumb throughout. Square corners unless noted otherwise. Except for walls constructed of prefaced concrete masonry units, lay masonry within the following tolerances (plus or minus unless otherwise noted):

<table>
<thead>
<tr>
<th>TABLE II TOLERANCES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation from the plumb in the lines and surfaces of columns, walls and arises</td>
</tr>
<tr>
<td>In adjacent masonry units</td>
</tr>
<tr>
<td>In 10 feet</td>
</tr>
</tbody>
</table>
### TABLE II TOLERANCES

<table>
<thead>
<tr>
<th>Description</th>
<th>In 20 feet</th>
<th>In 40 feet or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variations from the plumb for external corners, expansion joints, and other conspicuous lines</td>
<td>3/8 inch</td>
<td>1/2 inch</td>
</tr>
<tr>
<td>In 20 feet</td>
<td>1/4 inch</td>
<td></td>
</tr>
<tr>
<td>In 40 feet or more</td>
<td>1/2 inch</td>
<td></td>
</tr>
<tr>
<td>Variations from the level for exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines</td>
<td>1/4 inch</td>
<td></td>
</tr>
<tr>
<td>In 20 feet</td>
<td>1/2 inch</td>
<td></td>
</tr>
<tr>
<td>Variation from level for bed joints and top surfaces of bearing walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In 10 feet</td>
<td>1/4 inch</td>
<td></td>
</tr>
<tr>
<td>In 40 feet or more</td>
<td>1/2 inch</td>
<td></td>
</tr>
<tr>
<td>Variations from horizontal lines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In 10 feet</td>
<td>1/4 inch</td>
<td></td>
</tr>
<tr>
<td>In 20 feet</td>
<td>3/8 inch</td>
<td></td>
</tr>
<tr>
<td>In 40 feet or more</td>
<td>1/2 inch</td>
<td></td>
</tr>
<tr>
<td>Variations in cross sectional dimensions of columns and in thickness of walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minus</td>
<td>1/4 inch</td>
<td></td>
</tr>
<tr>
<td>Plus</td>
<td>1/2 inch</td>
<td></td>
</tr>
</tbody>
</table>

### 3.2.6 Cutting and Fitting

Full units of the proper size shall be used wherever possible, in lieu of cut units. Cutting and fitting, including that required to accommodate the work of others, shall be done by masonry mechanics using power masonry saws. Concrete masonry units may be wet or dry cut. Wet cut units, before being placed in the work, shall be dried to the same surface-dry appearance as uncut units being laid in the wall. Cut edges shall be clean, true and sharp. Openings in the masonry shall be made carefully so that wall plates, cover plates or escutcheons required by the installation will completely conceal the openings and will have bottoms parallel with the masonry bed joints. Reinforced masonry lintels shall be provided above openings over 12 inches wide for pipes, ducts, cable trays, and other wall penetrations, unless steel sleeves are used.
3.2.7 Jointing

Joints shall be tooled when the mortar is thumbprint hard. Horizontal joints shall be tooled last. Joints shall be brushed to remove all loose and excess mortar. Mortar joints shall be finished as follows:

3.2.7.1 Flush Joints

Joints in concealed masonry surfaces and joints at electrical outlet boxes in wet areas shall be flush cut. Flush cut joints shall be made by cutting off the mortar flush with the face of the wall. Joints in unparged masonry walls below grade shall be pointed tight. Flush joints for architectural units, such as fluted units, shall completely fill both the head and bed joints.

3.2.7.2 Tooled Joints

Joints in exposed exterior and interior masonry surfaces shall be tooled slightly concave. Joints shall be tooled with a jointer slightly larger than the joint width so that complete contact is made along the edges of the unit. Tooling shall be performed so that the mortar is compressed and the joint surface is sealed. Jointer of sufficient length shall be used to obtain a straight and true mortar joint.

3.2.7.3 Door and Window Frame Joints

On the exposed interior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch. On the exterior side of exterior frames, joints between frames and abutting masonry walls shall be raked to a depth of 3/8 inch.

3.2.8 Joint Widths

Joint widths shall be as follows:

3.2.8.1 Concrete Masonry Units

Concrete masonry units shall have 3/8 inch joints, except for prefaced concrete masonry units.

3.2.8.2 Split Faced Concrete Masonry Units

Prefaced concrete masonry units shall have a joint width of 3/8 inch wide on unfaced side and not less than 3/16 inch nor more than 1/4 inch wide on prefaced side.

3.2.9 Embedded Items

Fill spaces around built-in items with mortar. Point openings around flush-mount electrical outlet boxes in wet locations with mortar. Embed anchors, ties, wall plugs, accessories, flashing, pipe sleeves and other items required to be built-in as the masonry work progresses. Fully embed anchors, ties and joint reinforcement in the mortar. Fill cells receiving anchor bolts and cells of the first course below bearing plates with grout.

3.2.10 Unfinished Work

Step back unfinished work for joining with new work. Toothing may be
resorted to only when specifically approved. Remove loose mortar and thoroughly clean the exposed joints before laying new work.

3.2.11 Masonry Wall Intersections

Masonry bond each course at corners and elsewhere as shown. Masonry walls shall be anchored or tied together at corners and intersections with bond beam reinforcement and prefabricated corner or tee pieces of joint reinforcement as shown.

3.2.12 Partitions

Partitions shall be continuous from floor to underside of floor or roof deck where shown. An isolation joint shall be placed in the intersection between partitions and structural or exterior walls as shown. Interior partitions having 4 inch nominal thick units shall be tied to intersecting partitions of 4 inch units, 5 inches into partitions of 6 inch units, and 7 inches into partitions of 8 inch or thicker units. Cells within vertical plane of ties shall be filled solid with grout for full height of partition or solid masonry units may be used. Interior partitions having masonry walls over 4 inches thick shall be tied together with joint reinforcement. Partitions containing joint reinforcement shall be provided with prefabricated pieces at corners and intersections or partitions.

3.3 ANCHORED VENEER CONSTRUCTION

Completely separate the inner and outer wythes by a continuous airspace as indicated. Lay up both the inner and the outer wythes together except when adjustable joint reinforcement assemblies are approved for use. When both wythes are not brought up together, through-wall flashings shall be protected from damage until they are fully enclosed in the wall. The airspace between the wythes shall be kept clear and free of mortar droppings by temporary wood strips laid on the wall ties and carefully lifted out before placing the next row of ties. A coarse gravel or drainage material shall be placed behind the weep holes in the cavity to a minimum depth of 4 inches of coarse aggregate or 10 inches of drainage material to keep mortar droppings from plugging the weep holes.

3.4 WEEP HOLES

Wherever through-wall flashing occurs, provide weep holes to drain flashing to exterior at acceptable locations as indicated on drawings. Weep holes shall be open head joints at 32 inches o.c. Weep holes shall be provided not more than 32 inches on centers in mortar joints of the exterior wythe above wall flashing, over foundations, bond beams, and any other horizontal interruptions of the cavity. Weep holes shall be perfectly horizontal or slightly canted downward to encourage water drainage outward and not inward. Weep holes shall be constructed using weep hole ventilators. Other approved methods may be used for providing weep holes. Weep holes shall be kept free of mortar and other obstructions.

3.5 MORTAR MIX

Mix mortar in a mechanically operated mortar mixer for at least 3 minutes, but not more than 5 minutes. Measure ingredients for mortar by volume. Ingredients not in containers, such as sand, shall be accurately measured by the use of measuring boxes. Mix water with the dry ingredients in
sufficient amount to provide a workable mixture which will adhere to the vertical surfaces of masonry units. Retemper mortar that has stiffened because of loss of water through evaporation by adding water to restore the proper consistency and workability. Discard mortar that has reached its initial set or that has not been used within 2.5 hours after mixing.

3.6 REINFORCING STEEL

Clean reinforcement of loose, flaky rust, scale, grease, mortar, grout, or other coating which might destroy or reduce its bond prior to placing grout. Bars with kinks or bends not shown on the drawings shall not be used. Reinforcement shall be placed prior to grouting. Unless otherwise indicated, vertical wall reinforcement shall extend to within 2 inches of tops of walls.

3.6.1 Positioning Bars

Vertical bars shall be accurately placed within the cells at the positions indicated on the drawings. A minimum clearance of 1/2 inch shall be maintained between the bars and masonry units. Minimum clearance between parallel bars shall be one diameter of the reinforcement. Vertical reinforcing may be held in place using bar positioners located near the ends of each bar and at intermediate intervals of not more than 192 diameters of the reinforcement. Column and pilaster ties shall be wired in position around the vertical steel. Ties shall be in contact with the vertical reinforcement and shall not be placed in horizontal bed joints.

3.6.2 Splices

Bars shall be lapped a minimum of 48 diameters of the reinforcement. Welded or mechanical connections shall develop at least 125 percent of the specified yield strength of the reinforcement.

3.7 JOINT REINFORCEMENT INSTALLATION

Install joint reinforcement at 16 inches on center or as indicated. Reinforcement shall be lapped not less than 6 inches. Install prefabricated sections at corners and wall intersections. Place the longitudinal wires of joint reinforcement to provide not less than 5/8 inch cover to either face of the unit.

3.8 PLACING GROUT

Fill cells containing reinforcing bars with grout. Hollow masonry units in walls or partitions supporting plumbing, heating, or other mechanical fixtures, voids at door and window jambs, and other indicated spaces shall be filled solid with grout. Cells under lintel bearings on each side of openings shall be filled solid with grout for full height of openings. Walls below grade, lintels, and bond beams shall be filled solid with grout. Units other than open end units may require grouting each course to preclude voids in the units. Grout not in place within 1-1/2 hours after water is first added to the batch shall be discarded. Sufficient time shall be allowed between grout lifts to preclude displacement or cracking of face shells of masonry units. If blowouts, flowouts, misalignment, or cracking of face shells should occur during construction, the wall shall be torn down and rebuilt.
3.8.1 Vertical Grout Barriers for Fully Grouted Walls

Provide grout barriers not more than 30 feet apart, or as required, to limit the horizontal flow of grout for each pour.

3.8.2 Horizontal Grout Barriers

Embed grout barriers in mortar below cells of hollow units receiving grout.

3.8.3 Grout Holes and Cleanouts

3.8.3.1 Grout Holes

Provide grouting holes in slabs, spandrel beams, and other in-place overhead construction. Locate holes over vertical reinforcing bars or as required to facilitate grout fill in bond beams. Provide additional openings spaced not more than 16 inches on centers where grouting of all hollow unit masonry is indicated. Openings shall not be less than 4 inches in diameter or 3 by 4 inches in horizontal dimensions. Upon completion of grouting operations, plug and finish grouting holes to match surrounding surfaces.

3.8.3.2 Cleanouts for Hollow Unit Masonry Construction

Provide cleanout holes at the bottom of every pour in cores containing vertical reinforcement when the height of the grout pour exceeds 5 feet. Where all cells are to be grouted, construct cleanout courses using bond beam units in an inverted position to permit cleaning of all cells. Provide cleanout holes at a maximum spacing of 32 inches where all cells are to be filled with grout. Establish a new series of cleanouts if grouting operations are stopped for more than 4 hours. Cleanouts shall not be less than 3 by 4 inch openings cut from one face shell. Manufacturer's standard cutout units may be used at the Contractor's option. Cleanout holes shall not be closed until masonry work, reinforcement, and final cleaning of the grout spaces have been completed and inspected. For walls which will be exposed to view, close cleanout holes in an approved manner to match surrounding masonry.

3.8.4 Grouting Equipment

3.8.4.1 Grout Pumps

Pumping through aluminum tubes will not be permitted. Operate pumps to produce a continuous stream of grout without air pockets, segregation, or contamination. Upon completion of each day's pumping, remove waste materials and debris from the equipment, and dispose of outside the masonry.

3.8.4.2 Vibrators

Internal vibrators shall maintain a speed of not less than 5,000 impulses per minute when submerged in the grout. Maintain at least one spare vibrator at the site at all times. Apply vibrators at uniformly spaced points not further apart than the visible effectiveness of the machine. Limit duration of vibration to time necessary to produce satisfactory consolidation without causing segregation.
3.8.5 Grout Placement

Lay masonry to the top of a pour before placing grout. Do no place grout in two-wythe solid unit masonry cavity until mortar joints have set for at least 3 days during hot weather and 5 days during cold damp weather. Grout shall not be placed in hollow unit masonry until mortar joints have set for at least 24 hours. Grout shall be placed using a hand bucket, concrete hopper, or grout pump to completely fill the grout spaces without segregation of the aggregates. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. The height of grout pours and type of grout used shall be limited by the dimensions of grout spaces as indicated in Table III. Low-lift grout methods may be used on pours up to and including 5 feet in height. High-lift grout methods shall be used on pours exceeding 5 feet in height.

3.8.5.1 Low-Lift Method

Grout shall be placed at a rate that will not cause displacement of the masonry due to hydrostatic pressure of the grout. Mortar protruding more than 1/2 inch into the grout space shall be removed before beginning the grouting operation. Grout pours 12 inches or less in height shall be consolidated by mechanical vibration or by puddling. Grout pours over 12 inches in height shall be consolidated by mechanical vibration and reconsolidated by mechanical vibration after initial water loss and settlement has occurred. Vibrators shall not be inserted into lower pours that are in a semi-solidified state. Low-lift grout shall be used subject to the limitations of Table III.

3.8.5.2 High-Lift Method

Mortar droppings shall be cleaned from the bottom of the grout space and from reinforcing steel. Mortar protruding more than 1/4 inch into the grout space shall be removed by dislodging the projections with a rod or stick as the work progresses. Reinforcing, bolts, and embedded connections shall be rigidly held in position before grouting is started. CMU units shall not be pre-wetted. Grout, from the mixer to the point of deposit in the grout space shall be placed as rapidly as practical by pumping and placing methods which will prevent segregation of the mix and cause a minimum of grout splatter on reinforcing and masonry surfaces not being immediately encased in the grout lift. The individual lifts of grout shall be limited to 4 feet in height. The first lift of grout shall be placed to a uniform height within the pour section and vibrated thoroughly to fill all voids. This first vibration shall follow immediately behind the pouring of the grout using an approved mechanical vibrator. After a waiting period sufficient to permit the grout to become plastic, but before it has taken any set, the succeeding lift shall be poured and vibrated 12 to 18 inches into the preceding lift. If the placing of the succeeding lift is going to be delayed beyond the period of workability of the preceding, each lift shall be reconsolidated by reworking with a second vibrator as soon as the grout has taken its settlement shrinkage. The waiting, pouring, and reconsolidation steps shall be repeated until the top of the pour is reached. The top lift shall be reconsolidated after the required waiting period. The high-lift grouting of any section of wall between vertical grout barriers shall be completed to the top of a pour in one working day unless a new series of cleanout holes is established and the resulting horizontal construction joint cleaned. High-lift grout shall be used subject to the limitations in Table III.
### TABLE III

**POUR HEIGHT AND TYPE OF GROUT FOR VARIOUS GROUT SPACE DIMENSIONS**

<table>
<thead>
<tr>
<th>Maximum Grout Pour Height feet (4)</th>
<th>Grout Type</th>
<th>Grouting Procedure</th>
<th>Multiwythe Masonry (3)</th>
<th>Hollow-unit Masonry</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fine</td>
<td>Low Lift</td>
<td>3/4</td>
<td>1-1/2 x 2</td>
</tr>
<tr>
<td>5</td>
<td>Fine</td>
<td>Low Lift</td>
<td>2</td>
<td>2 x 3</td>
</tr>
<tr>
<td>8</td>
<td>Fine</td>
<td>High Lift</td>
<td>2</td>
<td>2 x 3</td>
</tr>
<tr>
<td>12</td>
<td>Fine</td>
<td>High Lift</td>
<td>2-1/2</td>
<td>2-1/2 x 3</td>
</tr>
<tr>
<td>24</td>
<td>Fine</td>
<td>High Lift</td>
<td>3</td>
<td>3 x 3</td>
</tr>
<tr>
<td>1</td>
<td>Coarse</td>
<td>Low Lift</td>
<td>1-1/2</td>
<td>1-1/2 x 3</td>
</tr>
<tr>
<td>5</td>
<td>Coarse</td>
<td>Low Lift</td>
<td>2</td>
<td>2-1/2 x 3</td>
</tr>
<tr>
<td>8</td>
<td>Coarse</td>
<td>High Lift</td>
<td>2</td>
<td>3 x 3</td>
</tr>
<tr>
<td>12</td>
<td>Coarse</td>
<td>High Lift</td>
<td>2-1/2</td>
<td>3 x 3</td>
</tr>
<tr>
<td>24</td>
<td>Coarse</td>
<td>High Lift</td>
<td>3</td>
<td>3 x 4</td>
</tr>
</tbody>
</table>

**Notes:**

1. The actual grout space or cell dimension shall be larger than the sum of the following items:
   - (a) The required minimum dimensions of total clear areas given in the table above;
   - (b) The width of any mortar projections within the space;
   - (c) The horizontal projections of the diameters of the horizontal reinforcing bars within a cross section of the grout space or cell.

2. The minimum dimensions of the total clear areas shall be made up of one or more open areas, with at least one area being 3/4 inch or greater in width.

3. Where only cells of hollow masonry units containing reinforcement are grouted, the maximum height of the pour shall not exceed the distance between horizontal bond beams.

### 3.9 BOND BEAMS

Bond beams shall be filled with grout and reinforced as indicated on the drawings. Grout barriers shall be installed under bond beam units to retain the grout as required. Reinforcement shall be continuous, including around corners, except through control joints or expansion joints, unless otherwise indicated on the drawings. Where splices are
required for continuity, reinforcement shall be lapped 48 bar diameters. A minimum clearance of 1/2 inch shall be maintained between reinforcement and interior faces of units.

3.10 CONTROL JOINTS

Control joints shall be provided as indicated and shall be constructed by using open end stretcher units in accordance with the details shown on the drawings. The vertical mortar joint at control joint locations shall be continuous, including through all bond beams. This shall be accomplished by utilizing half blocks in alternating courses on each side of the joint. The control joint key shall be interrupted in courses containing continuous bond beam steel. In single wythe exterior masonry walls, the exterior control joints shall be raked to a depth of 3/4 inch; backer rod and sealant shall be installed in accordance with Section 07 92 00 JOINT SEALANTS. Exposed interior control joints shall be raked to a depth of 1/4 inch. Concealed control joints shall be flush cut.

3.11 INDICATED JOINTS

Concrete masonry veneer joints located and constructed as indicated. Keep joints free of mortar and other debris.

3.12 LINTELS

3.12.1 Masonry Lintels

Construct masonry lintels with lintel units filled solid with grout in all courses and reinforced with a minimum of two No. 4 bars in the bottom course unless otherwise indicated on the drawings. Lintel reinforcement shall extend beyond each side of masonry opening 40 bar diameters or 24 inches, whichever is greater. Reinforcing bars shall be supported in place prior to grouting and shall be located 1/2 inch above the bottom inside surface of the lintel unit.

3.12.2 Steel Lintels

Construct steel lintels as shown on the drawings. Lintels shall be set in a full bed of mortar with faces plumb and true. Steel lintels shall have a minimum bearing length of 8 inches unless otherwise indicated on the drawings.

3.13 SILLS

Sills shall be set in a full bed of mortar with faces plumb and true.

3.14 ANCHORAGE TO CONCRETE AND STRUCTURAL STEEL

3.15 INSULATION

Anchored veneer walls shall be insulated, where shown, by installing board-type insulation on the cavity side of the inner wythe. Board type insulation shall be applied directly to the masonry or thru-wall flashing with adhesive. Insulation shall be neatly fitted between obstructions without impaling of insulation on ties or anchors. The insulation shall be applied in parallel courses with vertical joints breaking midway over the course below and shall be applied in moderate contact with adjoining units without forcing, and shall be cut to fit neatly against adjoining surfaces.
3.16 POINTING AND CLEANING

After mortar joints have attained their initial set, but prior to hardening, completely remove mortar and grout daubs or splashings from masonry-unit surfaces that will be exposed or painted. Before completion of the work, defects in joints of masonry to be exposed or painted shall be raked out as necessary, filled with mortar, and tooled to match existing joints. Immediately after grout work is completed, scum and stains which have percolated through the masonry work shall be removed using a high pressure stream of water and a stiff bristled brush. Masonry surfaces shall not be cleaned, other than removing excess surface mortar, until mortar in joints has hardened. Masonry surfaces shall be left clean, free of mortar daubs, dirt, stain, and discoloration, including scum from cleaning operations, and with tight mortar joints throughout. Metal tools and metal brushes shall not be used for cleaning.

3.16.1 Dry-Brushing

a. Exposed concrete masonry unit
b. Exposed concrete brick surfaces
c. shall be dry-brushed at the end of each day's work and after any required pointing, using stiff-fiber bristled brushes.

3.17 PROTECTION

Protect facing materials against staining. Cover top of walls with nonstaining waterproof covering or membrane when work is not in progress. Covering of the top of the unfinished walls shall continue until the wall is waterproofed with a complete roof or parapet system. Covering shall extend a minimum of 2 feet down on each side of the wall and shall be held securely in place. Before starting or resuming, top surface of masonry in place shall be cleaned of loose mortar and foreign material.

3.18 WASTE MANAGEMENT

Manage waste according to the Waste Management Plan and as follows.

Minimize water used to wash mixing equipment. Use trigger operated spray nozzles for water hoses.

3.18.1 Separate and Recycle Waste

Place materials defined as hazardous or toxic waste in designated containers. Fold up metal banding, flatten, and place in designated area for recycling. Collect wood packing shims and pallets and place in designated area. Use leftover mixed mortar as cavity fill at grade underground utility pipe kickers where lower strength mortar meets the requirements for bulk fill. Separate masonry waste and place in designated area for use as structural fill. Separate selected masonry waste and excess for landscape uses, either whole or crushed as ground cover.

3.18.2 Take-Back Program

Collect information from manufacturer for take-back program options. Set aside masonry units, full and partial, scrap, and packaging to be returned to manufacturer for recycling into new product. When such a service is
not available, local recyclers shall be sought after to reclaim the materials. Submit documentation that includes contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

3.19 TEST REPORTS

3.19.1 Field Testing of Mortar

Take at least three specimens of mortar each day. Spread a layer of mortar 1/2 to 5/8 inch thick on the masonry units and allowed to stand for one minute. Prepare and test the specimens for compressive strength in accordance with ASTM C780. Submit test results.

3.19.2 Field Testing of Grout

Field sampling and testing of grout shall be in accordance with the applicable provisions of ASTM C1019. A minimum of three specimens of grout per day shall be sampled and tested. Each specimen shall have a minimum ultimate compressive strength of 2000 psi at 28 days. Submit test results.

-- End of Section --
PART 1   GENERAL

1.1   REFERENCES

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

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI D100     (1991; R 2008) Cold-Formed Steel Design Manual

AISI SG03-3   (2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN WELDING SOCIETY (AWS)


ASTM INTERNATIONAL (ASTM)


Rubber


FM GLOBAL (FM)


STEEL DECK INSTITUTE (SDI)


SDI DDP (1987; R 2000) Deck Damage and Penetrations


SOCIETY FOR PROTECTIVE COATINGS (SSPC)


U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 3-301-01 (2010; Change 3) Structural Engineering

UNDERWRITERS LABORATORIES (UL)

UL 209 (2011) Cellular Metal Floor Raceways and Fittings


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.
Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Fabrication Drawings
Metal Floor Deck Units
Cant Strips
Ridge and Valley Plates
Metal Closure Strips

SD-03 Product Data

Accessories
Deck Units
Galvanizing Repair Paint
Joint Sealant Material
Mechanical Fasteners
Metal Floor Deck Units
Powder-Actuated Tool Operator
Repair Paint

SD-04 Samples

Metal Roof Deck Units
Flexible Closure Strips
Accessories

SD-05 Design Data

Deck Units
Submit manufacturer's design calculations, or applicable published literature for the structural properties of the proposed deck units.

SD-07 Certificates

Welding Qualifications
Fire Safety
Wind Storm Resistance
1.3 QUALITY ASSURANCE

1.3.1 Deck Units

Furnish deck units and accessory products from a manufacturer regularly engaged in manufacture of steel decking. Provide a 2 sq feet sample of decking material and each accessory to be used. Provide a sample of acoustical material to be used. Provide manufacturer's certificates attesting that the decking material meets the specified requirements.

1.3.2 Certification of Powder-Actuated Tool Operator

Manufacturer's certificate attesting that the operators are authorized to use the low velocity powder-actuated tool.

1.3.3 Welding Qualifications

Welding of structural deck is no permitted except in extreme circumstances as permitted by the contracting officer. When performed welding shall follow Welding Procedures in accordance with AWS D1.1/D1.1M. Test specimens shall be made in the presence of Contracting Officer and shall be tested by an approved testing laboratory at the Contractor's expense. Submit qualified Welder Qualifications in accordance with AWS D1.1/D1.1M, or under an equivalent approved qualification test. Perform tests on test pieces in positions and with clearances equivalent to those actually encountered. If a test weld fails to meet requirements, perform an immediate retest of two test welds until each test weld passes. Failure in the immediate retest will require the welder be retested after further practice or training, performing a complete set of test welds.

1.3.4 Regulatory Requirements

1.3.4.1 Fire Safety

Test roof deck as a part of a roof deck construction assembly of the type used for this project, listing as fire classified in the UL Bld Mat Dir, or listing as Class I construction in the FM APP GUIDE, and so labeled.

1.3.4.2 Wind Storm Resistance

Provide roof construction assembly capable of withstanding an uplift pressure of 60 pounds per square foot when tested in accordance with the uplift pressure test described in the FM DS 1-28 or as described in UL 580 and in general compliance with UFC 3-301-01.

1.3.5 Fabrication Drawings

Show type and location of units, location and sequence of connections, bearing on supports, methods of anchoring, attachment of accessories, adjusting plate details, size and location of holes to be cut and reinforcement to be provided, the manufacturer's erection instructions and other pertinent details.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver deck units to the site in a dry and undamaged condition. Store and handle steel deck in a manner to protect it from corrosion, deformation, and other types of damage. Do not use decking for storage or as working platform until units have been fastened into position. Exercise care not to damage material or overload decking during
construction. The maximum uniform distributed storage load must not exceed the design live load. Stack decking on platforms or pallets and cover with weathertight ventilated covering. Elevate one end during storage to provide drainage. Maintain deck finish at all times to prevent formation of rust. Repair deck finish using touch-up paint. Replace damaged material.

1.5 DESIGN REQUIREMENTS FOR ROOF DECKS

1.5.1 Properties of Sections

Properties of metal roof deck sections must comply with engineering design width as limited by the provisions of AISI D100.

1.5.2 Allowable Loads

Indicate total uniform dead and live load for detailing purposes.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Steel Sheet

Flat rolled carbon steel sheets of structural quality, thickness not less than indicated, meeting the requirements of AISI SG03-3, except as modified herein. For acoustical steel deck units, provide perforated sheets with 5/32 inch diameter holes staggered 3/8 inch on-centers.

2.1.2 Steel Coating

ASTM A653/A653M designation G90 galvanized, or ASTM A792/A792M designation AZ55, aluminum-zinc alloy. Apply coating to both sides of sheet. Conform to UL 209 for coating on decking provided as wire raceways.

2.1.3 Mixes

2.1.3.1 Galvanizing Repair Paint for Floor Decks

Provide a high-zinc-dust content paint for regalvanizing welds in galvanized steel conforming to ASTM A780/A780M.

2.1.4 Galvanized Steel Angles for Roof Decks

Provide hot-rolled carbon steel angles conforming to ASTM A36/A36M, merchant quality, Grade Designation SAE/AISI 1023 or SAE/AISI 1025, and hot-dip galvanized in accordance with ASTM A123/A123M.

2.1.5 Joint Sealant Material for Roof Decks

Provide a nonskinning, gun-grade, bulk compound material as recommended by the manufacturer.

2.1.6 Galvanizing Repair Paint for Roof Decks

Provide a high zinc-dust content paint for regalvanizing welds in galvanized steel and shall conform to ASTM A780/A780M.
2.1.7 Flexible Closure Strips for Roof Decks

Provide strips made of elastomeric material specified and premolded to the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking.

Provide a vulcanized, closed-cell, expanded chloroprene elastomer having approximately 3.5 psi compressive-deflection at 25 percent deflection (limits), conforming to ASTM D1056, Grade No. SCE 41, with the following additional properties:

- Britteness temperature of minus 40 degrees F when tested in accordance with ASTM D746.
- Flammability resistance with a flame spread rating of less than 25 when tested in accordance with ASTM E84.
- Resistance to ozone must be "no cracks" after exposure of a sample kept under a surface tensile strain of 25 percent to an ozone concentration of 100 parts per million of air by volume in air for 100 hours at 104 degrees F and tested in accordance with ASTM D1149.

Provide a elastomeric type adhesive with a chloroprene base as recommended by the manufacturer of the flexible closure strips.

2.2 ACCESSORIES

Provide accessories of same material as deck, unless specified otherwise. Provide manufacturer's standard type accessories, as specified.

2.2.1 Adjusting Plates

Provide adjusting plates, or segments of deck units, of same thickness and configuration as deck units in locations too narrow to accommodate full size units. Provide factory cut plates of predetermined size where possible.

2.2.2 End Closures

Fabricated of sheet metal by the deck manufacturer. Provide end closures minimum 0.028 inch thick to close open ends at exposed edges of floors, parapets, end walls, eaves, and openings through deck unless structural steel closure plates or other means of structural termination are provided.

2.2.3 Partition Closures

Provide closures for closing voids above interior walls and partitions that are perpendicular to the direction of the configurations. Provide rubber, plastic, or sheet steel closures above typical partitions. Provide minimum one inch thick soft composition rubber closures above walls and partitions contiguous to acoustical steel deck. Provide sheet steel closures above fire-resistant interior walls and partitions located on both sides of wall or partition. Provide glass fiber blanket insulation in the space between pairs of closures at acoustical partitions.

2.2.4 Closure Plates for Composite Deck

Support and retain concrete at each floor level. Provide edge closures at all edges of the slab of sufficient strength and stiffness to support the
wet concrete. Provide metal closures for all openings in composite steel deck 1/4 inch and over.

2.2.5 Sheet Metal Collar

Where deck is cut for passage of pipes, ducts, columns, etc., and deck is to remain exposed, provide a neatly cut sheet metal collar to cover edges of deck. Do not cut deck until after installation of supplemental supports.

2.2.6 Cover Plates

Sheet metal to close panel edge and end conditions, and where panels change direction or butt. Polyethylene-coated, self-adhesive, 2 inch wide joint tape may be provided in lieu of cover plates on flat-surfaced deck joints.

Fabricate cover plates for abutting floor deck units from the specified structural-quality steel sheets not less than nominal thickness before galvanizing. Provide 6 inch wide cover plates and form to match the contour of the floor deck units.

2.2.7 Roof Sump Pans

Sump pans must be provided for roof drains and must be minimum 0.075 inch thick steel, flat or recessed type as indicated. Shape sump pans to meet roof slope by the supplier or by a sheet metal specialist. Provide bearing flanges of sump pans to overlap steel deck a minimum of 3 inch. Shape, size, and reinforce the opening in bottom of the sump pan to receive roof drain.

2.2.8 Column Closures

Sheet metal, minimum 0.0358 inch thick or metal rib lath.

2.2.9 Access Hole Covers

Sheet metal, minimum 0.0474 inch thick.

2.2.10 Hanger

Provide clips or loops for utility systems and suspended ceilings of one or more of the following types:

a. Lip tabs or integral tabs where noncellular decking or flat plate of cellular section is 0.0474 inch thick or more, and a structural concrete fill is used over deck.

b. Slots or holes punched in decking for installation of pigtails.

c. Tabs driven from top side of decking and arranged so as not to pierce electrical cells.

d. Decking manufacturer's standard as approved by the Contracting Officer.

2.2.11 Mechanical Fasteners

Provide mechanical fasteners, such as powder actuated or pneumatically driven fasteners, for anchoring the deck to structural supports and
adjourning units that are designed to meet the loads indicated. Provide positive locking-type fasteners listed by the Steel Deck Institute and ICC-ES, as approved by the Contracting Officer.

2.2.12 Miscellaneous Accessories
Furnish the manufacturer's standard accessories to complete the deck installation. Furnish metal accessories of the same material as the deck and with the minimum design thickness as follows: saddles, 0.0474 inch welding washers, 0.0598 inch cant strip, 0.0295 inch other metal accessories, 0.0358 inch unless otherwise indicated. Accessories must include but not be limited to saddles, welding washers, fasteners, cant strips, butt cover plates, underlapping sleeves, and ridge and valley plates.

2.3 FABRICATION
Furnish one sample of each type of Metal Floor Deck Units used to illustrate the actual cross section dimensions and configuration.

Furnish sample of Metal Roof Deck Units used to illustrate actual cross section dimensions and configurations.

Furnish one sample of each type Flexible Closure Strips, 12 inch long.

2.3.1 Deck Units

2.3.2 Roof Deck

Conform to ASTM A792/A792M or ASTM A1008/A1008M for deck used in conjunction with insulation and built-up roofing. Fabricate roof deck units of the steel design thickness required by the design drawings and zinc-coated in conformance with ASTM A653/A653M, G90 coating class or aluminum-zinc coated in accordance with ASTM A792/A792M Coating Designation AZ55.

2.3.2.1 Cant Strips for Roof Decks

Fabricate cant strips from the specified commercial-quality steel sheets not less than nominal 0.0359 inch thick before galvanizing. Bend strips to form a 45-degree cant not less than 5 inch wide, with top and bottom flanges a minimum 3 inch wide. Length of strips 10 feet.

2.3.2.2 Ridge and Valley Plates for Roof Decks

Fabricate plates from the specified structural-quality steel sheets, not less than nominal 0.0359 inch thick before galvanizing. Provide plates of minimum 4-1/2 inch wide and bent to provide tight fitting closures at ridges and valleys. Provide a minimum length of ridge and valley plates of 10 feet.

2.3.2.3 Metal Closure Strips for Roof Decks

Fabricate strips from the specified commercial-quality steel sheets not less than nominal 0.0359 inch thick before galvanizing. Provide strips from the configuration required to provide tight-fitting closures at open ends and sides of steel roof decking.
2.3.3 Form Deck

Conform to ASTM A653/A653M or ASTM A1008/A1008M for deck used as formwork for concrete. Fabricate form deck of the steel design thickness required by the design drawings. Zinc-coat in conformance with ASTM A653/A653M, G90 coating class.

2.3.4 Touch-Up Paint

Provide touch-up paint for zinc-coated units of an approved galvanizing repair paint with a high-zinc dust content. Touch-up welds with paint conforming to SSPC Paint 20 in accordance with ASTM A780/A780M. Maintain finish of deck units and accessories by using touch-up paint whenever necessary to prevent the formation of rust.

For floor decking installation, wire brush, clean, and touchup paint the scarred areas on the top and bottom surfaces of the metal floor decking and on the surface of supporting steel members. Include welds, weld scars, bruises, and rust spots for scarred areas. Touched up the galvanized surfaces with galvanizing repair paint. Touch up the painted surfaces with paint for the repair of painted surfaces.

After roof decking installation, wire brush, clean, and touchup paint the scarred areas on top and bottom surfaces of metal roof decking. The scarred areas include welds, weld scars, bruises, and rust spots. Touchup galvanized surfaces with galvanizing repair paint. Touchup painted surfaces with repair paint of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

Prior to installation of decking units and accessories, examine worksite to verify that as-built structure will permit installation of decking system without modification.

3.2 INSTALLATION

Install steel deck units in accordance with SDI DDMO3 and approved shop drawings. Place units on structural supports, properly adjusted, leveled, and aligned at right angles to supports before permanently securing in place. Damaged deck and accessories including material which is permanently stained or contaminated, deformed, or with burned holes shall not be installed. Extend deck units over three or more supports unless absolutely impractical. Report inaccuracies in alignment or leveling to the Contracting Officer and make necessary corrections before permanently anchoring deck units. Locate deck ends over supports only. Ends of floor deck may be lapped or butted. Do not use unanchored deck units as a work or storage platform. Permanently anchor units placed by the end of each working day. Do not support suspended ceilings, light fixtures, ducts, utilities, or other loads by steel deck unless indicated. Distribute loads by appropriate means to prevent damage. Prepare Neatly fit acoustical material into the rib voids as indicated.

3.2.1 Attachment

Immediately after placement and alignment, and after correcting inaccuracies, permanently fasten steel deck units to structural supports and to adjacent deck units by welding with normal 5/8 inch diameter puddle
welds or fastened with screws, powder-actuated fasteners, or pneumatically driven fasteners as indicated on the design drawings and in accordance with manufacturer's recommended procedure and SDI 31. Clamp or weight deck units to provide firm contact between deck units and structural supports while performing welding or fastening. Anchoring the deck to structural supports with powder-actuated fasteners or pneumatically driven fasteners is required and recommended over welding for all roof deck. Attachment of adjacent deck units by button-punching is prohibited.

3.2.1.1 Welding

Do not weld roof deck. Perform welding in accordance with AWS D1.3/D1.3M using methods and electrodes recommended by the manufacturers of the base metal alloys being used. Ensure only operators previously qualified by tests prescribed in AWS D1.1/D1.1M and AWS D1.3/D1.3M make welds. Immediately recertify, or replace qualified welders, that are producing unsatisfactory welding. Conform to the recommendations of the Steel Deck Institute and the steel deck manufacturer for location, size, and spacing of fastening. Do use welding washers at the connections of the deck to supports. Do not use welding washers at sidelaps. Holes and similar defects will not be acceptable. Provide butted deck ends. Attach all partial or segments of deck units to structural supports in accordance with Section 2.5 of SDI DDMO3. Attach shear connectors as shown and welded as per AWS D1.1/D1.1M through the steel deck to the steel member where necessary and directly to the steel member where possible. Immediately clean welds by chipping and wire brushing. Heavily coat welds, cut edges and damaged portions of coated finish with zinc-dust paint conforming to ASTM A780/A780M.

3.2.1.2 Fastening

Anchor deck to structural supports and adjoining units with mechanical fasteners as listed by the Steel Deck Institute, ICC-ES, the fastener and steel deck manufacturers, and approved by the Contracting Officer. Drive the powder-actuated fasteners with a low-velocity piston tool by an operator authorized by the manufacturer of the powder-actuated tool. Drive pneumatically fasteners with a low-velocity fastening tool and comply with the manufacturer's recommendations.

3.2.1.3 Fastening Floor Deck Units

Fasten floor deck units to the steel supporting members at ends and at all intermediate supports, both parallel and perpendicular to deck span, by welds. Do not exceed spacing of welds of 12 inch on center, with a minimum of two welds per floor deck unit at each support. Provide 3/4 inch minimum diameter fusion welds. Coordinate welding sequence and procedure with the placing of the floor deck units. Blow holes shall be cause for rejection.

Lock sidelaps between adjacent floor deck units together at intervals not exceeding 48 inch on center by welding or button punching for all spans.

3.2.2 Openings

Cut or drill all holes and openings required and be coordinated with the drawings, specifications, and other trades. Frame and reinforce openings through the deck in conformance with SDI DDP. Reinforce holes and openings 6 to 12 inch across by 0.0474 inch thick steel sheet at least 12 inch wider and longer than the opening and be fastened to the steel deck at
each corner of the sheet and at a maximum of 6 inch on center. Reinforce holes and openings larger than 12 inch by steel channels or angles installed perpendicular to the steel joists and supported by the adjacent steel joists. Install steel channels or angles perpendicular to the deck ribs and fasten to the channels or angles perpendicular to the steel joists.

3.2.3 Deck Damage

SDI MOC2, for repair of deck damage.

3.2.4 Accessory Installation

3.2.4.1 Adjusting Plates

Provide in locations too narrow to accommodate full-size deck units and install as shown on shop drawings.

3.2.4.2 End Closures

Provide end closure to close open ends of cells at columns, walls, and openings in deck.

3.2.4.3 Closures Above Partitions

Provide for closing voids between cells over partitions that are perpendicular to direction of cells. Provide a one-piece closure strip for partitions 4 inch nominal or less in thickness and two-piece closure strips for wider partitions. Provide sheet metal closures above fire-rated partitions at both sides of partition with space between filled with fiberglass insulation.

3.2.4.4 Cover Plates

Provide metal cover plates, or joint tape, at joints between cellular decking sheets to be used as electrical raceways. Where concrete leakage would be a problem, provide metal cover plates, or joint tape, at joints between decking sheets, cellular or noncellular, to be covered with concrete fill.

3.2.4.5 Access Hole Covers

Provide to seal holes cut in decking to facilitate welding of decking to structural supports.

3.2.4.6 Hangers

Provide as indicated to support utility system and suspended ceilings. Space devices as indicated.

3.2.5 Sound Absorbing Material

Install sound absorbing glass fiber roll or premolded form, neatly in voids between perforated webs of acoustical noncellular steel deck and glass fiber rigid strip, in cells of acoustical cellular steel deck. Keep sound absorbing material dry before, during and after installation.
3.2.6 Concrete Work

Prior to placement of concrete, inspect installed decking to ensure that there has been no permanent deflection or other damage to decking. Replace decking which has been damaged or permanently deflected as approved by the Contracting Officer. Place concrete on metal deck in accordance with Construction Practice of SDI 31.

3.2.7 Preparation of Fire-Proofed Surfaces

Provide deck surfaces, both composite and noncomposite, which are to receive sprayed-on fireproofing, galvanized and free of all grease, mill oil, paraffin, dirt, salt, and other contaminants which impair adhesion of the fireproofing. Complete any required cleaning prior to steel deck installation using a cleaning method that is compatible with the sprayed-on fireproofing.

3.3 JOINT SEALING FOR ROOF DECKS

Seal sidelaps and endlaps with manufacturer's recommended joint sealing material. Shop or field apply the material. Before applying the sealing material, completely remove dust, dirt, moisture, and other foreign material from the surfaces to which the sealing material is to be applied. Apply sealing material in strict accordance with the sealing material manufacturer's printed instructions.

3.4 ROOF SUMP PANS

Place sump pans over openings in roof decking and fusion welded to top surface of roof decking. Do not exceed spacing of welds of 12 inch with not less than one weld at each corner. Field cut opening in the bottom of each roof sump pan to receive the roof drain as part of the work of this section.

3.5 CANT STRIPS FOR ROOF DECKS

Provide strips to be fusion welded to surface of roof decking, secured to wood nailers by galvanized screws or to steel framing by galvanized self-tapping screws or welds. Do not exceed spacing of welds and fasteners of 12 inch. Lap end joints a minimum 3 inch and secure with galvanized sheet metal screws spaced a maximum 4 inch on center.

3.6 RIDGE AND VALLEY PLATES FOR ROOF DECKS

Provide plates to be fusion welded to top surface of roof decking. Lap end joints a minimum 3 inch. For valley plates, provide endlaps to be in the direction of water flow.

3.7 CLOSURE STRIPS FOR ROOF DECKS

Provide closure strips at open, uncovered ends and edges of the roof decking and in voids between roof decking and top of walls and partitions where indicated. Install closure strips in position in a manner to provide a weathertight installation.

3.8 ROOF INSULATION SUPPORT FOR ROOF DECKS

Provide metal closure strips for support of roof insulation where rib openings in top surface of metal roof decking occur adjacent to edges and
openings. Weld metal closure strips in position.

3.9 CLEANING AND PROTECTION FOR ROOF DECKS

Upon completion of the deck, sweep surfaces clean and prepare for installation of the roofing.

3.10 FIELD QUALITY CONTROL

3.10.1 Decks Not Receiving Concrete

Inspect the decking top surface for distortion after installation. For roof decks not receiving concrete, verify distortion by placing a straight edge across three adjacent top flanges. The maximum allowable gap between the straight edge and the top flanges is 1/16 inch; when gap is more than 1/16 inch, provide corrective measures or replacement. Reinspect decking after performing corrective measures or replacement.

-- End of Section --
SECTION 05 40 01
PREFABRICATED COLD-FORMED METAL TRUSSES

PART 1   GENERAL

1.1   REFERENCES

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

AMERICAN IRON AND STEEL INSTITUTE (AISI)
AISI RG-9518 Design Guide for Cold-Formed Steel Trusses
AISI SG-671 (2002) Specifications and Commentary for the Design of Cold-Formed Steel Structural Members and Commentary

ASTM INTERNATIONAL (ASTM)
ASTM A 653/A 653M (2002; Rev. A) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM E 329 (2000b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

AMERICAN WELDING SOCIETY (AWS)
AWS D1.3 (1998) Structural Welding Code - Sheet Steel

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

1.2   SYSTEM REQUIREMENTS

1.2.1   Design Requirements

a. Structural Design: Prepare complete structural design calculations for framing members, connections, and accessories.

b. Design system to accommodate 1/2 inch (13 mm) vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges, and construction tolerances.
1.2.2 Performance Requirements

   a. Size components to withstand design loads as shown on Drawings, and following deflection limits:


1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control, or as otherwise designated. 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 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

   Framing Members

   Framing Accessories

   Truss elevations coordinated with Drawings showing framing, accessories, anchorage, and connection details. Shop drawings shall be signed and sealed by the qualified registered engineer responsible for their preparation

SD-03 Product Data

   Framing Members

   Framing Accessories

SD-07 Certificates

   Mill Certificates

   Mill certificates or test reports from independent testing agency, qualified in accordance with ASTM E 329, showing that the steel sheet used in the manufacture of each cold-formed component complies with the minimum yield strengths and uncoated steel thickness specified. Test reports shall be based on the results of three coupon tests in accordance with ASTM A 370.

   Qualifications

   Proof of manufacturer, installer, and welder qualifications.

   Welder certificates

SD-08 Manufacturer's Instructions

   Framing Members

   Framing Accessories
1.4 QUALITY ASSURANCE

1.4.1 Overall Standards

a. Calculate structural properties of cold-formed metal framing and accessories in accordance with AISI SG-671.

b. Provide drawings sealed and signed by a Professional Engineer licensed in the state where the Project is located.

c. Welding Standards: Comply with AWS D1.1 and AWS D1.3.

1.4.2 Qualifications

1.4.2.1 Manufacturers' Qualifications

Minimum five years experience in producing products of the type specified.

1.4.2.2 Installer Qualifications

Minimum three years experience in installation of the type of products specified.

1.4.2.3 Welder Qualifications

Current AWS Certificates for welding processes required.

1.4.3 Pre-Installation Meeting

a. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: Owner, Architect, General Contractor, and metal framing Sub-Contractor.

b. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.

c. Keep minutes of meeting including responsibilities of various parties and deviations from specifications and installation instructions. Distribute minutes to attendees within 72 hours.

1.5 DELIVERY, STORAGE, AND HANDLING

Follow manufacturer's instructions.

PART 2 PRODUCTS

2.1 FRAMING MEMBERS

2.1.1 Trusses

ASTM A 653/A 653M steel, G60 (Z180) galvanized. Provide manufacturer's standard chord and web member profiles with mechanical properties as required by structural design calculations. Shop fabrication required.

a. Design trusses in accordance with AISI RG-9518.

b. Determine mechanical properties by testing in accordance with
c. Configure web members as required by structural design calculations.

2.2 FRAMING ACCESSORIES

2.2.1 Material

ASTM A 653/A 653M steel; SS Grade 50 (340), Class 1, 50 ksi (340 MPa) minimum yield strength, 65 ksi (450 MPa) minimum tensile strength, G60 (Z180) hot-dipped galvanized coating, except as otherwise noted.

a. Stamp manufacturer's name on each accessory item.

b. Provide screws with accessories designated for screw attachment.

2.2.2 Connector Devices

2.2.2.1 Roof Ties

Fabricate for screw or weld attachment of truss to structural frame. Size and thickness as required by structural design calculations.

2.2.3 Bridging

Requirements vary according to manufacturer.

2.2.3.1 Cold Rolled Channel

Width and thickness as required by structural design calculations.

2.2.3.2 Flat Strap

Width and thickness as required by structural design calculations. Rigid attachment to stud flange.

2.2.3.3 Solid Bridging

Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. Size as required by structural design calculations.

2.2.3.4 Cross Bridging

Fabricate members for specific joist depth and spacing with one screw to each joist flange and one to each joist web. Provide bridging sized to joist depth and spacing, as required by structural design calculations.

2.2.4 Miscellaneous Items

2.2.4.1 Web Stiffeners

Channel shaped stiffener. Screw attachment to joist or stud webs. Provide size and thickness as required by structural design calculations.
2.3   FASTENERS

2.3.1   Screws

Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural design calculations.

2.4   MISCELLANEOUS MATERIALS

2.4.1   Galvanizing Repair Compound

SSPC Paint 20, spray-can applicator.

2.5   FABRICATION

2.5.1   Shop Assembly

Trusses shall be shop assembled. Fabricate assemblies to size and configuration required; fitted and connected to meet design requirements.

   a. Assemble in largest practical sections for delivery to site.

   b. Reinforce and brace assemblies to withstand handling stresses.

PART 3   EXECUTION

3.1   EXAMINATION

   a. Examine substrates upon which work will be installed.

   b. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

   c. Commencement of work by installer is acceptance of substrate.

3.2   GENERAL INSTALLATION

   a. Install cold-formed metal framing plumb, square, true to line and securely fastened as required by structural design calculations.

   b. Following manufacturer's installation instructions. If installation instructions conflict with these specifications or Drawings, adhere to specifications or Drawings.

   c. Cut members by shearing or sawing.

   d. Install members in single piece lengths except that tracks may be spliced, butt-welded, or each length anchored to a common building frame element.

   e. Install insulation in framing spaces of insulated assemblies made inaccessible after erection.

3.2.1   Repairs and Touch-Up

Clean damaged surfaces and coatings. Touch-up field welds and damaged galvanized surfaces with galvanizing repair compound.
3.2.2 Tolerances
    a. Variation from plumb, level, and true to line: 1/8 inch in 10 feet (1:960).
    b. Member Spacing: Not more than 1/8 inch (3 mm) plus or minus from spacing indicated.

3.3 FRAMING MEMBER INSTALLATION

3.3.1 Truss Installation
    a. Install trusses at spacing as shown on Drawings.
    b. Do not remove, cut, or otherwise alter truss members or connections.

3.4 FRAMING ACCESSORY INSTALLATION

Install accessories as required by structural design calculations. Provide appropriate fasteners in all predrilled holes backed by another framing member.

3.5 FIELD QUALITY CONTROL

3.5.1 Inspection

Project Inspector will inspect Work of this section.

3.5.2 Testing

Field and shop welds are subject to testing by an independent testing agency.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

ALUMINUM ASSOCIATION (AA)

AA DAF45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.3 (2013) Operations - Safety Requirements for Powder Actuated Fastening Systems

AMERICAN WELDING SOCIETY (AWS)


ASME INTERNATIONAL (ASME)

ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)


ASTM INTERNATIONAL (ASTM)


Steel Bolts and Studs, 60,000 PSI Tensile Strength

<table>
<thead>
<tr>
<th>Standard Specification</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM A36/A36M</td>
<td>(2014)</td>
</tr>
<tr>
<td>ASTM A500/A500M</td>
<td>(2013)</td>
</tr>
<tr>
<td>ASTM A53/A53M</td>
<td>(2012)</td>
</tr>
<tr>
<td>ASTM A780/A780M</td>
<td>(2009)</td>
</tr>
<tr>
<td>ASTM A924/A924M</td>
<td>(2014)</td>
</tr>
<tr>
<td>ASTM B209</td>
<td>(2014)</td>
</tr>
<tr>
<td>ASTM B221</td>
<td>(2014)</td>
</tr>
<tr>
<td>ASTM B26/B26M</td>
<td>(2014; E 2015)</td>
</tr>
<tr>
<td>ASTM C1513</td>
<td>(2013)</td>
</tr>
<tr>
<td>ASTM D1187/D1187M</td>
<td>(1997; E 2011; R 2011)</td>
</tr>
</tbody>
</table>

**MASTER PAINTERS INSTITUTE (MPI)**

MPI 79 (Oct 2009) Alkyd Anti-Corrosive Metal Primer

**SOCIETY FOR PROTECTIVE COATINGS (SSPC)**

SSPC SP 3 (1982; E 2004) Power Tool Cleaning

SSPC SP 6/NACE No.3 (2007) Commercial Blast Cleaning
1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Access doors and panels, installation drawings; G
   Embedded angles and plates, installation drawings; G
   Extruded Floor Mats and Frames; G

SD-03 Product Data
   Access doors and panels
   Extruded Floor Mats and Frames; G

1.3 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.4 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Carbon Steel
   ASTM A36/A36M.

2.1.2 Structural Tubing
   ASTM A500/A500M.

2.1.3 Steel Pipe
   ASTM A53/A53M, Type E or S, Grade B.

2.1.4 Anchor Bolts
   ASTM A307. Where exposed, shall be of the same material, color, and finish as the metal to which applied.

2.1.4.1 Expansion Anchors, Sleeve Anchors, Adhesive Anchors
   Provide expansion anchors, sleeve anchors, and adhesive anchors as indicated.
on the drawings.

2.1.4.2 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.4.3 Toggle Bolts

ASME B18.2.1.

2.1.4.4 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 or ASTM A307.

2.1.4.5 Powder Actuated Fasteners

Follow safety provisions of ASSE/SAFE A10.3.

2.1.4.6 Screws

ASME B18.2.1, ASME B18.6.2, ASME B18.6.3 and ASTM C1513.

2.1.4.7 Washers

Provide plain washers to conform to ASME B18.21.1. Provide beveled washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.1.

2.1.5 Aluminum Alloy Products

Conform to ASTM B209 for sheet plate, ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings, as applicable. Provide aluminum extrusions at least 1/8 inch thick and aluminum plate or sheet at least 0.050 inch thick.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, G90, as applicable.

2.2.2 Galvanize

Anchor bolts, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to ASTM A780/A780M or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.
2.2.4 Shop Cleaning and Painting

2.2.4.1 Surface Preparation

Blast clean surfaces in accordance with SSPC SP 6/NACE No.3. Surfaces that will be exposed in spaces above ceiling or in attic spaces, crawl spaces, furred spaces, and chases may be cleaned in accordance with SSPC SP 3 in lieu of being blast cleaned. Wash cleaned surfaces which become contaminated with rust, dirt, oil, grease, or other contaminants with solvents until thoroughly clean. Steel to be embedded in concrete shall be free of dirt and grease. Do not paint or galvanize bearing surfaces, including contact surfaces within slip critical joints, but coat with rust preventative applied in the shop.

2.2.4.2 Pretreatment, Priming and Painting

Apply pretreatment, primer, and paint in accordance with manufacturer's printed instructions. On surfaces concealed in the finished construction or not accessible for finish painting, apply an additional prime coat to a minimum dry film thickness of 1.0 mil. Tint additional prime coat with a small amount of tinting pigment.

2.2.5 Nonferrous Metal Surfaces

Protect by plating, anodic, or organic coatings.

2.2.6 Aluminum Surfaces

2.2.6.1 Surface Condition

Before finishes are applied, remove roll marks, scratches, rolled-in scratches, kinks, stains, pits, orange peel, die marks, structural streaks, and other defects which will affect uniform appearance of finished surfaces.

2.2.6.2 Aluminum Finishes

Unexposed sheet, plate and extrusions may have mill finish as fabricated. Unless otherwise specified, provide all other aluminum items with a anodized finish. Provide a coating thickness not less than that specified for protective and decorative type finishes for items used in interior locations or architectural Class I type finish for items used in exterior locations in AA DAF45. Provide a polished satin finish on items to be anodized.

2.3 ACCESS DOORS AND PANELS

Provide flush type access doors and panels unless otherwise indicated. Fabricate frames for access doors of steel not lighter than 14 gage with welded joints and anchorage for securing into construction. Provide access doors with a minimum of 14 by 20 inches, or as indicated on the drawings, and of not lighter than 14 gage steel, with stiffened edges and welded attachments. In addition, to be included in the base bid, furnish and install twelve (12) 18"x18" access panels, in locations as directed by the Contracting Officer. Provide in the bid document a unit price per panel for all materials and installation. Provide access doors hinged to frame and with a flush-face, turn-screw-operated latch. Provide exposed metal surfaces with a shop applied prime coat to be finish painted in the
field.

2.4 EXTRUDED FLOOR MAT FRAMES

Provide recess frames for roll-up floor mats of extruded 6063-T5 aluminum, in sizes shown. Miter corners to ensure accurate fitting. Determine depth of recess by the mat thickness. Anchor frames in concrete with anchor pins or bolts. Provide roll-up mats of aluminum construction with carpet surface. Provide roll-up mats for use in recessed area. Show construction details of recessed areas on the drawings.

2.5 MISCELLANEOUS PLATES AND SHAPES

Provide for items that do not form a part of the structural steel framework, such as lintels, sill angles, miscellaneous mountings and frames. Provide lintels fabricated from structural steel shapes over openings in masonry walls and partitions as indicated and as required to support wall loads over openings. Provide with connections and fasteners or welds as indicated on the drawings. Construct to have at least 8 inches bearing on masonry at each end.

Provide angles and plates, ASTM A36/A36M, for embedment as indicated. Galvanize embedded items exposed to the elements according to ASTM A123/A123M.

2.6 DOWNSPOUT BOOTS

Provide cast iron downspout boots with receiving bells sized to fit new 4" x 4" downsputs. Provide in configuration to transition to 6" PVC storm drain line below grade. Product to be by Barry Pattern and Foundry Co. series B25A or equal by other manufacturers.

2.7 WINDOW SUB-SILL

Provide window sub-sill of extruded aluminum alloy with size and design indicated. Provide not less than two anchors per window section for securing into mortar joints of masonry sill course. Provide sills with anodized finish to match window finish.

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners shall be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Form joints exposed to the weather shall be formed to exclude water. Items listed below require additional procedures.

3.2 WORKMANSHIP

Provide miscellaneous metalwork that is well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall
produce clean true lines and surfaces. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections of work in place and ground smooth. Provide a smooth finish on exposed surfaces of work in place and unless otherwise approved, flush exposed riveting. Mill joints where tight fits are required. Corner joints shall be coped or mitered, well formed, and in true alignment. Accurately set work to established lines and elevations and securely fastened in place. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening miscellaneous metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 BUILT-IN WORK

Form for anchorage metal work built-in with concrete or masonry, or provide with suitable anchoring devices as indicated or as required. Furnish metal work in ample time for securing in place as the work progresses.

3.5 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.6 FINISHES

3.6.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

3.6.2 Field Preparation

Remove rust preventive coating just prior to field erection, using a remover approved by the rust preventive manufacturer. Surfaces, when assembled, shall be free of rust, grease, dirt and other foreign matter.

3.6.3 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than 5 degrees F above the dew point of the surrounding air, or when surface temperature is below 45 degrees F or over 95 degrees F, unless approved by the Contracting Officer.
3.7 ACCESS PANELS

Install a removable access panel not less than 12 by 12 inches directly below each valve, flow indicator, damper, or air splitter that is located above the ceiling, other than an acoustical ceiling, and that would otherwise not be accessible. In addition, install all access hatches indicated on the drawings, and in sizes indicated as specified herein.

3.8 INSTALLATION OF DOWNSPOUT BOOTS

Secure downspouts to building through integral lips with appropriate fasteners.

3.9 RECESSED FLOOR FRAMES & MATS

Verify field measurements prior to releasing materials for fabrication by the manufacturer. Use a mat frame to ensure recess accuracy in size, shape and depth. Form pit by blocking out concrete when frames are installed. Assemble frames onsite and install so that upper edge will be level with finished floor surface. Screed the concrete base inside the mat recess frame area using the edge provided by the frame as a guide and anchor into the cement with anchor pins a minimum of 24 inches on centers.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN WELDING SOCIETY (AWS)

ASTM INTERNATIONAL (ASTM)

1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Pre-Installation Meetings

Within 60 days of Contract Award, submit fabrication drawings to the Contracting Officer for the following items:

a. Aluminum Railings and Handrails
b. Anchorage and fastening systems

Submit manufacturer's catalog data, including two copies of manufacturers specifications, load tables, dimension diagrams, and anchor details for the following items:

a. Concrete inserts
b. Protective coating
c. Aluminum railings and handrails
d. Anchorage and fastening systems

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:
PART 2   PRODUCTS

2.1 FABRICATION

Pre-assemble items in the shop to the greatest extent possible. Disassemble units only to the extent necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

For the fabrication of work exposed to view, use only materials that are smooth and free of surface blemishes, including pitting, seam marks, roller marks, rolled trade names, and roughness.

Provide railings and handrails detail plans and elevations at not less than 1-inch to 1-foot. Provide details of sections and connections at not less than 3-inches to 1-foot. Also detail setting drawings, diagrams, templates for installation of anchorages, including concrete inserts, and miscellaneous metal items having integral anchors.

Use materials of size and thicknesses indicated or, if not indicated, of required size and thickness to produce adequate strength and durability in finished product for intended use. Work materials to dimensions indicated on approved detail drawings, using proven details of fabrication and support. Use type of materials indicated or specified for the various components of work.

Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ensure all exposed edges are eased to a radius of approximately 1/32-inch.

Weld corners and seams continuously and in accordance with the recommendations of AWS D1.1/D1.1M. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

Form exposed connections with hairline joints that are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of the type indicated or, if not indicated, use Phillips flathead (countersunk) screws or bolts.

Provide anchorage of the type indicated and coordinated with the supporting structure. Fabricate anchoring devices and space as indicated
and as required to provide adequate support for the intended use of the work.

2.1.1 Aluminum Railings

Fabrication: Provide fabrication jointing by one of the following methods:

a. Flush-type rail fittings, welded and ground smooth with splice locks secured with 3/8-inch recessed head set screws.

2.1.2 Protective Coating

Galvanize the steelwork as indicated for aluminum railing installation. Provide for surfaces of steel that are:

a. Encased in concrete

Provide hot dipped galvanized steelwork as indicated in accordance with ASTM A123/A123M. Touch up abraded surfaces and cut ends of galvanized members with zinc-dust, zinc-oxide primer, or an approved galvanizing repair compound.

2.2 COMPONENTS

2.2.1 Concrete Inserts

As indicated in the drawings.

2.2.2 Aluminum Railings And Handrails

Provide railings and handrails consisting of 1 1/2-inch nominal schedule 40 pipe ASTM B429/B429M. Provide anodized aluminum dark bronze color railings. Ensure all fasteners are Series 300 stainless steel.

PART 3 EXECUTION

3.1 PREPARATION

Adjust stair railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length. Space posts as indicated on the drawings. Plumb posts in each direction. Secure posts to building construction as follows:

a. Anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized, standard weight, steel pipe, not less than 6-inches long, and having an inside diameter not less than 1/2-inch greater than the outside diameter of the inserted pipe post. Provide steel plate closure secured to the bottom of the sleeve, with closure width and length not less than 1-inch greater than the outside diameter of the sleeve. After posts have been inserted into sleeves, fill the annular space between post and sleeve with quick-setting hydraulic cement as recommended by the manufacturer.

3.2 INSTALLATION

Submit manufacturer's installation instructions for the following products to be used in the fabrication of stair railing:

a. Protective coating
b. Aluminum railings and handrails

c. Anchorage and fastening systems

3.2.1 Aluminum Handrail

Affix to base structure as indicated on the drawings. Where aluminum or alloy fittings or extrusions are to be in contact with dissimilar metals or concrete, coat the contact surface a heavy coating of bituminous paint.

-- End of Section --
PART 1  GENERAL

1.1  REFERENCES

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

AMERICAN LUMBER STANDARDS COMMITTEE (ALSC)


AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA C20 (2003) Structural Lumber Fire-Retardant Treatment by Pressure Processes
AWPA C27 (2002) Plywood – Fire-Retardant Treatment by Pressure Processes
AWPA M2 (2011) Standard for Inspection of Treated Wood Products

APA – THE ENGINEERED WOOD ASSOCIATION (APA)

APA L870 (2010) Voluntary Product Standard, PS 1-09, Structural Plywood

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS (2009) Architectural Woodwork Standards

ASME INTERNATIONAL (ASME)

ASME B18.2.1 (2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM F547 (2006; R 2012) Nails for Use with Wood and
Wood-Base Materials

HARDWOOD PLYWOOD AND VENEER ASSOCIATION (HPVA)


SOUTHERN PINE INSPECTION BUREAU (SPIB)


U.S. DEPARTMENT OF COMMERCE (DOC)

DOC/NIST PS58 (1973) Basic Hardboard (ANSI A135.4)

WEST COAST LUMBER INSPECTION BUREAU (WCLIB)


WESTERN WOOD PRODUCTS ASSOCIATION (WWPA)

WWPA G-5 (2011) Western Lumber Grading Rules

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

WDMA I.S.4 (2013) Preservative Treatment for Millwork

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Detail Drawings; G

SD-03 Product Data

Wood Items, and Trim; G

1.3 DETAIL DRAWINGS

The Contractor shall submit detail drawings showing fabricated items and special mill and woodwork items. Drawings shall indicate materials and details of construction, methods of fastening, erection, and installation.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver lumber, plywood, trim, and millwork to job site in an undamaged condition. Stack materials to ensure ventilation and drainage. Protect against dampness before and after delivery. Store materials under cover in a well-ventilated enclosure and protect against extreme changes in temperature and humidity. Do not store products in building until wet trade materials are dry.
1.5 QUALITY ASSURANCE

1.5.1 Lumber

Identify each piece or each bundle of lumber, millwork, and trim by the grade mark of a recognized association or independent inspection agency that is certified by the Board of Review, American Lumber Standards Committee, to grade the species.

1.5.2 Plywood

Each sheet of plywood shall bear the mark of a recognized association or independent inspection agency that maintains continuing control over quality of the plywood. Mark shall identify plywood by species group or span rating, and shall show exposure durability classification, grade, and compliance with APA L870.

1.5.3 Pressure-Treated Lumber and Plywood

Each treated piece shall be inspected in accordance with AWPA M2.

1.5.4 Nonpressure-Treated Woodwork and Millwork

Mark, stamp, or label, indicating compliance with WDMA I.S.4.

1.5.5 Fire-Retardant Treated Lumber

Each piece to bear Underwriters Laboratories label or the label of another nationally recognized independent testing laboratory.

PART 2 PRODUCTS

2.1 WOOD

2.1.1 Sizes and Patterns of Wood Products

Yard and board lumber sizes shall conform to ALSC PS 20. Provide shaped lumber and millwork in the patterns indicated and standard patterns of the association covering the species. Size references, unless otherwise specified, are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the applicable standard.

2.1.2 Trim, Finish, and Frames

Provide species and grades listed for materials to be paint finished. Provide materials that are to be stain, natural, or transparent finished one grade higher than that listed. Provide species indicated for materials to be transparent finished. Run trim, except window stools and aprons with hollow backs.
### TABLE OF GRADES FOR WOOD TO RECEIVE PAINT FINISH

<table>
<thead>
<tr>
<th>Grading Rules</th>
<th>Species</th>
<th>Exterior and Interior Trim, Finish, and Frames</th>
</tr>
</thead>
<tbody>
<tr>
<td>WCLIB 17 standard grading rules</td>
<td>Douglas Fir-Larch, Hem-Fir, Mountain Hemlock, Sitka Spruce, Western Cedars, Western Hemlock</td>
<td>All Species: C &amp; Btr VG, except A for Western Red Cedar</td>
</tr>
<tr>
<td>SPIB 1003 standard grading rules</td>
<td>Southern Pine</td>
<td>C &amp; Btr</td>
</tr>
</tbody>
</table>

#### 2.1.3 Utility Shelving

Utility shelving shall be a suitable species equal to or exceeding requirements of No. 3 Common white fir under WWPA G-5, 1 inch thick; or plywood, interior type, Grade A-B, 1/2 inch thick, any species group.

#### 2.1.4 Softwood Plywood

APA L870, thicknesses as indicated.


#### 2.1.5 Hardwood Plywood

HPVA HP-1, Type , Premium (A) Grade, face veneers of birch, of thickness indicated.

#### 2.1.6 Hardboard

DOC/NIST PS58, standard type, 1/4 inch thick.

#### 2.2 COUNTER TOPS

##### 2.2.1 Solid Surface

For solid surface counter tops refer to section 06 61 16, SOLID POLYMER (SOLID SURFACING) FABRICATIONS.

#### 2.3 MOISTURE CONTENT OF WOOD PRODUCTS

Maximum moisture content of wood products at time of delivery to the job site, and when installed, shall be as follows:

a. Interior Paneling: 6 percent.

b. Interior Finish Lumber, Trim, and Millwork 1-1/4 Inches Nominal or Less in Thickness: 6 percent on 85 percent of the pieces and 8 percent on remainder.

c. Moisture content of other materials shall be in accordance with the applicable standards.

2.4 PRESERVATIVE TREATMENT OF WOOD PRODUCTS

2.4.1 Pressure Treatment

Lumber and plywood used on the exterior of buildings or in contact with masonry or concrete shall be treated with water-borne preservative listed in AWPA P5 as applicable, and inspected in accordance with AWPA M2. Identify treatment on each piece of material by the quality mark of an agency accredited by the Board of Review of the American Lumber Standards Committee.

2.5 FIRE-RETARDANT TREATMENT

2.5.1 Wood Products

Fire-retardant treated lumber shall be pressure treated in accordance with AWPA C20. Fire-retardant treated plywood shall be pressure treated in accordance with AWPA C27. Material use shall be defined in AWPA C20 and AWPA C27 for Interior Type A and Exterior Type. Treatment and performance inspection shall be by a qualified independent testing agency that establishes performance ratings. Each piece or bundle of treated material shall bear identification of the testing agency to indicate performance with such rating. Treated materials to be exposed to rain wetting shall be subjected to an accelerated weathering technique in accordance with ASTM D2898, Method A, prior to being tested for compliance with AWPA C20 or AWPA C27.

2.6 HARDWARE

Provide sizes, types, and spacings of manufactured building materials recommended by the product manufacturer except as otherwise indicated or specified.

2.6.1 Wood Screws

ASME B18.6.1.

2.6.2 Bolts, Nuts, Lag Screws, and Studs

ASME B18.2.1 and ASME B18.2.2.

2.6.3 Nails

Nails shall be the size and type best suited for the purpose and shall conform to ASTM F547. Nails shall be hot-dip galvanized or aluminum when used on exterior work. Screws for use where nailing is impractical shall be size best suited for purpose.
2.7  FABRICATION

2.7.1  Quality Standards (QS)

The terms "Premium," "Custom," and "Economy" refer to the quality grades defined in AWI AWS. Items not specified to be of a specific grade shall be Custom grade. The AWI QS is superseded by all contract document requirements indicated or stated herein.

PART 3  EXECUTION

3.1  FINISH WORK

Provide sizes, materials, and designs as indicated and as specified. Apply primer to finish work before installing. Where practicable, shop assemble and finish items of built-up millwork. Joints shall be tight and constructed in a manner to conceal shrinkage. Miter trim and moldings at exterior angles and cope at interior angles and at returns. Material shall show no warp after installation. Install millwork and trim in maximum practical lengths. Fasten finish work with finish nails. Provide blind nailing where practicable. Set face nails for putty stopping.

3.1.1  Interior Finish Work

After installation, sand exposed surfaces smooth.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)


ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS (2009) Architectural Woodwork Standards

ASTM INTERNATIONAL (ASTM)

ASTM F547 (2006; R 2012) Nails for Use with Wood and Wood-Base Materials

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.9 (2010) Cabinet Hardware

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

WDMA I.S.1A (2011) Interior Architectural Wood Flush Doors

1.2 SYSTEM DESCRIPTION

Work in this section includes laminate clad custom casework cabinets and vanities as shown on the drawings and as described in this specification. This Section includes high-pressure laminate surfacing and cabinet hardware.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
Shop Drawings, G
Installation

SD-03 Product Data
Wood Materials, G
Wood Finishes

SD-04 Samples
Plastic Laminates, G
Cabinet Hardware

SD-07 Certificates
Quality Assurance
Laminate Clad Casework

1.4 QUALITY ASSURANCE

1.4.1 General Requirements

Unless otherwise noted on the drawings, all materials, construction methods, and fabrication shall conform to and comply with the custom grade quality standards as outlined in AWI AWS, Section for laminate clad cabinets. These standards shall apply in lieu of omissions or specific requirements in this specification. Contractors and their personnel engaged in the work shall be able to demonstrate successful experience with work of comparable extent, complexity and quality to that shown and specified. Submit a quality control statement which illustrates compliance with and understanding of AWI AWS requirements, in general, and the specific AWI AWS requirements provided in this specification. The quality control statement shall also certify a minimum of ten years Contractor's experience in laminate clad casework fabrication and construction. The quality control statement shall provide a list of a minimum of five successfully completed projects of a similar scope, size, and complexity.

1.4.2 Shop Drawings

Submit shop drawings showing all fabricated casework items in plan view, elevations and cross-sections to accurately indicate materials used, details of construction, dimensions, methods of fastening and erection, and installation methods proposed. Shop drawing casework items shall be clearly cross-referenced to casework items located on the project drawings. Shop drawings shall include a color schedule of all casework items to include all countertop, exposed, and semi-exposed cabinet finishes to include finish material manufacturer, pattern, and color.

1.5 DELIVERY, STORAGE, AND HANDLING

Casework may be delivered knockdown or fully assembled. Deliver all units to the site in undamaged condition, stored off the ground in fully enclosed areas, and protected from damage. The storage area shall be well ventilated and not subject to extreme changes in temperature or humidity.
1.6 SEQUENCING AND SCHEDULING

Coordinate work with other trades. Units shall not be installed in any room or space until painting, and ceiling installation are complete within the room where the units are located.

PART 2 PRODUCTS

2.1 WOOD MATERIALS

2.1.1 Lumber

a. All framing lumber shall be kiln-dried Grade III to dimensions as shown on the drawings. Frame front, where indicated on the drawings, shall be nominal 3/4 inch hardwood.

2.1.2 Panel Products

2.1.2.1 Plywood

All plywood panels used for framing purposes shall be veneer core hardwood plywood, AWI AWS Grade AA. Nominal thickness of plywood panels shall be as indicated in this specification and on the drawings.

2.2 SOLID POLYMER MATERIAL

Solid surfacing casework components shall conform to the requirements of Section 06 61 16 SOLID POLYMER (SOLID SURFACING) FABRICATIONS.

2.3 HIGH PRESSURE DECORATIVE LAMINATE (HPDL)

All plastic laminates shall meet the requirements of ANSI/NEMA LD 3 and ANSI A161.2 for high-pressure decorative laminates. Design, colors, surface finish and texture, and locations shall be as indicated on the drawings. Submit two samples of each plastic laminate pattern and color. Samples shall be a minimum of 5 by 7 inches in size. Plastic laminate types and nominal minimum thicknesses for casework components shall be as indicated in the following paragraphs.

2.3.1 Horizontal General Purpose Standard (HGS) Grade

Horizontal general purpose standard grade plastic laminate shall be 0.048 inches (plus or minus 0.005 inches) in thickness. This laminate grade is intended for horizontal surfaces where postforming is not required.

2.3.2 Vertical General Purpose Standard (VGS) Grade

Vertical general purpose standard grade plastic laminate shall be 0.028 inches (plus or minus 0.004 inches) in thickness. This laminate grade is intended for exposed exterior vertical surfaces of casework components where postforming is not required.

2.3.3 Cabinet Liner Standard (CLS) Grade

Cabinet liner standard grade plastic laminate shall be 0.020 inches in thickness. This laminate grade is intended for light duty semi-exposed interior surfaces of casework components.
2.3.4 Backing Sheet (BK) Grade

Undecorated backing sheet grade laminate is formulated specifically to be used on the backside of plastic laminated panel substrates to enhance dimensional stability of the substrate. Backing sheet thickness shall be 0.020 inches. Backing sheets shall be provided for all laminated casework components where plastic laminate finish is applied to only one surface of the component substrate.

2.4 EDGE BANDING

Edge banding for casework doors and drawer fronts shall be PVC vinyl and shall be 0.020 inch thick. Material width shall be as indicated on the drawings. Color and pattern shall match exposed door and drawer front laminate pattern and color.

2.5 CABINET HARDWARE

Submit one sample of each cabinet hardware item specified to include hinges, pulls, and drawer glides. All hardware shall conform to ANSI/BHMA A156.9, unless otherwise noted, and shall consist of the following components:

2.5.1 Door Hinges

Blum or equal-European type in bright chrome, BHMA No. A156.9 for overlay doors.

2.5.2 Cabinet Pulls

Trimco or equal #562-4-wire pull type in stainless steel type, BHMA No. A156.9.

2.5.3 Drawer Slide

Side mounted Knape and Vogt or equal #KVM-B405P22 type, BHMA No. A156.9 with full extension and a minimum 100 pound load capacity. Slides shall include an integral stop to avoid accidental drawer removal.

2.5.4 Adjustable Shelf Support System

Recessed (mortised) metal standards, BHMA No. BO4071, finish: painted brown. Support clips for the standards shall be open type, BHMA No. B04091.

2.6 FASTENERS

Nails, screws, and other suitable fasteners shall be the size and type best suited for the purpose and shall conform to ASTM F547 where applicable.

2.7 ADHESIVES, CAULKS, AND SEALANTS

2.7.1 Adhesives

Adhesives shall be of a formula and type recommended by AWI. Adhesives shall be selected for their ability to provide a durable, permanent bond and shall take into consideration such factors as materials to be bonded, expansion and contraction, bond strength, fire rating, and moisture resistance. Adhesives shall meet local regulations regarding VOC emissions and off-gassing.
2.7.1.1 Wood Joinery

Adhesives used to bond wood members shall be a Type II for interior use polyvinyl acetate resin emulsion. Adhesives shall withstand a bond test as described in WDMA I.S.1A.

2.7.1.2 Laminate Adhesive

Adhesive used to join high-pressure decorative laminate to wood shall be adhesive consistent with AWI and laminate manufacturer's recommendations. PVC edgebanding shall be adhered using a polymer-based hot melt glue.

2.7.2 Caulk

Caulk used to fill voids and joints between laminated components and between laminated components and adjacent surfaces shall be clear, 100 percent silicone.

2.7.3 Sealant

Sealant shall be of a type and composition recommended by the substrate manufacturer to provide a moisture barrier at sink cutouts and all other locations where unfinished substrate edges may be subjected to moisture.

2.8 WOOD FINISHES

Varnish and their applications required for laminate clad casework components shall be clear.

2.9 FABRICATION

Verify field measurements as indicated in the shop drawings before fabrication. Fabrication and assembly of components shall be accomplished at the shop site to the maximum extent possible. Construction and fabrication of cabinets and their components shall meet or exceed the requirements for AWI custom grade unless otherwise indicated in this specification. Cabinet style, in accordance with AWI AWS, Section 400-G descriptions, shall be as indicated on the drawings, reveal overlay.

2.9.1 Base and Wall Cabinet Case Body

2.9.1.1 Cabinet Components

Frame members shall be glued-together, kiln-dried hardwood lumber. Top corners, bottom corners, and cabinet bottoms shall be braced with either hardwood blocks or water-resistant glue and nailed in place metal or plastic corner braces. Cabinet components shall be constructed from the following materials and thicknesses:

2.9.1.1.1 Body Members (Ends, Divisions, Bottoms, and Tops)

3/4 inch veneer core plywood panel product.

2.9.1.1.2 Face Frames and Rails

3/4 inch hardwood lumber
2.9.1.1.3 Shelving

3/4 inch veneer core plywood panel product

2.9.1.1.4 Cabinet Backs

1/4 inch veneer core plywood panel product

2.9.1.1.5 Drawer Sides, Backs, and Subfronts

1/2 inch hardwood lumber

2.9.1.1.6 Drawer Bottoms

1/4 inch veneer core plywood panel product

2.9.1.1.7 Door and Drawer Fronts

3/4-inch veneer core plywood panel product

2.9.1.2 Joinery Method for Case Body Members

2.9.1.2.1 Tops, Exposed Ends, and Bottoms

a. Steel "European" assembly screws (1-1/2 inch from end, 5 inch on center, fasteners will not be visible on exposed parts).

b. Doweled, glued under pressure (approx. 4 dowels per 12 inches of joint).

c. Stop dado, glued under pressure, and either nailed, stapled or screwed (fasteners will not be visible on exposed parts).

d. Spline or biscuit, glued under pressure.

2.9.1.2.2 Exposed End Corner and Face Frame Attachment

2.9.1.2.2.1 Mitered Joint

lock miter or spline or biscuit, glued under pressure (no visible fasteners)

2.9.1.2.2.2 Non-Mitered Joint (90 degree)

butt joint glued under pressure (no visible fasteners)

2.9.1.2.2.3 Butt Joint

glued and nailed

2.9.1.2.3 Cabinet Backs (Wall Hung Cabinets)

Wall hung cabinet backs must not be relied upon to support the full weight of the cabinet and its anticipated load for hanging/mounting purposes. Method of back joinery and hanging/mounting mechanisms should transfer the load to case body members. Fabrication method shall be:
2.9.1.2.3.1 Full Bound

Full bound, captured in grooves on cabinet sides, top, and bottom. Cabinet backs for floor standing cabinets shall be side bound, captured in grooves; glued and fastened to top and bottom.

2.9.1.2.4 Cabinet Backs (Floor Standing Cabinets)

2.9.1.2.4.1 Side Bound

Side bound, captured in grooves; glued and fastened to top and bottom.

2.9.1.2.5 Wall Anchor Strips

Wall Anchor Strips shall be required for all cabinets with backs less than 1/2 inch thick. Strips shall consist of minimum 1/2 inch thick lumber, minimum 2-1/2 inches width; securely attached to wall side of cabinet back - top and bottom for wall hung cabinets, top only for floor standing cabinets.

2.9.2 Wall Anchor Strips at Restroom Vanities

Wall Anchor Strips shall be 1 1/2" thick lumber as indicated on the drawings.

2.9.3 Laminate Application

Laminate application to substrates shall follow the recommended procedures and instructions of the laminate manufacturer and ANSI/NEMA LD 3, using tools and devices specifically designed for laminate fabrication and application. Provide a balanced backer sheet (Grade BK) wherever only one surface of the component substrate requires a plastic laminate finish. Apply required grade of laminate in full uninterrupted sheets consistent with manufactured sizes using one piece for full length only, using adhesives specified herein or as recommended by the manufacturer. Fit corners and joints hairline. All laminate edges shall be machined flush, filed, sanded, or buffed to remove machine marks and eased (sharp corners removed). Clean up at easing shall be such that no overlap of the member eased is visible. Fabrication shall conform to ANSI A161.2. Laminate types and grades for component surfaces shall be as follows unless otherwise indicated on the drawings:

2.9.3.1 Base/Wall Cabinet Case Body

a. Exterior (exposed) surfaces to include exposed and semi-exposed face frame surfaces: HPDL Grade VGS.

b. Interior (semi-exposed) surfaces to include interior back wall, bottom, and side walls: HPDL Grade CLS2.9.3.2 Adjustable Shelving

2.9.3.2.1 Top and Bottom Surfaces

HPDL Grade HGS

2.9.3.2.2 All Edges

PVC edgebanding
2.9.3.3 Fixed Shelving

2.9.3.3.1 Top and Bottom Surfaces

HPDL Grade HGS

2.9.3.3.2 Exposed Edges

PVC edgebanding

2.9.3.4 Door, Drawer Fronts, Access Panels

2.9.3.4.1 Exterior (Exposed) and Interior (Semi-Exposed) Faces

HPDL Grade VGS

2.9.3.4.2 Edges

PVC edgebanding

2.9.3.5 Drawer Assembly

All interior and exterior surfaces: HPDL Grade CLS.

2.9.3.6 Tolerances

Flushness, flatness, and joint tolerances of laminated surfaces shall meet the AWI AWS custom grade requirements.

2.9.4 Finishing

2.9.4.1 Filling

No fasteners shall be exposed on laminated surfaces. All nails, screws, and other fasteners in non-laminated cabinet components shall be countersunk and the holes filled with wood filler consistent in color with the wood species.

2.9.4.2 Sanding

All surfaces requiring coatings shall be prepared by sanding with a grit and in a manner that scratches will not show in the final system.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall comply with applicable requirements for AWI AWS custom quality standards. Countertops and fabricated assemblies shall be installed level, plumb, and true to line, in locations shown on the drawings. Cabinets and other laminate clad casework assemblies shall be attached and anchored securely to the floor and walls with mechanical fasteners that are appropriate for the wall and floor construction.

3.1.1 Anchoring Systems

3.1.1.1 Floor

Base cabinets shall utilize a floor anchoring system. Anchoring and
mechanical fasteners shall not be visible from the finished side of the casework assembly. Where assembly abuts a wall surface, anchoring shall include a minimum 1/2 inch thick lumber or panel product hanging strip, minimum 2-1/2 inch width; securely attached to the top of the wall side of the cabinet back.

3.1.1.2 Wall

Vanity to be wall mounted shall utilize minimum 1-1/2 inch thick lumber hanging strips, minimum 2-1/2 inch width; securely attached to the wall side of the cabinet back, both top and bottom as indicated on the drawings. Cabinets to be wall mounted shall utilize minimum 1/2” thick hanging strip, minimum 2 - 1/2 inch wide both top and bottom as indicated on the drawings.

3.1.2 Countertops

Countertops shall be installed in locations as indicated on the drawings. Countertops shall be fastened to supporting casework structure with mechanical fasteners, hidden from view. All joints formed by the countertop or countertop splash and adjacent wall surfaces shall be filled with a clear silicone caulk. Loose back and side splashes shall be adhered to both the countertop surface perimeter and the adjacent wall surface with adhesives appropriate for the type of materials to be adhered. Joints between the countertop surface and splash shall be filled with clear silicone caulk in a smooth consistent concave bead. Bead size shall be the minimum necessary to fill the joint and any surrounding voids or cracks.

3.1.3 Hardware

Casework hardware shall be installed in types and locations as indicated on the drawings. 3.1.4 Doors, Drawers and Removable Panels

The fitting of doors, drawers and removable panels shall be accomplished within target fitting tolerances for gaps and flushness in accordance with AWI AWS custom grade requirements.

3.1.5 Plumbing Fixtures

Install solid surface sinks, sink hardware, and other plumbing fixtures in locations as indicated on the drawings and in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE and Section 06 61 16 SOLID POLYMER (SOLID SURFACING) FABRICATIONS.

-- End of Section --
PART 1  GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)


GREENGUARD ENVIRONMENTAL INSTITUTE (GEI)

GEI Greenguard Standards for Low Emitting Products

INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO)

IAPMO Z124.3 (2005) Plastic Lavatories

IAPMO Z124.6 (1997) Plastic Sinks

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

ANSI/NEMA LD 3 (2005) Standard for High-Pressure Decorative Laminates

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS Scientific Certification Systems
1.2 SYSTEM DESCRIPTION

a. Work under this section includes countertops, shower surrounds and window stools, and other items utilizing solid polymer (solid surfacing) fabrication as shown on the drawings and as described in this specification. Do not change source of supply for materials after work has started, if the appearance of finished work would be affected.

b. Installation of solid polymer fabricated components and assemblies requires strong, correctly located structural support provided by other trades. To provide a stable, sound, secure installation, close coordination is required between the solid polymer fabricator/installer and other trades to ensure that necessary structural wall support, cabinet counter top structural support, proper clearances, and other supporting components are provided for the installation of wall panels, countertops, window stools, and all other solid polymer fabrications to the degree and extent recommended by the solid polymer manufacturer.

c. Appropriate staging areas for solid polymer fabrications. Allow variation in component size and location of openings of plus or minus 1/8 inch.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Detail Drawings; G,
Installation; G,

SD-03 Product Data

Solid polymer material; G,
Qualifications
Fabrications
Certification

SD-04 Samples

Material; G,
1 sample of each color, and application, to be installed.

SD-06 Test Reports

Solid polymer material
1.4 QUALITY ASSURANCE

1.4.1 Qualifications

To ensure warranty coverage, solid polymer fabricators shall be certified to fabricate by the solid polymer material manufacturer being utilized. Mark all fabrications with the fabricator's certification label affixed in an inconspicuous location. Fabricators shall have a minimum of 5 years of experience working with solid polymer materials. Submit solid polymer manufacturer's certification attesting to fabricator qualification approval.

1.4.2 Detail Drawings

Submit Detail Drawings indicating locations, dimensions, component sizes, fabrication and joint details, attachment provisions, installation details, and coordination requirements with adjacent work.

1.4.3 Sustainable Design Certification

Product shall be third party certified by GEI Greenguard Indoor Air Quality Certified, SCS Scientific Certification Systems Indoor Advantage or equal. Certification shall be performed annually and shall be current.

1.5 DELIVERY, STORAGE, AND HANDLING

Do not deliver materials to project site until areas are ready for installation. Deliver components and materials to the site undamaged, in containers clearly marked and labeled with manufacturer's name. Materials shall be stored indoors and adequate precautions taken to prevent damage to finished surfaces. Provide protective coverings to prevent physical damage or staining following installation, for duration of project.

1.6 WARRANTY

Provide manufacturer's warranty of ten years against defects in materials, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for material and labor for replacement or repair of defective material for a period of ten years after component installation.

PART 2 PRODUCTS

2.1 MATERIAL

Provide solid polymer material that is a homogeneous filled solid polymer; not coated, laminated or of a composite construction; meeting IAPMO Z124.3 and IAPMO Z124.6 requirements. Material shall have minimum physical and performance properties specified. Superficial damage to a depth of 0.01 inch shall be repairable by sanding or polishing. Material thickness shall be as indicated on the drawings. In no case shall material be less than 1/4 inch in thickness. Submit a minimum 4 by 4 inch sample of each color and pattern for approval. Samples shall indicate full range of color and pattern variation. Submit test report results from an
independent testing laboratory attesting that the submitted solid polymer material meets or exceeds each of the specified performance requirements.

2.1.1 Acrylic-modified Polymer Solid Surfacing Material (Countertops, Vanity Sinks, Shower Surrounds and Window Stools).

Cast, solid polymer material shall be composed of a formulation containing acrylic and polyester polymers, mineral fillers, and pigments. Acrylic polymer content shall be not less than 5 percent and not more than 10 percent in order to meet the following minimum performance requirements:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>REQUIREMENT</th>
<th>TEST PROCEDURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexural Strength</td>
<td>5300 psi (min.)</td>
<td>ASTM D638</td>
</tr>
<tr>
<td>Hardness</td>
<td>7-Barcol</td>
<td>ASTM D2583</td>
</tr>
<tr>
<td>Thermal Expansion</td>
<td>.000145 in/in/F (max.)</td>
<td>ASTM D696</td>
</tr>
<tr>
<td>Boiling water Surface Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.05</td>
</tr>
<tr>
<td>High Temperature Resistance</td>
<td>No Change</td>
<td>ANSI/NEMA LD 3-3.06</td>
</tr>
<tr>
<td>Impact Resistance (Ball drop)</td>
<td>No Fracture</td>
<td>ANSI/NEMA LD 3-303</td>
</tr>
<tr>
<td>Fungal and Bacteria Growth</td>
<td>No Growth</td>
<td>ASTM G 21</td>
</tr>
<tr>
<td>Liquid Absorption (Weight in 24 hrs.)</td>
<td>0.04% max.</td>
<td>ASTM D570</td>
</tr>
<tr>
<td>Flammability</td>
<td>For all Colors Tested</td>
<td>ASTM E84</td>
</tr>
<tr>
<td>Flame Spread</td>
<td>FSI &lt;10 for 3 cm</td>
<td></td>
</tr>
<tr>
<td>Smoke Developed</td>
<td>SDI &lt; 50 for 3 cm</td>
<td></td>
</tr>
</tbody>
</table>

2.1.2 Material Patterns and Colors

Patterns and colors for all solid polymer components and fabrications shall be those indicated on the project drawings. Pattern and color shall occur, and shall be consistent in appearance, throughout the entire depth (thickness) of the solid polymer material.

2.1.3 Surface Finish

Exposed finished surfaces and edges shall receive a uniform appearance. Exposed surface finish shall be semi-gloss.
2.2 ACCESSORY PRODUCTS

Accessory products, as specified below, shall be manufactured by the solid polymer manufacturer or shall be products approved by the solid polymer manufacturer for use with the solid polymer materials being specified.

2.2.1 Seam Adhesive

Seam adhesive shall be a two-part adhesive kit to create permanent, inconspicuous, non-porous, hard seams and joints by chemical bond between solid polymer materials and components to create a monolithic appearance of the fabrication. Adhesive shall be approved by the solid polymer manufacturer. Adhesive shall be color-matched to the surfaces being bonded where solid-colored, solid polymer materials are being bonded together. The seam adhesive shall be clear or color matched where particulate patterned, solid polymer materials are being bonded together.

2.2.2 Panel Adhesive

Panel adhesive shall be neoprene based panel adhesive meeting TCA Hdbk, Underwriter's Laboratories (UL) listed. Use this adhesive to bond solid polymer components to adjacent and underlying substrates.

2.2.3 Silicone Sealant

Sealant shall be a mildew-resistant, FDA and OSHA Nationally Recognized Testing Laboratory (NRTL) listed silicone sealant or caulk in a clear formulation. The silicone sealant shall be approved for use by the solid polymer manufacturer. Use sealant to seal all expansion joints between solid polymer components and all joints between solid polymer components and other adjacent surfaces such as walls, floors, ceiling, and plumbing fixtures.

2.2.4 Mounting Hardware

Provide mounting hardware, including inserts and fasteners.

2.3 FABRICATIONS

Components shall be factory or shop fabricated to sizes and shapes indicated, to the greatest extent practical, in accordance with approved Shop Drawings and manufacturer's requirements. Provide shop cutouts for sinks, and plumbing fixtures where indicated on the drawings. Contours and radii shall be routed to template, with edges smooth. Defective and inaccurate work will be rejected. Submit product data indicating product description, fabrication information, and compliance with specified performance requirements for solid polymer, joint adhesive, and sealants.

2.3.1 Joints and Seams

Form joints and seams between solid polymer components using manufacturer's approved seam adhesive. Joints shall be inconspicuous in appearance and without voids to create a monolithic appearance.

2.3.2 Edge Finishing

Rout and finish component edges to a smooth, uniform appearance and finish. Edge shapes and treatments, including any inserts, shall be as detailed on the drawings. Rout all cutouts, then sand all edges smooth.
Repair or reject defective or inaccurate work.

2.3.3 Counter and Vanity Top Splashes

Fabricate backsplashes and end splashes from 1/2 inch thick solid surfacing material to be 4 inches high. Backsplashes and end splashes shall be provided for all counter tops and vanity tops at locations indicated on the drawings. Backsplashes and end splashes shall be shop fabricated and be permanently attached and field attached as follows.

2.3.3.1 Permanently Attached Backsplash

Permanently attached backsplashes shall be attached straight with seam adhesive to form a 90 degree transition.

2.3.3.2 End Splashes

End splashes shall be provided loose for installation at the jobsite after horizontal surfaces to which they are to be attached have been installed.

2.3.4 Window Stools

Fabricate window stools from 1/2 inch thick solid surfacing, solid polymer material. Dimensions, edge shape, and other details shall be as indicated on the drawings.

2.3.5 Counter and Vanity Tops

Fabricate all solid surfacing, solid polymer counter top and vanity top components from 1/2 inch thick material. Edge details, dimensions, locations, and quantities shall be as indicated on the drawings. Counter tops shall be complete with 4 inch high permanently attached with coved transition backsplash and loose end splashes at all locations. Attach 2 inch wide reinforcing strip of polymer material under each horizontal counter top seam.

2.3.5.1 Counter Top With Sink

a. Stainless Steel Sink. Countertops with sinks shall include cutouts to template as furnished by the sink manufacturer. Manufacturer's standard sink mounting hardware for stainless steel installation shall be provided. Seam between sink and counter top shall be sealed with silicone sealant. Sink, faucet, and plumbing requirements shall be in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

2.3.5.2 Vanity Tops With Bowls

a. Solid polymer bowls shall be a solid polymer manufacturer's standard, pre-molded product specifically designed for attachment to solid polymer counter tops.

2.3.6 Solid Polymer Vanity Bowls

Solid polymer vanity bowls shall be a standard product of the solid polymer manufacturer, designed specifically to be installed in solid polymer vanity tops. Bowls shall be of the same polymer composition as the adjoining counter top. Bowl design shall support a seam adhesive undermount installation method.
2.3.7  Shower and Drying Area Wall Panel System

Shower and Drying Area wall enclosures shall provide a system of solid polymer components to include: panels, corner trim, soap dish, shampoo shelf and panel edge trim. Dimensions of all components shall be as indicated on the drawings. Panels shall be formed from manufacturer's standard 1/4 inch thick sheet product. Panels shall be of width and height indicated seams occurring only as indicated on the drawings and at the inside corners of the enclosure. Soap dish and shampoo shelf shall be of a configuration, shape, and location as standard with the manufacturer's system.

2.4  Window Stools

Window Stools shall be of maximum practical length.

PART 3  EXECUTION

3.1  INSTALLATION

3.1.1  Components

Install all components and fabricated units plumb, level, and rigid. Make field joints between solid polymer components using solid polymer manufacturer's approved seam adhesives, to provide a monolithic appearance with joints inconspicuous in the finished work. Attach metal sinks to counter tops using solid polymer manufacturer's recommended clear silicone sealant and mounting hardware. Plumbing connections to sinks and lavatories shall be made in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

3.1.1.1  Loose Counter End Splashes

Mount loose splashes in the locations noted on the drawings. Loose splashes shall be adhered to the counter top with a color matched silicone sealant when the solid polymer components are solid colors. Use a clear silicone sealant to provide adhesion of particulate patterned solid polymer splashes to counter tops.

3.1.1.2  Wall Panels & Panel Systems

Installation of wall panels and system components to substrates shall include the use of a neoprene-based panel adhesive. Use seam adhesive to adhere all solid polymer components to each other with the exception of expansion joints and inside corners. All inside corners and expansion joints between solid polymer components shall be joined with silicone sealant. All joints between solid polymer components and non-solid polymer surfaces shall be sealed with a clear silicone sealant.

3.1.2  Silicone Sealant

Use a clear, silicone sealant or caulk to seal all expansion joints between solid polymer components and all joints between solid polymer components and other adjacent surfaces such as walls, floors, ceiling, and plumbing fixtures. Sealant bead shall be smooth and uniform in appearance and shall be the minimum size necessary to bridge any gaps between the solid surfacing material and the adjacent surface. Bead shall be continuous and run the entire length of the joint being sealed.

SECTION 06 61 16  Page 7
3.1.3 Plumbing

Make plumbing connections to sinks and lavatories in accordance with Section 22 00 00 PLUMBING, GENERAL PURPOSE.

3.2 CLEAN-UP

Components shall be cleaned after installation and covered to protect against damage during completion of the remaining project items. Components damaged after installation by other trades will be repaired or replaced at the General Contractor's cost. Component supplier will provide a repair/replace cost estimate to the General Contractor who shall approve estimate before repairs are made. Submit a minimum of six copies of maintenance data indicating manufacturer's care, repair and cleaning instructions. Maintenance video shall be provided, if available. Maintenance kit for matte finishes shall be submitted.

-- End of Section --
PART 1   GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D1227  (2013) Emulsified Asphalt Used as a Protective Coating for Roofing


ASTM D41/D41M  (2011) Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing

ASTM D4263  (1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method

ASTM D449  (2003; R 2008) Asphalt Used in Dampproofing and Waterproofing

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-07 Certificates

Materials; G

1.3  DELIVERY AND STORAGE

Deliver materials in sealed containers bearing manufacturer's original labels. Labels shall include date of manufacture, contents of each container, performance standards that apply to the contents and recommended shelf life.

PART 2   PRODUCTS

2.1  ASPHALT

ASTM D449, Type I or Type II.
2.2 ASPHALT PRIMER

ASTM D41/D41M.

2.3 EMULSION-BASED ASPHALT DAMPPROOFING

2.3.1 Fibrated Emulsion-Based Asphalt

Fibrated emulsion-based asphalt dampproofing shall be cold-applied type conforming to ASTM D1227 Type II, Class 1, asbestos-free, manufactured of refined asphalt, emulsifiers and selected clay, fibrated with mineral fibers. For spray or brush application, emulsion shall contain a minimum of 59 percent solids by weight, 56 percent solids by volume. For trowel application, emulsion shall contain a minimum of 58 percent solids by weight, 55 percent solids by volume.

2.4 METAL STUD PROTECTION AT INTERIOR WALLS WITH CEMENT BOARD APPLICATION.

2.4.1 Saturated Felt


PART 3 EXECUTION

3.1 SURFACE PREPARATION

Clean concrete and masonry surfaces to receive dampproofing of foreign matter and loose particles. Apply dampproofing to clean dry surfaces. Moisture test in accordance with ASTM D4263. If test indicates moisture, allow a minimum of 7 additional days after test completion for curing. If moisture still exists, redo test until substrate is dry.

3.2 Protection of Surrounding Areas

Before starting the dampproofing work, the surrounding areas and surfaces shall be protected from spillage and migration of dampproofing material onto other work. Drains and conductors shall be protected from clogging with dampproofing material.

3.3 APPLICATION

Prime surfaces to receive fibrous asphaltic dampproofing unless recommended otherwise by dampproofing materials manufacturer. Apply dampproofing after priming coat is dry, but prior to any deterioration of primed surface, and when ambient temperature is above 40 degrees F.

3.3.1 Surface Priming

Prime surfaces to receive fibrous asphalt dampproofing with asphalt primer. Apply primer when ambient temperature is above 40 degrees F and at rate of approximately one gallon per 100 square feet, fully covering entire surface to be dampproofed.

3.3.2 Cold-Application Method

3.3.2.1 Emulsion-Based Asphalt

Emulsion-based asphalt dampproofing work shall not be performed in temperatures below 40 degrees F. Emulsions shall have a smooth and
uniform consistency at time of application. Dampproofing materials shall be applied in accordance with manufacturer's published instructions to produce a smooth uniform dry film of not less than 12 mils thick without voids or defects. Dull or porous spots shall be recoated. Dampproofing materials shall seal tightly around pipes and other items projecting through dampproofing. Rates of application shall be as follows:

a. Primer: 1/2 gallon per 100 square feet, cold-applied.

b. Fibrated Dampproofing: 2 gallons per 100 square feet, cold-applied with spray, brush or trowel.

-- End of Section --
SECTION 07 13 53

ELASTOMERIC SHEET WATERPROOFING

04/06

PART 1   GENERAL

1.1   Applicability

Products specified herein are intended for use at the existing wetwell (to be partially demolished and backfilled) at the Spray Field Pump Room Building.

1.2   REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D1004 (2009) Initial Tear Resistance of Plastic Film and Sheeting

ASTM D1204 (2008) Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

ASTM D2136 (2002; R 2012) Coated Fabrics - Low-Temperature Bend Test


ASTM D751 (2006; R 2011) Coated Fabrics

1.3   SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. 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 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:
SD-03 Product Data
   Elastomeric waterproofing sheet material; G, RO
   Protection board
   Primers, adhesives, and mastics

SD-04 Samples
   Materials
   Submit material samples showing resolution of corner and field
   conditions and attachment to existing waterproof sheeting.

SD-06 Test Reports
   Elastomeric waterproofing sheet material
   Certify compliance with performance requirements specified
   herein.

Field Quality Control
Verification Of Conditions
Protective Covering

SD-08 Manufacturer's Instructions
   Primers, adhesives, and mastics
   Submit Manufacturer's material safety data sheets for primers,
   adhesives and mastics.

1.4 QUALITY ASSURANCE

1.4.1 Shop Drawing Requirements
   Include description and physical properties; termination details;
   application details; recommendations regarding shelf life, application
   procedures; requirements for protective covering; and precautions for
   flammability and toxicity.

1.5 DELIVERY, STORAGE, AND HANDLING
   Deliver and store materials out of the weather, in manufacturer's original
   packaging with brand name and product identification clearly marked. Do
   not permit uncertified materials in the work area.

1.6 ENVIRONMENTAL CONDITIONS
   Do not apply waterproofing during inclement weather or when there is ice,
   frost, surface moisture, or visible dampness on the surface to receive
   waterproofing and when ambient and surface temperatures are 40 degrees F
   or below. The restriction on the application of waterproofing materials
   when ambient and surface temperatures are below 40 degrees F will be
   waived if the Contractor devises a means, approved by the Contracting
Officer, of maintaining the surface and ambient temperatures above 40 degrees F.

PART 2 PRODUCTS

2.1 MATERIALS

Provide the type of elastomeric waterproofing sheet material and related primers, adhesives, and mastics as specified herein. Ensure compatibility of waterproofing materials and with the materials on which they will be applied. Materials shall conform to the applicable performance requirements cited below when tested in accordance with the referenced ASTM publications.

2.2 THERMOPLASTIC MEMBRANE: POLYVINYL CHLORIDE (PVC)

Polyvinyl chloride (PVC) flexible sheets with non-woven fiberglass reinforcing not less than 60 mils minimum thickness.

2.2.1 Thermoplastic Membrane Performance Requirements

a. Overall thickness, ASTM D751:, .059 inches min.;

b. Tensile strength ASTM D638:, 1600 psi min.;

c. Elongation at break, ASTM D638:, 250 percent minimum;

d. Seam strength, ASTM D638:, 90 percent minimum of tensile strength;

e. Retention of properties after heat aging, ASTM D3045;

f. Tensile strength, ASTM D638:, 95 percent of original;

g. Elongation, ASTM D638:, 95 percent of original;

h. Tear resistance, ASTM D1004:, 17 Pound Force

i. Low Temperature Bend, ASTM D2136:, minus 40 F;

j. Liner Dimensional Change, ASTM D1204: 0.002 percent; and

k. Weight Change After Immersion in Water, ASTM D570:, 2.0 percent maximum.

2.2.2 Adhesives

a. Adhesive for thermoplastic flashings as recommended by manufacturer.

b. Adhesive for Sub-Membrane Grid: 100 percent solids, two-part urethane, with minimum tensile strength of 150 psi, in accordance with ASTM D412 and adhesion to concrete of 12 ply in accordance with ASTM D429 as recommended by manufacture.

2.2.3 Accessories

Securement Strip: 14 gauge stainless steel metal bar 1 inch wide, pre-punched 1 inch on center for securement.
2.3 Protection Board

Provide protection board that is compatible with the waterproofing membrane. Use a minimum 1 inch thick polystyrene, as recommended by the manufacturer.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

Before starting the work, verify that surfaces to be waterproofed are in satisfactory condition. Notify the Contracting Officer of defects or conditions that will prevent a satisfactory application. Do not start application until defects and conditions have been corrected.

3.2 SURFACE PREPARATION

Ensure surfaces to be treated are clean, dry, smooth, and free from deleterious materials and projections. Thoroughly wet holes, joints, cracks, and voids in concrete with water and fill with Portland cement mortar, strike flush, and permit to dry. Cut off high spots or grind smooth. Finish top surfaces of projecting masonry or concrete ledges below grade, except footings, to a steep bevel with Portland cement mortar. Sweep surfaces to be covered before applying waterproofing to remove dust and foreign matter. Cure concrete by a method compatible with the waterproofing system.

3.3 APPLICATION

Follow manufacturer's printed installation instructions. Where indicated, mop continuous cant strips in place at vertical and horizontal corners before installing the waterproofing membrane. Do not use untreated wood or wood fiber cants. When using solvent welding liquid, avoid prolonged contact with skin and breathing of vapor. Provide adequate ventilation. Carry waterproofing of horizontal surfaces up abutting vertical surfaces as indicated and adhere solid to the substrate. Avoid wrinkles and buckles in applying membrane and joint reinforcement.

a. Non-Self-Adhering Membrane: Unroll membrane and allow to remain flat for at least one-half hour before application. Apply an asphalt concrete primer prior to application of asphaltic adhesive. Where solvent adhesive is applied, allow major portion of solvent to evaporate so that bonding adhesive does not stick to a dry finger touching it. Apply elastomeric waterproofing membrane in a full bed of adhesive at a uniform coverage rate in accordance with the recommendations in the membrane manufacturer's printed instructions. Pull membrane tight without stretching. As soon as adhesive is fully set and dry, recheck lap splices. Where openings or fishmouths appear, reseal and reroll lap splices.

3.4 FLASHING

Flash penetrations through membrane. Ensure that those penetrations be sealed with the appropriate sealant or mastic flashing component. Embed elastomeric membrane in a heavy coat of adhesive, except for self-adhering membrane. Continuous metal reglets shall be installed horizontally, as required by manufacturer.
3.5 FIELD QUALITY CONTROL

Notify the Contracting Officer one day prior to date of performing tests and before concealment. Do not proceed with work that conceals membrane waterproofing before receiving approval and acceptance of Contracting Officer.

3.6 PROTECTIVE COVERING

After installation has been inspected and approved by the Contracting Officer, apply a protective covering to the membrane waterproofing prior to backfilling. Protect vertical membrane waterproofing with a 1 inch minimum thickness of polystyrene.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C203 (2005; R 2012) Breaking Load and Flexural Properties of Block-Type Thermal Insulation


NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval.

Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data
- Board insulation; G
- Accessories
- Certification

SD-08 Manufacturer's Instructions
- Board Insulation
- Adhesive

1.3 SUSTAINABLE DESIGN CERTIFICATION

Product shall be third party certified in accordance with ULE Greenguard, SCS Scientific Certification Systems Indoor Advantage or equal. Certification shall be performed annually and shall be current.

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials to the site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.4.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.
1.5 SAFETY PRECAUTIONS

1.5.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.

1.5.2 Other Safety Considerations

Consider safety concerns and measures as outlined in ASTM C930.

PART 2 PRODUCTS

2.1 BOARD INSULATION

Provide only thermal insulating materials recommended by manufacturer for type of application indicated. Provide board or block thermal insulation conforming to the following standards and the physical properties listed below:

a. Unfaced Preformed Rigid Polyisocyanurate Board: ASTM C591

2.1.1 Thermal Resistance

5.7R per inch.

2.1.2 Fire Protection Requirement

a. Flame spread index of 75 or less when tested in accordance with ASTM E84.

b. Smoke developed index of 200 or less when tested in accordance with ASTM E84.

2.1.3 Other Material Properties

Provide thermal insulating materials with the following properties:

a. Rigid cellular plastics: Compressive Resistance at Yield: Not less than 20 pounds per square inch (psi) when measured according to ASTM D1621.

b. Flexural strength: Not less than 25 psi when measured according to ASTM C203.

c. Water Vapor Permeance: Not more than 1.1 Perms or less when measured according to ASTM E96/E96M, desiccant method, in the thickness required to provide the specified thermal resistance, including facings, if any.

d. Water Absorption: Not more than 2 percent by total immersion, by volume, when measured according to ASTM C272/C272M.

e. Water Adsorption: Not more than 1 percent by volume when measured in accordance with paragraph 14 of ASTM C553.
2.1.4 Recycled Materials

Provide thermal insulation containing recycled materials to the extent practicable, provided that the material meets all other requirements of this section. The minimum required recycled material contents (by weight, not volume) are:

<table>
<thead>
<tr>
<th>Material</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polyisocyanurate/</td>
<td>9 percent</td>
</tr>
</tbody>
</table>

2.1.5 Prohibited Materials

Do not provide materials containing more than one percent of asbestos.

2.2 DAMPPROOFING

2.2.1 Dampproofing for Masonry Cavity Walls

Bituminous material is specified in Section 07 11 13 BITUMINOUS DAMPPROOFING.

2.3 PROTECTION AND COVER BOARD AT ROOF INSULATION

To be 1/2" thick gypsum core with fiberglass mats, both sides, Dens Deck Roof Board or equal by other manufacturers.

2.4 ACCESSORIES

2.4.1 Adhesive

As recommended by insulation manufacturer.

2.4.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Before installing insulation, ensure that all areas that will be in contact with the insulation are dry and free of projections which could cause voids, compressed insulation, or punctured vapor retarders. If moisture or other conditions are found that do not allow the proper installation of the insulation, do not proceed but notify the Contracting Officer of such conditions.

3.2 PREPARATION

3.2.1 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

a. Recessed lighting fixtures, including wiring compartments, ballasts, and other heat producing devices, unless certified for installation surrounded by insulation: 3 inches from outside face of fixtures and
devices or as required by NFPA 70 and, if insulation is to be placed above fixture or device, 24 inches above fixture.

b. Vents and vent connectors used for venting products of combustion, flues, and chimneys other than masonry chimneys: minimum clearances as required by NFPA 211.

c. Gas Fired Appliances: Clearances as required in NFPA 54.

Blocking is not required if chimneys or flues are certified by the Manufacturer for use in contact with insulating materials.

3.3 INSTALLATION

3.3.1 Insulation Board

Install and handle insulation in accordance with the manufacturer's installation instructions. Keep material dry and free of extraneous materials. Observe safe work practices.

3.3.2 Electrical Wiring

Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.

3.3.3 Continuity of Insulation

Butt tightly against adjoining boards, studs, rafters, joists, sill plates, headers and obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joint, roof, and floor. Avoid creating any thermal bridges or voids.

3.4 INSTALLATION ON WALLS

3.4.1 Installation on Masonry Walls

Apply board directly to masonry with adhesive or fasteners as recommended by the insulation manufacturer. Fit between obstructions without impaling board on ties or anchors. Apply in parallel courses with joints breaking midway over course below. Put ends in moderate contact with adjoining insulation without forcing. Cut and shape as required to fit around wall penetrations, projections or openings to accommodate conduit or other services. Seal around cut-outs with sealant. Install board in wall cavities so that it leaves at least a nominal one inch free air space outside of the insulation to allow for cavity drainage.

3.4.2 Adhesive Attachment to Concrete and Masonry Walls

Apply adhesive to wall and completely cover wall with insulation.

a. As recommended by the insulation manufacturer.

b. Use only full back method for pieces of one square foot or less.

c. Butt all edges of insulation and seal edges with tape.
3.4.3 Mechanical Attachment on Concrete and Masonry Walls

Cut insulation to cover walls. Apply adhesive to wall and set clip or other mechanical fastener in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners, bend split prongs flush with insulation. Butt all edges of insulation and seal with tape.

3.4.4 Protection and Cover Board at Roof Insulation

Install board in accordance with manufacturer's instructions.

3.5 INSTALLATION ON UNDERSIDE OF CONCRETE FLOOR SLAB

3.5.1 Mechanically Fastened Systems

Size insulation to cover underside of slab. Apply adhesive to slab and set fasteners in adhesive as recommended by manufacturer. After curing of adhesive, install insulation over fasteners, bend split prongs flush with insulation. Butt all edges of insulation and seal with tape.

-- End of Section --
PART 1  GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)


ASTM E136  (2012) Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C


NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.134 Respiratory Protection

UL ENVIRONMENT (ULE)

ULE Greenguard UL Greenguard Certification Program

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Blanket Insulation; G

Sound Attenuation batts; G
Accessories
SD-08 Manufacturer's Instructions

Insulation

1.3 SUSTAINABLE DESIGN CERTIFICATION

Product must be third party certified in accordance with ULE Greenguard

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials to site in original sealed wrapping bearing manufacturer's name and brand designation, specification number, type, grade, R-value, and class. Store and handle to protect from damage. Do not allow insulation materials to become wet, soiled, crushed, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storing, and protecting of materials before and during installation.

1.4.2 Storage

Inspect materials delivered to the site for damage; unload and store out of weather in manufacturer's original packaging. Store only in dry locations, not subject to open flames or sparks, and easily accessible for inspection and handling.

1.5 SAFETY PRECAUTIONS

1.5.1 Respirators

Provide installers with dust/mist respirators, training in their use, and protective clothing, all approved by National Institute for Occupational Safety and Health (NIOSH)/Mine Safety and Health Administration (MSHA) in accordance with 29 CFR 1910.134.

1.5.2 Other Safety Concerns

Consider other safety concerns and measures as outlined in ASTM C930.

PART 2 PRODUCTS

2.1 BLANKET INSULATION

ASTM C665, Type I, blankets without membrane coverings and a flame spread of 25 or less and a smoke developed rating of 150 or less when tested in accordance with ASTM E84.

2.1.1 Thermal Resistance Value (R-VALUE)

The R-Value must be minimum 3R per inch.

2.1.2 Recycled Materials

Provide Thermal Insulation containing recycled materials to the extent practicable, provided the material meets all other requirements of this section. The minimum required recycled materials content by weight are:
Fiberglass: 20 to 25 percent glass cullet

2.1.3 Prohibited Materials

Do not provide asbestos-containing materials.

2.1.4 Reduced Volatile Organic Compounds (VOC) for Insulation Materials

ULE Greenguard

2.2 BLOCKING

Wood, metal, unfaced mineral fiber blankets in accordance with ASTM C665, Type I, or other approved materials. Use only non-combustible materials meeting the requirements of ASTM E136 for blocking around chimneys and heat producing devices.

2.3 Sound Attenuation Batt Insulation

Unfaced, flexible fiberglass insulation batts designed to deliver sound control in metal stud cavities of interior partitions.

2.3.1 Applicable Standards

Comply with ASTM C665 Type I and ASTM E136.

2.3.2 Fire Safety

Non-combustible material classified 10/10 when tested in accordance with ASTM E84.

2.4 ACCESSORIES

2.4.1 Adhesive

As recommended by the insulation manufacturer.

2.4.2 Mechanical Fasteners

Corrosion resistant fasteners as recommended by the insulation manufacturer.

2.4.3 Wire Mesh

Corrosion resistant and as recommended by the insulation manufacturer.

PART 3 EXECUTION

3.1 EXISTING CONDITIONS

Before installing insulation, ensure that areas that will be in contact with the insulation are dry and free of projections which could cause voids, compressed insulation, or punctured vapor retarders. If moisture or other conditions are found that do not allow the workmanlike installation of the insulation, do not proceed but notify Contracting Officer of such conditions.
3.2 PREPARATION

3.2.1 Blocking Around Heat Producing Devices

Install non-combustible blocking around heat producing devices to provide the following clearances:

a. Vents and vent connectors used for venting the products of combustion, flues, and chimneys other than masonry chimneys: Minimum clearances as required by NFPA 211.

b. Gas Fired Appliances: Clearances as required in NFPA 54.

Blocking around flues and chimneys is not required when insulation blanket, including any attached vapor retarder, passed ASTM E136, in addition to meeting all other requirements stipulated in Part 2. Blocking is also not required if the chimneys are certified by the manufacturer for use in contact with insulating materials.

3.3 INSTALLATION

3.3.1 Insulation

Install and handle insulation in accordance with manufacturer's instructions. Keep material dry and free of extraneous materials. Any materials that show visual evidence of biological growth due to presence of moisture must not be installed on the building project. Ensure personal protective clothing and respiratory equipment is used as required. Observe safe work practices.

3.3.1.1 Electrical wiring

Do not install insulation in a manner that would sandwich electrical wiring between two layers of insulation.

3.3.1.2 Continuity of Insulation

Install blanket insulation to butt tightly against adjoining blankets and to studs, rafters, joists, sill plates, headers and any obstructions. Provide continuity and integrity of insulation at corners, wall to ceiling joints, roof, and floor. Avoid creating thermal bridges.

3.3.1.3 Installation at Bridging and Cross Bracing

Insulate at bridging and cross bracing by splitting blanket vertically at center and packing one half into each opening. Butt insulation at bridging and cross bracing; fill in bridged area with loose or scrap insulation.

3.3.1.4 Installation of Walls with Sound Attenuation Batts

Seal the bottom metal stud track and all penetrations with acoustical sealant.

3.3.1.5 Insulation without Affixed Vapor Retarder

Provide snug friction fit to hold insulation in place. Stuff pieces of insulation into cracks between trusses, joists, studs and other framing,
such as at attic access doors, door and window heads, jambs, and sills, band joists, and headers.

3.3.1.6 Sizing of Blankets

Provide only full width blankets when insulating between studs. Size width of blankets for a snug fit where trusses, joists or studs are irregularly spaced.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

**AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)**

AIHA Z88.6 (2006) Respiratory Protection - Respirator Use - Physical Qualifications for Personnel

**ASTM INTERNATIONAL (ASTM)**


ASTM D2126 (2009) Response of Rigid Cellular Plastics to Thermal and Humid Aging

ASTM D2856 (1994; R 1998) Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer


1.2 DESCRIPTION OF INSULATION SYSTEM

The insulation system shall consist of sprayed in-place polyurethane foam insulation which inherently provides a code compliant 15 minute thermal barrier assembly. Alternately, a 15 minute thermal barrier shall be installed over the sprayed polyurethane foam insulation.

1.2.1 Performance Requirements

The installed insulation system shall be free of defects including foam blistering, or voids; suitable for the climatic and service conditions of the installation. The finished installation shall be in accordance with the International Building Code (2012) installation and comply with the following tests:

a. A temperature transmission test (such as a modified ASTM E 119, the actual thermal barrier test apparatus being smaller than the typical larger-scale wall or roof/ceiling test assemblies); and

b. A fire integrity test (a large-scale fire test such as NFPA 286, UL 1040, UL 1715 or FM 4880 with a specific acceptance criteria defined within the IBC.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Spray Polyurethane foam; G

Submit literature including material description, physical
properties, recommended storage conditions, Material Safety Data
Sheets, and shelf life expiration date.

Submit manufacturers recommended ventilation requirements and
reoccupancy time period durations.

15 Minute Intumescent Thermal Barrier Protective coating, (If
applied separately); G

Submit literature including material description, physical
properties, recommended storage conditions, Material Safety Data
Sheets, and shelf life expiration date.

Primer

Submit literature including material description, physical
properties, recommended storage conditions, Material Safety Data
Sheets, and shelf life expiration date.

SD-06 Test Reports

Surface burning characteristics

Flame Spread

Smoke Development Index

SD-08 Manufacturer's Instructions

SPRAY POLYURETHANE FOAM

Intumescent Protective Coating; G

As required by polyurethane foam manufacturer for 15 minute
thermal barrier protection of Polyurethane foam. Submit
manufacturer's complete application instructions and details, and
to include storage, handling, and warnings or precautions on
flammability and toxicity. Include manufacturer's written
recommendations for primers and for surface preparation of metals
and other materials and surface substrates over which sprayed
polyurethane foam and coating system will be applied.

Primers; G

Submit manufacturer's complete application instructions and
details, and to include storage, handling, and warnings or
precautions on flammability and toxicity. Include manufacturer's
written recommendations for primers and for surface preparation of
metals, and other materials and surface substrates over which
sprayed polyurethane foam and coating system will be applied.

Surface preparation

Submit manufacturer's complete application instructions and
details, and to include storage, handling, and warnings or
precautions on flammability and toxicity. Include manufacturer's
written recommendations for primers and for surface preparation of
metals, and other materials and surface substrates over which
sprayed polyurethane foam and coating system will be applied.
1.4 QUALITY ASSURANCE

1.4.1 Qualification of Manufacturer

Sprayed polyurethane foam and 15 minute thermal barrier coating products manufacturer shall have a minimum of 10 years experience in the manufacture of polyurethane foam and coating products.

1.4.2 Qualification of Applicator

The insulation system applicator shall have prior manufacturer training in the application of sprayed polyurethane foam and coating materials. Applicator shall be certified and approved by the foam and coating manufacturer to apply the specified materials. Applicator shall have a minimum of 5 years experience in application of the specified materials and minimum of 10 years experience in the application of sprayed thermal polyurethane foam insulation systems. Mechanics applying the foam and coating materials shall have minimum 3 years prior experience in handling and spraying the type of materials specified and spray equipment must be operated by or under the direct full-time supervision of manufacturer-trained personnel.

1.4.3 Pre-Installation Conference

After approval of submittals and before performing system installation work, hold a pre-installation conference to review the following:

a. Drawings and specifications and submittals related to the work;

b. Contractor's plan for coordination of the work of the various trades involved in providing the system and other components impacting the work;

c. Quality control plan for the installation and sequence of the work.

d. Property protection measures.

e. Safety requirements including ventilation isolation and reoccupancy of the spaces time period.

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

Deliver and store materials in sufficient quantity to allow for uninterrupted flow of work. Materials shall be delivered to the jobsite in their original unopened packages, clearly marked with the manufacturer's name, brand name, description of contents, and shelf life of containerized materials.

1.5.2 Storage

Materials shall be stored in clean, dry areas, away from excessive heat, sparks, and open flame. Storage area shall be ventilated to prevent
build-up of flammable gases. Maintain temperatures in the storage area below the materials' flash point and within limits recommended by the manufacturer's printed instructions.

1.5.3 Handling

Handle materials and containers during application work safely and in accordance with manufacturer recommendations. Store liquids in airtight containers and keep containers closed except when removing materials. Do not use equipment or containers containing remains of dissimilar materials. Do not expose foam component containers to direct sunlight for periods of time sufficient to cause contents to exceed 80 degrees F. Mark and remove from job site materials which have been exposed to moisture or that exceed shelf life limits. Not more than half the shelf life shall have expired when materials are applied.

1.6 ENVIRONMENTAL CONDITIONS

Do not apply spray foam insulation system materials when visible dampness is present on the surface to be covered. Use moisture-measuring methods and equipment as required to verify that the moisture conditions of substrate surfaces are in accordance with insulation system materials manufacturer requirements prior to application of foam and thermal barrier coating materials. Substrate temperatures shall be within limits recommended by the manufacturer's printed instructions, unless specified otherwise.

1.6.1 Primer

Follow manufacturer's printed application and curing instructions, except that no primer shall be applied when ambient temperature is below 40 degrees F or when ambient temperature is expected to fall below 35 degrees F during drying or curing period. Primer material and color shall be selected to promote proper substrate temperature for sprayed polyurethane foam application.

1.6.2 Sprayed Polyurethane Foam

Do not apply sprayed polyurethane foam if the surface temperature is less than 50 degrees F, higher than 120 degrees F, or is less than 5 degrees F above the dewpoint. Relative humidity shall be within limits recommended by the sprayed polyurethane foam manufacturer's printed instructions. Determine the dewpoint at the jobsite prior to and upon completion of each work day unless variable weather conditions require more frequent monitoring. The wet bulb and dry bulb temperatures during application of sprayed polyurethane foam shall be within the ranges recommended by the sprayed polyurethane foam manufacturer. Take wet bulb and dry bulb temperatures at the beginning of foaming, end of foaming, and at 2 hour intervals during foaming.

1.7 COORDINATION

Insulation operations shall be coordinated with work of other trades. The installed insulation system shall be protected from damage. Damaged areas shall be repaired.
1.8 CONTRACTOR'S FOAM SPRAY EQUIPMENT

1.8.1 Applicator

Use an airless foam spray gun of the mechanical, self-cleaning type, that does not require a flushing solvent during the spray operation.

1.8.2 Equipment Calibration

Fully calibrate the foam metering equipment to monitor each liquid component to within 2 percent of the foam material manufacturer's required metering ratio. Calibrate spray equipment each day at start of operations, after each restart if spraying operations have been terminated for more than one hour, whenever there is a change in fan pattern or pressure, whenever slow curing areas are noticed, whenever a change is made in hose length or working height, and after changeover between materials. Calibration shall consist of demonstrating that the equipment is adjusted to deliver components in proper mix and proportion. Calibration test shall be done on cardboard or plywood adjacent to the area to be sprayed.

1.8.3 Metering Equipment Requirements

Use foam metering equipment capable of developing and maintaining the foam manufacturer's required liquid component pressures and temperatures. Foam metering equipment shall have gages for visual monitoring. Equipment shall provide temperature control of foam components to within the temperature ranges recommended by the foam manufacturer's printed instructions.

1.8.4 Moisture Protection

Protect the surfaces of component supply containers or tanks used to feed the foam metering equipment from moisture.

1.8.5 Compressed Air

Supply compressed air in contact with foam components during mixing or atomization through moisture traps that are continuously bled.

1.8.6 Dispense Excess Materials

Do not deposit materials used for cleaning of equipment or materials dispensed for calibration purposes and establishment of spray gun pattern on the surfaces to be sprayed. Dispense such materials into scrap containers or onto plastic film, or cardboard, and dispose of in compliance with safety requirements and jobsite regulations.

1.9 SPECIAL SAFETY PROVISIONS

During application, the following shall be required unless in conflict with the manufacturer's recommendations or requirements of a recognized legal authority, in which case, the manufacturer's recommendations or the legal authority's requirements take precedence:
1.9.1 Special Equipment

1.9.1.1 Air Masks

Wear fresh air supply masks when applying foam or when handling hazardous liquid materials. Respiratory protective devices shall be as recommended by AIHA Z88.6 and the manufacturer for the interior application conditions specific to this project. Instruct personnel required to use respiratory protective devices in the use of the devices. Maintain such equipment and inspect regularly.

1.9.1.2 Air Monitoring

Provide for evaluation of volatile organic compounds in indoor air in accordance with ASTM D 6345.

In addition, provide safety badges with color indicators and monitors to continuously monitor adjacent occupied spaces for compliance with OSHA standards.

1.9.1.3 Eye and Face Masks

Use eye and face protection during materials application. Eye and face protective equipment shall meet the requirements of ANSI/ISEA Z87.1.

1.9.1.4 Clothing and Gloves

Wear protective clothing and gloves during materials application. Skin areas not covered by clothing shall be protected by protective creams.

1.9.2 Handling Precautions

1.9.2.1 Venting of Material Containers

Partially unscrew material container and drum caps to gradually vent the containers prior to opening. Do not inhale vapors. Decontaminate empty component containers by filling with water and allowing to stand for 48 hours with bung caps removed. Under no circumstances seal, stop, or close the containers which have been emptied of the foam component.

1.10 WARRANTY

Provide spray foam insulation system material and workmanship warranties meeting specified requirements for a period of 2 years. Revision or amendment to standard manufacturer warranty shall be provided as required to comply with the specified requirements.

PART 2 PRODUCTS

2.1 SPRAY POLYURETHANE FOAM

Spray polyurethane foam shall be standard product of the manufacturer, and containers shall be factory marked with the manufacturer's name or trademark. The foam material shall be a product whose performance is intended for the application and application conditions indicated. The foam material shall be of a formulation suitable for the environmental and climatic conditions in which foam will be applied. Polyurethane foam shall meet ASTM C1029 and shall meet the following requirements:
TEST STANDARD       DESCRIPTION                           VALUE
ASTM C518            Thermal Resistance                   
Aged 90 days         1" nominal                           R - 4.6 min
ASTM D2856           Closed Cell Content                   >90%
ASTM D1622           Core Density (nominal)                2.0 lbs/ft³
ASTM D1623           Tensile Strength                     28 p.s.i.
ASTM D1621           Compressive Strength                  22 p.s.i.
ASTM C1338           Criteria for Fungi Resistance           Pass
ASTM E84             Surface Burning Characteristics         4" max
                        Flame Spread                                <25
                        Smoke Development Index                      <400
ASTM D2126           Dimensional Stability                
                        12% Humidity                                 Pass
                        97% Relative Humidity                         Pass
ASTM E96/E96M        Water Vapor Permeability             2.4" Thick Foam
                        0.99 perms

2.2 INTUMESCENT PROTECTIVE COATING

Spray applied polyurethane foam shall be so formulated to pass the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275 as outlined in the International Building Code (2012) for 15 minute thermal barrier or shall be protected by a manufacturer tested intumescent coating to provide an equivalent rating per the ICC-ES.

2.3 PRIMER

Primers used shall be as required and recommended by the coating and spray foam materials manufacturer for the substrate to be covered. Rust-inhibiting primer shall be used for ferrous metal surfaces. Cut-back asphalt primers are prohibited.

2.4 INSPECTION TOOLS

Maintain the following inspection tools on site for use in evaluating conditions and quality:

a. Moisture meter - to measure degree of moisture within or on the substrate surface.

b. Sling Psychrometer and psychrometric chart, or electronic psychrometer or hygrometer - to measure ambient temperature, humidity and dew point.

c. Surface thermometer - to read temperature of a surface.

d. Optical comparator - to read dry film thickness.

e. Wet film thickness gauge - read wet film thickness.

f. Probe wire (0.025 inches diameter, maximum) - to inspect foam depth.

PART 3 EXECUTION

3.1 PROTECTION OF PROPERTY

Protect all construction to remain, equipment, and other surfaces adjacent to the work from overspray from foam and coating materials. Any surfaces damaged by insulation system products shall be restored or replaced to the
satisfaction of the Government at no additional expense to the Government.

3.1.1 Masking

Provide masking protection to protect surfaces immediately adjacent to foam and coating at time of application.

3.2 SPECIAL PRECAUTIONS AND INSTRUCTIONS

3.2.1 Primers

Do not dilute primers or other materials unless required and recommended by the manufacturer. Do not use cleaning solvents for thinning primers or other materials.

3.2.2 Material Handling

Handle materials and containers during application work safely and in accordance with recommendations of the manufacturer. Store liquids in airtight containers and keep containers closed except when removing materials. Do not use equipment or containers containing remains of dissimilar materials or products.

3.2.3 Fire and Explosion Hazards

Prohibit open flames, sparks, welding, and smoking in the application area. Provide and maintain a fire extinguisher of appropriate type and size in the application area.

3.2.4 Air Quality

Provide continuous monitoring of air quality in and adjacent to the work zones. Continuously exhaust work zones to maintain OSHA and manufacturers required air quality. Continue to flush and monitor work zone until proper air quality is obtained.

3.3 INSULATION AREA PREPARATION

3.3.1 Preapplication Inspection

Ensure that all existing building components of the application are clean, suitable for application and perimeter foam stops are in place prior to the application of the primer and spray polyurethane foam.

3.3.1.1 Surface Examination

Examine surfaces and correct defects that may adversely affect the insulation system application or performance.

3.3.2 Work Area Isolation.

Seal off vents during foam and coating application. Coordinate with the Contracting Officer. Give the Contracting Officer 7 days notice before shutting down ventilation equipment. Isolate to the greatest extent possible, areas of the work from other occupied areas of the building. Provide portable ventilation and temporary air barriers during spray foam insulation installation.
3.4 GENERAL APPLICATION

Application shall be as specified and in general accord with requirements and recommendations of ASTM D5469/D5469M and NRCA RoofMan "Quality Control Guidelines in the Application of Spray Polyurethane Foam Roofing".

3.5 SURFACE PREPARATION FOR FOAM APPLICATION

Surfaces that are to receive spray foam application shall be dry; completely cured; free of grease, oils, dirt and other foreign matter or contaminants which will interfere with total adhesion of polyurethane foam.

3.6 SPRAY FOAM APPLICATION

3.6.1 Spray Foam

Apply foam to provide a minimum finished thickness as indicated. Check foam thickness during application by probing depth with probe wire. Adjust application procedures as necessary to develop required foam thickness.

3.6.2 Surface Uniformity

Do not exceed the minimum thickness of the foam by more than 1/2 inch, except as necessary at transitions and penetrations, or as otherwise approved by the Contracting Officer.

3.6.3 Finish Appearance and Texture

The finished surface of applied foam shall be free of ridges, bumps, pinholes, depressions, crevices, voids, or oxidation and shall be "course orange peel" or smoother in conformance with photographic standards of ASTM D5469/D5469M or SPFA AY-104. Soft, spongy, delaminating, brittle, or otherwise non-complying areas of foam shall be removed and replaced.

3.6.4 Foam Finish Correction

If the sprayed foam skin is removed to correct surface texture or to remove excess foam thickness, respray the cut surface with foam formation at least 1/2 inch thick to provide a protective foam skin prior to application of the protective thermal coating.

3.6.5 Finish Removal

Remove foam that is not bonded, of poor cell structure, wet, or otherwise does not meet the material quality specifications.

3.6.6 Application Time Limits

Do not start foam application on an area larger than can be brought to the specified full foam thickness, cured, and coated with the thermal barrier coating system on the same day.

3.6.7 Curing Time

Cure the applied foam for a minimum of 2 hours and as otherwise recommended by the foam manufacturer prior to application of the protective coating.
3.6.8 Spray Foam Clean Up

Remove overspray masking materials and coverings upon completion of the spray foam and thermal barrier application. Remove foam overspray found on adjacent surfaces.

3.7 INTUMESCENT PROTECTIVE COATING

Apply protective coating on foam insulation not less than 2 hours after but on the same day as installation of the foam insulation. Do not leave foam uncoated overnight. Provide in accordance with manufacturers recommendations and tested assembly data.

3.8 FIELD QUALITY CONTROL

3.8.1 Construction Monitoring

During progress of the work, Contractor shall make visual inspections as necessary to insure compliance with specified parameters. Additionally, verify the following:

a. Protection of surrounding building finishes measures are in place. Work area isolation of hazardous fumes, to adjacent spaces, and other occupied building spaces is in place. Work zone is properly ventilated in accordance with OSHA and manufacturers recommendations.

b. Equipment is in working order. Metering devices are accurate.

c. Materials are not installed in adverse weather.

d. Surfaces are cleaned and primed and substrates are in acceptable condition prior to application of materials.

e. Materials comply with specified requirements.

f. All materials are properly stored, handled and protected from moisture or other damages.

g. Foam material is applied in minimum of two passes, or lifts, applied in thickness from 1/2 inch to 1-1/2 inches per lift.

h. Foam is free of blistering in its formation and the surface texture is as specified.

i. Foam is cured minimum of 2 hours or in accordance with manufacturer requirements prior to thermal coating application.

j. Air quality monitoring equipment is in place.

3.9 CORRECTION OF DEFICIENCIES

Correction of deficiencies shall be as directed by the Contracting Officer at no additional cost to the Government.

3.10 CLEAN-UP AND DISPOSAL

All waste material, material containers, and debris shall be cleaned up daily and placed in appropriate trash containers. At completion of the work all waste material, debris, and containers shall be removed from the
job site and disposed of as required by local regulations.

-- End of Section --
PART 1   GENERAL

1.1   REFERENCES

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

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI S100                      (2012) North American Specification for the Design of Cold-Formed Steel Structural Members

AISI SG03-3                   (2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7                      (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASCE 7-10                   (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)


ASTM INTERNATIONAL (ASTM)


ASTM C792  (2004; R 2008) Effects of Heat Aging on Weight Loss, Cracking, and Chalking of Elastomeric Sealants


ASTM D1654  (2008) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments


ASTM D2244  (2015a) Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates


ASTM D3359  (2009; E 2010; R 2010) Measuring Adhesion by Tape Test

ASTM D3363  (2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test

Films

ASTM D4587 (2011) Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings

ASTM D522 (1993a; R 2008) Mandrel Bend Test of Attached Organic Coatings


ASTM D610 (2008; R 2012) Evaluating Degree of Rusting on Painted Steel Surfaces

ASTM D714 (2002; R 2009) Evaluating Degree of Blistering of Paints

ASTM D822 (2001; R 2006) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings


ASTM E1592 (2005; R 2012) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference


ASTM E2140 (2001; R 2009) Standard Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head

ASTM E283 (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E331 (2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

Materials


FM GLOBAL (FM)

FM 4471 (2010) Class I Panel Roofs

METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)


NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)


SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)


UNDERWRITERS LABORATORIES (UL)


1.2 DESCRIPTION OF METAL ROOF SYSTEM

1.2.1 Performance Requirements

Steel panels and accessory components must conform to the following standards:

ASTM A1008/A1008M
ASTM A123/A123M
ASTM A36/A36M
ASTM A463/A463M for aluminum coated steel sheet
ASTM A755/A755M for metallic coated steel sheet for exterior coil prepainted applications.
ASTM A924/A924M for metallic coated steel sheet
ASTM D522 for applied coatings
UL Bld Mat Dir

1.2.1.1 Hydrostatic Head Resistance

No water penetration when tested according to ASTM E2140.
1.2.1.2 Wind Uplift Resistance

Provide standing seam metal roof panel system with concealed clips that conforms to the requirements of ASTM E1592 and/or UL 580. Uplift force due to wind action governs the design for panels. Submit wind uplift/load test report and other required submittal data prior to commencing installation.

Roof system and attachments must resist the wind loads as determined by ASCE 7-10, in pounds per square foot and as shown on the drawings.

The design uplift force for each connection assembly shall be that pressure given for the area under consideration, multiplied by the tributary load area of the connection assembly and multiplied by the appropriate factor of safety, as follows:

a. Single fastener in a connection: 3.0
b. Two or more fasteners in each connection: 2.25

1.2.1.3 Static Air Infiltration

Completed roof system shall have a maximum of .06 cfm/sf with 6.24 kPA air pressure differential as per ASTM E283, ASTM E1680.

1.2.1.4 Water Infiltration

Completed roof system shall have no evidence of water penetration at an inward static air pressure differential of not less than 6.24 psf (43kPa) and not more that 12.0 psf (83 kPa) as per ASTM E331, ASTM E1646.

1.2.1.5 Fixation

Panels must be fixed at ridge with concealed fasteners with allowance for expansion at eaves and valleys.

1.2.1.6 Color

Color to be per Robins AFB standard as indicated on the drawings.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Roofing panels; G

Flashing and Accessories; G Refer to Section 07 60 00 Flashing and Sheet Metal

Contract drawings show the design wind loads and the extent and general assembly details of the metal roof panels. Contractor must provide design for members and connections not shown on the drawings. Roof panels and accessories must be the products of the same manufacturer. Coordinate this submittal with roof framing.
drawings such that the roof substrate requirements are reflected in the roof framing documents.

Include in shop drawings all flashings and trims associated with the roof. Construct materials from same materials as roof. Coordinate with Section 07 60 00 FLASHING AND SHEET METAL.

SD-03 Product Data

Submit manufacturer's catalog data for the following items:

Roof panels; G,
Factory-Applied Color Finish; G
Accessories
Fasteners
Pressure Sensitive Tape;
Underlayments; G
Gaskets and Sealing/Insulating Compounds
Coil Stock;
Repair Paint; G, AE

SD-04 Samples

Factory-applied Color Finish, samples, 9 inch lengths, full width; G
Note: Color selection to be per Robins AFB standards as indicated on the drawings and may not be of manufacturers standard selection.

SD-05 Design Data

Wind Uplift Resistance; G

SD-06 Test Reports

Leakage Test Report; G
Wind Uplift/Load Test Report; G

Provide design calculations prepared by a professional engineer specializing in structural engineering verifying that system(s) supplied and any additional framing meets design load criteria indicated. Coordinate calculations with manufacturer's test results. Structural Roof System are required in this document. Include calculations for roof:

Clip spacing and allowable load per clip.
Fastening of clips to structure or intermediate supports.
Intermediate support spacing and framing and fastening to
structure when required.
Allowable panel span at anchorage spacing indicated.
Safety factor used in design loading.
Governing code requirements or criteria.
Edge and termination details.
Fastener spacing / pull out
Fire Rating Test Report; G

Metal roof panels and component materials must also comply with the requirements in FM 4471 as part of a panel roofing system as listed in Factory Mutual Guide (FMG) "Approval Guide" for Class 1 or noncombustible construction, as applicable.

Factory Finish and Color Performance Requirements; G

SD-07 Certificates
Roof Panels
Qualification of Manufacturer
Qualification of Applicator; G

SD-08 Manufacturer's Instructions
Installation Manual; G

SD-09 Manufacturer's Field Reports
Manufacturer's Field Inspection Reports; G

SD-11 Closeout Submittals
Warranties; G
Information Card; G

1.4 QUALITY ASSURANCE

1.4.1 Qualification of Manufacturer

Submit documentation verifying metal roof manufacturer has been in the business of manufacturing metal roof panels for a period of not less than 5 years.

Manufacturer must also provide engineering services by an authorized engineer, currently licensed in the geographic area of the project, with a minimum of five (5) years experience as an engineer knowledgeable in roof wind design analysis, protocols and procedures for MBMA RSDM, ASCE 7, UL 580, and FM 4471. Engineer must provide certified engineering calculations for the project conforming to the stated references.
1.4.1.1 Manufacturer's Technical Representative

The manufacturer's technical representative must be thoroughly familiar with the products to be installed, installation requirements and practices, and with any special considerations in the geographical area of the project. The representative must perform field inspections and attend meetings as specified.

1.4.1.2 Single Source

Unless otherwise approved, panels, clips, closures, and other accessories must be standard products of the same manufacturer, and the most recent design of the manufacturer to operate as a complete system for the intended use.

1.4.2 Qualification of Applicator

Metal roof system applicator must be approved, authorized, or licensed in writing by the roof panel manufacturer and have a minimum of three years experience as an approved, authorized, or licensed applicator with that manufacturer and has been trained by the manufacturer to install the specified system, and is approved at a level capable of providing the specified warranty. Supply the names, locations and client contact information of 5 projects of similar size and scope constructed by applicator using the manufacturer's roofing products submitted for this project within the previous three years.

1.4.3 Field Verification

Prior to the preparation of drawings and fabrication, verify location of roof framing, roof openings and penetrations, and any other special conditions. Indicate all special conditions and measurements on final shop drawings.

1.4.4 Pre-roofing Conference

After approval of submittals and before performing roofing system installation work, hold a pre-roofing conference to review the following:

a. Drawings, specifications, and submittals related to the roof work. Submit, as a minimum; sample profiles of roofing panels, with factory-applied color finish samples, flashing and accessories, gutter/downspout assembly samples, typical fasteners and pressure sensitive tape, sample gaskets and sealant/insulating compounds. Also include data and 1/2 pint sample of repair paint, and technical data on coil stock and coil stock compatibility, and manufacturer's installation manual.

b. Roof system components installation;

c. Procedure for the roof manufacturer's technical representative's onsite inspection and acceptance of the roofing substrate, the name of the manufacturer's technical representatives, the frequency of the onsite visits, distribution of copies of the inspection reports from the manufacturer's technical representative;

d. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing; and
e. Quality control plan for the roof system installation;

f. Safety requirements.

Coordinate pre-roofing conference scheduling with the Contracting Officer. Attendance is mandatory for the Contractor, the Contracting Officer's designated personnel, personnel directly responsible for the installation of metal roof system, flashing and sheet metal work, mechanical and electrical work, other trades interfacing with the roof work, and representative of the metal roofing manufacturer. Before beginning roofing work, provide a copy of meeting notes and action items to all attending parties. Note action items requiring resolution prior to start of roof work.

1.5 DELIVERY, HANDLING, AND STORAGE

Deliver, store, and handle panel materials, bulk roofing products, accessories, and other manufactured items in a manner to prevent damage and deformation, as recommended by the manufacturer, and as specified.

1.5.1 Delivery

Package and deliver materials to the site in undamaged condition. Provide adequate packaging to protect materials during shipment. Do not uncrate materials until ready for use, except for inspection. Immediately upon arrival of materials at jobsite, inspect materials for damage, deformation, dampness, and staining. Remove affected materials from the site and immediately replace. Remove moisture from wet materials not otherwise affected, restack and protect from further moisture exposure.

1.5.2 Handling

Handle materials in a manner to avoid damage. Select and operate material handling equipment so as not to damage materials or applied roofing.

1.5.3 Storage

Stack materials stored on site on platforms or pallets, and cover with tarpaulins or other weathertight covering which prevents trapping of water or condensation under the covering. Store roof panels so that water which may have accumulated during transit or storage will drain off. Do not store panels in contact with materials that might cause staining. Secure coverings and stored items to protect from wind displacement.

1.6 PROJECT CONDITIONS

Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements, and specified safety requirements.

1.7 FABRICATION

Fabricate and finish metal roof panels and accessories on a factory stationary industrial type or leased or installer owned portable rolling mill to the greatest extent possible, per manufacturer's standard procedures and processes, and as necessary to fulfill indicated performance requirements. Comply with indicated profiles, dimensional and
structural requirements.

Provide panel profile, as indicated herein including major ribs for full length of panel. Fabricate panel side laps with factory installed gaskets/sealants providing a weather tight seal and preventing metal-to-metal contact, and minimizing noise from movements within the panel assembly.

1.7.1 Finishes

Finish quality and application processes must conform to the related standards specified within this section. Noticeable variations within the same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize any contrasting variations.

1.7.2 Accessories

Fabricate flashing and trim to comply with recommendations in SMACNA 1793 as applicable to the design, dimensions, metal, and other characteristics of the item indicated.

a. Form exposed sheet metal accessories which are free from excessive oil canning, buckling, and tool marks, and are true to line and levels indicated, with exposed edges folded back to form hems.

b. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

c. Sealed Joints: Form non-expansion, but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA 1793.

d. Conceal fasteners. Exposed fasteners are not allowed.

e. Fabricate cleats and attachments devices of size and metal thickness recommended by SMACNA or by metal roof panel manufacturer for application, but not less than the thickness of the metal being secured.

1.8 WARRANTIES

Provide metal roof system material and workmanship warranties meeting specified requirements. Provide revision or amendment to manufacturer's standard warranty as required to comply with the specified requirements.

1.8.1 Metal Roof Panel Manufacturer Warranty

Furnish the metal roof panel manufacturer's 20-year no dollar limit roof system materials and installation workmanship warranty, including flashing, components, trim, and accessories necessary for a watertight roof system construction. Make warranty directly to the Government, commencing at time of Government's acceptance of the roof work. The warranty must state that:

a. If within the warranty period, the metal roof system, as installed for its intended use in the normal climatic and environmental conditions of the facility, becomes non-watertight, shows evidence of moisture intrusion within the assembly, displaces, corrodes, perforates,
separates at the seams, or shows evidence of excessive weathering due to defective materials or installation workmanship, the repair or replacement of the defective and damaged materials of the metal roof system and correction of defective workmanship is the responsibility of the metal roof panel manufacturer. All costs associated with the repair or replacement work are the responsibility of the metal roof panel manufacturer.

b. If the manufacturer or his approved applicator fail to perform the repairs within 48 hours of notification, emergency temporary repairs performed by others does not void the warranty.

1.8.2 Manufacturer's Finish Warranty

Provide a manufacturer's no-dollar-limit 20 year warranty for the roofing system. Issue the warranty directly to the Government at the date of Government acceptance warranting that the factory color finish, under normal atmospheric conditions at the site, will not crack, peel, or delaminate; chalk in excess of a numerical rating of 8 when measured in accordance with ASTM D4214; or fade or change colors in excess of 5 NBS units as measured in accordance with ASTM D2244.

1.8.3 Metal Roof System Installer Warranty

Provide roof system installer warranty for a period of not less than ten years that the roof system, as installed, is free from defects in installation workmanship, to include the roof panel installation, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight roof system assembly. Issue warranty directly to the Government. Correction of defective workmanship and replacement of damaged or affected materials is the responsibility of the metal roof system installer. All costs associated with the repair or replacement work are the responsibility of the installer.

1.8.4 Continuance of Warranty

Repair or replacement work that becomes necessary within the warranty period must be approved, as required, and accomplished in a manner so as to restore the integrity of the roof system assembly and validity of the metal roof system manufacturer warranty for the remainder of the manufacturer warranty period.

1.9 CONFORMANCE AND COMPATIBILITY

The entire metal roofing and flashing system must be in accordance with specified and indicated requirements, including wind resistance requirements. Work not specifically addressed and any deviation from specified requirements must be in general accordance with recommendations of the MBMA RSDM, NRCA RoofMan, the metal panel manufacturer's published recommendations and details, and compatible with surrounding components and construction. Submit any deviation from specified or indicated requirements to the Contracting Officer for approval prior to installation.
PART 2 PRODUCTS

2.1 Steel Sheet PANELS

Roll-form steel sheet roof panels to the specified profile, with minimum fy = 50 ksi, 24 or 22 gauge, as required by manufacturer, and depth as indicated or greater to meet span requirements of the structures. Material must be plumb and true, and within the tolerances listed:

a. Aluminum-Zinc alloy coated steel sheet conforming to ASTM A792/A792M and AISI SG03-3.

b. Individual panels to have continuous length sufficient to cover the entire length of any unbroken roof slope with no joints or seams and formed without warping, waviness, or ripples that are not a part of the panel profile and free from damage to the finish coating system.

c. Provide panels with thermal expansion and contraction consistent with the type of system specified, and the following profile:
   1. profile to be a minimum 1 1/2 inch high standing seam in Cee Lock configuration, maximum 18 inch coverage with mechanical rolled seam with concealed clips and fasteners.

2.2 FACTORY FINISH AND COLOR PERFORMANCE REQUIREMENTS

All panels and associated flashings, fascias, gutters, etc. are to receive a factory applied polyvinylidene fluoride or Kynar 500/Hylar 5000 finish consisting of a baked topcoat with a manufacturer's recommended prime coat conforming to the following:

a. Metal Preparation: All metal is to have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with an acid rinse, and thorough drying.

b. Prime Coating: A base coat of epoxy paint, specifically formulated to interact with the top-coat, is to be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. The prime coat must be oven cured prior to application of the finish coat.

c. Exterior Finish Coating: Apply the exterior finish coating over the primer by roll coating to a dry film thickness of 0.80 plus 0.05 mils. This exterior finish coat must be oven-cured.

d. Interior finish coating: Apply a wash coat on the reverse side over primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry fill thickness of 0.50 plus 0.10 mils. The wash coat must be oven cured.

e. Color: The exterior finish chosen from the manufacturer's standard color chart as described on the finish schedule.

f. Physical Properties: Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

General: ASTM D5894 and ASTM D4587.
Abrasión: ASTM D968  
Adhesión: ASTM D3359  
Chalking: ASTM D4214  
Chemical Pollution: ASTM D1308  
Color Change and Conformity: ASTM D2244  
Creepage: ASTM D1654  
Cyclic Corrosion Test: ASTM D5894  
Flame Spread: ASTM E84  
Flexibility: ASTM D522  
Formability: ASTM D522  
Gloss at 60 and 85 degrees: ASTM D523  
Humidity: ASTM D2247 and ASTM D714  
Oxidation: ASTM D610  
Pencil Hardness: ASTM D3363  
Reverse Impact: ASTM D2794  
Salt Spray: ASTM B117  
Weatherometer: ASTM G 152, ASTM G 153 and ASTM D822  

2.2.1 Specular Gloss  
Finished roof surfaces to have a specular gloss value of 30 plus or minus 5 at an angle of 60 degrees when measured in accordance with ASTM D523.

2.3 MISCELLANEOUS METAL FRAMING  

2.3.1 General  
Provide cold formed metallic-coated steel sheet conforming to ASTM A653/A653M, AISI S100 unless otherwise indicated.

2.3.2 Fasteners and Miscellaneous Metal Framing  
Provide compatible type, corrosion resistant, of sufficient size and length to penetrate the supporting element a minimum of one inch with other required properties to fasten miscellaneous metal framing members to substrates in accordance with the roof panel manufacturer's and ASCE 7 requirements.

2.3.2.1 Exposed Fasteners  
Minimize exposed fasteners. Do not penetrate roof panels with exposed fasteners. Fasteners must be heavy galvanized coated steel or stainless steel, compatible with the sheet panel or flashing material and of the type and size recommended by the manufacturer to meet the performance requirements and design loads. All exposed fasteners to be painted to match the materials being fastened. Fasteners for accessories must be the manufacturer's standard. Provide an integral metal washer, matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick for exposed fasteners.

2.3.2.2 Screws  
Provide hot dip galvanized fasteners for steel and stainless steel for aluminum.

2.3.2.3 Rivets  
Provide closed-end type rivets, corrosion resistant stainless steel (minimum 3/16 inch) are required.
2.3.2.4 Attachment Clips

Provide hot-dip galvanized, conforming to ASTM A653/A653M, or stainless steel, series 300 clips. Size, shape, thickness and capacity must meet the thickness and design load criteria specified.

2.3.3 Electrodes for Manual, Shielded Metal Arc Welding

Electrodes for manual, shielded metal arc welding must meet the requirements of AWS D1.1/D1.1M, and be covered, mild-steel electrodes conforming to AWS A5.1/A5.1M.

2.4 ACCESSORIES

Accessories must be compatible with the metal panels. Sheet metal flashing, trim, metal closure strips, caps, and similar metal accessories must be not less than the minimum thicknesses specified for roof panels. Provide exposed metal accessories to match the panels furnished. Molded foam rib, ridge and other closure strips must be closed-cell or solid-cell synthetic rubber or neoprene premolded to match configuration of the panels and not absorb or retain water.

2.4.1 Pre-manufactured Accessories

Pre-manufactured accessories must be manufacturer's standard for intended purpose, compatible with the metal roof system and approved for use by the metal panel manufacturer.

2.4.2 Metal Closure Strips

Provide factory fabricated steel closure strips of the same gauge, color, finish and profile as the specified panel.

2.5 JOINT SEALANTS

2.5.1 Sealants

Sealants are to be an approved gun type for use in hand or air pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F) with a minimum solid content of 85 percent of the total volume. Sealant must dry with a tough, durable surface skin which permits it to remain soft and pliable underneath, providing a weather tight joint. No migratory staining, in conformance with to ASTM C792, is permitted on painted or unpainted metal, stone, glass, vinyl or wood.

Prime all joints to receive sealants with a compatible one-component or two-component primer as recommended by the roof panel manufacturer.

2.5.1.1 Shop Applied Sealants

Sealant for shop-applied caulking must be an approved gun grade, non-sag one-component polysulfide or silicone conforming to ASTM C792 and ASTM C920, Type II, with a curing time which ensures the sealants plasticity at the time of field erection. Color to match panel color.
2.5.1.2 Field Applied Sealants

Sealants for field-applied caulking must be an approved gun grade, non-sag one-component polysulfide or two component polyurethane with an initial maximum Shore A durometer hardness of 25, conforming to ASTM C920, Type II. Color to match panel color.

2.5.1.3 Tape Sealants

Provide pressure sensitive, 100 percent solid tape sealant with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the panel manufacturer.

2.5.2 Sheet Metal Flashing and Trim

2.5.2.1 Fabrication, General

Custom fabricate sheet metal flashing and trim to comply with recommendations within the SMACNA 1793 that apply to design, dimensions, metal type, and other characteristics of design indicated. Shop fabricate items to the greatest extent possible. Obtain and verify field measurements for accurate fit prior to shop fabrication. Fabricate flashing and trim without excessive oil canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

2.5.2.2 Roof Drainage Sheet Metal Fabrications

Refer to Section 07 60 00 FLASHING AND SHEET METAL.

2.6 UNDERLAYMENTS

2.6.1 Self-Adhering Modified Bitumen Underlayment

Provide self-adhering modified bitumen membrane underlayment material in compliance with ASTM D1970/D1970M, suitable for use as underlayment for metal roofing, minimum 40 mils thick. Use membrane resistant to cyclical elevated temperatures for extended period of time in high heat service conditions. Provide membrane with integral non-tacking top surface of polyethylene film or other surface material to serve as separator between bituminous material and metal products to be applied above.

Similar material is to be applied at miscellaneous wall and soffit conditions indicated on the drawings.

2.6.2 Slip Sheet

Provide 5 pounds per 100 sf rosin sized unsaturated building paper for slip sheet if required by manufacturer.

2.7 GASKETS AND SEALING/INSULATING COMPOUNDS

Gaskets and sealing/insulating compounds must be nonabsorptive and suitable for insulating contact points of incompatible materials. Sealing/insulating compounds must be non-running after drying.

2.8 FINISH REPAIR MATERIAL

Repair paint for color finish enameled roofing must be compatible paint of
the same formula and color as the specified finish furnished by the manufacturer.

Only use repair and touch-up paint supplied by the roof panel manufacturer and that is compatible with the specified system.

PART 3 EXECUTION

3.1 EXAMINATION

Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the work. Ensure surfaces are suitable, dry and free of defects and projections which might affect the installation.

Examine primary and secondary framing to verify that rafters, purlins, angels, channels, and other structural support members for panels and anchorages have been installed within alignment tolerances required by metal panel manufacturer, UL, ASTM, and ASCE 7 requirements.

Examine rough-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of panels prior to installation.

Submit a written report to the Contracting Officer, endorsed by the installer, listing conditions detrimental to the performance of the work. Proceed with installation only after defects have been corrected.

3.2 INSTALLATION

Installation must meet specified requirements and be in accordance with the manufacturer's installation instructions and approved shop drawings. Do not install damaged materials. Dissimilar materials which are not compatible when contacting each other must be insulated by means of gaskets or sealing/insulating compounds. Keep all exposed surfaces and edges clean and free from sealant, metal cuttings, hazardous burrs, and other foreign material. Remove stained, discolored, or damaged materials from the site.

3.2.1 Preparation

Clean all substrate substances which may be harmful to insulation and roof panels including removing projections capable of interfering with insulation and roof panel attachment.

Install sub-purlins, eave angles, furring, and other miscellaneous panel support members and anchorage according to metal panel manufacturer's written instructions.

3.2.2 Underlayment

Install underlayment according to panel manufacturer's written recommendations and recommendation in NRCA "The NRCA Roofing and Waterproofing Manual".

3.2.2.1 Self-Adhering Sheet Underlayment

Install self-adhering sheet underlayment; wrinkle free on coverboard.
Comply with low-temperature installation restrictions of manufacturer where applicable. Install at locations indicated on project drawings, lapped in a direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.

3.2.2.2 Slip Sheet

Apply specified slip sheet at time of roof panel installation when underlayment is used that may be in direct contact with and adhere to or adversely impact the underside of roof panels, and as otherwise recommended by the roof panel manufacturer.

3.3 INSULATION INSTALLATION

Install insulation concurrently with metal roof panel installation, in thickness indicated, to cover entire roof, according to manufacturer's written instructions.

3.4 PROTECTION OF APPLIED MATERIALS

Do not permit storing, walking, wheeling, and trucking directly on applied roofing/insulation materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to applied roofing/insulation materials, and to distribute weight to conform to indicated live load limits of roof construction.

3.5 FASTENER INSTALLATION

Anchor metal panels and other components of the Work securely in place, using approved fasteners according to manufacturer's written instructions.

3.5.1 Welding

Procedures for manual, shielded metal-arc welding, the appearance and quality of welds made, and the methods used in correcting welding work must be in accordance with AWS D1.1/D1.1M.

3.6 FLASHING, TRIM, AND CLOSURE INSTALLATION

3.6.1 General Requirements

Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently water tight and weather resistant. Work is to be accomplished to form weather tight construction without waves, warps, buckles, fastening stresses or distortion, and to allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accomplish the work must conform to the manufacturers written instructions.

3.6.2 Metal Flashing

Install exposed metal flashing at building corners, rakes, eaves, junctions between metal siding and roofing, valleys and changes off slope or direction in metal roofing, building expansion joints and gutters.

Exposed metal flashing must be the same material, color, and finish as the
specified metal roofing panels. Furnish flashing in minimum 8 foot lengths. Exposed flashing must have 1 inch locked and blind soldered end joints, with expansion joints at intervals of no greater than 16 feet.

Fasten flashing at not more than 8 inches on center for roofs, except where flashing is held in place by the same screws used to secure panels. Exposed flashing and flashing subject to rain penetration must be bedded in specified joint sealant. Flashing which is contact with dissimilar metals must be isolated by means of the specified asphalt mastic material to prevent electrolytic deterioration.

Form drips to the profile indicated, with the edge folded back 1/2 inch to form a reinforced drip edge.

3.7  ROOF PANEL INSTALLATION

Provide metal roof panels full length from eave to ridge. Anchor metal panels or other components of the Work securely in place, with provisions for thermal and structural movement in accordance with NRCA 0409 for roof panels.

Steel Panels: Use painted stainless steel fasteners for exterior surfaces and galvanized fasteners for unexposed surfaces.

Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using approved fasteners according to manufacturer's written instructions. Provide all blocking and nailers as required.

Metal Protection: Where dissimilar metals contact each other or possibly corrosive substrates, protect against galvanic action by coating contact surfaces with a bituminous coating or applying rubberized asphalt underlayment to each contact surface as recommended by the metal roof panel manufacturer.

Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and required for weatherproof performance of metal roof panel system. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

3.7.1  Handling and Erection

Erect roofing panel systems in accordance with the approved erection drawings, printed instructions and safety precautions of the manufacturer.

Do not subject panels to overloading, abuse, or undue impact. Do not apply bent, chipped, or defective panels. Damaged panels must be replaced and removed from the site at the contractors expense. Erect panels true, plumb, and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with indicated rake, eave, and curb overhang. Allow for thermal movement of the roofing panels, movement of the building structure, and provide permanent freedom from noise due to wind pressure.

Do not permit storage, walking, wheeling or trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to the installed roofing materials, and to distribute weight to conform to the
indicated live load limits of the roof construction. Roof panels must be laid with ribs in the direction of the roof slope. Field cutting of metal panels by torch is not permitted. Field cut only as recommended by manufacturer's written instructions.

3.7.2 Closure Strips

Install metal closure strips at open ends of metal ridge rolls; open ends of corrugated or ribbed pattern roofs, and at intersection of wall and roof, unless open ends are concealed with formed eave flashing; rake of metal roof unless open end has a formed flashing member; and in other required areas.

3.7.3 Workmanship

Make lines, arises, and angles sharp and true. Free exposed surfaces from any visible wave, warp, buckle and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and as necessary to make the work watertight.

3.8 ACCEPTANCE PROVISIONS

3.8.1 Erection Tolerances

Erect metal roofing straight and true with plumb vertical lines correctly lapped and secured in accordance with the manufacturer's written instructions. Horizontal lines must not vary more than 1/8 inch in 40 feet.

3.8.2 Leakage Tests

Finished application of metal roofing is to be subject to inspection and test for leakage by the Contracting Officer or his designated representative, and Architect/Engineer.

Inspection and testing is to be made promptly after erection to permit correction of defects and removal/replacement of defective materials.

3.8.3 Repairs to Finish

Scratches, abrasions, and minor surface defects of finish may be repaired with the specified repair materials and as recommended by the metal panel manufacturer. Finished repaired surfaces must be uniform and free from variations of color and surface texture. Repaired metal surfaces that are not acceptable to the project requirements are to be immediately removed and replaced with new material.
3.9 CLEAN UP AND DISPOSAL

Clean exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from roofs. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces must be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating. Touch up scratches in panel finish with manufacturer supplied touch-up paint system to match panel finish. Treat exposed cut edges with manufacturer supplied coating.

Collect all scrap/waste materials and place in containers. Promptly dispose of demolished and scrap materials. Do not allow scrap/waste materials to accumulate on-site; transport immediately from the government property and legally dispose of them.

3.10 FIELD QUALITY CONTROL

3.10.1 Manufacturer's Inspection

Manufacturer's technical representative must visit the site a minimum of one time during the installation for purposes of reviewing materials installation practices and adequacy of work in place. Make inspections at substantial completion, at a minimum. Follow-up inspections of previously noted deficiencies or application errors must be performed as requested by the Contracting Officer. After each inspection, submit a report, signed by the manufacturer's technical representative to the Contracting Officer within 3 working days. Note in the report overall quality of work, deficiencies and any other concerns, and recommended corrective action.

Submit three signed copies of the manufacturer's field inspection reports to the Contracting Officer within one week of substantial completion.

3.11 INFORMATION CARD

For each roof, furnish a typewritten information card for facility records and a card laminated in plastic and framed for interior display at roof access point, or a photoengraved 0.032 inch thick aluminum card for exterior display. Format as directed in paragraph titled "Form One".

Make card 8 1/2 by 11 inches minimum. Information card must identify facility name and number; location; contract number; approximate roof area; detailed roof system description, including deck type, roof panel manufacturer and product name, type underlayment(s), date of completion; installing contractor identification and contact information; manufacturer warranty expiration, warranty reference number, and contact information. Install card at location as directed by the Contracting Officer and provide a paper copy to the Contracting Officer.

3.11.1 Form One

FORM 1 - PREFORMED STEEL PANEL ROOFING SYSTEM AND COMPONENTS

1. Contract Number:

2. Building Number & Location:

3. Specification Number:
4. Deck/Substrate Type:

5. Slopes of Deck/Roof Structure:

6. Insulation Type & Thickness:

7. Insulation Manufacturer:

8. Vapor Retarder:  ( )Yes  ( )No

9. Vapor Retarder Type:

10. Preformed Steel Standing Seam Roofing Description:
    a. Manufacturer (Name, Address, & Phone No.):
    b. Product Name:
    c. Width:
    d. Gage:
    e. Base Metal:
    f. Method of Attachment:

11. Repair of Color Coating:
    a. Coating Manufacturer (Name, Address & Phone No.):
    b. Product Name:
    c. Surface Preparation:
    d. Recoating Formula:
    e. Application Method:

12. Statement of Compliance or Exception:
    _______________________________________________________________________
    _______________________________________________________________________
    _______________________________________________________________________

13. Date Roof Completed:

14. Warranty Period:  From_______________  To_______________

15. Roofing Contractor (Name & Address):

16. Prime Contractor (Name & Address):

Contractor's Signature _________________________  Date:

Inspector's Signature _________________________  Date:Text

3.12 DATE OF INSTALLATION WALL-MOUNTED PLACARD

Furnish an exterior "Date of Installation Placard", 0.032 inch thick aluminum, 8-1/2 inches high by 11 inches wide, with mounting accessories, photoengraved to include the following information:

Facility Name and Number
Approximate Roof Area Newly Installed and Date of Completion
Manufacturer, Type of Roof Panel and Name
Underlayment and Insulation System, R value
Installing Contractor and Contact Information
Warranty Expiration Date
Warranty Reference Number and Contact Information

Install placard as directed by the Contracting Officer.

3.13 USACE WARRANTY

CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM

FACILITY DESCRIPTION___________________________________________________

BUILDING NUMBER:_______________________________________________________

CORPS OF ENGINEERS CONTRACT NUMBER:__________________________________

CONTRACTOR

CONTRACTOR:_____________________________________________________________

ADDRESS:_______________________________________________________________

POINT OF CONTACT:_______________________________________________________

TELEPHONE NUMBER:______________________________________________________

OWNER

OWNER:_______________________________________________________________

ADDRESS:_______________________________________________________________

POINT OF CONTACT:_______________________________________________________

TELEPHONE NUMBER:______________________________________________________

CONSTRUCTION AGENT

CONSTRUCTION AGENT:____________________________________________________

ADDRESS:_______________________________________________________________

POINT OF CONTACT:_______________________________________________________

TELEPHONE NUMBER:______________________________________________________

CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM
(continued)

THE NON-STRUCTURAL METAL ROOF SYSTEM INSTALLED ON THE ABOVE NAMED BUILDING
IS WARRANTED BY _____________________________ FOR A PERIOD OF TWENTY (20)
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM
(continued)
YEARS AGAINST WORKMANSHIP AND MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL
FAILURE, AND LEAKAGE. THE NON-STRUCTURAL METAL ROOFING SYSTEM COVERED UNDER
THIS WARRANTY SHALL INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING:
THE ENTIRE ROOFING SYSTEM, MANUFACTURER SUPPLIED FRAMING AND STRUCTURAL
MEMBERS, METAL ROOF PANELS, FASTENERS, CONNECTORS, ROOF SECUREMENT
COMPONENTS, AND ASSEMBLIES TESTED AND APPROVED IN ACCORDANCE WITH UL 580.
IN ADDITION, THE SYSTEM PANEL FINISHES, SLIP SHEET, INSULATION, VAPOR
RETARDER, ALL ACCESSORIES, COMPONENTS, AND TRIM AND ALL CONNECTIONS ARE
INCLUDED. THIS INCLUDES ROOF PENETRATION ITEMS SUCH AS VENTS, CURBS,
SKYLIGHTS; INTERIOR OR EXTERIOR GUTTERS AND DOWNSPOUTS; EAVES, RIDGE, HIP,
VALLEY, RAKE, GABLE, WALL, OR OTHER ROOF SYSTEM FLASHING INSTALLED AND ANY
OTHER COMPONENTS SPECIFIED WITHIN THIS CONTRACT TO PROVIDE A WEATHERTIGHT
ROOF SYSTEM; AND ITEMS SPECIFIED IN OTHER SECTIONS OF THE SPECIFICATIONS
THAT ARE PART OF THE NON-STRUCTURAL METAL ROOFING SYSTEM.

ALL MATERIAL DEFICIENCIES, WIND DAMAGE, STRUCTURAL FAILURE, AND LEAKAGE
ASSOCIATED WITH THE NON-STRUCTURAL METAL ROOF SYSTEM COVERED UNDER THIS
WARRANTY SHALL BE REPAIRED AS APPROVED BY THE CONTRACTING OFFICER. THIS
WARRANTY SHALL COVER THE ENTIRE COST OF REPAIR OR REPLACEMENT, INCLUDING ALL
MATERIAL, LABOR, AND RELATED MARKUPS. THE ABOVE REFERENCED WARRANTY
COMMENCED ON THE DATE OF FINAL ACCEPTANCE ON _______________________
AND WILL REMAIN IN EFFECT FOR STATED DURATION FROM THIS DATE.

SIGNED, DATED, AND NOTARIZED (BY COMPANY PRESIDENT)

______________________________                       _______________________
(Company President)                      (Date)
CONTRACTOR’S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOFING SYSTEM
(continued)

THE CONTRACTOR MUST SUPPLEMENT THIS WARRANTY WITH WRITTEN WARRANTIES FROM
THE MANUFACTURER AND/OR INSTALLER OF THE NON-STRUCTURAL METAL ROOFING
SYSTEM. SUBMIT ALONG WITH THE CONTRACTOR’S WARRANTY. HOWEVER, THE CONTRACTOR
IS ULTIMATELY RESPONSIBLE FOR THIS WARRANTY AS OUTLINED IN THE
SPECIFICATIONS AND AS INDICATED IN THIS WARRANTY EXAMPLE.

EXCLUSIONS FROM COVERAGE

1. NATURAL DISASTERS, ACTS OF GOD (LIGHTNING, FIRE, EXPLOSIONS, SUSTAINED
WIND FORCES IN EXCESS OF THE DESIGN CRITERIA, EARTHQUAKES, AND HAIL).

2. ACTS OF NEGLIGENCE OR ABUSE OR MISUSE BY GOVERNMENT OR OTHER PERSONNEL,
INCLUDING ACCIDENTS, VANDALISM, CIVIL DISOBEDIENCE, WAR, OR DAMAGE CAUSED BY
FALLING OBJECTS.

3. DAMAGE BY STRUCTURAL FAILURE, SETTLEMENT, MOVEMENT, DISTORTION, WARPAGE,
OR DISPLACEMENT OF THE BUILDING STRUCTURE OR ALTERATIONS MADE TO THE
BUILDING.

4. CORROSION CAUSED BY EXPOSURE TO CORROSIVE CHEMICALS, ASH OR FUMES
GENERATED OR RELEASED INSIDE OR OUTSIDE THE BUILDING FROM CHEMICAL PLANTS,
FOUNDRIES, PLATING WORKS, KILNS, FERTILIZER FACTORIES, PAPER PLANTS, AND THE
LIKE.

5. FAILURE OF ANY PART OF THE NON-STRUCTURAL METAL ROOF DUE TO ACTIONS BY
THE OWNER TO INHIBIT FREE DRAINAGE OF WATER FROM THE ROOF AND GUTTERS AND
DOWNSPOUTS OR ALLOW PONDING WATER TO COLLECT ON THE ROOF SURFACE.
CONTRACTOR’S DESIGN MUST INSURE FREE DRAINAGE FROM THE ROOF AND NOT ALLOW
PONDING WATER.

6. THIS WARRANTY APPLIES TO THE NON-STRUCTURAL METAL ROOFING SYSTEM. IT
DOES NOT INCLUDE ANY CONSEQUENTIAL DAMAGE TO THE BUILDING INTERIOR OR
CONTENTS WHICH IS COVERED BY THE WARRANTY OF CONSTRUCTION CLAUSE INCLUDED IN
THIS CONTRACT.

7. THIS WARRANTY CANNOT BE TRANSFERRED TO ANOTHER OWNER WITHOUT WRITTEN
CONSENT OF THE CONTRACTOR; AND THIS WARRANTY AND THE CONTRACT PROVISIONS
WILL TAKE PRECEDENCE OVER ANY CONFLICTS WITH STATE STATUTES.
CONTRACTOR'S TWENTY (20) YEAR NO PENAL SUM WARRANTY
FOR
NON-STRUCTURAL METAL ROOF SYSTEM
(continued)

**REPORTS OF LEAKS AND ROOF SYSTEM DEFICIENCIES MUST BE RESPONDED TO WITHIN 48 HOURS OF RECEIPT OF NOTICE, BY TELEPHONE OR IN WRITING, FROM EITHER THE OWNER OR CONTRACTING OFFICER. INITIATE EMERGENCY REPAIRS TO PREVENT FURTHER ROOF LEAKS IMMEDIATELY; SUBMIT A WRITTEN PLAN FOR APPROVAL TO REPAIR OR REPLACE THIS ROOF SYSTEM WITHIN SEVEN (7) CALENDAR DAYS. COMMENCE ACTUAL WORK FOR PERMANENT REPAIRS OR REPLACEMENT WITHIN 30 DAYS AFTER RECEIPT OF NOTICE, AND COMPLETED WITHIN A REASONABLE TIME FRAME. IF THE CONTRACTOR FAILS TO ADEQUATELY RESPOND TO THE WARRANTY PROVISIONS, AS STATED IN THE CONTRACT AND AS CONTAINED HEREIN, THE CONTRACTING OFFICER MAY HAVE THE NON-STRUCTURAL METAL ROOF SYSTEM REPAIRED OR REPLACED BY OTHERS AND CHARGE THE COST TO THE CONTRACTOR.


POST A FRAMED COPY OF THIS WARRANTY IN THE MECHANICAL ROOM OR OTHER APPROVED LOCATION DURING THE ENTIRE WARRANTY PERIOD.

-- End of Section --

SECTION 07 41 13 Page 25
PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)


AAMA 800 (2010) Voluntary Specifications and Test Methods for Sealants

AMERICAN IRON AND STEEL INSTITUTE (AISI)

AISI S100 (2012) North American Specification for the Design of Cold-Formed Steel Structural Members

AISI SG03-3 (2002; Suppl 2001-2004; R 2008) Cold-Formed Steel Design Manual Set

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASCE 7-10 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)


Process

**ASTM A653/A653M**  
(2015) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

**ASTM A792/A792M**  

**ASTM B117**  

**ASTM C920**  

**ASTM D1056**  

**ASTM D1308**  

**ASTM D1654**  
(2008) Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

**ASTM D1667**  
(2005; R 2011) Flexible Cellular Materials – Poly (Vinyl Chloride) Foam (Closed-Cell)

**ASTM D2244**  
(2015a) Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

**ASTM D2247**  

**ASTM D2794**  

**ASTM D3359**  
(2009; E 2010; R 2010) Measuring Adhesion by Tape Test

**ASTM D3363**  
(2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test

**ASTM D4214**  

**ASTM D4587**  
(2011) Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings

**ASTM D522/D522M**  
(2014) Mandrel Bend Test of Attached Organic Coatings


ASTM D610  (2008; R 2012) Evaluating Degree of Rusting on Painted Steel Surfaces

ASTM D714  (2002; R 2009) Evaluating Degree of Blistering of Paints

ASTM D822  (2001; R 2006) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings


ASTM E1592  (2005; R 2012) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

ASTM E283  (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

ASTM E331  (2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference


METAL BUILDING MANUFACTURERS ASSOCIATION (MBMA)


NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

1.2 DEFINITIONS

Metal Wall Panel: Metal wall panels, attachment system components and accessories necessary for a complete weather-tight wall system.

1.3 DESCRIPTION OF WALL AND SOFFIT PANEL SYSTEM

Factory color finished, galvalume metal wall panel and soffit system with concealed fastening attachment. Panel profile must be flush face and must match existing wall panels in color and profile. Soffit panels are to match new metal roof color. Profile to be same as wall panels. Note: Color may not be of manufacturers standard selection.

1.3.1 Metal Wall and Soffit Panel General Performance

Comply with performance requirements, conforming to AISI S100, without failure due to defective manufacture, fabrication, installation, or other defects in construction. Wall panels, soffit panels, and accessory components must conform to the following standards:

- ASTM A1008/A1008M
- ASTM A123/A123M
- ASTM A36/A36M
- ASTM A463/A463M for aluminum coated steel sheet

1.3.2 Structural Performance

Maximum calculated fiber stress must not exceed the allowable value in the AISI or AA manuals; a one third overstress for wind is allowed. Midspan deflection under maximum design loads is limited to L/180. Contract drawings show the design wind loads and the extent and general assembly details of the metal siding. Contractor must provide design for members and connections not shown on the drawings. Siding panels and accessories must be the products of the same manufacturer.

Provide metal wall and soffit panel assemblies complying with the load and stress requirements in accordance with ASTM E1592. Wind Load force due to wind action governs the design for panels.

Wall and soffit systems and attachments are to resist the wind loads as determined by ASTM E72 and ASCE 7-10 in the geographic area where the construction will take place, in pounds per square foot. Submit five copies of wind load tests to the Contracting Officer.

1.3.3 Air Infiltration

Air leakage must conform to the limits through the wall assembly area when tested according to ASTM E283.

1.3.4 Water Penetration Under Static Pressure

No water penetration when tested according to ASTM E331.
1.3.5 Water Penetration Under Dynamic Pressure

No evidence of water leakage when tested according to AAMA 501.1.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals

Submit Documentation for the following items:

- Qualification of Manufacturer; G
- Qualification of Installation Contractor; G
- Sample Warranty; G

SD-02 Shop Drawings

- Installation Drawings; G

SD-03 Product Data

Submit Manufacturer's catalog data for the following items:

- Wall and Soffit Panels; G
- Factory Color Finish
- Closure Materials
- Pressure Sensitive Tape
- Sealants and Caulking
- Accessories

SD-04 Samples

Submit as required each of the following samples:

- Wall Panels, 12 inches long by actual panel width; G
- Soffit Panels, 12 inches long by actual panel width; G
- Fasteners; G
- Metal Closure Strips, 10 inches long of each type; G
- Color chart and chips indicating match to existing wall panels, and soffit panel match to new roof panels; G
- Submit manufacturer's color charts and chips, approximately 4 by 4 inches, showing full range of colors, textures and patterns available for wall and soffit panels with factory applied finishes. Note: Requirement to match existing wall panel color and new roof color may require custom color.

SD-05 Design Data

- Wind load design analysis; G

As applicable, submit the following wind load design analysis
data, to include, but not limited to:

wind speed
exposure category, co-efficient, importance factor
type of facility
negative pressures for each zone
methods and requirements of attachment

SD-06 Test Reports

Submit test reports for the following in accordance with the referenced articles in this section.

Leakage Tests; G
Wind Load Tests; G
Coating Tests; G
Chalking Tests; G

SD-08 Manufacturer's Instructions

Include detailed application instructions and standard manufacturer drawings altered as required by these specifications.

Installation of Wall and Soffit panels; G

SD-09 Manufacturer's Field Reports

Submit 3 bound copies of the Manufacturer's Field Reports; G

SD-11 Closeout Submittals

Warranty; G
Maintenance Instructions; G

20 year "No Dollar Limit" warranty for labor and material

1.5 QUALITY ASSURANCE

1.5.1 Pre-Installation Conference

Upon notification of submittal receipt and approval by the Contracting Officer; and prior to the commencement of the work, the Contractor must attend a pre-installation conference to review the following:

a. Drawings and Specifications.
b. Qualification of Installer.
c. Sustainable acquisition
d. Approved Warranty
e. Sample wall and soffit panels, 12 inches long by actual panel width
f. Sample metal closure strips, 10 inches long of each type
g. Color charts and chips
h. Coatings and base metal tests, chalking tests
i. Construction schedule, availability of materials, Installer's personnel, equipment and facilities required to progress with the work without delay.

j. Methods and procedures related to installation of panels, including manufacturer's written instructions. Explicitly identify in writing, differences between manufacturer's instructions and the specified requirements.

k. Support conditions for compliance with requirements, including alignment between and attachment to structural members.

l. Flashing, special details, wall penetrations, openings, and condition of other construction that will affect metal panels.

m. Governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.

n. Temporary protection requirements for metal panel assembly during and after installation.

o. Wall and soffit panel observation and repair procedures after metal panel installation. Provide detailed written instructions including copies of Material Safety Data Sheets for maintenance and repair materials, and manufacturer's maintenance instructions.

1.5.1.1 Installation Drawings

Installation shop drawings for wall and soffit panels, flashing, accessories, and anchorage systems must indicate completely dimensioned structural frame and erection layouts, openings in the wall, special framing details, and construction details at corners, building intersections and flashing, location and type of mastic and metal filler strips.

1.5.1.2 Wind Load Design Analysis

Wind design analysis must include wall and soffit plan delineating dimensions and attachment patterns for each zone. Wind design analysis must be prepared and sealed by Licensed Project Engineer in the geographic area where the construction will take place.

1.5.2 Manufacturer's Technical Representative

The representative must have authorization from manufacturer to approve field changes and be thoroughly familiar with the products and installations in the geographical area where construction will take place.

1.5.3 Qualification of Manufacturer

Certify that metal wall panel system manufacturer has a minimum of five (5) years experience in manufacturing metal wall and soffit system and accessory products.

Manufacturer must also provide engineering services by an authorized engineer; currently licensed in the geographical area where construction will take place, having a minimum of four (4) years experience as an engineer knowledgeable in wind load design analysis, protocols and
procedures per MBMA MBSM, "Metal Building Systems Manual"; ASCE 7-10, and ASTM E1592.

Provide certified engineering calculations, using the products submitted, for Wind load requirements in accordance with ASCE 7.

1.5.4 Certified Qualification of Installation Contractor

The installation contractor must be approved and certified by the metal wall panel manufacturer prior to beginning the installation of the metal wall panel system. Subcontracting by Certified Contractor for the metal wall panel work is not permitted.

1.5.5 Single Source

Obtain each type of metal wall and soffit panels, clips, closure materials and other accessories from the standard products of the single source from a single manufacturer to operate as a complete system for the intended use.

1.5.6 Manufacturer's Maintenance Instructions

Provide manufacturer's detailed written instructions including copies of Material Safety Data Sheets for maintenance and repair materials.

1.6 DELIVERY, HANDLING, AND STORAGE

Deliver and protect package components, sheets, metal wall and soffit panels, and other manufactured items to prevent damage or deformation during transportation and handling.

Unload, store, and erect metal wall and soffit panels in a manner to prevent bending, warping, twisting, and surface damage.

Stack and store metal wall panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering to ensure dryness, with positive slope for drainage of water. Do not store metal wall panels in contact with other materials that might cause staining, denting, or other surface damage.

Retain strippable protective covering on metal wall and soffit panel until actual installation.

1.7 PROJECT CONDITIONS

1.7.1 Field Measurements

Verify locations of wall framing, subgirts and substrate, and opening dimensions by field measurements before metal wall or soffit panel fabrication and indicate measurements on Shop Drawings.

1.7.2 Weather Limitations

Proceed with installation preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into wall system or building.
1.8 WARRANTY

Warranty must conform to the Sample Warranty as reviewed and approved by the Contracting Officer.

1.8.1 20 Year "No Dollar Limit" Warranty for Labor and Material

Furnish manufacturer's no-dollar-limit warranty for the metal wall and soffit panel system. The warranty period is to be no less than twenty (20) years from the date of Government acceptance of the work. The warranty is to be issued directly to the Government. The warranty is to provide that if within the warranty period the metal wall and soffit panel system shows evidence of corrosion, perforation, rupture or excess weathering due to deterioration of the wall panel system resulting from defective materials and correction of the defective workmanship is to be the responsibility of the metal wall panel system manufacturer. Repairs that become necessary because of defective materials and workmanship while metal wall and soffit panel system is under warranty are to be performed within 24 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 24 hours of notification will constitute grounds for having emergency repairs performed by others and not void the warranty.

PART 2 PRODUCTS

2.1 FABRICATION

Unless approved otherwise, fabricate and finish metal wall and soffit panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated and specified performance requirements. Comply with existing profiles and with dimensional and structural requirements.

Provide panel profile, including major ribs for full length of panel. Fabricate metal panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weather-tight and minimize noise from movements within panel assembly.

2.1.1 Sheet Metal Accessories

Fabricate flashing and trim to comply with recommendations in SMACNA 1793 that apply to the design, dimensions, metal, and other characteristics of item indicated:

a. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

b. End Seams: fabricate nonmoving end seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

c. Sealed Joints: form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA 1793.

d. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
e. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA 1793 or by metal wall panel manufacturer for application, but not less than thickness of metal being secured.

2.2 PANEL MATERIALS

2.2.1 Steel Sheet

Roll-form steel wall panels to the specified profile, with fy= 50 ksi, 24 or 22 to match existing gauge and depth, and as required by the systems engineer, as indicated. Material must be plumb and true, and within the tolerances listed:

a. Aluminum-Zinc Alloy-coated Steel Sheet conforming to ASTM A792/A792M and AISI SG03-3.

b. Individual panels must be continuous length to cover the entire length of any unbroken wall or soffit area with no joints or seams and formed without warping, waviness, or ripples that are not part of the panel profile and free of damage to the finish coating system.

cd. Provide panels with thermal expansion and contraction consistent with the type of system specified.

1. Profile to match existing nominal 1 1/2" x 12" panel.

2. Smooth, flat Surface Texture.

2.2.2 Factory Color Finish - Color required must match existing and may not be of standard selection.

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes. Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

All panels are to receive a factory-applied polyvinylidene fluoride Kynar 500/Hylar 5000 finish consisting of a baked-on top-coat with a manufacturer's recommended prime coat conforming to the following:

2.2.2.1 Metal Preparation

Carefully prepare all metal surface for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion coating, cold water rinsing, sealing with acid rinse, and thorough drying.

2.2.2.2 Prime Coating

Apply a base coat of epoxy paint, specifically formulated to interact with the top-coat, to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. Prime coat must be oven cured prior to application of finish coat.

2.2.2.3 Exterior Finish Coating

Roll coat the finish coating over the primer by roll coating to dry film
thickness of 0.80 plus 5 mils for a total dry film thickness of 1.00 plus 0.10 mils. Oven-cure finish coat.

2.2.2.4 Interior Finish Coating

Apply a wash-coat on the reverse side over the primer by roll coating to a dry film thickness of 0.30 plus 0.05 mils for a total dry film thickness of 0.50 plus 0.10 mils. Oven-cured the wash coat.

2.2.2.5 Color

Provide exterior finish color as required to match existing. Manufacturers standard colors may not match and will be considered unacceptable.

2.2.2.6 Physical Properties

Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

<table>
<thead>
<tr>
<th>General:</th>
<th>ASTM D5894 and ASTM D4587</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion:</td>
<td>ASTM D968</td>
</tr>
<tr>
<td>Adhesion:</td>
<td>ASTM D3359</td>
</tr>
<tr>
<td>Chalking:</td>
<td>ASTM D4214</td>
</tr>
<tr>
<td>Chemical Pollution:</td>
<td>ASTM D1308</td>
</tr>
<tr>
<td>Color Change and Conformity:</td>
<td>ASTM D2244</td>
</tr>
<tr>
<td>Creepage:</td>
<td>ASTM D1654</td>
</tr>
<tr>
<td>Cyclic Corrosion Test:</td>
<td>ASTM D5894</td>
</tr>
<tr>
<td>Flame Spread:</td>
<td>ASTM E84</td>
</tr>
<tr>
<td>Flexibility:</td>
<td>ASTM D522/D522M</td>
</tr>
<tr>
<td>Formability:</td>
<td>ASTM D522/D522M</td>
</tr>
<tr>
<td>Gloss at 60 and 85 degrees:</td>
<td>ASTM D523</td>
</tr>
<tr>
<td>Humidity:</td>
<td>ASTM D2247 and ASTM D714</td>
</tr>
<tr>
<td>Oxidation:</td>
<td>ASTM D610</td>
</tr>
<tr>
<td>Pencil Hardness:</td>
<td>ASTM D3363</td>
</tr>
<tr>
<td>Reverse Impact:</td>
<td>ASTM D2794</td>
</tr>
<tr>
<td>Salt Spray:</td>
<td>ASTM B117</td>
</tr>
</tbody>
</table>
2.3 MISCELLANEOUS METAL FRAMING

Cold-formed metallic-coated steel sheet conforming to ASTM A653/A653M.

2.3.1 Fasteners for Miscellaneous Metal Framing

Type, material, corrosion resistance, size and sufficient length to penetrate the supporting member a minimum of 1 inch with other properties required to fasten miscellaneous metal framing members to supporting members and substrates in accordance with the wall panel manufacturer's and ASCE 7-10 requirements.

2.4 FASTENERS

2.4.1 General

2.4.1.1 Exposed Fasteners

Provide corrosion resistant fasteners for wall panels, made of coated steel, aluminum, or 300 - series corrosion resisting stainless steel, or nylon capped steel compatible with the sheet panel or flashing and of a type and size recommended by the manufacturer to meet the performance requirements and design loads.

Fasteners for accessories must be the manufacturer's standard. Provide an integral metal washer matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick.

2.4.1.2 Hidden Fasteners

Provide corrosion resistant fasteners recommended by the manufacturer to meet the performance requirements and design loads.

2.4.1.3 Screws

Screws to be corrosion resistant coated steel, aluminum and/or 300 - series stainless steel being the type and size recommended by the manufacturer to meet the performance requirements.

2.4.1.4 Rivets

Rivets to be closed-end type, corrosion resistant coated steel, aluminum or stainless steel where watertight connections are required.

2.4.1.5 Attachment Clips

Fabricate concealed clips from steel hot-dipped galvanized in accordance with ASTM A653/A653M, Z275 G 90 or Series 300 stainless steel. Size, shape, thickness and capacity as required meeting the insulation thickness, design load criteria specified, and configuration indicated on the drawings.

Fabricate exposed clips from same material as wall or soffit panel material.
2.5 ACCESSORIES

2.5.1 General

All accessories must be compatible with the metal wall panels. Sheet metal flashing, trim, metal closure strips, caps and similar metal accessories must not be less than the minimum thickness specified for the wall panels. Exposed metal accessories/finishes to match the panels furnished, except as otherwise indicated. Molded foam rib, ridge and other closure strips must be non-absorbent closed-cell or solid-cell synthetic rubber or pre-molded neoprene to match configuration of the panels.

2.5.2 Rubber Closure Strips

Provide closed-cell, expanded cellular rubber conforming to ASTM D1056 and ASTM D1667; extruded or molded to the configuration of the specified wall panel and in lengths supplied by the wall panel manufacturer.

2.5.3 Metal Closure Strips

Provide factory fabricated steel closure strips to be the same gauge, color, finish and profile of the specified wall panel.

2.5.4 Joint Sealants

2.5.4.1 Sealants and Caulking

Provide approved gun type sealants for use in hand- or air-pressure caulking guns at temperatures above 4 degrees C (or frost-free application at temperatures above 10 degrees F with minimum solid content of 85 percent of the total volume. Sealants must dry with a tough, durable surface skin which permit remaining soft and pliable underneath, providing a weather-tight joint. No migratory staining is permitted on painted or unpainted metal, stone, glass, vinyl, or wood.

Prime all joints receiving sealants with a compatible one-component or two-component primer as recommended by the wall panel manufacturer.

2.5.4.2 Shop-Applied

Sealant for shop-applied caulking must be non-curing butyl compliant with AAMA 800 to ensure the sealant's plasticity at the time of field erection.

2.5.4.3 Field-Applied

Sealant for field-applied caulking must be an approved gun grade, non-sag one component polysulfide or two-component polyurethane with an initial maximum Shore A durometer hardness of 25, and conforming to ASTM C920, Type II. Color to match panel colors.

2.5.4.4 Pressure Sensitive Tape

Provide pressure sensitive tape sealant, 100 percent solid with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the wall panel manufacturer.
2.6 SHEET METAL FLASHING AND TRIM

2.6.1 Fabrication

Shop fabricate sheet metal flashing and trim where practicable to comply with recommendations in SMACNA 1793 that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

2.7 REPAIR OF FINISH PROTECTION

Repair paint for color finish PVDF wall panel must be compatible paint of the same formula and color as the specified finish furnished by the wall panel manufacturer. Provide 2 pints of repair paint matching each color of specified panels.

PART 3 EXECUTION

3.1 EXAMINATION

Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of the Work.

Examine primary and secondary wall framing to verify that subgirts and furring, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal wall panel manufacturer, UL, ASTM, ASCE 7 and as required for the geographical area where construction will take place.

Examine roughing-in for components and systems penetrating metal wall panels to verify actual locations of penetrations relative to seam locations of metal wall panels before metal panel installation.

Submit to the Contracting Officer a written report, endorsed by Installer, listing conditions detrimental to performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment. Miscellaneous framing installation, including sub-purlins, girts, angles, furring, and other miscellaneous wall panel support members and anchorage must be according to metal wall panel manufacturer's written instructions.

3.3 WALL AND SOFFIT PANEL INSTALLATION

Provide full length metal wall panels, from sill to eave as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor metal wall and soffit panels and other components of the Work securely in place, with provisions for thermal and structural movement in accordance with MBMA MBSM.

Erect wall and soffit panel system in accordance with the approved
erection drawings, the printed instructions and safety precautions of the manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Bent, chipped, or defective sheets shall not be applied.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated eave, and sill.

Work is to allow for thermal movement of the wall panel, movement of the building structure, and to provide permanent freedom from noise due to wind pressure.

Field cutting metal wall panels by torch is not permitted.

3.3.1 Steel Wall and Soffit Panels

Use stainless-steel fasteners for exterior surfaces and galvanized steel fasteners for interior surfaces.

3.3.2 Anchor Clips

Anchor metal wall and soffit panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

3.3.3 Metal Protection

Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal panel manufacturer.

3.3.4 Joint Sealers

Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.

3.4 FASTENER INSTALLATION

Anchor metal panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

3.5 FLASHING, TRIM AND CLOSURE INSTALLATION

3.5.1 General Requirements

Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams to form permanently watertight and weather resistant.

Install sheet metal work to form weather-tight construction without waves,
warps, buckles, fastening stresses or distortion, and allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades is to be performed by sheet metal mechanics.

3.5.2 Metal Flashing

Install exposed metal flashing at building corners, sills and eaves, junctions between metal siding and walling as indicated on the drawings. Exposed metal flashing must be the same material, color, and finish as the specified metal panel.

Fasten flashing at a minimum of 8 inches on center, except where flashing is held in place by the same screws that secure covering sheets.

Flashing is to be furnished in at least 8 foot lengths. Exposed flashing is to have 1 inch locked and blind-soldered end joints, and expansion joints at intervals of not more than 16 feet.

Exposed flashing and flashing subject to rain penetration to be bedded in the specified joint sealant.

Isolate flashing which is in contact with dissimilar metals by means of the specified asphalt mastic material to prevent electrolytic deterioration.

Form drips to the profile indicated, with the edge folded back 1/2 inch to form a reinforced drip edge.

3.5.3 Closures

Install metal closure strips at open ends of corrugated or ribbed pattern walls, and at intersection of wall and wall unless open ends are concealed with formed flashing; and in other required areas.

Install mastic closure strips at intersection of the wall with metal walling; top and bottom of metal siding; heads of wall openings; and in other required locations.

3.6 WORKMANSHIP

Make lines, arises, and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections which might affect the application. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight.
3.7 ACCEPTANCE PROVISIONS

3.7.1 Erection Tolerances

Erect metal wall panels straight and true with plumb vertical lines correctly lapped and secured in accordance with the manufacturer's written instructions.

3.7.2 Leakage Tests

Finished application of metal wall panels are to be subject to inspection and test for leakage by request of the Contracting Officer, Architect/Engineer. Conduct inspection and tests at no cost to the Government.

Inspection and testing is to be made promptly after erection to permit correction of defects and the removal and replacement of defective materials.

3.7.3 Repairs to Finish

Scratches, abrasions, and minor surface defects of finish may be repaired with the specified repair materials. Finished repaired surfaces must be uniform and free from variations of color and surface texture.

Repaired metal surfaces that are not acceptable to the project requirements and/or Contracting Officer are to be immediately removed and replaced with new material.

3.7.4 Paint-Finish Metal Siding

Paint-finish metal siding will be tested for color stability by the Contracting Officer during the manufacturer's specified guarantee period.

Panels that indicate color changes, fading, or surface degradation, determined by visual examination, must be removed and replaced with new panels at no expense to the Government.

New panels will be subject to the specified tests for an additional year from the date of their installation.

3.8 FIELD QUALITY CONTROL

3.8.1 Construction Monitoring

Make visual inspections as necessary to ensure compliance with specified requirements. Additionally, verify the following:

a. Materials comply with the specified requirements.

b. All materials are properly stored, handled and protected from damage. Damaged materials are removed from the site.

c. Framing and substrates are in acceptable condition, in compliance with specification, prior to application of panels.

d. Panels are installed without buckles, ripples, or waves and in uniform alignment and modulus.
e. Side laps are formed, sealed, fastened or seam locked as required.

f. The proper number, type, and spacing of attachment clips and fasteners are installed.

g. Installer adheres to specified and detailed application parameters.

h. Associated flashing and sheet metal are installed in a timely manner in accord with the specified requirements.

Provide five bound copies of Manufacturer's Field Reports to the Contracting Officer two weeks prior to project close-out.

3.9 CLEAN-UP AND DISPOSAL

Clean all exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from work area. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces must be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

Collect and place scrap/waste materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site; transport demolished materials from government property and legally dispose of them.

-- End of Section --
SECTION 07 54 19
POLYVINYL-CHLORIDE ROOFING
02/13

PART 1   GENERAL

1.1   APPLICABILITY

This specification is included as a reference guide to the miscellaneous repair of the existing PVC roofing due to mechanical system modifications. All efforts should be made to match the existing system as closely as possible.

1.2   REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)


AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASCE 7-10 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)


AMPHALT ROOFING MANUFACTURER'S ASSOCIATION (ARMA)

ARMA PMBRG98 (1998) Quality Control Guideline for the Application of Polymer Modified Bitumen Roofing

ASTM INTERNATIONAL (ASTM)


ASTM E108 (2011) Fire Tests of Roof Coverings
1.3 SUMMARY

Existing, mechanically fastened polyvinyl-chloride (PVC) roof membrane system applied over recovery board, existing built uproof, insulation and metal decking. Verify existing system prior to modification.

1.4 ASSEMBLY REQUIREMENTS

Roofing membrane sheet widths shall be consistent with membrane attachment methods and wind uplift requirements, and shall be as large as practical. In order to minimize joints and 3-way overlaps, prefabricated sheets are not accepted. Provide membrane which is free of defects and foreign material. Coordinate flashing work to permit continuous roof-surfacing operations. Insulation shall be applied and weatherproofed on the same day.

1.4.1 Fire Resistance

Complete roof system assembly:

a. Class A rated in accordance with ASTM E108, FM 4470, or UL 790; and

b. Be listed as Class I roof deck construction in FM APP GUIDE.

FM or UL approved components of the roof covering assembly shall bear the appropriate FM or UL label.

1.4.2 Wind Uplift Resistance

The complete roof system assembly shall be rated and installed to resist wind loads calculated in accordance with ASCE 7-10 and validated by uplift resistance testing in accordance with Factory Mutual (FM) test procedures. Do not install non-rated systems, except as approved by the Contracting Officer. Submit Engineering calculations, signed, sealed, and dated by a Registered Engineer validating the wind resistance per ASCE 7-10,
and ANSI/SPRI ES-1 of non-rated roof system. Base wind uplift measurements on a design wind speed of 120 mph in accordance with ASCE 7-10 and other applicable building code requirements.

1.4.3 Solar Reflectance Index (SRI)

SRI shall match existing system.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Detail Drawings; G
Roof plan; G

SD-03 Product Data

PVC Roofing Membrane; G
Bonding Adhesive
Flashing
Membrane Fasteners and Plates
Roof Insulation
Pre-manufactured accessories; G

SD-05 Design Data

Wind Uplift Resistance; G

SD-07 Certificates

Qualification of manufacturer
Qualifications of Applicator
Qualification of Engineer of Record
Fire Resistance classification
Minimum Polymer Thickness
Sample warranty; G

SD-08 Manufacturer's Instructions

Application Method; G
Membrane Flashing; G
Auxiliary Fasteners; G
Pre-manufactured accessories

SD-11 Closeout Submittals

Warranty; G

1.6 QUALITY ASSURANCE

1.6.1 Qualification of Manufacturer

Polyvinyl-Chloride sheet roofing system manufacturer must have a minimum of 10 years experience in manufacturing PVC roofing products.
Manufacturer must prove compatibility of the proposed system with existing installation.

1.6.2 Qualifications of Applicator

Roofing system applicator must be approved, authorized, or licensed in writing by the PVC sheet roofing system manufacturer and have a minimum of five years experience as an approved, authorized, or licensed applicator with that manufacturer and be approved at a level capable of providing the specified warranty. Supply the names, locations and client contact information of five projects, within the previous three years, of similar size and scope that the applicator has constructed using the manufacturer's roofing products submitted for this project.

1.6.3 Qualification of Engineer of Record

Engineer of Record must be currently licensed within the jurisdiction of the project.

Wind uplift requirements in accordance with Local and State codes ASCE 7, in accordance with ICC IBC.

1.6.4 Conformance and Compatibility

The entire roofing and flashing system shall be in accordance with specified and indicated requirements, including fire and wind resistance.

1.6.5 Prereroofing Conference

After approval of submittals and before performing roofing and insulation system installation work, hold a preroofing conference to review the following:

a. Drawings, including roof plan, specifications and submittals related to the roof work.

b. Roof system components installation;

c. Procedure for the roof manufacturer's technical representative's onsite inspection and acceptance of the roofing substrate, and roofing substrate, the name of the manufacturer's technical representatives, the frequency of the onsite visits, distribution of copies of the inspection reports from the manufacturer's technical representative to roof manufacturer;

d. Contractor's plan for coordination of the work of the various trades involved in providing the roofing system and other components secured to the roofing; and

e. Quality control (ARMA PMBRG98) plan for the roof system installation;

f. Safety requirements.

Coordinate preroofing conference scheduling with the Contracting Officer. The conference shall be attended by the Contractor, the Contracting Officer's designated personnel, personnel directly responsible for the installation of roofing and insulation, flashing and sheet metal work, mechanical and electrical work, other trades interfacing with the roof.
work, designated safety personnel trained to enforce and copy with ASSE/SAFE A10.24, Fire Marshall, and a representative of the roofing materials manufacturer. Before beginning roofing work, provide a copy of meeting notes and action items to all attending parties. Note action items requiring resolution prior to start of roof work.

1.7 DETAIL DRAWINGS

Submit roof plan depicting attachments of roof system components.

1.8 DELIVERY, STORAGE, AND HANDLING

1.8.1 Delivery

Deliver materials in the manufacturer's original, unopened containers and rolls with labels intact and legible. Mark and remove wet or damaged materials from the site. Where materials are covered by a referenced specification number, the container shall bear the specification number, type, class, and shelf life expiration date where applicable. Deliver materials in sufficient quantity to allow work to proceed without interruption.

1.8.2 Storage

Protect materials against moisture absorption and contamination or other damage. Avoid crushing or crinkling of roll materials. Store roll materials on end on clean raised platforms or pallets one level high in dry locations with adequate ventilation, such as an enclosed building or closed trailer. Do not store roll materials in buildings under construction until concrete, mortar, and plaster work is finished and dry. Maintain roll materials at temperatures above 50 degrees F for 24 hours immediately before application. Do not store materials outdoors unless approved by the Contracting Officer. Completely cover felts stored outdoors, on and off roof, with waterproof canvas protective covering. Do not use polyethylene sheet as a covering. Tie covering securely to pallets to make completely weatherproof. Provide sufficient ventilation to prevent condensation. Do not store more materials on roof than can be installed the same day and remove unused materials at end of each days work. Distribute materials temporarily stored on roof to stay within live load limits of the roof construction.

a. Maintain a minimum distance of 35 foot for all stored flammable materials, including materials covered with shrink wraps, craft paper and/or tarps from all torch/welding applications.

b. Immediately remove wet, contaminated or otherwise damaged or unsuitable materials from the site. Damaged materials may be marked by the Contracting Officer.

1.8.3 Handling

Prevent damage to edges and ends of roll materials. Do not install damaged materials in the work. Select and operate material handling equipment to prevent damage to materials or applied roofing.

1.9 ENVIRONMENTAL REQUIREMENTS

Do not install roofing system when air temperature is below 40 degrees F, during any form of precipitation, including fog, or when there is ice,
frost, moisture, or any other visible dampness on the roof deck. Follow manufacturer's printed instructions for Cold Weather Installation.

1.10 SEQUENCING

Coordinate the work with other trades to ensure that components which are to be secured to or stripped into the roofing system are available and that permanent flashing and counterflashing in accordance with NRCA 3740, are installed as the work progresses. Ensure temporary protection measures are in place to preclude moisture intrusion or damage to installed materials. Application of roofing shall immediately follow application of insulation as a continuous operation. Coordinate roofing operations with insulation work so that all roof insulation applied each day is covered with roof membrane installation the same day.

1.11 WARRANTY

Provide roof system material and workmanship warranties. Provide revision or amendment to standard membrane manufacturer warranty as required to comply with the specified requirements. Minimum manufacturer warranty shall have no dollar limit, cover full system water-tightness, and shall have a minimum duration of 20 years. Submit sample certificate.

1.11.1 Roof Membrane Manufacturer Warranty

Furnish the roof membrane manufacturer's 20-year, no dollar limit roof system materials and installation workmanship warranty, including flashing, insulation, and accessories necessary for a watertight roof system construction. Provide warranty directly to the Government and commence warranty effective date at time of Government's acceptance of the roof work. The warranty must state that:

a. If within the warranty period the roof system, as installed for its intended use in the normal climatic and environmental conditions of the facility, becomes non-watertight, shows evidence of moisture intrusion within the assembly, splits, tears, cracks, delaminates, separates at the seams, or shows evidence of excessive weathering due to defective materials or installation workmanship, the repair or replacement of the defective and damaged materials of the roof system assembly and correction of defective workmanship are the responsibility of the roof membrane manufacturer. All costs associated with the repair or replacement work are the responsibility of the roof membrane manufacturer.

b. When the manufacturer or his approved applicator fail to perform the repairs within 72 hours of notification, emergency temporary repairs performed by others does not void the warranty.

1.11.2 Roofing System Installer Warranty

The roof system installer shall warrant for a minimum period of two years that the roof system, as installed, is free from defects in installation workmanship, to include the roof membrane, flashing, insulation, accessories, attachments, and sheet metal installation integral to a complete watertight roof system assembly. Write the warranty directly to the Government. The roof system installer is responsible for correction of defective workmanship and replacement of damaged or affected materials. The roof system installer is responsible for all costs associated with the repair or replacement work.
1.11.3 Continuance of Warranty

Approve repair or replacement work that becomes necessary within the warranty period and accomplished in a manner so as to restore the integrity of the roof system assembly and validity of the roof membrane manufacturer warranty for the remainder of the manufacturer warranty period.

1.11.4 Existing Warranty

Provide documentation, from the present warranty provider, that no existing warranties have been affected by work provided under this contract.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 PVC Roof Membrane

Provide a minimum polymer thickness 0.072 inch reinforced PVC as specified herein. Provide PVC system capable of obtaining 20 year warranties and as listed in the applicable wind uplift and fire rating classification listings.

Submit Data as required by this section. Data shall include written acceptance by the roof membrane manufacturer of the insulation and other products and accessories to be provided by and warranted under the full system guarantee of the roof membrane manufacturer.

a. Coordinate with other specification sections related to the roof work. Furnish a combination of specified materials that comprise a roof system acceptable to the roof membrane manufacturer and meeting specified requirements. Provide materials free of defects and suitable for the service and climatic conditions of the installation. All warranted roof system components shall be sourced from the PVC roof membrane manufacturer, including but not limited to all insulation, coverboards, accessories, adhesives and edge metal.

b. For each roof, furnish a typewritten information card for facility records and a card laminated in plastic and framed for interior display at roof access point, or a photoengraved 0.032 inch thick aluminum card for exterior display. Card shall be 8 1/2 by 11 inches minimum. Information card shall identify facility name and number; location; contract number; approximate roof area; detailed roof system description, including deck type, membrane, method of application, manufacturer, insulation and cover board system and thickness; presence of tapered insulation for primary drainage, presence of vapor retarder; date of completion; installing Contractor identification and contact information; membrane manufacturer warranty expiration, warranty reference number, and contact information. Install card at roof top or access location as directed by the Contracting Officer and provide a paper copy to the Contracting Officer.

2.1.2 Bonding Adhesive

Provide PVC membrane manufacturer's low volatile organic compound (VOC) membrane adhesive, as supplied by roof membrane manufacturer, and
recommended by the manufacturer's printed data for bonding of PVC membrane materials to acceptable insulation, wood, metal, concrete or other acceptable substrate materials. Bonding adhesive shall not be used to bond membrane materials to each other.

2.1.3 Water Cutoff Mastic/Water Block

As supplied by the roof membrane manufacturer and recommended by the manufacturer's printed data.

2.1.4 Membrane Flashing

Membrane flashing, including self-adhering membrane flashing, perimeter flashing, flashing around roof penetrations and prefabricated pipe seals, shall be minimum polymer thickness 0.072 inch reinforced PVC for 20-year warranties, and shall be utilized as recommended and supplied by the roof membrane manufacturer or minimum 0.072 inch thick reinforced PVC roof membrane and flashing's for 20 year warranties. Submit certification from PVC membrane manufacturer that the proposed PVC membrane roofing product meets the minimum polymer thickness specified.

2.1.5 Membrane Fasteners and Plates

Coated, corrosion-resistant fasteners as recommended and supplied by the PVC roof membrane manufacturer and meeting the requirements of FM 4470 and FM RoofNav (www.roofnav.com) or FM APP GUIDE for Class I roof deck construction and the wind uplift resistance specified. Fasteners and Plates to be supplied and warranted for the substrate type(s) by PVC membrane manufacturer and recommended by PVC membrane manufacturer's printed data.

2.1.5.1 Stress Plates, Bar or Rail for Fasteners

Corrosion-resistant stress plates as recommended by the roof membrane manufacturer's printed instructions and meeting the requirements of FM 4470 must be utilized and must be supplied by PVC roof membrane manufacturer. Stress plates shall be formed to prevent dishing or cupping. Manufacturer-supplied anchoring bar or rails may be utilized for high wind conditions.

2.1.5.2 Auxiliary Fasteners

Corrosion resistance screws, nails, or anchors must be suitable for intended attachment purpose and be recommended and supplied for use by the PVC roof membrane manufacturer.

2.1.6 Pre-manufactured Accessories

Pre-manufactured accessories shall be manufacturer's standard for intended purpose, must comply with applicable specification section, be compatible with the membrane roof system and approved for use and supplied by the PVC roof membrane manufacturer. Pre-fabricated Curbs shall be 16 gauge AZ55 galvalume with minimum 4 inch flange for attachment to roof nailers. Curbs shall provide minimum height of 10 inches above the finished roof membrane surface.

2.1.7 Roof Insulation

Insulation system and facer material shall be compatible with membrane
application specified and be approved and supplied by the PVC membrane roof manufacturer.

2.2 Reinforced, PVC Membrane

Reinforced polyvinyl chloride (PVC) membrane shall contain fibers or scrim, and shall comply with ASTM D4434/D 4434M as previously existing. Grade I or Type III or Type IV, fleece backed, or ASTM D6754/D6754M, and in all cases shall provide 0.072 inch minimum thickness for mechanically fastened application. Not withstanding the ASTM standards referenced, reinforced PVC roof membranes provided under this section shall have the minimum, labeled thickness specified. PVC membrane thickness specified herein is exclusive of backing material on the bottom of fleece-backed membrane. Principal polymer used in manufacture of the membrane sheet shall be PVC. Width and length of PVC membrane roofing sheet shall be consistent with membrane attachment methods and wind uplift requirements, and shall be as large as practical. In order to minimize joints and 3-way overlaps, prefabricated sheets are not accepted. Maximum reinforced PVC membrane roofing sheet dimensions to be the maximum width obtainable from PVC membrane roof manufacturer in order to minimize seams in the field of the roof.

PART 3 EXECUTION

3.1 EXAMINATION

Ensure that the following conditions exist prior to application of the roofing materials:

a. Curbs, roof penetrating components and equipment supports are in place.

b. Surfaces are rigid, clean, dry, smooth, and free from cracks, holes, and sharp changes in elevation.

c. Substrate is sloped to provide positive drainage.

d. Walls and vertical surfaces are constructed to receive counter flashing, and will permit mechanical fastening of the base flashing materials.

e. Insulation boards are installed smoothly and evenly, and are not broken, cracked, or curled. There are no gaps in insulation board joints exceeding 1/4 inch in width.

3.2 APPLICATION METHOD

Apply entire PVC membrane roofing utilizing mechanically fastened application methods. Apply roofing materials as specified herein unless approved otherwise by the Contracting Officer. Submit instructions including pattern and frequency of mechanical attachments required in the field for roof, corners, and perimeters to provide for the specified wind resistance.

3.2.1 Special Precautions

a. Do not dilute coatings or sealants unless specifically recommended by the material manufacturer's printed application instructions. Do not thin liquid materials or cleaners used for cleaning PVC sheet.
b. Keep liquids in airtight containers, and keep containers closed except when removing materials.

c. Use liquid components, including adhesives, within their shelf life period. Store adhesives at 60 to 80 degrees F prior to use. Avoid excessive adhesive application and adhesive spills, as they can be destructive to some thermoplastic sheets and insulations; follow adhesive manufacturer's printed application instructions. Mix and use liquid components in accordance with label directions and manufacturer's printed instructions.

d. Provide clean, dry cloths or pads for applying membrane cleaners and cleaning of membrane.

e. Do not use heat guns or open flame to expedite drying of adhesives or primers.

f. Require workmen and others who walk on the membrane to wear clean, soft-soled shoes to avoid damage to roofing materials.

g. Do not use equipment with sharp edges which could puncture the PVC membrane roofing sheet.

h. Shut down air intakes and any related mechanical systems and seal open vents and air intakes when applying solvent-based materials in the area of the opening or intake. Coordinate shutdowns with the Contracting Officer.

3.2.2 PVC Roofing Membrane

Provide a watertight roof membrane sheet free of contaminants and defects that might affect serviceability. Provide a uniform, straight, and flat edge. Membrane shall be overlapped a minimum of 3 inches at sides for adhered applications and minimum 4 inches at ends. Direction of laps shall allow water to flow over and not against the lap. Membrane joints shall be free of wrinkles and fishmouths. The entire length of hot-air-welded seams shall be probe-tested and corrected during the day of installation. Defective areas shall be re-welded. Wrinkles, fishmouths, or damaged areas shall be cut out and the area covered with membrane using a continuous hot-air-welded seam on all sides. Repairs shall be probe-tested for continuity. Hot-air-welded seams are to be accomplished in accordance with the PVC membrane roofing manufacturer's published requirements.

3.2.2.1 Flashing

Roof edges, projections through the roof and changes in roof planes shall be flashed. The seam shall be sealed a minimum of 3 inches beyond the fasteners which attach the membrane to nailers. The installed flashing's shall be secured at the top of the flashing a maximum of 12 inches on centers under the counterflashign or cap. Where possible, prefabricated components shall be used for pipe seals and flashing accessories.

3.2.3 Mechanically Fastened Membrane Application

Layout membrane and lap adjoining sheets in accordance with membrane manufacturer's printed instructions such that the minimum recommended seam width is maintained and to ensure that seam width is as required by tested assembly meeting specified wind resistance requirements. Account for
additional overlap required for placement of fasteners and plates or battens beyond the closed seam. Allow for sufficient membrane to form proper membrane terminations. Ensure membrane is free of wrinkles and ridges in the installation. Mechanically secure the membrane sheet with specified fasteners in the lap area. Space fasteners as required to provide the wind uplift resistance specified and in accordance with submitted fastener patterns for the field, corner, and perimeter roof areas. Set fasteners firm to plate or batten. Form field hot-air-welded seams and laps and/or coverstrips, as specified. Check all seams and ensure full/continuous lap seal.

3.2.4 Securement at Base Tie-In Conditions

Mechanically fasten the roof membrane at penetrations, at base of curbs and walls, and at all locations where the membrane turns and angles greater than 4 degrees (1:12). Space fasteners a maximum of 12 inches on center, except where more frequent attachment is required to meet specified wind resistance or where recommended by the roof membrane manufacturer. Cover over fasteners with a layer of flashing material. Hot-air-weld all seams of flashing material as recommended by the roof membrane manufacturer's printed data.

3.2.5 Pre-fabricated Curbs

Securely anchor prefabricated curbs to nailer or other base substrate and flashed with PVC membrane flashing materials. See detail drawings.

3.3 FLASHINGS

Provide flashings in the angles formed at walls and other vertical surfaces and where required to make the work watertight, except where metal flashings are indicated.

3.3.1 General

Provide a one-ply flashing membrane, as specified for the system used, and install immediately after the roofing membrane is placed and prior to finish coating where a finish coating is required. Flashings must be stepped where vertical surfaces abut sloped roof surfaces. Provide sheet metal reglet in which sheet metal cap flashings are installed of not more than 16 inch nor less than 8 inch above the roofing surfaces. Exposed joints and end laps of flashing membrane must be made and sealed in the manner required for roofing membrane.

3.3.2 Membrane Flashing

3.3.2.1 Installation

Install flashing and flashing accessories as the roof membrane is installed. Apply flashing to cleaned surfaces and as recommended by the roof membrane manufacturer and as specified. Utilize cured PVC membrane flashing and prefabricated accessory flashings to the maximum extent recommended by the roof membrane manufacturer. Limit uncured flashing material to reinforcing inside and outside corners and angle changes in plane of membrane, and to flashing scuppers, pourable sealer pockets, and other formed penetrations or unusually shaped conditions as recommended by the roof membrane manufacturer where the use of cured material is impractical. Extend base flashing not less than 8 inch above roofing surface and as necessary to provide for seaming overlap on roof membrane.
as recommended by the roof membrane manufacturer.

3.3.2.2 Sealing

Seal flashing membrane for a minimum of 3 inch on each side of fastening device used to anchor roof membrane to nailers. Completely adhere flashing sheets in place. Seam flashing membrane in the same manner as roof membrane, except as otherwise recommended by the membrane manufacturer's printed instructions and approved by the Contracting Officer. Reinforce all corners and angle transitions by applying uncured membrane to the area in accordance with roof membrane manufacturer recommendations. Mechanically fasten top edge of base flashing with manufacturer recommended termination bar fastened at maximum 12 inch on center. Install sheet metal flashing over the termination bar in the completed work. Mechanically fasten top edge of base flashing for all other terminations in a manner recommended by the roof membrane manufacturer. Apply membrane liner over top of exposed nailers and blocking and to overlap top edge of base flashing installation at curbs, parapet walls, expansion joints and as otherwise indicated to serve as waterproof lining under sheet metal flashing components.

3.4 CORRECTION OF DEFICIENCIES

Where any form of deficiency is found, additional measures must be taken as deemed necessary by the Contracting Officer to determine the extent of the deficiency and provide corrective action recommendations. Perform corrective action as directed by the Contracting Officer.

3.5 PROTECTION OF APPLIED ROOFING

At the end of the day's work and when precipitation is imminent, protect applied membrane roofing system from water intrusion.

3.5.1 Temporary Flashing for Permanent Roofing

Provide temporary flashing at drains, curbs, walls and other penetrations and terminations of roofing sheets until permanent flashings can be applied. Remove temporary flashing before applying permanent flashing.

3.6 FIELD QUALITY CONTROL

3.6.1 Construction Monitoring

During progress of the roof work, make visual inspections as necessary to ensure compliance with specified parameters. Additionally, verify the following:

a. Equipment is in working order. Metering devices are accurate.

b. Materials are not installed in adverse weather conditions.

c. Substrates are in acceptable condition, in compliance with specification, prior to application of subsequent materials.

(1) Nailers and blocking are provided where and as needed.

(2) Insulation substrate is smooth, properly secured to its substrate, and without excessive gaps prior to membrane application.
(3) The proper number, type, and spacing of fasteners are installed.

(4) Materials comply with the specified requirements.

(5) All materials are properly stored, handled and protected from moisture or other damages. Liquid components are properly mixed prior to application.

(6) Adhesives are applied uniformly to both mating surfaces and checked for proper set prior to bonding mating materials. Mechanical attachments are spaced as required, including additional fastening of membrane in corner and perimeter areas as required.

(7) Membrane is properly overlapped.

(8) Membrane seaming is as specified by PVC membrane manufacturer. All seams are checked at the end of each work day.

(9) Applied membrane is inspected and repaired as necessary prior to paver installation.

(10) Membrane is adhered without ridges, wrinkles, kinks, fishmouths.

(11) Installer adheres to specified and detailed application parameters.

(12) Associated flashing's and sheet metal are installed in a timely manner in accord with the specified requirements.

(13) Temporary protection measures are in place at the end of each work shift.

3.6.2 Manufacturer's Inspection

Manufacturer's technical representative shall visit the site a minimum of 2 times during the installation for purposes of reviewing materials installation practices and adequacy of work in place. Inspections shall occur during the first 20 squares of membrane installation, at mid-point of the installation, and at substantial completion, at a minimum. Additional inspections need not exceed one for each 100 squares of total roof area with the exception that follow-up inspections of previously noted deficiencies or application errors shall be performed as requested by the Contracting Officer. After each inspection, a report, signed by the manufacturer's technical representative shall be submitted by the roofing Contractor to the Contracting Officer within 3 working days. The report shall note overall quality of work, deficiencies and any other concerns, and recommended corrective action.

3.7 CLEAN UP

Remove debris, scraps, containers and other rubbish and trash resulting from installation of the roofing system from job site each day.

3.8 INSTRUCTIONS TO GOVERNMENT PERSONNEL

Furnish written and verbal instructions on proper maintenance procedures to designated Government personnel. Furnish instructions by a competent representative of the roof membrane manufacturer and include a minimum of
4 hours on maintenance and emergency repair of the membrane. Include a demonstration of membrane repair, and give sources of required special tools. Furnish information on safety requirements during maintenance and emergency repair operations. Include copies of Material Safety Data Sheets for maintenance/repair materials.

-- End of Section --
SECTION 07 60 00
FLASHING SHEET METAL, PARAPET WALL COPING AND ROOF CURBS
08/08

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)


SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)


1.2 GENERAL REQUIREMENTS

Finished sheet metalwork will form a weathertight construction without waves, warps, buckles, fastening stresses or distortion, which allows for expansion and contraction. Sheet metal mechanic is responsible for cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades. Coordinate installation of sheet metal items used in conjunction with roofing with roofing work to permit continuous roofing operations.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Gutters; G
Downspouts; G
Flashings, and Prefabricated Roof Curbs; G
Copings; G; G,
Drip edge; G; G,

Indicate thicknesses, dimensions, fastenings and anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.
SD-03 Product Data

Prefabricated Roof Curbs; G

Manufacturers descriptive data including all materials, finishes, methods of attachment, and warranty information.

1.4 DELIVERY, HANDLING, AND STORAGE

Package and protect materials during shipment. Uncrate and inspect materials for damage, dampness, and wet-storage stains upon delivery to the job site. Remove from the site and replace damaged materials that cannot be restored to like-new condition. Handle sheet metal items to avoid damage to surfaces, edges, and ends. Store materials in dry, weather-tight, ventilated areas until immediately before installation.

PART 2 PRODUCTS

2.1 MATERIALS

Do not use lead, lead-coated metal. Use any metal listed by SMACNA Arch. Manual for a particular item, unless otherwise specified or indicated. All exposed items are to match metal panel roof system Kynar 500/Hylar 5000 material, finish and color at building addition. Conform to the requirements specified and to the thicknesses and configurations established in SMACNA Arch. Manual for the materials.

Furnish sheet metal items in lengths indicated. Single pieces less than 8 feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Factory fabricate corner pieces with minimum 12 inch legs. Provide accessories and other items essential to complete the sheet metal installation. Provide accessories made of the same or compatible materials as the items to which they are applied. Fabricate sheet metal items of the materials specified below and to the gage, thickness, or weight shown in Table I at the end of this section. Where a material is not identified specifically in the drawings use Table I, attached, each is acceptable and may be used except as follows:

2.1.1 Flashings

Must be of the same material, color and finish as new metal roofing at building addition.

2.1.2 Finish

Exposed exterior items of zinc-coated steel sheet must have a baked-on, factory-applied color coating of polyvinylidene fluoride or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Provide finish coating dry-film thickness of 0.8 to 1.3 mils and color to match adjacent new roof panel at building addition.

2.1.3 Aluminum Alloy Sheet and Plate

ASTM B 209 anodized clear form alloy, and temper appropriate for use.

2.1.4 Fasteners

Use the same metal or a metal compatible with the item fastened. Use
stainless steel fasteners to fasten dissimilar materials.

2.2 Prefabricated Roof Curbs

To be duct size, plus 8" clear inside dimensions as manufactured by Thybar Corporation or equal by other manufacturers.

2.2.1 Construction

Fabricated of 16 gauge steel with 1 1/2" foil faced fiberglass insulated sidewalls.

2.2.2 Configuration

Standard configuration as indicated.

2.2.3 Finish

To be galvanized, primed steel.

2.3 Premanufactured Wall Coping

To be as manufactured by Hickman Co. Permasnap Model or equal by other manufacturers.

2.3.1 Coping Construction

Coping to be supplied complete with galvanized 20 gauge steel cleat, prefinished metal chair and PVDF finished 24 gauge cap.

2.3.2 Color

Color to match Robins Base standard for roof panels. Color may not be of manufacturers standard selection.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Workmanship

Make lines and angles sharp and true. Free exposed surfaces from visible wave, warp, buckle, and tool marks. Fold back exposed edges neatly to form a 1/2 inch hem on the concealed side. Make sheet metal exposed to the weather watertight with provisions for expansion and contraction.

Make surfaces to receive sheet metal plumb and true, clean, even, smooth, dry, and free of defects and projections. For installation of items not shown in detail or not covered by specifications conform to the applicable requirements of SMACNA 1793, Architectural Sheet Metal Manual. Provide sheet metal flashing in the angles formed where roof decks abut walls, curbs, ventilators, pipes, or other vertical surfaces and wherever indicated and necessary to make the work watertight. Join sheet metal items together as shown in Table II.

3.1.2 Cleats

Provide continuous cleats where shown. Provide 22 ga cleats unless otherwise approved.
3.1.3 Bolts, Rivets, and Screws

Install bolts, rivets, and screws where indicated or required. Provide compatible washers where required to protect surface of sheet metal and to provide a watertight connection.

3.1.4 Seams

Straight and uniform in width and height with no sealant showing on the face.

3.1.4.1 Flat-lock Seams

Finish not less than 3/4 inch wide.

3.1.4.2 Lap Seams

Overlap seams not soldered, not less than 3 inch.

3.1.4.3 Loose-Lock Expansion Seams

Not less than 3 inch wide; provide minimum one inch movement within the joint. Completely fill the joints with the specified sealant, applied at not less than 1/8 inch thick bed.

3.1.4.4 Standing Seams

Not less than one inch high, double locked without solder.

3.1.4.5 Flat Seams

Make seams in the direction of the flow.

3.1.5 Metal Surfaces

Paint surfaces in contact with mortar, concrete, or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

3.1.6 Expansion and Contraction

Provide expansion and contraction joints at not more than 32 foot intervals for aluminum and at not more than 40 foot intervals for other metals. Provide an additional joint where the distance between the last expansion joint and the end of the continuous run is more than half the required interval. Space joints evenly.

3.1.7 Metal Drip Edge

Provide a metal drip edge, designed to allow water run-off to drip free of underlying construction, at eaves and rakes. Extend back from the edge of the deck not less than 4 inch and secure with compatible screws spaced not more than 10 inch on center along upper edge.

3.1.8 Gutters

The hung type of shape indicated and supported on underside by brackets that permit free thermal movement of the gutter. Provide gutters in sizes
indicated complete with end caps, outlets, brackets, and other accessories necessary for installation. Bead with hemmed edge or reinforce the outer edge of gutter with a stiffening bar not less than 3/4 by 3/16 inch of material compatible with gutter. Fabricate gutters in sections not less than 8 feet. Lap the sections a minimum of one inch in the direction of flow or provide with concealed splice plate 6 inch minimum. Join the gutters by riveted and sealed joints. Provide expansion-type slip joints midway between outlets. Install gutters below slope line of the roof so that snow and ice can slide clear. Support gutters on adjustable hangers spaced not more than 30 inch on center. Adjust gutters to slope uniformly to outlets, with high points occurring midway between outlets. Fabricate hangers and fastenings from metals indicated on the drawings.

3.1.9 Downspouts

Space supports for downspouts according to the manufacturer's recommendation for the masonry substrate. Types, shapes and sizes are indicated. Provide complete including elbows and offsets. Provide downspouts in approximately 10 foot lengths. Provide end joints to telescope not less than 1/2 inch and lock longitudinal joints. Provide gutter outlets to cast iron subgrade drainage boots. Keep downspouts not less than one inch away from walls. Fasten to the walls at top, bottom, and at an intermediate point not to exceed 5 feet on center with leader straps or concealed rack-and-pin type fasteners. Form straps and fastenings of metal compatible with the downspouts.

3.1.9.1 Terminations

Neatly fit into the drainage connection the downspouts terminating in drainage lines and fill the joints with a portland cement mortar cap sloped away from the downspout.

3.1.10 Flashing at Roof Penetrations Roof Curbs

Provide metal flashing or neoprene boot type flashing for all pipes and roof curbs as indicated on the drawings.

3.1.11 Copings

Provide coping using PFDF finished, galvalume coated, 24 gauge steel 8 or 10 feet long joined by a 4 inch lap seam. Terminate outer edges with caps. Install per manufacturers recommendations.

3.2 PAINTING

Field-paint sheet metal for separation of dissimilar materials.

3.3 CLEANING

Clean exposed sheet metal work at completion of installation. Remove grease and oil films, handling marks, contamination from steel wool, fittings and drilling debris, and scrub-clean. Free the exposed metal surfaces of dents, creases, waves, scratch marks, and solder or weld marks.

3.4 REPAIRS TO FINISH

Scratches, abrasions, and minor surface defects of finish may be repaired in accordance with the manufacturer's printed instructions and as approved. Repair damaged surfaces caused by scratches, blemishes, and
variations of color and surface texture. Replace items which cannot be repaired.

3.5 FIELD QUALITY CONTROL

Establish and maintain a Quality Control Plan for sheet metal used in conjunction with roofing to assure compliance of the installed sheet metalwork with the contract requirements. Remove work that is not in compliance with the contract and replace or correct. Include quality control, but not be limited to, the following:

a. Observation of environmental conditions; number and skill level of sheet metal workers; condition of substrate.

b. Verification that specified material is provided and installed.

c. Inspection of sheet metalwork, for proper size(s) and thickness(es), fastening and joining, and proper installation.

3.5.1 Procedure

Submit for approval prior to start of roofing work. Include a checklist of points to be observed. Document the actual quality control observations and inspections. Furnish a copy of the documentation to the Contracting Officer at the end of each day.

<table>
<thead>
<tr>
<th>TABLE I. SHEET METAL WEIGHTS, THICKNESSES, AND GAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVDF</td>
</tr>
<tr>
<td>Coated Steel,</td>
</tr>
<tr>
<td>U.S. Std. Gage</td>
</tr>
<tr>
<td>Flashings:</td>
</tr>
<tr>
<td>Base................. 24</td>
</tr>
<tr>
<td>Coping............. 20 and 24</td>
</tr>
<tr>
<td>Sheets, smooth... 24</td>
</tr>
<tr>
<td>Edge strip........ -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE II. SHEET METAL JOINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF JOINT</td>
</tr>
<tr>
<td>Item Designation PVDF Coated Steel Remarks</td>
</tr>
<tr>
<td>Base One inch 3 inch lap for expansion joint</td>
</tr>
<tr>
<td>Item</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Reglets</td>
</tr>
<tr>
<td>Stepped</td>
</tr>
<tr>
<td>Edge strip</td>
</tr>
</tbody>
</table>

-- End of Section --
SECTION 07 84 00

FIRESTOPPING

05/10

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM E2174 (2014) Standard Practice for On-Site Inspection of Installed Fire Stops


FM GLOBAL (FM)

FM 4991 (2013) Approval of Firestop Contractors


INTERNATIONAL CODE COUNCIL (ICC)


UNDERWRITERS LABORATORIES (UL)

UL 1479 (2003; Reprint Oct 2012) Fire Tests of Through-Penetration Firestops

UL 723 (2008; Reprint Aug 2013) Test for Surface Burning Characteristics of Building Materials

1.2 SYSTEM DESCRIPTION

1.2.1 General

Furnish and install tested and listed firestopping systems, combination of materials, or devices to form an effective barrier against the spread of flame, smoke and gases, and maintain the integrity of fire resistance rated walls, floors, and, including through-penetrations.

a. Through penetrations include the annular space around pipes, tubes, conduit, wires, cables and vents at the existing 4 hour, 12" CMU wall separating corridor #116 from all shop areas to the south. This includes Vestibules #117A and 117B, Steam Cleaning #118, Red Room #119A and Shop #120.

b. All penetrations at the mezzanine floor.

1.2.2 Sequencing

Coordinate the specified work with other trades. Apply firestopping materials, at penetrations of pipes and ducts, prior to insulating, unless insulation meets requirements specified for firestopping. Firestop material shall be inspected and approved prior to final completion and enclosing of any assemblies that may conceal installed firestop.

1.2.3 Submittals Requirements

a. Submit detail drawings including manufacturer's descriptive data, typical details conforming to UL Fire Resistance or other details certified by another nationally recognized testing laboratory, installation instructions or UL listing details for a firestopping assembly in lieu of fire-test data or report. For those firestop applications for which no UL tested system is available through a manufacturer, a manufacturer's engineering judgment, derived from similar UL system designs or other tests, shall be submitted for review and approval prior to installation. Submittal shall indicate the firestopping material to be provided for each type of application. When more than a total of 5 penetrations are to receive firestopping, provide drawings that indicate location, "F" "T" and "L" ratings, and type of application.

b. Submit certificates attesting that firestopping material complies with the specified requirements. For all intumescent firestop materials used in through penetration systems, manufacturer shall provide certification of compliance with UL 1479.

c. Submit documentation of training and experience for Installer.

d. Submit inspection report stating that firestopping work has been inspected and found to be applied according to the manufacturer's recommendations and the specified requirements.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:
1.4 QUALITY ASSURANCE

1.4.1 Installer

Engage an experienced Installer who is:

a. FM Research approved in accordance with FM 4991, operating as a UL Certified Firestop Contractor, or

b. Certified, licensed, or otherwise qualified by the firestopping manufacturer as having the necessary staff, training, and a minimum of 3 years experience in the installation of manufacturer's products in accordance with specified requirements. A manufacturer's willingness to sell its firestopping products to the Contractor or to an installer engaged by the Contractor does not in itself confer installer qualifications on the buyer. The Installer shall have been trained by a direct representative of the manufacturer (not distributor or agent) in the proper selection and installation procedures. The installer shall obtain from the manufacturer written certification of training, and retain proof of certification for duration of firestop installation.

1.4.2 Inspector Qualifications

The inspector shall meet the criteria contained in ASTM E699 for agencies involved in quality assurance and shall have a minimum of two years experience in construction field inspections of firestopping systems, products, and assemblies. The inspector shall be completely independent of, and divested from, the installer, the manufacturer, and the supplier of any material or item being inspected. The inspector shall not be a competitor of the installer, the contractor, the manufacturer, or supplier of any material or item being inspected. Include in the qualifications submittal a notarized statement assuring compliance with the requirements stated herein.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the original unopened packages or containers showing name of the manufacturer and the brand name. Store materials off the ground, protected from damage and exposure to elements and temperatures in accordance with manufacturer requirements. Remove damaged or deteriorated materials from the site. Use materials within their indicated shelf life.
PART 2 PRODUCTS

2.1 FIRESTOPPING MATERIALS

Provide firestopping materials, supplied from a single domestic manufacturer, consisting of commercially manufactured, asbestos-free, nontoxic products FM APP GUIDE approved, or UL listed, for use with applicable construction and penetrating items, complying with the following minimum requirements:

2.1.1 Fire Hazard Classification

Material shall have a flame spread of 25 or less, and a smoke developed rating of 50 or less, when tested in accordance with ASTM E84 or UL 723. Material shall be an approved firestopping material as listed in UL Fire Resistance or by a nationally recognized testing laboratory.

2.1.2 Toxicity

Material shall be nontoxic and carcinogen free to humans at all stages of application or during fire conditions and shall not contain hazardous chemicals or require harmful chemicals to clean material or equipment. Firestop material must be free from Ethylene Glycol, PCB, MEK, or other types of hazardous chemicals.

2.1.3 Fire Resistance Rating

Firestop systems shall be UL Fire Resistance listed or FM APP GUIDE approved with "F" rating at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected. Where required, firestop systems shall also have "T" rating at least equal to the fire-rated floor in which the openings are to be protected.

2.1.3.1 Through-Penetrations

Firestopping materials for through-penetrations, as described in paragraph SYSTEM DESCRIPTION, shall provide "F", "T" and "L" fire resistance ratings in accordance with ASTM E814 or UL 1479. Fire resistance ratings shall be as follows:

2.1.3.1.1 Penetrations of Fire Resistance Rated Occupancy separation Wall

F Rating = 4 hour.

2.1.3.1.2 Penetrations of Fire Resistance Rated Floors

F Rating = 4 hour. Where the penetrating item is outside of a wall cavity the F rating must be equal to the fire resistance rating of the floor penetrated, and the T rating shall be in accordance with the requirements of ICC IBC.PART 3 EXECUTION

3.1 PREPARATION

Areas to receive firestopping shall be free of dirt, grease, oil, or loose materials which may affect the fitting or fire resistance of the firestopping system.
3.2 INSTALLATION

Completely fill void spaces with firestopping material regardless of geometric configuration, subject to tolerance established by the manufacturer. Install firestopping in accordance with manufacturer's written instructions. Provide tested and listed firestop systems in the following locations, except in floor slabs on grade:

a. Penetrations of duct, conduit, cable and pipe through floors and through fire-resistance rated wall ands.

b. Other locations where required to maintain fire resistance rating of the construction.

3.2.1 Insulated Pipes and Ducts

Thermal insulation shall be cut and removed where pipes or ducts pass through firestopping, unless insulation meets requirements specified for firestopping.

3.2.2 Data and Communication Cabling

Cabling for data and communication applications shall be sealed with re-enterable firestopping devices.

3.2.2.1 Re-Enterable Devices

Firestopping devices shall be pre-manufactured modular devices, containing built-in self-sealing intumescent inserts. Firestopping devices shall allow for cable moves, additions or changes without the need to remove or replace any firestop materials. Devices must be capable of maintaining the fire resistance rating of the penetrated membrane at 0 percent to 100 percent visual fill of penetrants; while maintaining "L" rating of <10 cfm/sf at 0 percent to 100 percent visual fill.

3.3 INSPECTION

3.3.1 General Requirements

The firestopped areas shall not be covered or enclosed until inspection is complete and approved by the Contracting Officer. The inspector shall inspect the applications initially to ensure adequate preparations (clean surfaces suitable for application, etc.) and periodically during the work to assure that the completed work has been accomplished according to the manufacturer's written instructions and the specified requirements. Submit written reports indicating locations of and types of penetrations and types of firestopping used at each location; type shall be recorded by UL listed printed numbers.

3.3.2 Inspection Standards

Inspect all firestopping in accordance to ASTM E2393 and ASTM E2174 for firestop inspection, and document inspection results to be submitted.

-- End of Section --
SECTION 07 92 00

JOINT SEALANTS

01/07

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C509 (2006; R 2011) Elastomeric Cellular Preformed Gasket and Sealing Material

ASTM C734 (2006; R 2012) Low-Temperature Flexibility of Latex Sealants After Artificial Weathering

ASTM C834 (2014) Latex Sealants

ASTM C919 (2012) Use of Sealants in Acoustical Applications


ASTM D217 (2010) Cone Penetration of Lubricating Grease


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Sealants; G

Primers; G

Bond breakers

Backstops; G
Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). Provide a copy of the Material Safety Data Sheet for each solvent, primer or sealant material.

SD-07 Certificates

Sealant

Certificates of compliance stating that the materials conform to the specified requirements.

1.3 ENVIRONMENTAL CONDITIONS

Apply sealant when the ambient temperature is between 40 and 90 degrees F.

1.4 DELIVERY AND STORAGE

Deliver materials to the job site in unopened manufacturers' external shipping containers, with brand names, date of manufacture, color, and material designation clearly marked thereon. Label elastomeric sealant containers to identify type, class, grade, and use. Carefully handle and store materials to prevent inclusion of foreign materials or subjection to sustained temperatures exceeding 90 degrees F or less than 0 degrees F.

1.5 QUALITY ASSURANCE

1.5.1 Compatibility with Substrate

Verify that each of the sealants are compatible for use with joint substrates.

1.5.2 Joint Tolerance

Provide joint tolerances in accordance with manufacturer's printed instructions.

1.5.3 Mock-Up

Project personnel is responsible for installing sealants in mock-up prepared by other trades, using materials and techniques approved for use on the project.

1.6 SPECIAL WARRANTY

 Guarantee sealant joint against failure of sealant and against water penetration through each sealed joint for five years.

PART 2 PRODUCTS

2.1 SEALANTS

Provide sealant that has been tested and found suitable for the substrates to which it will be applied.

2.1.1 Interior Sealant

Provide ASTM C834. Location(s) and color(s) of sealant for the following:
2.1.2 Exterior Sealant

For joints in vertical surfaces, provide ASTM C920, Type S or M, Grade NS, Class 25, Use NT. For joints in horizontal surfaces, provide ASTM C920, Type S or M, Grade P, Class 25, Use T. Provide location(s) and color(s) of sealant as follows:

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Joints at metal wall or roof panels.</td>
<td>Match wall or roof panel color</td>
</tr>
<tr>
<td>b. Voids where items pass through exterior walls or masonry abuts adjacent materials.</td>
<td>Match adjacent material color</td>
</tr>
</tbody>
</table>

2.1.3 Acoustical Sealant

Install at metal stud tracks, in walls that have acoustical batt insulation, and Mechanical, Electrical or Plumbing wall penetrations below ceiling plane at similar walls.

Rubber or polymer-based acoustical sealant conforming to ASTM C919 must have a flame spread of 25 or less and a smoke developed rating of 50 or less when tested in accordance with ASTM E84. Acoustical sealant must have a consistency of 250 to 310 when tested in accordance with ASTM D217, and must remain flexible and adhesive after 500 hours of accelerated weathering as specified in ASTM C734, and must be non-staining.

2.2 PRIMERS

Provide a nonstaining, quick-drying type and consistency recommended by the sealant manufacturer for the particular application.

2.3 BOND BREAKERS

Provide the type and consistency recommended by the sealant manufacturer to prevent adhesion of the sealant to backing or to bottom of the joint.

2.4 BACKSTOPS

Provide neoprene, polyurethane, or polyethylene foams free from oil or other staining elements as recommended by sealant manufacturer. Provide 25 to 33 percent oversized backing for closed cell and 40 to 50 percent oversized backing for open cell material, unless otherwise indicated. Make backstop material compatible with sealant. Do not use oakum and other types of absorptive materials as backstops.

2.4.1 Rubber

Conform to ASTM D1056, Type 2, closed cell, Class A round cross section for
cellular rubber sponge backing.

2.4.2 Synthetic Rubber

Conform to ASTM C509, Option I, Type I preformed rods or tubes for Synthetic rubber backing.

2.4.3 Neoprene

Conform to ASTM D1056, closed cell expanded neoprene cord Type 2, Class C, Grade 2C2 for Neoprene backing.

2.4.4 Silicon Rubber Base

Provide Silicon Rubber Based Sealants of single component, solvent release, color as selected, conforming to ASTM C920, Non-sag, Type 5, Grade NS, Class 25.

2.5 CLEANING SOLVENTS

Provide type(s) recommended by the sealant manufacturer except for aluminum and bronze surfaces that will be in contact with sealant.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Clean surfaces from dirt, moisture, grease, oil, wax, lacquer, paint, or other foreign matter that would tend to destroy or impair adhesion. Remove oil and grease with solvent. Surfaces must be wiped dry with clean cloths. When resealing an existing joint, remove existing caulk or sealant prior to applying new sealant. For surface types not listed below, contact sealant manufacturer for specific recommendations.

3.1.1 Steel Surfaces Other Than Metal Wall Panels

Remove loose mill scale by sandblasting or, if sandblasting is impractical or would damage finish work, scraping and wire brushing. Remove protective coatings by sandblasting or using a residue-free solvent.

3.1.2 Aluminum Surfaces

Remove temporary protective coatings from surfaces that will be in contact with sealant. When masking tape is used as a protective coating, remove tape and any residual adhesive just prior to sealant application. For removing protective coatings and final cleaning, use nonstaining solvents recommended by the manufacturer of the item(s) containing aluminum.

3.1.3 Concrete and Masonry Surfaces

Where surfaces have been treated with curing compounds, oil, or other such materials, remove materials by wire brushing. Remove laitance, efflorescence from the joint cavity.

3.1.4 Wood Surfaces

Keep wood surfaces to be in contact with sealants free of splinters and sawdust or other loose particles.
3.2 SEALANT PREPARATION

Do not add liquids, solvents, or powders to the sealant. Mix multicomponent elastomeric sealants in accordance with manufacturer's instructions.

3.3 APPLICATION

3.3.1 Joint Width-To-Depth Ratios

a. Acceptable Ratios:

<table>
<thead>
<tr>
<th>JOINT WIDTH</th>
<th>JOINT DEPTH MINIMUM</th>
<th>JOINT DEPTH MAXIMUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>For concrete:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1/4 inch (minimum)</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
</tr>
<tr>
<td>over 1/4 inch to 1/2 inch</td>
<td>1/4 inch</td>
<td>Equal to width</td>
</tr>
<tr>
<td>over 1/2 inch to 2 inch</td>
<td>1/2 inch</td>
<td>5/8 inch</td>
</tr>
</tbody>
</table>

b. Unacceptable Ratios: Where joints of acceptable width-to-depth ratios have not been provided, clean out joints to acceptable depths and grind or cut to acceptable widths without damage to the adjoining work. Grinding is not required on metal surfaces.

3.3.2 Masking Tape

Place masking tape on the finish surface on one or both sides of a joint cavity to protect adjacent finish surfaces from primer or sealant smears. Remove masking tape within 10 minutes after joint has been filled and tooled.

3.3.3 Backstops

Install backstops dry and free of tears or holes. Tightly pack the back or bottom of joint cavities with backstop material to provide a joint of the depth specified. Install backstops in the following locations:

a. Where indicated.

b. Where backstop is not indicated but joint cavities exceed the acceptable maximum depths specified in paragraph entitled, "Joint Width-to-Depth Ratios".

3.3.4 Primer

Immediately prior to application of the sealant, clean out loose particles from joints. Where recommended by sealant manufacturer, apply primer to joints in concrete and other porous surfaces in accordance with sealant manufacturer's instructions. Do not apply primer to exposed finish surfaces.
3.3.5 Bond Breaker

Provide bond breakers to the back or bottom of joint cavities, as recommended by the sealant manufacturer for each type of joint and sealant used, to prevent sealant from adhering to these surfaces. Carefully apply the bond breaker to avoid contamination of adjoining surfaces or breaking bond with surfaces other than those covered by the bond breaker.

3.3.6 Sealants

Provide a sealant compatible with the material(s) to which it is applied. Do not use a sealant that has exceeded shelf life or has jelled and can not be discharged in a continuous flow from the gun. Apply the sealant in accordance with the manufacturer's printed instructions with a gun having a nozzle that fits the joint width. Force sealant into joints to fill the joints solidly without air pockets. Tool sealant after application to ensure adhesion. Make sealant uniformly smooth and free of wrinkles. Upon completion of sealant application, roughen partially filled or unfilled joints, apply sealant, and tool smooth as specified. Apply sealer over the sealant when and as specified by the sealant manufacturer.

3.4 PROTECTION AND CLEANING

3.4.1 Protection

Protect areas adjacent to joints from sealant smears. Masking tape may be used for this purpose if removed 5 to 10 minutes after the joint is filled.

3.4.2 Final Cleaning

Upon completion of sealant application, remove remaining smears and stains and leave the work in a clean and neat condition.

a. Masonry and Other Porous Surfaces: Immediately scrape off fresh sealant that has been smeared on masonry and rub clean with a solvent as recommended by the sealant manufacturer. Allow excess sealant to cure for 24 hour then remove by wire brushing or sanding.

-- End of Section --
PART 1   GENERAL

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 the basic designation only.

AMERICAN WELDING SOCIETY (AWS)


ASTM INTERNATIONAL (ASTM)


ASTM C612 (2014) Mineral Fiber Block and Board Thermal Insulation

ASTM E283 (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.115 (2014) Hardware Preparation in Steel Doors and Steel Frames

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 105 (2013) Standard for Installation of Smoke Door Assemblies and Other Opening Protectives


NFPA 80 (2013) Standard for Fire Doors and Other Opening Protectives
STEEL DOOR INSTITUTE (SDI/DOOR)


SDI/DOOR 113 (2001; R2006) Standard Practice for Determining the Steady State Thermal Transmittance of Steel Door and Frame Assemblies

SDI/DOOR A250.11 (2001) Recommended Erection Instructions for Steel Frames

SDI/DOOR A250.6 (2003; R2009) Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames

SDI/DOOR A250.8 (2003; R2008) Recommended Specifications for Standard Steel Doors and Frames

UNDERWRITERS LABORATORIES (UL)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Schedule of doors; G

Schedule of frames; G

Submit door and frame locations.

SD-03 Product Data

Doors; G

Frames; G

Accessories

Weatherstripping

Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. When "custom hollow metal doors" are provided in lieu of "standard steel doors," provide additional details and data sufficient for comparison to SDI/DOOR A250.8 requirements.
1.3 DELIVERY, STORAGE, AND HANDLING

Deliver doors, frames, and accessories undamaged and with protective wrappings or packaging. Provide temporary steel spreaders securely fastened to the bottom of each welded frame. Store doors and frames on platforms under cover in clean, dry, ventilated, and accessible locations, with 1/4 inch airspace between doors. Remove damp or wet packaging immediately and wipe affected surfaces dry. Replace damaged materials with new.

PART 2 PRODUCTS

2.1 STANDARD STEEL DOORS

SDI/DOOR A250.8, except as specified otherwise. Prepare doors to receive door hardware as specified in Section 08 71 00. Undercut where indicated. Doors shall be 1-3/4 inch thick, unless otherwise indicated.

2.1.1 Classification - Level, Performance, Model

2.1.1.1 Extra Heavy Duty Doors

SDI/DOOR A250.8, Level 3, physical performance Level A, Model 2 with core construction as required by the manufacturer for interior doors and for indicated exterior doors, of size(s) and design(s) indicated. Where vertical stiffener cores are required, the space between the stiffeners shall be filled with mineral board insulation.

2.2 ACCESSORIES

2.2.1 Moldings

Provide moldings around glass of interior doors. Provide nonremovable moldings on corridor side of interior doors. Secure inside moldings to stationary moldings.

2.3 INSULATION CORES

Insulated cores shall be of type specified, and provide an apparent U-factor of .48 in accordance with SDI/DOOR 113 and shall conform to:

a. Mineral board: ASTM C612, Type I.2.4 STANDARD STEEL FRAMES

SDI/DOOR A250.8, Level 2, except as otherwise specified. Form frames to sizes and shapes indicated, with welded corners. Provide steel frames for doors, unless otherwise indicated.

2.4.1 Welded Frames

Continuously weld frame faces at corner joints. Mechanically interlock or continuously weld stops and rabbets. Grind welds smooth.

Weld frames in accordance with the recommended practice of the Structural Welding Code Sections 1 through 6, AWS D1.1/D1.1M and in accordance with the practice specified by the producer of the metal being welded.

2.4.2 Anchors

Provide anchors to secure the frame to adjoining construction. Provide
steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage.

2.4.2.1 Wall Anchors

Provide at least three anchors for each jamb. For frames which are more than 7.5 feet in height, provide one additional anchor for each jamb for each additional 2.5 feet or fraction thereof.

   a. Masonry: Provide anchors of corrugated or perforated steel straps or 3/16 inch diameter steel wire, adjustable or T-shaped;
   
   b. Completed openings: Secure frames to previously placed concrete or masonry with expansion bolts in accordance with SDI/DOOR 111; and

2.4.2.2 Floor Anchors

Provide floor anchors drilled for 3/8 inch anchor bolts at bottom of each jamb member.

2.5 FIRE DOORS AND FRAMES

NFPA 80 and NFPA 105 and this specification. The requirements of NFPA 80 and NFPA 105 shall take precedence over details indicated or specified.

2.5.1 Labels

Fire doors and frames shall bear the label of Underwriters Laboratories (UL), Factory Mutual Engineering and Research (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing shall be in accordance with NFPA 252 or UL 10C. Labels shall be metal with raised letters, and shall bear the name or file number of the door and frame manufacturer. Labels shall be permanently affixed at the factory to frames and to the hinge edge of the door. Door labels shall not be painted.

2.6 WEATHERSTRIPPING

As specified in Section 08 71 00 DOOR HARDWARE.

2.6.1 Integral Gasket

Black synthetic rubber gasket with tabs for factory fitting into factory slotted frames, or extruded neoprene foam gasket made to fit into a continuous groove formed in the frame, may be provided in lieu of head and jamb seals specified in Section 08 71 00 DOOR HARDWARE. Insert gasket in groove after frame is finish painted. Air leakage of weatherstripped doors shall not exceed 0.5 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283.

2.7 HARDWARE PREPARATION

Provide minimum hardware reinforcing gages as specified in SDI/DOOR A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of SDI/DOOR A250.8 and SDI/DOOR A250.6. For additional requirements refer to ANSI/BHMA A156.115. Drill and tap for surface-applied hardware at the
project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of SDI/DOOR A250.8, as applicable. Punch door frames to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

2.8 FINISHES

2.8.1 Hot-Dip Zinc-Coated and Factory-Primed Finish

Fabricate scheduled doors and frames from hot dipped zinc coated steel, alloyed type, that complies with ASTM A924/A924M and ASTM A653/A653M. The coating weight shall meet or exceed the minimum requirements for coatings having 0.4 ounces per square foot, total both sides, i.e., A40. Repair damaged zinc-coated surfaces by the application of zinc dust paint. Thoroughly clean and chemically treat to insure maximum paint adhesion. Factory prime as specified in SDI/DOOR A250.8.

2.8.2 Electrolytic Zinc-Coated Anchors and Accessories

Provide electrolytically deposited zinc-coated steel in accordance with ASTM A879/A879M, Commercial Quality, Coating Class A. Phosphate treat and factory prime zinc-coated surfaces as specified in SDI/DOOR A250.8.

2.9 FABRICATION AND WORKMANSHIP

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable. On wraparound frames for masonry partitions, provide a throat opening 1/8 inch larger than the actual masonry thickness. Design other frames in exposed masonry walls or partitions to allow sufficient space between the inside back of trim and masonry to receive caulking compound.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Frames

Set frames in accordance with SDI/DOOR A250.11. Plumb, align, and brace securely until permanent anchors are set. Anchor bottoms of frames with expansion bolts or powder-actuated fasteners. Build in or secure wall anchors to adjoining construction. Where frames require ceiling struts or overhead bracing, anchor frames to the struts or bracing.

3.1.2 Doors

Hang doors in accordance with clearances specified in SDI/DOOR A250.8. After erection and glazing, clean and adjust hardware.

3.1.3 Fire Doors and Frames

Install fire doors and frames, including hardware, in accordance with
NFPA 80 and NFPA 105.

3.2 PROTECTION

Protect doors and frames from damage. Repair damaged doors and frames prior to completion and acceptance of the project or replace with new, as directed. Wire brush rusted frames until rust is removed. Clean thoroughly. Apply an all-over coat of rust-inhibitive paint of the same type used for shop coat.

3.3 CLEANING

Upon completion, clean exposed surfaces of doors and frames thoroughly. Remove mastic smears and other unsightly marks.

-- End of Section --
PART 1   GENERAL

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 the basic designation only.

ALUMINUM ASSOCIATION (AA)

AA DAF45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)


AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)


ASTM E1300 (2012a; E 2012) Determining Load Resistance of Glass in Buildings

ASTM E283 (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen


ASTM E331 (2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air
# Performance Requirements

## 1.2 Structural

Exterior doors, frames and hardware shall be designed to resist equivalent static design loads in accordance with ASTM F1642. Frame deflections shall not exceed \( L/160 \) of the unsupported member lengths. Equivalent static design loads for connections of window or door frame to the surrounding walls or hardware and associated connections, and glazing stop connections shall be in accordance with ASTM F2248 and ASTM E1300. Design supporting elements and their connections based on their ultimate capacities. Provide calculations of a Professional Engineer that substantiates compliance with these requirements. Use frames that provide an equivalent level of performance. Shapes and thicknesses of framing members shall be sufficient to withstand a design wind load of not less than 30 pounds per square foot of supported area with a deflection of not more than \( 1/175 \) times the length of the member and a safety factor of not less than 1.65. Provide glazing beads, moldings, and trim of not less than 0.050 inch nominal thickness.

## 1.2.2 Air Infiltration

When tested in accordance with ASTM E283, air infiltration shall not exceed 0.06 cubic feet per minute per square foot of fixed area at a test pressure of 6.24 pounds per square foot (50 mile per hour wind).

## 1.2.3 Water Penetration

When tested in accordance with ASTM E331, there shall be no water penetration at a pressure of 8 pounds per square foot of fixed area.

## 1.3 Submittals

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. The following shall be submitted in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

**SD-02 Shop Drawings**

Doors and frames; G

Show elevations of each door type, size of doors and frames, metal gages, details of door and frame construction, methods of anchorage, glazing details, weatherstripping, provisions for and location of hardware, and details of installation.

**SD-04 Samples**
Finish sample
SD-05 Design Data
Structural calculations for deflection; G
SD-08 Manufacturer's Instructions
Doors and frames
Submit detail specifications and instructions for installation, adjustments, cleaning, and maintenance.

1.4 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the site for damage. Unload and store with minimum handling. Provide storage space in dry location with adequate ventilation, free from dust or water, and easily accessible for inspection and handling. Stack materials on nonabsorptive strips or wood platforms. Do not cover doors and frames with tarps, polyethylene film, or similar coverings. Protect finished surfaces during shipping and handling using manufacturer's standard method, except that no coatings or lacquers shall be applied to surfaces to which caulking and glazing compounds must adhere.

1.5 QUALITY CONTROL

1.5.1 Shop Drawing Requirements

Drawings shall indicate elevations of doors and frames, full-size sections, thickness and gages of metal, fastenings, proposed method of anchoring, size and spacing of anchors, details of construction, method of glazing, details of operating hardware, method and materials for weatherstripping, installation details, and other related items.

1.5.2 Sample Requirements

1.5.2.1 Finish Sample Requirements

Submit color chart of standard factory-finish color coatings.

PART 2 PRODUCTS

2.1 DOORS AND FRAMES

Swing-type aluminum doors and frames of size, design, and location indicated. Provide doors complete with frames, framing members and accessories.

Type of Aluminum doors included in storefront system includes:

Impact Resistance System (at outer storefront section at entry vestibules); 3 1/2 inch vertical face dimension, 2 inch depth, 3/16 inch wall thickness interior structural silicone glazed, high traffic/impact resistant applications.

2.1.1 Design Requirements for Aluminum (Components)

Design, size components, and install system to withstand these loads
without breakage, loss, failure of seals, product deterioration, and other defects, AAMA 503.

a. Dead and Live Loads: Determined by ASCE 7 and calculated in accordance with applicable codes.

b. Seismic Loads: Design and install system to comply with applicable seismic requirements for project location as defined by Section 1613 of the International Building Code (IBC).

c. Effects of applicable wind load acting inward and outward normal to plane of wall in accordance with ASTM E330.

d. Thermal Loads And Movement:
   (1) Ambient Temperature Range: 120 degrees F.
   (2) Material Surfaces Range: 180 degrees F.

e. Provide and install weatherstripping, exterior gaskets, sealants, and other accessories to resist water and air penetration.

2.2 MATERIALS

2.2.1 Anchors
   Stainless steel.

2.2.2 Weatherstripping
   Continuous wool pile, silicone treated, or type recommended by door manufacturer.

2.2.3 Aluminum Alloy for Doors and Frames
   ASTM B221, Alloy 6063-T5 for extrusions. ASTM B209, alloy and temper best suited for aluminum sheets and strips.

2.2.4 Fasteners
   Hard aluminum or stainless steel.

2.2.5 Structural Steel
   ASTM A36/A36M.

2.2.6 Aluminum Paint
   Aluminum door manufacturer's standard aluminum paint.

2.3 FABRICATION

2.3.1 Aluminum Frames
   Extruded aluminum shapes with contours approximately as indicated. Provide removable glass stops and glazing beads for frames accommodating fixed glass. Use countersunk stainless steel Phillips screws for exposed fastenings, and space not more than 12 inches on center. Mill joints in frame members to a hairline fit, reinforce, and secure mechanically.
2.3.2 Aluminum Doors

Of type, size, and design indicated and not less than 1-3/4 inch thick. Minimum wall thickness, 0.125 inch, except beads and trim, 0.050 inch. Door sizes shown are nominal and shall include standard clearances as follows: 0.093 inch at hinge and lock stiles, 0.125 inch between meeting stiles, 0.125 inch at top rails, 0.187 inch between bottom and threshold, and 0.687 inch between bottom and floor.

2.3.2.1 Full Glazed Stile and Rail Doors

Doors shall have medium stiles and rails as indicated. Fabricate from extruded aluminum hollow seamless tubes or from a combination of open-shaped members interlocked or welded together. Fasten top and bottom rail together by means of welding or by 3/8 or 1/2 inch diameter cadmium-plated tensioned steel tie rods. Provide an adjustable mechanism of jack screws or other methods in the top rail to allow for minor clearance adjustments after installation.

2.3.3 Welding and Fastening

Where possible, locate welds on unexposed surfaces. Dress welds on exposed surfaces smoothly. Select welding rods, filler wire, and flux to produce a uniform texture and color in finished work. Remove flux and spatter from surfaces immediately after welding. Exposed screws or bolts will be permitted only in inconspicuous locations, and shall have countersunk heads. Weld concealed reinforcements for hardware in place.

2.3.4 Weatherstripping

Provide on stiles and rails of exterior doors. Fit into slots which are integral with doors or frames. Weatherstripping shall be replaceable without special tools, and adjustable at meeting rails of pairs of doors. Installation shall allow doors to swing freely and close positively. Air leakage of a single leaf weatherstripped door shall not exceed 1.25 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283.

2.3.5 Anchors

On the backs of subframes, provide anchors of the sizes and shapes indicated for securing subframes to adjacent construction. Anchor transom bars at ends and mullions at head and sill. Place anchors as indicated.

2.3.6 Provisions for Hardware

Coordinate with Section 08 71 00 DOOR HARDWARE. Deliver hardware templates and hardware (except field-applied hardware) to the door manufacturer for use in fabrication of aluminum doors and frames. Cut, reinforce, drill, and tap doors and frames at the factory to receive template hardware. Provide doors to receive surface-applied hardware, except push plates, kick plates, and mop plates, with reinforcing only; drill and tap in the field. Provide hardware reinforcements of stainless steel or steel with hot-dipped galvanized finish, and secure with stainless steel screws.
2.3.7 Provisions for Glazing

Provide extruded aluminum snap-in glazing beads on interior side of doors. Provide extruded aluminum, theft-proof, snap-in glazing beads or fixed glazing beads on exterior or security side of doors. Glazing beads shall have vinyl insert glazing gaskets. Design glazing beads to receive glass of thickness indicated or specified.

2.3.8 Finishes

Provide exposed aluminum surfaces with factory finish of anodic coating.

2.3.8.1 Anodic Coating

Clean exposed aluminum surfaces and provide an anodized finish conforming to AA DAF45. Finish shall be electrolytically deposited color-anodized, designation AA-M10-C22-A34, Architectural Class II 0.4 mil to 0.7 mil. Color shall be dark bronze to match existing window wall system to remain.

PART 3 EXECUTION

3.1 INSTALLATION

Plumb, square, level, and align frames and framing members to receive doors, transoms and adjoining sidelights. Anchor frames to adjacent construction as indicated and in accordance with manufacturer's printed instructions. Anchor bottom of each frame to rough floor construction with 3/32 inch thick stainless steel angle clips secured to back of each jamb and to floor construction; use stainless steel bolts and expansion rivets for fastening clip anchors. Hang doors to produce clearances specified in paragraph entitled "Aluminum Doors," of this section. After erection and glazing, adjust doors and hardware to operate properly.

3.2 PROTECTION FROM DISSIMILAR MATERIALS

3.2.1 Dissimilar Metals

Where aluminum surfaces come in contact with metals other than stainless steel, zinc, or small areas of white bronze, protect from direct contact to dissimilar metals.

3.2.1.1 Protection

Provide one of the following systems to protect surfaces in contact with dissimilar metals:

a. Paint the dissimilar metal with one coat of heavy-bodied bituminous paint.

b. Apply a good quality elastomeric sealant between the aluminum and the dissimilar metal.

c. Paint the dissimilar metal with one coat of primer and one coat of aluminum paint.

d. Use a nonabsorptive tape or gasket in permanently dry locations.
3.2.2 Drainage from Dissimilar Metals

In locations where drainage from dissimilar metals has direct contact with aluminum, provide protective paint to prevent aluminum discoloration.

3.2.3 Masonry and Concrete

Provide aluminum surfaces in contact with mortar, concrete, or other masonry materials with one coat of heavy-bodied bituminous paint.

3.2.4 Wood or Other Absorptive Materials

Provide aluminum surfaces in contact with absorptive materials subject to frequent moisture, and aluminum surfaces in contact with treated wood, with two coats of aluminum paint or one coat of heavy-bodied bituminous paint. In lieu of painting the aluminum, the Contractor shall have the option of painting the wood or other absorptive surface with two coats of aluminum paint and sealing the joints with elastomeric sealant.

3.3 CLEANING

Upon completion of installation, clean door and frame surfaces in accordance with door manufacturer's written recommended procedure. Do not use abrasive, caustic, or acid cleaning agents.

3.4 PROTECTION

Protect doors and frames from damage and from contamination by other materials such as cement mortar. Prior to completion and acceptance of the work, restore damaged doors and frames to original condition, or replace with new ones.

-- End of Section --
PART 1   GENERAL

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 the basic designation only.

ARCHITECTURAL WOODWORK INSTITUTE (AWI)

AWI AWS (2009) Architectural Woodwork Standards

WINDOW AND DOOR MANUFACTURERS ASSOCIATION (WDMA)

WDMA I.S.1A (2011) Interior Architectural Wood Flush Doors


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. The following shall be submitted in accordance with 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Doors; G

Submit drawings or catalog data showing each type of door unit. Drawings and data shall indicate door type and construction, sizes, thickness, methods of assembly and veneer species.

SD-03 Product Data

Doors; G

Accessories

Water-resistant sealer

Sample warranty

SD-04 Samples

Door finish colors; G

Submit a minimum of three color selection samples, minimum 3 by 5 inches in size representing wood stain for selection by the Contracting Officer.

SD-06 Test Reports
Submit cycle-slam test report for doors tested in accordance with WDMA TM-7, and hinge loading resistance test report for doors tested in accordance with WDMA TM-8.

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver doors to the site in an undamaged condition and protect against damage and dampness. Stack doors flat under cover. Support on blocking, a minimum of 4 inch thick, located at each end and at the midpoint of the door. Store doors in a well-ventilated building so that they will not be exposed to excessive moisture, heat, dryness, direct sunlight, or extreme changes of temperature and humidity. Replace defective or damaged doors with new ones.

1.4 WARRANTY

Warrant doors free of defects as set forth in the door manufacturer's standard door warranty.

PART 2 PRODUCTS

2.1 DOORS

Provide door of the types, sizes, and designs indicated and specified free of urea-formaldehyde resins.

2.1.1 Interior Flush Doors

Provide particleboard core, Type II flush doors conforming to WDMA I.S.1A with faces of premium grade quarter sawn red oak veneer.

2.2 ACCESSORIES

2.2.1 Door Light Openings

Provide glazed openings with the manufacturer's standard wood moldings. Provide moldings for doors of the same wood species and color as the wood face veneers. Provide lip type moldings for flush doors.

Additional Hardware Reinforcement

Provide the minimum lock blocks to secure the specified hardware. The measurement of top, bottom, and intermediate rail blocks are a minimum 5 inch by full core width. Comply with the manufacturer's labeling requirements for reinforcement blocking, but not mineral material similar to the core.

2.3 FABRICATION

2.3.1 Marking

Stamp each door with a brand, stamp, or other identifying mark indicating quality and construction of the door.
2.3.2 Quality and Construction

Identify the standard on which the construction of the door was based.

2.3.3 Adhesives and Bonds

WDMA I.S.1A. Use Type II bond for interior doors. Provide a nonstaining adhesive on doors with a natural finish.

2.3.4 Finishes

2.3.4.1 Factory Finish

Provide doors finished at the factory by the door manufacturer as follows: AWI AWS Section 1500, specification for System No. 4 Conversion varnish alkyd urea or System No. 5 Vinyl catalyzed. The coating is AWI AWS premium, medium rubbed sheen, open grain effect. Use stain when required to produce the finish specified for color. Seal edges, cutouts, trim, and wood accessories, and apply two coats of finish compatible with the door face finish. Touch-up finishes that are scratched or marred, or where exposed fastener holes are filled, in accordance with the door manufacturer's instructions. Match color and sheen of factory finish using materials compatible for field application.

2.3.4.2 Color

Provide door finish colors as selected by the Contracting Officer from the color selection samples.

2.3.5 Water-Resistant Sealer

Provide manufacturer's standard water-resistant sealer compatible with the specified finish.

2.4 SOURCE QUALITY CONTROL

Meet or exceed the following minimum performance criteria utilizing standard mortise leaf hinges:

a. Cycle-slam: 200,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with the requirements of WDMA TM-7.

b. Hinge loading resistance: Averages of ten test samples not less than 700 pounds load when tested for direct screw withdrawal in accordance with WDMA TM-8 using a No. 12, 1-1/4 inch long, steel, fully threaded wood screw. Drill 5/32 inch pilot hole, use 1-1/2 inch opening around screw for bearing surface, and engage screw full, except for last 1/8 inch. Do not use a steel plate to reinforce screw area.

PART 3 EXECUTION

3.1 INSTALLATION

Seal cuts made on the job immediately after cutting using approved water-resistant sealer. Fit, trim, and hang doors with a 1/16 inch minimum, 1/8 inch maximum clearance at sides and top, and a 3/16 inch minimum, 1/4 inch maximum clearance over thresholds. Provide 3/8 inch minimum, 7/16 inch maximum clearance at bottom where no threshold occurs. Door warp shall not exceed 1/4 inch when measured in accordance with WDMA I.S.1A.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

**AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)**


AAMA 501 (2005) Methods of Test for Exterior Walls


AAMA 800 (2010) Voluntary Specifications and Test Methods for Sealants

**AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)**


**AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)**

ASCE 7 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASCE 7-10 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

**ASTM INTERNATIONAL (ASTM)**


Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference


ASTM E1886 (2013a) Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials


ASTM E331 (2000; R 2009) Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference


BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.4 (2013) Door Controls - Closers

GLASS ASSOCIATION OF NORTH AMERICA (GANA)


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

16 CFR 1201 Safety Standard for Architectural Glazing Materials

UNDERWRITERS LABORATORIES (UL)

UL 325 (2013) Door, Drapery, Gate, Louver, and Window Operators and Systems
1.2 ADMINISTRATIVE REQUIREMENTS

1.2.1 Pre-Installation Meetings

Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

Within 30 days of the Contract Award, submit the following for review and approval by the Contracting Officer:

- Listing of product installations
- Sample warranty
- Finish and color samples
- Manufacturer's catalog data
- Installation drawings
- Fabrication drawings for custom fabrications

Concurrently submit certified test reports showing compliance with specified performance characteristics and UL 325 for the following:

a. Air Infiltration ASTM E783
b. Wind Load (Resistance) AAMA 501
c. Deflection ASTM F1642
d. Condensation Resistance and Thermal Transmittance Performance Requirements
e. Water Infiltration ASTM E1105
f. Structural Requirements ASTM F1642

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals
  - Sample Warranty; G
  - Listing of Product Installations

SD-02 Shop Drawings
  - Installation Drawings; G
  - Fabrication Drawings; G

SD-03 Product Data
Manufacturer's Catalog Data; G
SD-04 Samples
Finish and Color Samples; G
SD-06 Test Reports
Certified Test Reports; G
SD-07 Certificates
Manufacturer's Product Warranty; G

1.4 QUALITY ASSURANCE

1.4.1 Qualifications

1.4.1.1 Installer Qualifications

Provide documentation of Installer experience as determined by Contractor to perform work of this section, who has specialized in the installation of work similar to that required for this project, and who is acceptable to product manufacturer.

1.4.1.2 Manufacturer Qualifications

Manufacturers are acceptable providing they meet the requirements specified in this section and project drawings.

Ensure manufacturer is capable of providing field service representation during construction, approving acceptable installer and approving application method.

1.4.2 Single Source Responsibility

When aluminum entrances are part of a building enclosure system, including storefront framing, windows and related products, provide building enclosure system products from a single source manufacturer.

Provide design, structural engineering, and custom fabrication for door portal system and supply of all components, materials, and products based on a single manufacturer of sole responsibility. Provision of products from numerous sources for site assembly without complete single source design and supply responsibility is not acceptable. Work items and components to be fabricated or supplied by single source are:

a. Door assemblies to be installed in door portal as specified in Section 08 11 16 ALUMINUM DOORS AND FRAMES.

b. Glazed wall to be constructed around door portal as specified in this Section.

c. Door operating hardware to be installed on or within door portal as specified in Section 08 71 00 DOOR HARDWARE.

d. Glass as specified in Section 08 81 00 GLAZING.
1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Ordering

Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

1.5.2 Packing, Shipping, Handling and Unloading

Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1.5.3 Storage and Protection

Store materials protected from exposure to harmful weather conditions. Handle storefront material and components to avoid damage. Protect storefront material against damage from elements, construction activities, and other hazards before, during and after storefront installation.

1.6 PROJECT / SITE CONDITIONS

1.6.1 Field Measurements

Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

This Specification includes aluminum frames, glass and glazing, and components.

Type of Aluminum Storefront System includes:

Impact Resistance System (at outer storefront section at entry vestibules); provide 4 1/2 inch by 2 inch, interior structural silicone glazed, high traffic/impact resistant applications.

System to be equal to series Trifab 451 UT as manufactured by Kawneer or equal by other manufacturers.

2.1.1 Design Requirements for Aluminum (Components)

Design, size components, and install system to withstand these loads without breakage, loss, failure of seals, product deterioration, and other defects, AAMA 503.

a. Dead and Live Loads: Determined by ASCE 7 and calculated in accordance with applicable codes.

b. Seismic Loads: Design and install system to comply with applicable seismic requirements for project location as defined by Section 1613 of the International Building Code (IBC).

c. Effects of applicable wind load acting inward and outward normal to plane of wall in accordance with ASTM E330.
d. Thermal Loads And Movement:
   (1) Ambient Temperature Range: 120 degrees F.
   (2) Material Surfaces Range: 180 degrees F.

e. Provide and install weatherstripping, exterior gaskets, sealants, and other accessories to resist water and air penetration.


g. Blast Mitigation Performance: Tested in accordance with ASTM F2248. The test specimen shall receive a minimum Low Level of Protection per UFC 4-010-01. Storefront system manufacturer shall calculate design pressures and manufacture system with the following assumptions:
   (1) Stand off distance is 75'-0".
   (2) Occupancy is Billeting.
   (3) Explosive weight II is the blast load.

2.1.1.1 Material Standard

ASTM B221 ASTM B221M; 6063-T5 alloy and tempered.

Provide door stile and rail face dimensions of all entrance doors, to a minimum, as follows:

<table>
<thead>
<tr>
<th>Vertical Stile</th>
<th>Top Rail</th>
<th>Bottom Rail</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-1/2 inches</td>
<td>3-1/2 inches</td>
<td>6-1/2 inches</td>
</tr>
</tbody>
</table>

Provide major portions of the door members at.125 inches nominal in thickness and glazing molding to be .050 inches thick.

2.1.1.2 Tolerances

Reference to tolerances for wall thickness and other cross-sectional dimensions of entrance members are nominal and in compliance with Aluminum Standards and Data, published by The Aluminum Association.

Provide either EPDM elastomeric extrusions or thermoplastic elastomer glazing gaskets. Structural silicone sealant is required.

2.1.2 Performance Requirements

2.1.2.1 Air Infiltration

Submit certified test reports showing compliance with specified performance characteristics as follows:

a. Maximum allowable infiltration, for a completed storefront system is not to exceed 0.06 cfm/square foot when tested in accordance with ASTM E1424 at differential static pressure of 6.24 psf.
2.1.2.2 Wind Loads

Provide completed storefront system capable of withstanding wind pressure loads, normal to the wall plane indicated, as required according to ASCE 7-10.

2.1.2.3 Deflection

Submit certified test reports showing compliance with specified performance characteristics as follows:

- The maximum allowable deflection in any member when tested in accordance with ASTM E330 with allowable stress in accordance with AA Specifications for Aluminum Structures is L/175 or 3/4 inches maximum.

2.1.2.4 Condensation Resistance and Thermal Transmittance

Submit certified test reports showing compliance with specified performance characteristics as follows:

a. U-Value Requirements:

   (1) Perform test in accordance with AAMA 1503 procedure and on the configuration specified therein.

   (2) Thermal Transmittance ("U" Value) maximum 0.70 BTU/hr/sf/deg F at 15 mph exterior wind.

b. CRF Class Requirements:

   (1) Perform test in accordance with AAMA 1503.

   (2) Condensation Resistance Factor Requirements (CRF) minimum 62 (frames) 68 (glass).

2.1.2.5 Water Infiltration

Submit certified test reports showing compliance with specified performance characteristics as follows:

System is designed to provide no uncontrolled water when tested in accordance with ASTM E331 at a static pressure of 8 psf.

2.2 FABRICATION

2.2.1 Entrance System Fabrication

Provide door corner construction consisting of mechanical clip fastening, SIGMA deep penetration plug welds and 1-1/8 inch long fillet welds inside and outside of all four corners. Provide hook-in type exterior glazing stop with EPDM glazing gaskets reinforced with non-stretchable cord. Provide interior glazing stop mechanically fastened to the frame member incorporating a silicone compatible spacer used with silicone sealant.

Accurately fit and secure joints and corners. Make joints hairline in appearance. Prepare components with internal reinforcement for door hardware. Arrange fasteners and attachments to conceal from view.
2.2.2 Shop Assembly

Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

2.2.2.1 Welding

Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

2.2.3 Fabrication Tolerance

Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

Fabricate aluminum entrances in accordance with entrance manufacturer's prescribed tolerances.

2.2.3.1 Material Cuts

Square to 1/32 inch off square, over largest dimension; proportionate amount of 1/32 inch on the two dimensions.

2.2.3.2 Maximum Offset At Consecutive Members

1/64 inch in alignment between two consecutive members in line, end to end.

2.2.3.3 Joints

(Between adjacent members in same assembly: Hairline and square to adjacent member.

2.2.3.4 Variation

In squaring diagonals for doors and fabricated assemblies: 1/16 inch.

2.2.3.5 Flatness

For doors and fabricated assemblies: plus/minus 1/16 inch of neutral plane.

2.3 ACCESSORIES

2.3.1 Fasteners

Provide stainless steel where exposed.

2.3.2 Perimeter Anchors

When steel anchors are used, provide insulation between steel material and aluminum material to prevent galvanic action.
2.3.3 Standard Entrance Hardware

2.3.3.1 Weatherstripping

Equip meeting stiles on pairs of doors with an adjustable astragal utilizing wool pile with polymeric fin.

Provide door weatherstripping on a single acting butt hung door and frame (single or pairs) comprised of a thermoplastic elastomer weatherstripping on a tubular shape with a semi-rigid polymeric backing. Provide Sill Sweep Strips: EPDM blade gasket sweep strip in an aluminum extrusion applied to the interior exposed surface of the bottom rail with concealed fasteners. (Provide as necessary to meet specified performance tests.)

2.3.3.2 Threshold

Provide extruded aluminum threshold, one piece per door opening, with ribbed surface per hardware schedule.

2.3.3.3 Closer

Provide surface closer only per ANSI/BHMA A156.4 per hardware schedule.

2.3.3.4 Security Lock/Dead Lock

Provide A/R MS 1850A lock with (2) A/R 1871 cylinder operated flush bolts per hardware schedule.

2.4 RELATED MATERIALS

2.4.1 Sealants

Refer to Section 07 92 00 JOINT SEALANTS. Ensure all sealants conform to AAMA 800.

2.4.2 Glass

Refer to Section 08 81 00 GLAZING.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Site Verification of Conditions

Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

Verify openings are sized to receive storefront system and sill plate is level in accordance with manufacturer's acceptable tolerances.

3.2 INSTALLATION

Install entrance system in accordance with manufacturer's instructions and AAMA storefront and entrance guide specifications manual. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities. Provide alignment attachments and
shims to permanently fasten system to building structure. Align assembly plumb and level, free of warp and twist. Maintain assembly dimensional tolerances aligning with adjacent work.

Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using nylatron pads or bituminous coating. Shim and brace aluminum system before anchoring to structure. Verify weep holes are open, and metal joints are sealed in accordance with manufacturer's installation instructions. Seal metal to metal joints using sealant recommended by system manufacturer.

3.2.1 Preparation

Field verify dimensions prior to fabricating assembly components.

3.2.1.1 Adjacent Surfaces Protection

Protect adjacent work areas and finish surfaces from damage during product installation.

3.2.1.2 Aluminum Surface Protection

Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

3.2.2 Related Products Installation Requirements

3.2.2.1 Sealants (Perimeter)

Refer to Section 07 92 00 JOINT SEALANTS.

3.2.2.2 Glass

Refer to Section 08 81 00 GLAZING.

3.2.2.3 Reference


3.3 PROTECTION AND CLEANING

3.3.1 Protection

Protect installed product's finish surfaces from damage during construction. Protect aluminum storefront system from damage from grinding and polishing compounds, plaster, lime, acid, cement, or other harmful contaminants.

3.3.2 Cleaning

Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to owner's acceptance. Remove construction debris from project site and legally dispose of debris.

3.4 WARRANTY

Submit three signed copies of manufacturer's product warranty for entrance system as follows:
Warranty Period: two years from Date of Substantial Completion of the project, provided that the Limited Warranty begins in no event later than six months from date of shipment by manufacturer.

Ensure Warranty language is identical to "As Approved" version of the sample warranty submitted and returned from the Contracting Officer.

-- End of Section --
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 the basic designation only.

ASTM INTERNATIONAL (ASTM)

ASTM E283 (2004; R 2012) Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)

ANSI/BHMA A156.1 (2013) Butts and Hinges
ANSI/BHMA A156.13 (2012) Mortise Locks & Latches Series 1000
ANSI/BHMA A156.16 (2013) Auxiliary Hardware
ANSI/BHMA A156.17 (2004; R 2010) Self Closing Hinges & Pivots
ANSI/BHMA A156.18 (2012) Materials and Finishes
ANSI/BHMA A156.2 (2011) Bored and Preassembled Locks and Latches
ANSI/BHMA A156.21 (2009) Thresholds
ANSI/BHMA A156.4 (2013) Door Controls - Closers
ANSI/BHMA A156.5 (2010) Auxiliary Locks and Associated Products
ANSI/BHMA A156.6 (2010) Architectural Door Trim
ANSI/BHMA A156.7 (2003; R 2009) Template Hinge Dimensions
ANSI/BHMA A156.8 (2010) Door Controls - Overhead Stops and Holders
BHMA A156.15 (2011) Release Devices Closer Holder, Electromagnetic and Electromechanical
BHMA A156.22 (2012) Door Gasketing and Edge Seal Systems

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS.

SD-02 Shop Drawings
   Hardware schedule; G
   Keying system

SD-03 Product Data
   Hardware items; G

SD-08 Manufacturer's Instructions
   Installation

SD-10 Operation and Maintenance Data
   Hardware Schedule items, Data Package 1; G
   Submit data package in accordance with Section 01730 OPERATION AND MAINTENANCE DATA.

SD-11 Closeout Submittals
   Key Bitting

1.3 HARDWARE SCHEDULE

Prepare and submit hardware schedule in the following form:
### Key Bitting Chart Requirements

Submit key bitting charts to the Contracting Officer prior to completion of the work. Include:

- Complete listing of all keys (AA1, AA2, etc.).
- Complete listing of all key cuts (AA1-123456, AA2-123458).
- Tabulation showing which key fits which door.
- Copy of floor plan showing doors and door numbers.
- Listing of 20 percent more key cuts than are presently required in each master system.

### Quality Assurance

#### Hardware Manufacturers and Modifications

Provide, as far as feasible, locks, hinges, and closers of one lock, hinge, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

#### Key Shop Drawings Coordination Meeting

Prior to the submission of the key shop drawing, the Contracting Officer, Contractor, Door Hardware subcontractor, using Activity and Base Locksmith shall meet to discuss key requirements for the facility.

### Delivery, Storage, and Handling

Deliver hardware in original individual containers, complete with necessary appurtenances including fasteners and instructions. Mark each individual container with item number as shown in hardware schedule. Deliver permanent keys and removable cores to the Contracting Officer, either directly or by certified mail. Deliver construction master keys with the locks.

### Part 2 Products

#### Template Hardware

Provide hardware to be applied to metal or to prefinished doors manufactured to template. Promptly furnish template information or templates to door and frame manufacturers. Conform to ANSI/BHMA A156.7 for template hinges. Coordinate hardware items to prevent interference with other hardware.
2.2 HARDWARE FOR FIRE DOORS AND EXIT DOORS

Provide all hardware necessary to meet the requirements of NFPA 80 for fire doors and NFPA 101 for exit doors, as well as to other requirements indicated, even if such hardware is not specifically mentioned under paragraph entitled "Hardware Schedule." Provide the label of Underwriters Laboratories, Inc. for such hardware listed in UL Bld Mat Dir or labeled and listed by another testing laboratory acceptable to the Contracting Officer.

2.3 HARDWARE ITEMS

Clearly and permanently mark with the manufacturer's name or trademark, hinges, locks, latches, exit devices, bolts and closers where the identifying mark will be visible after the item is installed. For closers with covers, the name or trademark may be beneath the cover.

2.3.1 Hinges

ANSI/BHMA A156.1, 4-1/2 by 4-1/2 inch unless otherwise indicated. Construct loose pin hinges for exterior doors and reverse-bevel interior doors so that pins will be nonremovable when door is closed. Other antifriction bearing hinges may be provided in lieu of ball-bearing hinges.

2.3.2 Spring Hinges

ANSI/BHMA A156.17.

2.3.3 Locks and Latches

2.3.3.1 Bored Locks and Latches

ANSI/BHMA A156.2, Series 4000, Grade 1.

2.3.4 Exit Alarm at Door #118

To be as manufactured by STI Inc., Model # STI-6400 or equal by other manufacturers.

2.3.5 Cylinders and Cores

Provide cylinders for new locks, including locks provided under other sections of this specification. Provide fully compatible cylinders with products of the Best Lock Corporation with interchangeable cores which are removable by a special control key. Factory set the cores with seven pin tumblers using the A4 system and F keyway. Submit a core code sheet with the cores. Provide master keyed cores in one system for this project. Provide construction interchangeable cores.

New Best cores shall be shipped to the following address:
78 CES/CEOIV/Lockshop
775 Macon Street
Robins Air Force Base, Georgia 31098

2.3.6 Keying System

Provide an extension of the existing keying system. Existing locks have interchangeable cores. Provide construction interchangeable cores.
Provide key cabinet as specified.

Provide sub-master keying system for the building, and keyed to the existing Best removable-core master and grand master keying systems. Key equipment spaces and mechanical rooms separately from the building systems, and keyed alike to the existing Best master and grand master systems for these doors.

2.3.7 Lock Trim

Cast, forged, or heavy wrought construction and commercial plain design.

2.3.7.1 Knobs and Roses

Conform to the minimum test requirements of ANSI/BHMA A156.2 and ANSI/BHMA A156.13 for knobs, roses, and escutcheons. For unreinforced knobs, roses, and escutcheons, provide 0.050 inch thickness. For reinforced knobs, roses, and escutcheons, provide outer shell of 0.035 inch thickness, and combined thickness of 0.070 inch, except for knob shanks, which are 0.060 inch thick.

2.3.7.2 Lever Handles

Provide lever handles in lieu of knobs. Conform to the minimum requirements of ANSI/BHMA A156.13 for mortise locks of lever handles for exit devices. Provide lever handle locks with a breakaway feature (such as a weakened spindle or a shear key) to prevent irreparable damage to the lock when force in excess of that specified in ANSI/BHMA A156.13 is applied to the lever handle. Provide lever handles return to within 1/2 inch of the door face.

2.3.7.3 Texture

Provide knurled or abrasive coated knobs or lever handles for doors which are accessible to blind persons and which lead to dangerous areas.

2.3.8 Keys

Furnish one file key, one duplicate key, and one working key for each key change and for each master and grand master. Furnish one additional working key for each lock of each keyed-alike group. Furnish a quantity of key blanks equal to 20 percent of the total number of file keys. Stamp each key with appropriate key control symbol and "U.S. property - Do not duplicate." Do not place room number on keys.

2.3.9 Closers

ANSI/BHMA A156.4, Series C02000, Grade 1, with PT 4C. Provide with brackets, arms, mounting devices, fasteners, full size covers, except at storefront mounting and other features necessary for the particular application. Size closers in accordance with manufacturer's recommendations, or provide multi-size closers, Sizes 1 through 6, and list sizes in the Hardware Schedule. Provide manufacturer's 10 year warranty.
2.3.9.1 Identification Marking

Engrave each closer with manufacturer's name or trademark, date of manufacture, and manufacturer's size designation located to be visible after installation.

2.3.10 Overhead Holders

ANSI/BHMA A156.8.

2.3.11 Closer Holder-Release Devices

BHMA A156.15.

2.3.12 Door Protection Plates

ANSI/BHMA A156.6.

2.3.12.1 Sizes of and Kick Plates

2 inch less than door width for single doors; one inch less than door width for pairs of doors. Provide 8 inch kick plates for flush doors.

2.3.13 Edge Guards

ANSI/BHMA A156.6, stainless steel, 48 inch height. Apply to lock stile at the following doors: #109, #115, #117B, and #119A.2.3.14 Door Stops and Silencers

ANSI/BHMA A156.16. Silencers Type L03011. Provide three silencers for each single door, two for each pair.

2.3.15 Thresholds

ANSI/BHMA A156.21. Use J35100, with vinyl or silicone rubber insert in face of stop, for exterior doors opening out, unless specified otherwise.

2.3.16 Weather Stripping Gasketing

BHMA A156.22. Provide the type and function designation where specified in paragraph entitled "Hardware Schedule". Provide a set to include head and jamb seals, sweep strips, . Air leakage of weather stripped doors not to exceed 1.25 cubic feet per minute of air per square foot of door area when tested in accordance with ASTM E283. Provide weather stripping with one of the following:

2.3.16.1 Extruded Aluminum Retainers

Extruded aluminum retainers not less than 0.050 inch wall thickness with vinyl, neoprene, silicone rubber, or polyurethane inserts. Provide bronze anodized aluminum.

2.3.17 Rain Drips

Extruded aluminum, not less than 0.08 inch thick, bronze anodized. Set drips in sealant and fasten with stainless steel screws.
2.3.17.1 Door Rain Drips
Approximately 1-1/2 inch high by 5/8 inch projection. Align bottom with bottom edge of door.

2.3.17.2 Overhead Rain Drips
Approximately 1-1/2 inch high by 2-1/2 inch projection, with length equal to overall width of door frame. Align bottom with door frame rabbet.

2.3.18 Special Tools
Provide special tools, such as spanner and socket wrenches and dogging keys, required to service and adjust hardware items.

2.4 FASTENERS
Provide fasteners of proper type, quality, size, quantity, and finish with hardware. Provide stainless steel or nonferrous metal fasteners that are exposed to weather. Provide fasteners of type necessary to accomplish a permanent installation.

2.5 FINISHES
ANSI/BHMA A156.18. Provide hardware in BHMA 630 finish (satin stainless steel), unless specified otherwise. Provide items not manufactured in stainless steel in BHMA 626 finish (satin chromium plated) over brass or bronze, except aluminum paint finish for surface door closers, and except BHMA 652 finish (satin chromium plated) for steel hinges. Provide hinges for exterior doors in stainless steel with BHMA 630 finish or chromium plated brass or bronze with BHMA 626 finish. Furnish exit devices in BHMA 626 finish in lieu of BHMA 630 finish. Match exposed parts of concealed closers to lock and door trim. Match hardware finish for aluminum doors to the doors.

2.6 KEY CABINET
ANSI/BHMA A156.5, Type E8341 (125 hooks).

3.1 INSTALLATION
Install hardware in accordance with manufacturers' printed installation instructions. Fasten hardware to wood surfaces with full-threaded wood screws or sheet metal screws. Provide machine screws set in expansion shields for fastening hardware to solid concrete and masonry surfaces. Provide toggle bolts where required for fastening to hollow core construction. Provide through bolts where necessary for satisfactory installation.

3.1.1 Weather Stripping Installation
Handle and install weather stripping to prevent damage. Provide full contact, weather-tight seals. Operate doors without binding.

3.1.1.1 Stop-Applied Weather Stripping
Fasten in place with color-matched sheet metal screws not more than 9 inch on center after doors and frames have been finish painted.
3.1.2 Threshold Installation

Extend thresholds the full width of the opening and notch end for jamb stops. Set thresholds in a full bed of sealant and anchor to floor with cadmium-plated, countersunk, steel screws in expansion sleeves.

3.2 FIRE DOORS AND EXIT DOORS

Install hardware in accordance with NFPA 80 for fire doors, NFPA 101 for exit doors.

3.3 HARDWARE LOCATIONS

SDI/DOOR A250.8, unless indicated or specified otherwise.


b. Mop Plates: Bottom flush with bottom of door.

3.4 FIELD QUALITY CONTROL

After installation, protect hardware from paint, stains, blemishes, and other damage until acceptance of work. Submit notice of testing 15 days before scheduled, so that testing can be witnessed by the Contracting Officer. Adjust hinges, locks, latches, bolts, holders, closers, and other items to operate properly. Demonstrate that permanent keys operate respective locks, and give keys to the Contracting Officer. Correct, repair, and finish, as directed, errors in cutting and fitting and damage to adjoining work.

3.5 HARDWARE SETS
Provide hardware for aluminum doors under this section. Deliver Hardware templates and hardware, except field-applied hardware to the aluminum door and frame manufacturer for use in fabricating the doors and frames.

### DOOR HARDWARE SCHEDULE

<table>
<thead>
<tr>
<th>Hardware</th>
<th>BHMA #</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HW-01</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA Hinge</td>
<td>A5111 4.5x4.5</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Push Plate</td>
<td>J301 4&quot;x16&quot;</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Pull Plate</td>
<td>J405 4&quot;x16&quot;</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Surface Closer</td>
<td>CO2011/CO2021 PT4D PT4H (SRI)</td>
<td>689</td>
</tr>
<tr>
<td>2 EA Kick Plate</td>
<td>J102 .050 8&quot;x2&quot; LDW</td>
<td>654</td>
</tr>
<tr>
<td>1 EA Wall Stop</td>
<td>L52101</td>
<td>630</td>
</tr>
<tr>
<td><strong>HW-02</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA Hinge</td>
<td>A5111 4.5X4.5</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Classroom Lock</td>
<td>F84</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Interchangeable Core</td>
<td>As Required</td>
<td>626</td>
</tr>
<tr>
<td>1 EA Surface Closer</td>
<td>CO2011/CO2021 PT4D PT4H (SRI)</td>
<td>689</td>
</tr>
<tr>
<td>1 EA Wall Stop</td>
<td>L52101</td>
<td>630</td>
</tr>
<tr>
<td><strong>HW-03</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA Hinge</td>
<td>A5111 4.5x4.5</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Storeroom Lock</td>
<td>F86</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Interchangeable Core</td>
<td>As Required</td>
<td>626</td>
</tr>
<tr>
<td>2 EA Kick Plate</td>
<td>J102 .050 8&quot;x2&quot; LDW</td>
<td>654</td>
</tr>
<tr>
<td>1 EA Wall Stop</td>
<td>L52101</td>
<td>630</td>
</tr>
<tr>
<td><strong>HW-04</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 EA Hinge</td>
<td>A5111 4.5X4.5 NRP</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Rim Cylinder</td>
<td>As Required</td>
<td>626</td>
</tr>
<tr>
<td>2 EA Offset Door Pull</td>
<td>J402 1&quot; Dia. X12&quot;</td>
<td>630</td>
</tr>
<tr>
<td>2 EA Surface Closer</td>
<td>CO2011/CO2021 PT4D PT4H (SRI)</td>
<td>689</td>
</tr>
<tr>
<td>1 EA Threshold</td>
<td>J35130 x 72&quot;</td>
<td>AL</td>
</tr>
<tr>
<td>1 EA Flush Bolt</td>
<td>LO4251</td>
<td>626</td>
</tr>
<tr>
<td><strong>HW-05</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 EA Hinge</td>
<td>A5111 4.5x4.5</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Office Lock</td>
<td>F82</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Interchangeable Core</td>
<td>As Required</td>
<td>626</td>
</tr>
<tr>
<td>1 EA Wall Stop</td>
<td>L52101</td>
<td>630</td>
</tr>
<tr>
<td><strong>HW-06</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 EA Hinge</td>
<td>A511 NRP</td>
<td>630</td>
</tr>
<tr>
<td>1 EA Storeroom Lock</td>
<td>F86</td>
<td>630</td>
</tr>
<tr>
<td>Quantity</td>
<td>Description</td>
<td>Code</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>1</td>
<td>Interchangeable Core</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Flush Bolt</td>
<td>LO4251</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hinge</td>
<td>A5111</td>
</tr>
<tr>
<td>1</td>
<td>Rim Cylinder</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Offset Door Pull</td>
<td>J402</td>
</tr>
<tr>
<td>1</td>
<td>Surface Closer</td>
<td>CO2011/CO2021</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PT4DPT4H (SRI)</td>
</tr>
<tr>
<td>1</td>
<td>Threshold</td>
<td>J35130 x 36&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Hinge</td>
<td>A511</td>
</tr>
<tr>
<td>1</td>
<td>Weather-stripping</td>
<td>ROY255</td>
</tr>
<tr>
<td>1</td>
<td>Door Sweep</td>
<td>ROY536</td>
</tr>
<tr>
<td>1</td>
<td>Threshold</td>
<td>J32129x36&quot;</td>
</tr>
<tr>
<td>1</td>
<td>Storeroom Lock</td>
<td>F86</td>
</tr>
<tr>
<td>1</td>
<td>Interchangeable Core</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Overhead Rain Drip</td>
<td></td>
</tr>
</tbody>
</table>

--- End of Section ---
PART 1  GENERAL

1.1  REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)


AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 7-10 (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

ASTM INTERNATIONAL (ASTM)


ASTM C509 (2006; R 2011) Elastomeric Cellular Preformed Gasket and Sealing Material


ASTM D2287 (2012) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds


ASTM E1300 (2012a; E 2012) Determining Load Resistance of Glass in Buildings

ASTM E413 (2010) Rating Sound Insulation
1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. The following shall be submitted in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Insulating Glass; G
Glazing Accessories; G

Manufacturer's descriptive product data, handling and storage recommendations, installation instructions, and cleaning instructions.

SD-04 Samples

Insulating Glass; G
Two 8 by 10 inch samples of each of the following: insulating glass units.

Three samples of each indicated material.

SD-07 Certificates

Insulating Glass; G

Certificates stating that the glass meets the specified requirements. Labels or manufacturers marking affixed to the glass will be accepted in lieu of certificates.

SD-08 Manufacturer's Instructions

Setting and sealing materials; G

Glass setting; G

Submit glass manufacturer's recommendations for setting and sealing materials and for installation of each type of glazing material specified.

1.3 SYSTEM DESCRIPTION

Glazing systems shall be fabricated and installed watertight and airtight to withstand thermal movement, blast loading and wind loading without glass breakage, gasket failure, deterioration of glazing accessories, and defects in the work. Glazed panels shall comply with the safety standards, as indicated in accordance with ANSI Z97.1. Glazed panels shall comply with indicated wind/snow loading in accordance with ASTM E1300.

1.3.1 Design Requirements for Glazing

Design, size components, and install glazing system to withstand these loads without breakage, loss, failure of seals, product deterioration, and other defects.


1.4 DELIVERY, STORAGE, AND HANDLING

Deliver products to the site in unopened containers, labeled plainly with manufacturers' names and brands. Store glass and setting materials in safe, enclosed dry locations and do not unpack until needed for installation. Handle and install materials in a manner that will protect them from damage.

1.5 ENVIRONMENTAL REQUIREMENTS

Do not start glazing work until the outdoor temperature is above 40 degrees F and rising, unless procedures recommended by the glass manufacturer and approved by the Contracting Officer are made to warm the glass and rabbet surfaces. Provide ventilation to prevent condensation of moisture on glazing work during installation. Do not perform glazing work during damp or rainy weather.
1.6 WARRANTY

1.6.1 Warranty for Insulating Glass Units

Warranty insulating glass units against development of material obstruction to vision (such as dust, fogging, or film formation on the inner glass surfaces) caused by failure of the hermetic seal, other than through glass breakage, for a 10-year period following acceptance of the work. Provide new units for any units failing to comply with terms of this warranty within 45 working days after receipt of notice from the Government.

PART 2 PRODUCTS

2.1 GLASS

ASTM C1036, unless specified otherwise. In doors and sidelights, provide safety glazing material conforming to 16 CFR 1201.

2.1.1 Annealed Glass

Annealed glass shall be Type I transparent flat type, Class 1 – tinted, Quality q3 – glazing select, 48 percent light transmittance, 0.51 percent shading coefficient, conforming to ASTM C1036. Tinted annealed glass will be the outer light of the insulated glazing unit. Color shall match existing exterior glass at window wall system.

2.1.2 Laminated Safety Glass

ASTM C1172, Kind LA fabricated from two nominal 1/8 inch pieces of Type I, Class 1, Quality q3, flat annealed transparent glass conforming to ASTM C1036. Flat glass shall be laminated together with a minimum of 0.090 inch thick, clear polyvinyl butyral interlayer. The total thickness shall be nominally 1/4 inch.

2.1.3 Tempered Glass

ASTM C1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class 1 (transparent) 2 (tinted heat absorbing), Quality q3, 1/4 inch thick, conforming to ASTM C1048 and GANA Standards Manual. Color shall be clear. Provide as outer light in insulated glazing units wherever safety glazing material is indicated or specified.

2.2 INSULATING GLASS UNITS

Two panes of glass separated by a dehydrated 1/2 inch airspace, filled with argon gas, and hermetically sealed. Non-residential glazed systems (including frames and glass) shall be certified by the National Fenestration Rating Council with a whole-window Solar Heat Gain Coefficient (SHGC) maximum of .25 determined according to NFRC 200 procedures and a U-factor maximum of .7 Btu/hr-ft²-F in accordance with NFRC 100. Glazing shall meet or exceed a luminous efficacy of 1.0. Glazed panels shall be rated for not less than 26 Sound Transmission Class (STC) when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413. Dimensional tolerances shall be as specified in IGMA TR-1200. Spacer shall be black, roll-formed, with bent or tightly welded or keyed and sealed joints to completely seal the spacer periphery and eliminate moisture and hydrocarbon vapor transmission into
airspace through the corners. Primary seal shall be compressed polyisobutylene and the secondary seal shall be a specially formulated silicone.

2.2.1 Buildings

The inner light shall be ASTM C1172, laminated safety clear annealed flat glass Type I, Class I, Quality q3, 1/4 inch thick. No. 3 surface (inside surface of interior panel) shall be coated with anti-reflective low-emissivity coating. The outer light shall be ASTM C1036, Type I, Class 2 (tinted heat absorbing), Quality q4, 1/4 inch thick and ASTM C1048, Grade B (fully tempered), Style I (uncoated), Type I, Class 2 (tinted heat absorbing), Quality q4, 1/4 inch thick at locations where safety glass is indicated.

2.3 SETTING AND SEALING MATERIALS

Provide as specified in the GANA Glazing Manual, IGMA TM-3000, IGMA TB-3001, and manufacturer's recommendations, unless specified otherwise herein. Do not use metal sash putty, nonskinning compounds, nonresilient preformed sealers, or impregnated preformed gaskets. Materials exposed to view and unpainted shall be gray or neutral color.

2.3.1 Sealants

Provide elastomeric and structural sealants.

2.3.1.1 Elastomeric Sealant

ASTM C920, Type S, Grade NS, Class 12.5, Use G. Use for channel or stop glazing metal sash. Sealant shall be chemically compatible with setting blocks, edge blocks, and sealing tapes, with sealants used in manufacture of insulating glass units. Color of sealant shall be black.

2.3.1.2 Structural Sealant

ASTM C1184, Type S.

2.3.2 Joint Backer

Joint backer shall have a diameter size at least 25 percent larger than joint width; type and material as recommended in writing by glass and sealant manufacturer.

2.3.3 Preformed Channels

Neoprene, vinyl, or rubber, as recommended by the glass manufacturer for the particular condition.

2.3.4 Sealing Tapes

Preformed, semisolid, PVC-based material of proper size and compressibility for the particular condition, complying with ASTM D2287. Use only where glazing rabbet is designed for tape and tape is recommended by the glass or sealant manufacturer. Provide spacer shims for use with compressible tapes. Tapes shall be chemically compatible with the product being set.
2.3.5 Setting Blocks and Edge Blocks

Closed-cell neoprene setting blocks shall be dense extruded type conforming to ASTM C509 and ASTM D395, Method B, Shore A durometer between 70 and 90. Edge blocking shall be Shore A durometer of 50 (plus or minus 5). Silicone setting blocks shall be required when blocks are in contact with silicone sealant. Profiles, lengths and locations shall be as required and recommended in writing by glass manufacturer. Block color shall be black.

2.3.6 Glazing Gaskets

Glazing gaskets shall be extruded with continuous integral locking projection designed to engage into metal glass holding members to provide a watertight seal during dynamic loading, building movements and thermal movements. Glazing gaskets for a single glazed opening shall be continuous one-piece units with factory-fabricated injection-molded corners free of flashing and burrs. Glazing gaskets shall be in lengths or units recommended by manufacturer to ensure against pull-back at corners. Glazing gasket profiles shall be as recommended by the manufacturer for the intended application.

2.3.6.1 Aluminum Framing Glazing Gaskets

Glazing gaskets for aluminum framing shall be permanent, elastic, non-shrinking, non-migrating, watertight and weathertight.

2.3.7 Accessories

Provide as required for a complete installation, including glazing points, clips, shims, angles, beads, and spacer strips. Provide noncorroding metal accessories. Provide primer-sealers and cleaners as recommended by the glass and sealant manufacturers.

PART 3 EXECUTION

3.1 PREPARATION

Preparation, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Determine the sizes to provide the required edge clearances by measuring the actual opening to receive the glass. Grind smooth in the shop glass edges that will be exposed in finish work. Leave labels in place until the installation is approved, except remove applied labels on heat-absorbing glass and on insulating glass units as soon as glass is installed. Securely fix movable items or keep in a closed and locked position until glazing compound has thoroughly set.

3.2 GLASS SETTING

Shop glaze or field glaze items to be glazed using glass of the quality and thickness specified or indicated. Glazing, unless otherwise specified or approved, shall conform to applicable recommendations in the GANA Glazing Manual, GANA Sealant Manual, IGMA TB-3001, IGMA TM-3000, and manufacturer's recommendations. Aluminum windows, may be glazed in conformance with one of the glazing methods described in the standards under which they are produced, except that face puttying with no bedding will not be permitted. Handle and install glazing materials in accordance
with manufacturer's instructions. Use beads or stops which are furnished
with items to be glazed to secure the glass in place. Verify products are
properly installed, connected, and adjusted.

3.2.1 Insulating Glass Units

Do not grind, nip, or cut edges or corners of units after the units have
left the factory. Springing, forcing, or twisting of units during setting
will not be permitted. Handle units so as not to strike frames or other
objects. Installation shall conform to applicable recommendations of
IGMA TB-3001 and IGMA TM-3000.

3.3 CLEANING

Clean glass surfaces and remove labels, paint spots, putty, and other
defacement as required to prevent staining. Glass shall be clean at the
time the work is accepted.

3.4 PROTECTION

Glass work shall be protected immediately after installation. Glazed
openings shall be identified with suitable warning tapes, cloth or paper
flags, attached with non-staining adhesives. Reflective glass shall be
protected with a protective material to eliminate any contamination of the
reflective coating. Protective material shall be placed far enough away
from the coated glass to allow air to circulate to reduce heat buildup and
moisture accumulation on the glass. Upon removal, separate protective
materials for reuse or recycling. Glass units which are broken, chipped,
cracked, abraded, or otherwise damaged during construction activities
shall be removed and replaced with new units.

3.5 WASTE MANAGEMENT

Disposal and recycling of waste materials, including corrugated cardboard
recycling, shall be in accordance with the Waste Management Plan. Upon
removal, separate protective materials and reuse or recycle. Close and
seal tightly all partly used sealant containers and store protected in
well-ventilated, fire-safe area at moderate temperature.

-- End of Section --
SECTION 09 22 00
SUPPORTS FOR GYPSUM BOARD
02/10

PART 1   GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)


ASTM C645 (2011a) Nonstructural Steel Framing Members

ASTM C754 (2011) Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Metal support systems; G,

Submit for the erection of metal framing, furring, and ceiling suspension systems. Indicate materials, sizes, thicknesses, and fastenings.

1.3  DELIVERY, STORAGE, AND HANDLING

Deliver materials to the job site and store in ventilated dry locations. Storage area shall permit easy access for inspection and handling. If materials are stored outdoors, stack materials off the ground, supported on a level platform, and fully protected from the weather. Handle materials carefully to prevent damage. Remove damaged items and provide new items.
PART 2   PRODUCTS

2.1   MATERIALS

Provide steel materials for metal support systems with galvanized coating ASTM A653/A653M, G-60; aluminum coating ASTM A463/A463M, T1-25; or a 55-percent aluminum-zinc coating.

2.1.1   Materials for Attachment of Gypsum Wallboard

2.1.1.1   Suspended and Furred Ceiling Systems

   ASTM C645.

2.1.1.2   Nonload-Bearing Wall Framing and Furring

   ASTM C645, but not thinner than 0.0329 inch thickness. The ASTM certified third party testing statement for equivalent thicknesses shall not apply.

2.1.1.3   Z-Furring Channels with Wall Insulation

   Not lighter than 22 gage galvanized steel, Z-shaped in depth as indicated on the drawings.

2.1.1.4   Backing Plates at Wall Mounted Items

   Minimum 16 gauge galvanized steel, 4 inches or more in height, and in lengths as required to span two or more stud spacings.

PART 3   EXECUTION

3.1   INSTALLATION

3.1.1   Systems for Attachment of Gypsum Wallboard

3.1.1.1   Suspended and Furred Ceiling Systems

   ASTM C754, except provide framing members 16 inches o.c. unless indicated otherwise.

3.1.1.2   Non-loadbearing Wall Framing and Furring

   ASTM C754, except as indicated otherwise.

3.1.1.3   Z-Furring Channels with Wall Insulation

   Install Z-furring channels vertically spaced not more than 1"-4" o.c. Locate Z-furring channels at interior and exterior corners in accordance with manufacturer's printed erection instructions. Fasten furring channels to masonry walls with powder-driven fasteners or hardened concrete steel nails through narrow flange of channel. Space fasteners not more than 1"-4" o.c.

ERECTION TOLERANCES

Provide framing members which will be covered by finish materials such as wallboard, within the following limits:

a. Layout of walls and partitions: 1/4 inch from intended position;

b. Plates and runners: 1/4 inch in 8 feet from a straight line;
c. Studs: 1/4 inch in 8 feet out of plumb, not cumulative; and

d. Face of framing members: 1/4 inch in 8 feet from a true plane.

Provide framing members which will be covered by ceramic tile set in dry-set mortar, latex-portland cement mortar, or organic adhesive within the following limits:

a. Layout of walls and partitions: 1/4 inch from intended position;

b. Plates and runners: 1/8 inch in 8 feet from a straight line;

c. Studs: 1/8 inch in 8 feet out of plumb, not cumulative; and

d. Face of framing members: 1/8 inch in 8 feet from a true plane.

-- End of Section --
PART 1   GENERAL

1.1   REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A108.11 (1992; Reaffirmed 2005) Specifications for Interior Installation of Cementitious Backer Units

ASTM INTERNATIONAL (ASTM)

ASTM C1002 (2007; R 2013) Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs


ASTM C475/C475M (2012) Joint Compound and Joint Tape for Finishing Gypsum Board

ASTM C840 (2011) Application and Finishing of Gypsum Board

ASTM C954 (2011) Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness


Rubber Deterioration - Surface Ozone
Cracking in a Chamber

ASTM D2394 (2005; R 2011) Simulated Service Testing of Wood and Wood-Base Finish Flooring


ASTM D624 (2000; R 2012) Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers


GYPSUM ASSOCIATION (GA)

GA 214 (2010) Recommended Levels of Gypsum Board Finish


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Cementitious backer units, G
Regular Gypsum Board, G
Moisture-Resistant Gypsum Board, G
Glass Mat Covered or Reinforced Gypsum Sheathing (Exterior), G
Glass Mat Covered or Reinforced Gypsum Sheathing Sealant, G
Impact Resistant Gypsum Board, G
(With and without moisture resistance)
Accessories

Submit for each type of gypsum board and for cementitious backer units.

SD-07 Certificates

Asbestos Free Materials; G

Certify that gypsum board types, gypsum backing board types, cementitious backer units, and joint treating materials do not contain asbestos.

1.3 DELIVERY, STORAGE, AND HANDLING

1.3.1 Delivery

Deliver materials in the original packages, containers, or bundles with each bearing the brand name, applicable standard designation, and name of manufacturer, or supplier.

1.3.2 Storage

Keep materials dry by storing inside a sheltered building. Where necessary to store gypsum board and cementitious backer units outside, store off the ground, properly supported on a level platform, and protected from direct exposure to rain, snow, sunlight, and other extreme weather conditions. Provide adequate ventilation to prevent condensation. Store per manufacturer's recommendations for allowable temperature and humidity range. Do not store panels near materials that may off gas or emit harmful fumes, such as kerosene heaters, fresh paint, or adhesives.

1.3.3 Handling

Neatly stack gypsum board and cementitious backer units flat to prevent sagging or damage to the edges, ends, and surfaces.

1.4 ENVIRONMENTAL CONDITIONS

1.4.1 Temperature

Maintain a uniform temperature of not less than 50 degrees F in the structure for at least 48 hours prior to, during, and following the application of gypsum board, cementitious backer units, and joint treatment materials, or the bonding of adhesives.

1.4.2 Exposure to Weather

Protect gypsum board and cementitious backer unit products from direct exposure to rain, snow, sunlight, and other extreme weather conditions.

1.5 QUALIFICATIONS

Furnish type of gypsum board work specialized by the installer with a minimum of 3 years of documented successful experience.
PART 2   PRODUCTS

2.1   MATERIALS

Conform to specifications, standards and requirements specified. Provide gypsum board types, gypsum backing board types, cementitious backing units, and joint treating materials manufactured from asbestos free materials only.

2.1.1   Gypsum Board

ASTM C1396/C1396M

Gypsum board may contain post-consumer or post-industrial recycled content.

2.1.1.1   Regular

48 inch wide, 5/8 inch thick, tapered edges. Provide tapered edge gypsum board in the following locations.

a. All ceilings scheduled to receive gypsum board except for moisture resistant gypsum board indicated on the Room Finish Schedule
b. All gypsum board interior wall applications from above finished ceiling where extending to deck above

2.1.2   Regular Water-Resistant Gypsum Board

ASTM C1396/C1396M

2.1.3   Glass Mat Covered or Reinforced Gypsum Sheathing

Exceeds physical properties of ASTM C1396/C1396M and ASTM C1177/C1177M. Provide 1/2 inch, gypsum sheathing. Provide gypsum board of with a noncombustible water-resistant core, with glass mat surfaces embedded to the gypsum core or reinforcing embedded throughout the gypsum core. Warrant gypsum sheathing board for at least twelve months against delamination due to direct weather exposure. Provide continuous, self adhered waterproof membrane to cover exterior face of sheathing. Seal all joints, seams, and penetrations with compatible sealant.

2.1.3.1   Glass Mat Covered or Reinforced Gypsum Sheathing Sealant

Provide sealant compatible with gypsum sheathing, rubber washers for masonry veneer anchors, and other associated cavity wall components such as anchors and through wall flashing. Provide sealants for gypsum sheathing board edge seams and veneer anchor penetrations recommended by the gypsum sheathing manufacturer and have the following performance requirements:

a. ASTM D412: Tensile Strength, 80 psi
b. ASTM D412: Ultimate Tensile Strength (maximum elongation), 170 psi
c. ASTM D624: Tear Strength, dieB, 27 ppi
d. ASTM D1149: Joint Movement Capability after 14 Days cure, plus or minus 50 percent.

2.1.4   Impact Resistant Gypsum Board

To be installed at all gypsum board interior wall applications below finished ceiling heights. See Room Finish Schedule and wall types for
additional moisture resistant requirement.

48 inch wide, 5/8 inch thick, tapered edges. Reinforced gypsum panel with imbedded fiber mesh or lexan backing testing in accordance with the following tests. Hard body impact test must attain a Level 2 performance in accordance with ASTM C1629/C1629M. Provide fasteners that meet manufacturer requirements and specifications stated within this section. Impact resistant gypsum board, when tested in accordance with ASTM E84, have a flame spread rating of 25 or less and a smoke developed rating of 50.

2.1.4.1 Structural Failure Test

ASTM E695 or ASTM D2394 for structural failure (drop penetration). ASTM E695 using a 60 lb sand filled leather bag, resisting no less than 300 ft. lb. cumulative impact energy before failure or ASTM D2394 using 5.5 inch hemispherical projectile resisting no less than 264 ft. lb. before failure. Provide test specimen stud spacing a minimum 16 inch on center.

2.1.4.2 Indentation Test

ASTM D5420 or ASTM D1037 for indentation resistance. ASTM D5420 using a 32 oz weight with a 5/8 inch hemispherical impacting head dropped once 3 feet creating not more than 0.137 inch indentation or ASTM D1037 using no less than 470 lb weight applied to the 0.438 inch diameter ball to create not more than a 0.0197 inch indentation depth.

2.1.5 Cementitious Backer Units

In accordance with the Tile Council of America (TCA) Handbook.

To be installed at all tile and solid surface wall and base applications and epoxy base applications.

2.1.6 Joint Treatment Materials

ASTM C475/C475M. Use all purpose joint and texturing compound containing inert fillers and natural binders, including lime compound. Pre-mixed compounds shall be free of antifreeze, vinyl adhesives, preservatives, biocides and other slow releasing compounds.

2.1.6.1 Embedding Compound

Specifically formulated and manufactured for use in embedding tape at gypsum board joints and compatible with tape, substrate and fasteners.

2.1.6.2 Finishing or Topping Compound

Specifically formulated and manufactured for use as a finishing compound.

2.1.6.3 All-Purpose Compound

Specifically formulated and manufactured to serve as both a taping and a finishing compound and compatible with tape, substrate and fasteners.

2.1.6.4 Setting or Hardening Type Compound

Specifically formulated and manufactured for use with fiber glass mesh tape.
2.1.6.5 Joint Tape

Use cross-laminated, tapered edge, reinforced paper, or fiber glass mesh tape recommended by the manufacturer.

2.1.7 Fasteners

2.1.7.1 Screws

ASTM C1002, Type "G", Type "S" or Type "W" steel drill screws for fastening gypsum board to gypsum board, steel framing members less than 0.033 inch thick. ASTM C954 steel drill screws for fastening gypsum board to steel framing members 0.033 to 0.112 inch thick. Provide cementitious backer unit screws with a polymer coating.

2.1.8 Adhesives

Adhesives are not permitted.

2.1.9 Accessories

ASTM C1047. Fabricate from corrosion protected steel or plastic designed for intended use. Accessories manufactured with paper flanges are not acceptable. Flanges shall be free of dirt, grease, and other materials that may adversely affect bond of joint treatment. Provide prefinished or job decorated materials.

2.1.10 Water

Provide clean, fresh, and potable water.

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Framing and Furring

Verify that framing and furring are securely attached and of sizes and spacing to provide a suitable substrate to receive gypsum board and cementitious backer units. Verify that all blocking, headers and supports are in place to support plumbing fixtures and to receive soap dishes, grab bars, towel racks, and similar items. Do not proceed with work until framing and furring are acceptable for application of gypsum board and cementitious backer units.

3.2 APPLICATION OF GYPSUM BOARD

Apply gypsum board to framing and furring members in accordance with ASTM C840 or GA 216 and the requirements specified. Apply gypsum board with separate panels in moderate contact; do not force in place. Stagger end joints of adjoining panels. Neatly fit abutting end and edge joints. Use gypsum board of maximum practical length; select panel sizes to minimize waste. Cut out gypsum board to make neat, close, and tight joints around openings. In vertical application of gypsum board, provide panels in lengths required to reach full height of vertical surfaces in one continuous piece. Lay out panels to minimize waste; reuse cutoffs whenever feasible. Treat edges of cutouts for plumbing pipes, screwheads, and joints with water-resistant compound as recommended by the gypsum board manufacturer. Provide type of gypsum board for use in each
system specified herein as indicated.

3.2.1 Application of Gypsum Board to Steel Framing and Furring

Apply in accordance with ASTM C840, System VIII or GA 216.

3.2.2 Exterior Application

Apply exterior gypsum board (such as at soffits) in accordance with ASTM C840, System XI or GA 216.

3.2.3 Glass Mat Covered or Fiber Reinforced Gypsum Sheathing

Apply gypsum sheathing in accordance with gypsum association publications GA 253. Follow gypsum sheathing manufacturer's requirements of design details for joints and fasteners and be properly installed to protect the substrate from moisture intrusion. Do not leave exposed surfaces of the gypsum sheathing beyond the manufacturer's recommendation without a weather barrier cladding. Provide continuous asphalt impregnated building felt over sheathing surface in shingle fashion with edges and ends lapped a minimum of 6 inch. Property flash the openings. Seal all joints, seams, and penetrations with a compatible silicone sealant.

3.2.4 Floating Interior Angles

Minimize framing by floating corners with single studs and drywall clips. Locate the attachment fasteners adjacent to ceiling and wall intersections in accordance with ASTM C840, System XII or GA 216, for single-ply applications of gypsum board to wood framing.

3.2.5 Control Joints

Install expansion and contraction joints in ceilings and walls in accordance with ASTM C840, System XIII or GA 216. Fill control joints between studs in fire-rated construction with fire safing insulation to match the fire-rating of construction.

3.2.6 Application of Impact Resistant Gypsum Board

Apply in accordance with applicable system of ASTM C840 as specified or GA 216. Follow manufacturers written instructions on how to cut, drill and attach board.

3.3 Application of Cementitious Backer Units

3.3.1 Application

At the installation of wall tile, solid surface shower surrounds and epoxy base, apply cementitious backer units in accordance with ANSI A108.11. Place a 15 lb asphalt impregnated, continuous felt paper membrane behind cementitious backer units, between backer units and studs or base layer of gypsum board. Place membrane with a minimum 6 inch overlap of sheets laid shingle style.

3.3.2 Joint Treatment

ANSI A108.11.
3.4 FINISHING OF GYPSUM BOARD

Tape and finish gypsum board in accordance with ASTM C840, GA 214 and GA 216. Finish plenum areas above ceilings to Level 1 in accordance with GA 214. Finish water resistant gypsum backing board, ASTM C1396/C1396M, to receive ceramic tile to Level 2 in accordance with GA 214. Finish walls and ceilings to receive a heavy-grade wall covering or heavy textured finish before painting to Level 3 in accordance with GA 214. Finish walls and ceilings without critical lighting to receive flat paints, light textures, or wall coverings to Level 4 in accordance with GA 214. Unless otherwise specified, finish all gypsum board walls, partitions and ceilings to Level 4 in accordance with GA 214. Provide joint, fastener depression, and corner treatment. Tool joints as smoothly as possible to minimize sanding and dust. Do not use fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer. Protect workers, building occupants, and HVAC systems from gypsum dust.

3.5 SEALING

Seal openings around pipes, fixtures, and other items projecting through gypsum board and cementitious backer units as specified in Section 07 92 00 JOINT SEALANTS Apply material with exposed surface flush with gypsum board or cementitious backer units.

3.6 PATCHING

Patch surface defects in gypsum board to a smooth, uniform appearance, ready to receive finishes.

3.7 WASTE MANAGEMENT

As specified in Waste Management Plan and as follows.

Identify manufacturer's policy for collection or return of remaining construction scrap, unused material, demolition scrap, and packaging material. Institute demolition and construction recycling to take advantage of manufacturer's programs. When such a service is not available, seek local recyclers to reclaim the materials.

-- End of Section --
1.1 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)


ASTM INTERNATIONAL (ASTM)


ASTM C648 (2004; R 2009) Breaking Strength of Ceramic Tile

MARBLE INSTITUTE OF AMERICA (MIA)


TILE COUNCIL OF NORTH AMERICA (TCNA)

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191

Americans with Disabilities Act (ADA)
Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
Detail Drawings; G

SD-03 Product Data
Tile; G,
Setting-Bed; G,
Mortar, Grout, and Adhesive; ; G,

SD-04 Samples
Tile; G
Accessories; G
Transition Strips; G
Grout; G

SD-07 Certificates
Tile
Mortar, Grout, and Adhesive

SD-08 Manufacturer's Instructions
Maintenance Instructions

SD-10 Operation and Maintenance Data
Installation; G

1.3 QUALITY ASSURANCE

Installers to be from a company specializing in performing this type of work and have a minimum of two years experience. Each type and color of tile to be provided from a single source. Each type and color of mortar, adhesive, and grout to be provided from the same source.

1.4 DELIVERY, STORAGE, AND HANDLING

Ship tiles in sealed packages and clearly marked with the grade, type of tile, producer identification, and country of origin. Deliver materials to the project site in manufacturer's original unopened containers with
seals unbroken and labels and hallmarks intact. Protect materials from weather, and store them under cover in accordance with manufacturer's printed instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

Do not perform ceramic tile work unless the substrate and ambient temperature is at least 50 degrees F and rising. Maintain temperature above 50 degrees F while the work is being performed and for at least 7 days after completion of the work. When temporary heaters are used, ventilate the area to the outside to avoid carbon dioxide damage to new tilework.

1.6 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1-year period.

1.7 EXTRA MATERIALS

Supply an extra 2 percent of each type tile used in clean and marked cartons.

PART 2 PRODUCTS

2.1 TILE

Furnish tiles that comply with ANSI A137.1 and are standard grade tiles. Provide a minimum breaking strength of 125 lbs. for wall tile and 250 lbs. for floor tile in accordance with ASTM C648. Provide floor tiles with a wet dynamic coefficient of friction (DCOF) value of 0.42 or greater when tested in accordance with ANSI A137.1 requirements. Provide glazed floor tile with a Class IV-Commercial classification as rated by the manufacturer when tested in accordance with ASTM C1027 for visible abrasion resistance as related to foot traffic. For materials like tile, accessories, and transition strips submit samples of sufficient size to show color range, pattern, type and joints. Submit manufacturer's catalog data.

2.1.1 Porcelain Tile

Furnish glazed, rectified porcelain tile, base and trim pieces. Provide tile with a V2 aesthetic classification. Blend tiles in factory and in packages to have same color range and continuous blend for installation. Provide nominal tile size(s) of 12 by 12 and 18 by 18 inch and 5/16 inch thick. Provide a 0.50 percent maximum water absorption in accordance with ASTM C373.

2.2 SETTING-BED

Submit manufacturer's catalog data. Compose the setting-bed of the following materials:

2.2.1 Portland Cement

Conform to ASTM C150/C150M for cement, Type I, white for wall mortar and gray for other uses.
2.2.2 Sand
Conform to ASTM C144 for sand.

2.2.3 Hydrated Lime
Conform to ASTM C206 for hydrated lime, Type S or ASTM C207, Type S.

2.3 WATER
Provide potable water.

2.4 MORTAR, GROUT, AND ADHESIVE
Submit certificates indicating conformance with specified requirements. Submit manufacturer's catalog data. Conform to the following for mortar, grout, adhesive, and sealant:

2.4.1 Dry-Set Portland Cement Mortar
TCNA Hdbk.

2.4.2 Latex-Portland Cement Mortar
TCNA Hdbk.

2.4.3 Ceramic Tile Grout
TCNA Hdbk; petroleum-free and plastic-free latex-portland cement grout.

2.4.4 Organic Adhesive
TCNA Hdbk, Type I. Water-resistant. Comply with applicable regulations regarding toxic and hazardous materials and as specified.

2.4.5 Sealants
Comply with applicable regulations regarding toxic and hazardous materials and as specified. Grout sealant must not change the color or alter the appearance of the grout.

2.4.6 Cementitious Backer Board
Provide cementitious backer units, for use as tile substrate in accordance with TCNA Hdbk. Furnish 1/2 inch thick cementitious backer units.

2.5 TRANSITION STRIPS
Provide marble transitions appropriate for conditions. Categorize marble Group A as classified by MIA Design Manual. Provide a fine sand-rubbed finish marble, beige in color. Provide minimum 12.0 marble abrasion when tested in accordance with ASTM C241/C241M. Provide transition strips that comply with 36 CFR 1191 requirements.

2.6 COLOR, TEXTURE, AND PATTERN
Provide color, pattern and texture as indicated on the drawings. Color listed is not intended to limit the selection of equal colors from other manufacturers. Provide floor patterns as specified on the drawings.
PART 3  EXECUTION

3.1  PREPARATORY WORK AND WORKMANSHIP

Inspect surface to receive tile in conformance to the requirements of TCNA Hdbk for surface conditions for the type setting bed specified and for workmanship. Provide variations of tiled surfaces that fall within maximum values shown below:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>WALLS</th>
<th>FLOORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry-Set Mortar</td>
<td>1/8 inch in 8 ft.</td>
<td>1/8 inch in 10 ft.</td>
</tr>
<tr>
<td>Latex Portland Cement Mortar</td>
<td>1/8 inch in 8 ft.</td>
<td>1/8 inch in 10 ft.</td>
</tr>
</tbody>
</table>

3.2  GENERAL INSTALLATION REQUIREMENTS

Do not start tile work until roughing in for mechanical and electrical work has been completed and tested, and built-in items requiring membrane waterproofing have been installed and tested. Close space, in which tile is being set, to traffic and other work. Keep closed until tile is firmly set. Do not start floor tile installation in spaces requiring wall tile until after wall tile has been installed. Apply tile in colors and patterns indicated in the area shown on the drawings. Install tile with the respective surfaces in true even planes to the elevations and grades shown. Provide special shapes as required for sills, jambs, recesses, offsets, external corners, and other conditions to provide a complete and neatly finished installation. Solidly back tile bases and coves with mortar. Do not walk or work on newly tiled floors without using kneeling boards or equivalent protection of the tiled surface. Keep traffic off horizontal portland cement mortar installations for at least 72 hours. Keep all traffic off epoxy installed floors for at least 40 hours after grouting, and heavy traffic off for at least 7 days, unless otherwise specifically authorized by manufacturer. Dimension and draw detail drawings at a minimum scale of 1/4 inch = 1 foot. Include drawings of pattern at inside corners, outside corners, termination points and location of all equipment items such as thermostats, switch plates, mirrors and toilet accessories mounted on surface. Submit drawings showing ceramic tile pattern elevations and floor plans. Submit manufacturer's preprinted installation instructions.

3.3  INSTALLATION OF WALL TILE

Install wall tile in accordance with the TCNA Hdbk, method W244C and with grout joints of 1/8 inch. Install thinner wall tile flush with thicker wall tile applied on same wall and provide installation materials as recommended by the tile and setting materials manufacturer's to achieve flush installation.

3.3.1  Dry-Set Mortar and Latex-Portland Cement Mortar

Use Latex Portland Cement when installing porcelain ceramic tile.

3.3.2  Ceramic Tile Grout

Prepare and install ceramic tile grout in accordance with TCNA Hdbk.
Provide and apply manufacturer's standard product for sealing grout joints in accordance with manufacturer's recommendations.

3.4 INSTALLATION OF FLOOR TILE

Install floor tile in accordance with TCNA Hdbk method F113 and with grout joints of 1/8 inch.

3.4.1 Dry-Set and Latex-Portland Cement

Use Latex-Portland cement mortar to install tile directly over properly cured, plane, clean concrete slabs in accordance with TCNA Hdbk. Use Latex Portland cement when installing porcelain ceramic tile.

3.4.2 Ceramic Tile Grout

Prepare and install ceramic tile grout in accordance with TCNA Hdbk. Provide and apply manufacturer's standard product for sealing grout joints in accordance with manufacturer's recommendations.

3.5 INSTALLATION OF TRANSITION STRIPS

Install transition strips where indicated, in a manner similar to that of the ceramic tile floor and as recommended by the manufacturer. Provide thresholds full width of the opening. Install head joints at ends not exceeding 1/4 inch in width and grouted full.

3.6 EXPANSION JOINTS

3.6.1 Walls

Provide expansion joints at control joints in backing material. Wherever backing material changes, install an expansion joint to separate the different materials.

3.6.2 Floors

Provide expansion joints over construction joints, control joints, and expansion joints in concrete slabs. Provide expansion joints where tile abuts restraining surfaces such as perimeter walls, curbs and columns and at intervals of 24 to 36 feet each way in large interior floor areas. Extend expansion joints through setting-beds and fill.

3.7 CLEANING AND PROTECTING

Upon completion, thoroughly clean tile surfaces in accordance with manufacturer's approved cleaning instructions. Do not use acid for cleaning glazed tile. Clean floor tile with resinous grout or with factory mixed grout in accordance with printed instructions of the grout manufacturer. After the grout has set, provide a protective coat of a noncorrosive soap or other approved method of protection for tile wall surfaces. Cover tiled floor areas with building paper before foot traffic is permitted over the finished tile floors. Provide board walkways on tiled floors that are to be continuously used as passageways by workmen. Replace damaged or defective tiles. Submit copy of manufacturer's printed maintenance instructions.

-- End of Section --
SECTION 09 51 00
ACOUSTICAL CEILINGS
08/10

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)


ASTM C423 (2009a) Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method


ASTM C834 (2014) Latex Sealants

ASTM E1264 (2014) Acoustical Ceiling Products

ASTM E1414/E1414M (2011a; E 2014) Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum

ASTM E1477 (1998a; R 2013) Luminous Reflectance
1.2 SYSTEM DESCRIPTION

Provide sound controlling units mechanically mounted on a ceiling suspension system for acoustical treatment. The unit size, texture, finish, and color must be as specified. The location and extent of acoustical treatment shall be as shown on the approved detail drawings. Submit drawings showing suspension system, method of anchoring and fastening, details, and reflected ceiling plan. Coordinate with paragraph RECLAMATION PROCEDURES for reclamation of mineral fiber acoustical ceiling panels to be removed from the job site.

1.2.1 Ceiling Attenuation Class and Test

Provide a ceiling system with an attenuation class (CAC) of 35 for ACT-1 when determined in accordance with ASTM E1414/E1414M. Provide fixture attenuators over light fixtures and other ceiling penetrations, and provide acoustical blanket insulation adjacent to partitions, as required to achieve the specified CAC. Provide test ceiling continuous at the partition and assembled in the suspension system in the same manner that the ceiling will be installed on the project.

1.2.2 Ceiling Sound Absorption

Determine the Noise Reduction Coefficient (NRC) in accordance with ASTM C423 Test Method.

1.2.3 Light Reflectance

Determine light reflectance factor in accordance with ASTM E1477 Test Method.

1.2.4 Other Submittals Requirements

The following shall be submitted:

a. Manufacturer's data indicating percentage of recycle material in acoustic ceiling tiles to verify affirmative procurement compliance.

b. Total weight and volume quantities of acoustic ceiling tiles with recycle material.

c. Manufacturer's catalog showing UL classification of fire-rated ceilings giving materials, construction details, types of floor and roof constructions to be protected, and UL design number and fire protection time rating for each required floor or roof construction and acoustical ceiling assembly.

d. Reports by an independent testing laboratory attesting that acoustical ceiling systems meet specified sound transmission requirements. Data attesting to conformance of the proposed system to Underwriters Laboratories requirements for the fire endurance rating listed in UL Fire Resistance may be submitted in lieu of test reports.
e. Certificate attesting that the mineral based acoustical units furnished for the project contain recycled material and showing an estimated percent of such material.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
  Approved Detail Drawings; G

SD-03 Product Data
  Acoustical Ceiling Systems; G
  Certification

SD-04 Samples
  Acoustic Ceiling Tiles; G

SD-06 Test Reports
  Ceiling Attenuation Class and Test; G

SD-07 Certificates
  Acoustic Ceiling Tiles; G

1.4 DELIVERY, STORAGE. AND HANDLING

Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked. Carefully handle and store materials in dry, watertight enclosures. Immediately before installation, store acoustical units for not less than 24 hours at the same temperature and relative humidity as the space where they will be installed in order to assure proper temperature and moisture acclimation.

1.5 ENVIRONMENTAL REQUIREMENTS

Maintain a uniform temperature of not less than 60 degrees F nor more than 85 degrees F and a relative humidity of not more than 70 percent for 24 hours before, during, and 24 hours after installation of acoustical units.

1.6 SCHEDULING

Complete and dry interior finish work such as plastering, concrete and terrazzo work before ceiling installation. Complete mechanical, electrical, and other work above the ceiling line; install and start operating heating, ventilating, and air conditioning systems in order to maintain temperature and humidity requirements.
1.7 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period. Include an agreement to repair or replace acoustical panels that fail within the warranty period in the standard performance guarantee or warranty. Failures include, but are not limited to, sagging and warping of panels; rusting and manufacturers defects of grid system.

1.8 EXTRA MATERIALS

Furnish spare tiles, from the same lot as those installed, of each color at the rate of 5 tiles for each 1000 tiles installed.

PART 2 PRODUCTS

2.1 ACOUSTICAL UNITS

Submit two samples of each type of acoustical unit and each type of suspension grid tee section showing texture, finish, and color. Conform acoustical units to ASTM E1264, Class A, and the following requirements:

2.1.1 Units for Exposed-Grid System ACT-1

2.1.1.1 Type

Type III (non-asbestos mineral fiber with painted finish)

2.1.1.2 Flame Spread

Class A, 25 or less

2.1.1.3 Pattern

C

2.1.1.4 Minimum NRC

0.55 in open office areas; and in conference rooms and other rooms as designated.

2.1.1.5 Minimum Light Reflectance Coefficient

LR-1, 0.75 or greater

2.1.1.6 Nominal Size

24 by 24 inch

2.1.1.7 Edge Detail

Reveal angled tegular

2.1.1.8 Finish

Factory-applied standard finish.

2.1.1.9 Minimum CAC

35
2.2 SUSPENSION SYSTEM

Provide standard exposed-grid direct hung, concealed, upward access as shown on drawings suspension system conforming to ASTM C635/C635M for heavy-duty systems. Provide surfaces exposed to view of aluminum or steel with a factory-applied white color baked-enamel finish. Provide wall molding having a flange of not less than 15/16 inch. Provide inside and outside corner caps standard mitered corners. Suspended ceiling framing system must have the capability to support the finished ceiling, light fixtures, air diffusers, and accessories, as shown. Provide a suspension system with a maximum deflection of 1/360 of the span length.

2.3 HANGERS

Provide hangers and attachment capable of supporting a minimum 300 pound ultimate vertical load without failure of supporting material or attachment.

2.3.1 Wires

Conform wires to ASTM A641/A641M, Class 1, 0.08 inch (12 gauge)

2.3.2 Straps

Provide straps of 1 by 3/16 inch galvanized steel conforming to ASTM A653/A653M, with a light commercial zinc coating or ASTM A1008/A1008M with an electrodeposited zinc coating conforming to ASTM B633, Type RS.

2.3.3 Rods

Provide 3/16 inch diameter threaded steel rods, zinc or cadmium coated.

2.3.4 Eyebolts

Provide eyebolts of weldless, forged-carbon-steel, with a straight-shank in accordance with ASTM A489. Eyebolt size must be a minimum 1/4 inch, zinc coated.

2.3.5 Masonry Anchorage Devices

Comply with ASTM C636/C636M for anchorage devices for eyebolts or machine screws.

2.4 ADHESIVE

Use adhesive as recommended by tile manufacturer.

2.5 FINISHES

Use manufacturer's standard textures, patterns and finishes as specified for acoustical units and suspension system members. Treat ceiling suspension system components to inhibit corrosion.

2.6 COLORS AND PATTERNS

Use colors and patterns for acoustical units and suspension system components as indicated on the drawings.
PART 3 EXECUTION

3.1 INSTALLATION

Examine surfaces to receive directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of the work. Rid areas, where acoustical units will be cemented, of oils, form residue, or other materials that reduce bonding capabilities of the adhesive. Complete and dry interior finish work such as plastering, concrete, and terrazzo work before installation. Complete and approve mechanical, electrical, and other work above the ceiling line prior to the start of acoustical ceiling installation. Provide acoustical work complete with necessary fastenings, clips, and other accessories required for a complete installation. Do not expose mechanical fastenings in the finished work. Lay out hangers for each individual room or space. Provide hangers to support framing around beams, ducts, columns, grilles, and other penetrations through ceilings. Keep main runners and carrying channels clear of abutting walls and partitions. Provide at least two main runners for each ceiling span. Wherever required to bypass an object with the hanger wires, install a subsuspension system so that all hanger wires will be plumb.

3.1.1 Suspension System

Install suspension system in accordance with ASTM C636/C636M and as specified herein. Do not suspend hanger wires or other loads from underside of steel decking.

3.1.1.1 Plumb Hangers

Install hangers plumb and not pressing against insulation covering ducts and pipes. Where lighting fixtures are supported from the suspended ceiling system, provide hangers at a minimum of four hangers per fixture and located not more than 6 inch from each corner of each fixture.

3.1.1.2 Splayed Hangers

Where hangers must be splayed (sloped or slanted) around obstructions, offset the resulting horizontal force by bracing, countersplaying, or other acceptable means.

3.1.2 Wall Molding

Provide wall molding where ceilings abut vertical surfaces. Miter corners where wall moldings intersect or install corner caps. Secure wall molding not more than 3 inch from ends of each length and not more than 16 inch on centers between end fastenings. Provide wall molding springs at each acoustical unit in semi-exposed or concealed systems.

3.1.3 Acoustical Units

Install acoustical units in accordance with the approved installation instructions of the manufacturer. Ensure that edges of acoustical units are in close contact with metal supports, with each other, and in true alignment. Arrange acoustical units so that units less than one-half
width are minimized. Hold units in exposed-grid system in place with manufacturer's standard hold-down clips, if units weigh less than 1 psf or if required for fire resistance rating.

3.1.4 Caulking

Seal all joints around pipes, ducts or electrical outlets penetrating the ceiling. Apply a continuous ribbon of acoustical sealant on vertical web of wall or edge moldings.

3.1.5 Adhesive Application

Wipe back of tile to remove accumulated dust. Daub acoustical units on back side with four equal daubs of adhesive. Apply daubs near corners of tiles. Ensure that contact area of each daub is at least 2 inch diameter in final position. Press units into place, aligning joints and abutting units tight and uniform without differences in joint widths.

3.2 CLEANING

Following installation, clean dirty or discolored surfaces of acoustical units and leave them free from defects. Remove units that are damaged or improperly installed and provide new units as directed.

3.3 RECLAMATION PROCEDURES

Neatly stack ceiling tile, designated for recycling by the Contracting Officer, on 4 by 4 foot pallets not higher than 4 foot. Panels must be completely dry. Shrink wrap and symmetrically stack pallets on top of each other without falling over.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D4078 (2002; R 2008) Water Emulsion Floor Polish
ASTM F1861 (2008; E 2012; R 2012) Resilient Wall Base
ASTM F1869 (2011) Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
ASTM F2170 (2011) Determining Relative Humidity in Concrete Floor Slabs in situ Probes
ASTM F710 (2011) Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


1.2 SYSTEM DESCRIPTION

1.2.1 Fire Resistance Requirements

Provide a critical radiant flux of not less than 0.45 watts per square centimeter (Class 1) for flooring in corridors and exits when tested in accordance with ASTM E648 or NFPA 253.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation
identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Resilient Flooring and Accessories; G

SD-03 Product Data
   Resilient Flooring and Accessories
   Adhesives
   Wall Base

SD-04 Samples
   Resilient Flooring and Accessories; G

SD-06 Test Reports
   Moisture, Alkalinity and Bond Tests; G

SD-08 Manufacturer's Instructions
   Surface Preparation; G
   Installation; G

SD-10 Operation and Maintenance Data
   Resilient Flooring and Accessories; G

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the building site in original unopened containers bearing the manufacturer's name, style name, pattern color name and number, production run, project identification, and handling instructions. Store materials in a clean, dry, secure, and well-ventilated area free from strong contaminant sources and residues with ambient air temperature maintained above 68 degrees F and below 85 degrees F, stacked according to manufacturer's recommendations. Remove resilient flooring products from packaging to allow ventilation prior to installation. Protect materials from the direct flow of heat from hot-air registers, radiators and other heating fixtures and appliances. Observe ventilation and safety procedures specified in the MSDS. Do not store rubber surface products with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store exposed rubber surface materials in occupied spaces.

1.5 ENVIRONMENTAL REQUIREMENTS

Maintain areas to receive resilient flooring at a temperature above 68 degrees F and below 85 degrees F for 3 days before application, during application and 2 days after application, unless otherwise directed by the flooring manufacturer for the flooring being installed. Maintain a minimum temperature of 55 degrees F thereafter. Provide adequate ventilation to remove moisture from area and to comply with regulations limiting concentrations of hazardous vapors.
1.6 SCHEDULING

Schedule resilient flooring application after the completion of other work which would damage the finished surface of the flooring.

1.7 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period.

1.8 EXTRA MATERIALS

Provide extra flooring material of each color and pattern at the rate of 5 tiles for each 1000 tiles installed. Provide extra wall base material composed of 20 linear feet of each type, color and pattern. Package all extra materials in original properly marked containers bearing the manufacturer's name, brand name, pattern color name and number, production run, and handling instructions. Provide extra materials from the same lot as those installed. Leave extra stock at the site in location assigned by Contracting Officer.

PART 2 PRODUCTS

2.1 VINYL COMPOSITION TILE VCT-1

Conform to ASTM F1066 Class 2, through pattern tile, Composition 1, asbestos-free, 12 inch square and 1/8 inch thick. Provide color and pattern uniformly distributed throughout the thickness of the tile.

2.2 WALL BASE

Conform to ASTM F1861, Type TS (vulcanized thermoset rubber), Style A (straight - installed with carpet) and Style B (coved - installed with resilient flooring). Provide 4 inch high and a minimum 1/8 inch thick wall base. Provide job formed corners in matching height, shape, and color.

2.3 MOULDING

Provide tapered mouldings of vinyl or rubber and types as indicated on the drawings. Provide vertical lip on moulding of maximum 1/4 inch. Provide bevel change in level between 1/4 and 1/2 inch with a slope no greater than 1:2.

2.4 ADHESIVES

Provide adhesives for flooring, base and accessories as recommended by the manufacturer and comply with local indoor air quality standards. Submit manufacturer's descriptive data, documentation stating physical characteristics, and mildew and germicidal characteristics.

2.5 SURFACE PREPARATION MATERIALS

Provide surface preparation materials, such as lining felt, and floor crack fillers as recommended by the flooring manufacturer for the subfloor conditions. Use the following substrates:

a. Concrete.
2.6  POLISH/FINISH

Provide polish finish as recommended by the manufacturer and conform to ASTM D4078 for polish.

2.7  CAULKING AND SEALANTS

Provide caulking and sealants in accordance with Section 07 92 00 JOINT SEALANTS.

2.8  MANUFACTURER'S COLOR, PATTERN AND TEXTURE

Provide color, pattern and texture for resilient flooring and accessories as indicated on the drawings. Color listed is not intended to limit the selection of equal colors from other manufacturers. Provide floor patterns as specified on the drawings. Provide flooring in any one continuous area from same production run with same shade and pattern. Submit manufacturer's descriptive data and three samples of each indicated color and type of flooring, base, mouldings, and accessories sized a minimum 2-1/2 by 4 inch.

PART 3  EXECUTION

3.1  EXAMINATION

Examine and verify that site conditions are in agreement with the design package. Report all conditions that will prevent a proper installation. Do not take any corrective action without written permission from the Government. Work will proceed only when conditions have been corrected and accepted by the installer. Submit manufacturer's printed installation instructions for all flooring materials and accessories, including preparation of substrate, seaming techniques, and recommended adhesives.

3.2  SURFACE PREPARATION

Provide a smooth, true, level plane for surface preparation of the flooring, except where indicated as sloped. Floor to be flat to within 3/16 inch in 10 feet. Prepare subfloor in accordance with flooring manufacturer's recommended instructions. Prepare the surfaces of lightweight concrete slabs (as defined by the flooring manufacturer) as recommended by the flooring manufacturer. Comply with ASTM F710 for concrete subfloor preparation. Floor fills or toppings may be required as recommended by the flooring manufacturer. Install underlayments, when required by the flooring manufacturer, in accordance with manufacturer's recommended printed installation instructions. Before any work under this section is begun, correct all defects such as rough or scaling concrete, chalk and dust, cracks, low spots, high spots, and uneven surfaces. Repair all damaged portions of concrete slabs as recommended by the flooring manufacturer. Remove concrete curing and sealer compounds from the slabs, other than the type that does not adversely affect adhesion. Remove paint, varnish, oils, release agents, sealers, waxes, and adhesives, as required by the flooring product in accordance with manufacturer's printed installation instructions.

3.3  MOISTURE, ALKALINITY AND BOND TESTS

Determine the suitability of the concrete subfloor for receiving the resilient flooring with regard to moisture content and pH level by moisture and alkalinity tests. Conduct moisture testing in accordance
with ASTM F1869 or ASTM F2170, unless otherwise recommended by the flooring manufacturer. Conduct alkalinity testing as recommended by the flooring manufacturer. Determine the compatibility of the resilient flooring adhesives to the concrete floors by a bond test in accordance with the flooring manufacturer's recommendations. Submit copy of test reports for moisture and alkalinity content of concrete slab, and bond test stating date of test, person conducting the test, and the area tested.

3.4 PLACING VINYL COMPOSITION TILES

Install tile flooring and accessories in accordance with manufacturer's printed installation instructions. Prepare and apply adhesives in accordance with manufacturer's directions. Keep tile lines and joints square, symmetrical, tight, and even. Keep each floor in true, level plane, except where slope is indicated. Vary edge width as necessary to maintain full-size tiles in the field, no edge tile to be less than one-half the field tile size, except where irregular shaped rooms make it impossible. Cut flooring to fit around all permanent fixtures, built-in furniture and cabinets, pipes, and outlets. Cut, fit, and scribe edge tile to walls and partitions after field flooring has been applied.

3.5 PLACING MOULDING

Provide moulding where flooring termination is higher than the adjacent finished flooring and at transitions between different flooring materials. When required, locate moulding under door centerline. Moulding is not required at doorways where thresholds are provided. Secure moulding with adhesive as recommended by the manufacturer. Prepare and apply adhesives in accordance with manufacturer's printed directions.

3.6 PLACING WALL BASE

Install wall base in accordance with manufacturer's printed installation instructions. Prepare and apply adhesives in accordance with manufacturer's printed directions. Tighten base joints and make even with adjacent resilient flooring. Fill voids along the top edge of base at masonry walls with caulk. Roll entire vertical surface of base with hand roller, and press toe of base with a straight piece of wood to ensure proper alignment. Avoid excess adhesive in corners.

3.7 CLEANING

Immediately upon completion of installation of flooring in a room or an area, dry/clean the flooring and adjacent surfaces to remove all surplus adhesive. Clean flooring as recommended in accordance with manufacturer's printed maintenance instructions and within the recommended time frame. As required by the manufacturer, apply the recommended number of coats and type of polish and/or finish in accordance with manufacturer's written instructions.

3.8 PROTECTION

From the time of installation until acceptance, protect flooring from damage as recommended by the flooring manufacturer. Remove and replace flooring which becomes damaged, loose, broken, or curled and wall base which is not tight to wall or securely adhered.
PART 1   GENERAL

1.1  REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C307  (2003; R 2012) Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing

ASTM C413  (2011; R 2012) Absorption of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes

ASTM C531  (2000; R 2012) Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, and Monolithic Surfacing, and Polymer Concretes


ASTM D4259  (1988; R 2012) Standard Practice for Abrading Concrete


1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Manufacturer's Catalog Data; G

Cured Epoxy Binder; G

Epoxy-Resin Binder/Matrix; G

Aggregate; G

Surface Sealing Coat; G

SD-04 Samples
1.3 ADMINISTRATIVE REQUIREMENTS

1.3.1 Product Data

Within 30 days of contract award, submit manufacturer's catalog data for the following items:

a. Epoxy
b. Epoxy Resin Mortar and Curing Agent
c. Quartz Silica
d. Surface Sealing Coats

1.3.2 Design Mix Data

Within 30 days of contract award, submit design mix data for the following items, including a complete list of ingredients and admixtures:

a. Epoxy Resin
b. Curing Agent
c. Aggregate
d. Surface Sealing Coats

Ensure applicable test reports verify the mix has been successfully tested and meets design requirements.

1.4 QUALITY ASSURANCE

Submit a sample records of inspection plan, including the records of corrective action to be taken.

1.4.1 Sampling

Submit hardboard mounted epoxy flooring samples not less than 12 inch square for each required color.

Provide panels showing nominal thickness of finished toppings, color, and texture of finished surfaces. Finished floor toppings and the approved samples are to match in color and texture.
1.5 DELIVERY, HANDLING, AND STORAGE

Protect materials from weather, soil, and damage during delivery, storage, and construction. Deliver materials in original packages, containers, or bundles bearing brand name and name of material.

Maintain materials used in the installation of floor topping at a temperature between 65 and 85 degrees F.

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Resinous flooring system shall be a nominal 3/16 inch flooring system comprised of primer, base, grout coat sealer, and coating.

2.1.1 Primer

Provide a clear two-component, penetrating UV resistant epoxy primer consisting of: (1) a liquid blend of a biphenyl-based epoxy resin, and (2) a liquid curing agent, which individually cures the epoxy resin at room temperature to a glossy smooth film.

2.1.2 Epoxy Resin Base

Combine the four component troweled mortar consisting of epoxy resin, curing agent, colored quartz silica blend, and glass aggregate in the proportions specified by the manufacturer to form a compatible system immediately on mixing. Cure combined components possessing a glossy, nongreasy surface at relative humidities less than 80 percent. The complete system shall have the following properties after curing 24 hours at 77 degrees F, followed by 24 hours at 125 degrees F:

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>TEST METHOD</th>
<th>REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile strength, psi* at test temperature: 77 degrees F</td>
<td>ASTM C307</td>
<td>1500</td>
</tr>
<tr>
<td>Water absorption, percent 24 hours at 77 degrees F, maximum</td>
<td>ASTM C413</td>
<td>.20</td>
</tr>
<tr>
<td>Hardness, Shore D</td>
<td>ASTM D2240</td>
<td>85 to 90</td>
</tr>
<tr>
<td>Coefficient of linear thermal expansion, inch/inch/degree C, maximum</td>
<td>ASTM C531, 0 degrees C to 40 degrees C</td>
<td>1.8 X 10^-5</td>
</tr>
</tbody>
</table>

2.1.3 Grout Coat/Sealer Coat

Provide a grout coat and a separate sealer coat of a two component, clear, UV resistant, epoxy sealer consisting of epoxy resin and an amine curing agent. Amounts of components will differ in the grout coat and the sealer.
coat according to manufacturer instructions.

2.1.4 Surface Sealing Coat

Provide a two component nonambering aliphatic moisture-curing polyurethane surface sealer into which has been incorporated a suitable flatting agent. Add flatting agent not more than 24 hours prior to actual application of the coating. Ensure cured coating with flatting agent yields 60-degree specular gloss of 10 to 20 when tested in accordance with ASTM D523.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Safety Precautions

Prior to application in confined spaces of toppings and coatings containing flammable or toxic properties, provide forced ventilation to ensure that vapor concentration is kept at acceptable limits recommended by the manufacturer of the product.

Erect "NO SMOKING" signs, and prohibit smoking or use of spark- or flame-producing devices within 50 feet of any mixing or placing operation involving flammable materials.

Provide personnel required to handle, mix, or apply toppings containing toxic or flammable properties with such items of personal protective equipment and apparel for eye, skin, and respiratory protection as are recommended by the manufacturer of the product. Ensure all personnel are trained in the appropriate use and wearing of personal protection equipment.

Accomplish sand blasting under approved controlled conditions with respect to sand and dust control to prevent damage to personnel and facility.

3.2 PREPARATION

Prior to applying resinous flooring material, inspect substrate and immediately report any unsatisfactory conditions that exist and repair.

3.2.1 Concrete Subfloor

3.2.1.1 New Concrete Floors

Do not commence installation of floor topping until concrete has cured a minimum of 28 calendar days. Verify concrete floor is straight, properly sloped, and has wooden float type finish. Ensure concrete is moist cured with burlap or polyethylene. Do not use curing agents, methods, or materials which prevent proper bonding of resinous flooring. Prior to applying the prime coat, clean concrete surface by an approved method.

3.2.1.2 Existing Concrete Floors

Clean existing concrete floors, with hard troweled or contaminated areas in conformance with ASTM D4259, and ensure concrete is free of all paint, sealers, curing agents, oil, grease, moisture, dirt or any other contaminants. Remove any loose or corroded segments of existing concrete and patch with a grouting compound as recommended by the resinous flooring manufacturer. Fill all cracks with an elastomeric jointing compound compatible with the resinous flooring system used.
3.2.2 Mixing Of Materials

Job mix proportions are based on the trial batch proportions used to prepare the floor topping samples as submitted and approved. Binder aggregate ratio normally range from 1:2 to 1:2.3 (by weight), since mixtures providing satisfactory density, trowelability, and surface texture are affected by variations in particle shapes, sizes, and size distribution. Blend different aggregate gradations (by weight) according to manufacturers instructions. Minor adjustments of the mix proportions of the approved floor topping samples are permitted, subject to approval.

Use mechanical equipment for mixing of materials. Use rotating replaceable 5- to 16-gallon pail mixers for blending components A (epoxy resin) and B (curing agent) of epoxy primer.

Use rotating paddle-type masonry mortar mixers for preblending the three sizes and color pigment, if any, of the aggregate and addition of the mixed epoxy resin base. Ensure mixing times are as recommended by the materials supplier(s), provided mixing times result in homogeneous mixtures. In case the equipment used does not provide uniform mixtures in the times recommended, with approval by the Contracting Officer, adjust the mixing times. Limit quantity of material mixed at one time to that which can be applied and finished within the working life of the mixtures. Verify temperature of materials at the time of mixing are between 65 and 85 degrees F.

3.2.3 Protection of Adjacent Surfaces

In addition to the protection of adjacent surfaces during installation, provide areas used to store and mix materials with a protective covering under the materials. After application of the sealer coats, protect finished flooring during the remainder of the construction period. In areas of expected minimum or moderate traffic, cover floors with 70-pound kraft paper, a 30-30-30 waterproof kraft paper, or an approved substitute, with strips taped together and edges secured to prevent roll-up. Place vegetable fiberboard, plywood, or other suitable material that does not mar the flooring over the paper to protect areas used as passages by workmen and areas subject to floor damage because of subsequent building operations. Upon completion of construction, remove the protection, clean flooring and, where necessary, repair, reseal, or both, at no additional cost to the Government.

3.3 APPLICATION OF FLOOR TOPPING

3.3.1 Areas Of Application

Anchor plates set with the top surface at or above the finished epoxy floor level do not require coverage with this flooring material. Extend flooring under equipment, except when the equipment base is indicated to be flush against the structural floor. Cover and/or mask surfaces not to receive the epoxy floor topping, such as equipment or cabinets installed prior to surface-preparation efforts and adjacent to the flooring installation.

3.3.2 Application of Prime Coat and Troweling

Ensure prepared subfloor surface is dry and at a temperature of not less than 60 degrees F when application of the floor topping is initiated.
Immediately prior to application of the prime/scratch coat on the prepared surface, remove dust or other loose particles by blowing with compressed air or vacuum cleaned. Use only an air compressor equipped with an efficient oil-water trap to prevent oil contamination or wetting of surface.

Apply a thin roller coat of the epoxy primer specified to the prepared subfloor as a prime coat. As an aid to placing, compacting, and finishing the floor topping, form a scratch coat by sprinkling a minimum quantity of the aggregate on the prime coat surface immediately following the prime coat application. Prime coat application rate is approximately 150 square feet per gallon. Prior to application of the prime/scratch coat, fill cracks in the concrete, and make provisions to keep control or expansion joints open.

Place the floor topping prior to final gelling of the prime/scratch coat. Immediately after the materials are mixed as specified, dump the mixture in the placement area and spread to prolong troweling life. Scree or rough trowel placed materials to the specified thickness and then compact by the use of a smooth roller prior to finish troweling to a nominal thickness of 3/16 inch plus or minus 1/16 inch. Ensure all finished surfaces are free of ridges, hollows (bird-baths), trowel marks, and smoothness varies no more than 1/8 inch when tested with an 8-foot straightedge. Make provisions to maintain the work areas in a relatively dust-free environment during curing of the topping.

3.3.3 Grout Coat/Sealer Coat/Surface Sealing Coat

After the floor topping has set firmly (approximately 8 hours depending on subfloor temperature) in a relatively dust-free environment, apply two thin coats of the grout coat, by means of brush, roller, squeegee, or notched trowel to provide a pore-free, easy-to-clean surface. At the time of sealer application, ensure the surface is dust-free. Depending on relative humidity, allow the applied grout coat to cure to a tack-free condition in 2 to 4 hours. Do not apply second coat until after the initial coat has cured to a tack-free, hard film. Maintain topping areas in a relatively dust-free environment during curing of the sealer coats. After grout coat has cured (approximately 8 hours), apply one coat of sealer coat immediately after mixing. After sealer coat has cured (minimum 12 hours), apply first coat of surface sealing coat. After approximately 6 hours, apply second coat of surface sealing coat.

3.3.4 Integral Cove Base

Provide a 4 inch high cove base to all wall surfaces as indicated on the drawings. Install so as to provide a 1/2 inch radius at the juncture of the floor and the wall.

3.4 FIELD QUALITY CONTROL

3.4.1 Repairing

Remove and replace damaged or unacceptable portions of completed work with new work to match adjacent surfaces at no additional cost to the Government.

3.5 CLEANING

Clean surfaces of the new work, and adjacent surfaces soiled as a result.
of the work. Remove all equipment, surplus materials, and rubbish associated with the work from the site.

3.6 WARRANTY

Submit a 2 year written warranty for all materials and installation work to the Contracting Officer.

-- End of Section --
THIS PAGE INTENTIONALLY LEFT BLANK FOR DUPLEX PRINTING
SECTION 09 68 00

CARPETING

11/13

PART 1   GENERAL

1.1   REFERENCES

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

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)

AATCC 107  (2009; E 2010) Colorfastness to Water
AATCC 134  (2011) Electrostatic Propensity of Carpets
AATCC 16   (2004; E 2010) Colorfastness to Light
AATCC 165  (2008; E 2011) Colorfastness to Crocking: Textile Floor Coverings – Crockmeter Method
AATCC 174  (2011) Antimicrobial Activity Assessment of Carpets

ASTM INTERNATIONAL (ASTM)

ASTM D3278  (1996; R 2011) Flash Point of Liquids by Small Scale Closed-Cup Apparatus
ASTM D5848  (2010; E 2010) Mass Per Unit Area of Pile Yarn Floor Coverings

CARPET AND RUG INSTITUTE (CRI)

CRI CIS   (2011) Carpet Installation Standard

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

16 CFR 1630  Standard for the Surface Flammability of Carpets and Rugs (FF 1-70)
1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Installation Drawings; G

SD-03 Product Data
   Carpet; G

SD-04 Samples
   Carpet; G

SD-06 Test Reports
   Moisture and Alkalinity Tests; G

SD-07 Certificates
   Carpet
   Regulatory Requirements

SD-08 Manufacturer's Instructions
   Surface Preparation
   Installation

SD-10 Operation and Maintenance Data
   Carpet; G
   Cleaning and Protection; G
   Maintenance Service

1.3 QUALITY ASSURANCE

Provide the Carpet and Rug Institute (CRI) Indoor Air Quality (IAQ) label for carpet, and adhesives or demonstrate compliance with testing criteria and frequencies through independent laboratory test results. Carpet and adhesives bearing the label will indicate that the carpet has been tested and meets the Regulatory Requirements and criteria of the CRI IAQ Carpet Testing Program, and minimizes the impact on indoor air quality. Procure carpet in accordance with 40 CFR 247, and where possible, purchased locally to reduce emissions of fossil fuels from transporting. Submit certificates, showing conformance with the referenced standards contained in this section, for the following: Carpet...
1.4 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the site in the manufacturer's original wrappings and packages clearly labeled with the manufacturer's name, brand name, size, dye lot number, and related information. Remove materials from packaging and store them in a clean, dry, well ventilated area (100 percent outside air supply, minimum of 1.5 air changes per hour, and no recirculation), protected from damage, soiling, and moisture, and strong contaminant sources and residues, and maintain at a temperature above 60 degrees F for 2 days prior to installation. Do not store carpet or carpet tiles with materials which have high emissions of volatile organic compounds (VOCs) or other contaminants. Do not store carpet near materials that may off gas or emit harmful fumes, such as kerosene heaters, fresh paint, or adhesives.

1.5 AMBIENT CONDITIONS

Maintain areas in which carpeting is to be installed at a temperature above 60 degrees F and below 90 degrees F for 2 days before installation, during installation, and for 2 days after installation. Provide temporary ventilation during work of this section. Maintain a minimum temperature of 55 degrees F thereafter for the duration of the contract.

1.6 WARRANTY

Provide manufacturer's standard performance guarantees or warranties including minimum ten year wear warranty, two year material and workmanship and ten year tuft bind and delamination.

PART 2 PRODUCTS

2.1 CARPET

Furnish first quality carpet; free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains, and other physical and manufacturing defects. Provide carpet materials and treatments as reasonably nonallergenic and free of other recognized health hazards. Provide a static control construction on all grade carpets which gives adequate durability and performance. Submit manufacturer's catalog data and printed documentation stating physical characteristics, durability, resistance to fading, and flame resistance characteristics for each type of carpet material and installation accessory. Submit manufacturer's catalog data for 1) Carpet. Also, submit samples of the following:

a. Carpet: minimum of Two "Production Quality" samples 24 by 24 inches of each carpet proposed for use, showing quality pattern and color specified

2.1.1 Physical Characteristics for Modular Tile Carpet

2.1.1.1 Carpet Construction - CPT-1

Tufted patterned loop.

2.1.1.2 Type

Modular tile 24 by 24 inch square with 0.15 percent growth/shrink rate in accordance with ISO 2551.
2.1.1.3 Pile Type
Level Loop

2.1.1.4 Pile Fiber
Commercial 100 percent branded (federally registered trademark) Type 6 nylon continuous filament.
   a. Solution Q Nylon.

2.1.1.5 Gauge
1/10 inch

2.1.1.6 Stitches
Minimum 10 per inch

2.1.1.7 Surface Pile Weight
Minimum 26 ounces per square yard. This does not include weight of backings. Determine weight in accordance with ASTM D5848.
   a. 26 ounces per square yard.

2.1.1.8 Pile Thickness
0.156 inches

2.1.1.9 Pile Density
10,400

2.1.1.10 Traffic Classification
Heavy

2.1.1.11 Dye Method
Solution dyed

2.1.1.12 Backing System
Provide primary backing materials like polypropylene. Provide secondary backing to suit project requirements of those customarily used and accepted by the trade for each type of carpet.
   a. Ecoworx® Tile

2.2 PERFORMANCE REQUIREMENTS

2.2.1 Static Control
Provide static control to permanently regulate static buildup to less than 3.5 kV when tested at 20 percent relative humidity and 70 degrees F in accordance with AATCC 134.
2.2.2 Flammability and Critical Radiant Flux Requirements

Comply with 16 CFR 1630. Provide carpet in corridors and exits with a minimum average critical radiant flux of 0.22 watts per square centimeter when tested in accordance with ASTM E648.

2.2.3 Tuft Bind

Comply with ASTM D1335 for tuft bind force required to pull a tuft or loop free from carpet backing with a minimum 8 pound average force for modular carpet tile.

2.2.4 Colorfastness to Crocking

Comply dry and wet crocking with AATCC 165 and with a Class 4 minimum rating on the AATCC Color Transference Chart for all colors.

2.2.5 Colorfastness to Light

Comply colorfastness to light with AATCC 16, Test Option E "Water-Cooled Xenon-Arc Lamp, Continuous Light" and with a minimum 4 grey scale rating after 40 hours.

2.2.6 Colorfastness to Water

Comply colorfastness to water with AATCC 107 and with a minimum 4.0 grey scale rating and a minimum 4.0 transfer scale rating.

2.2.7 Delamination Strength

Provide delamination strength for tufted carpet with a secondary back of minimum 2.5 lbs/inch.

2.2.8 Antimicrobial

Nontoxic antimicrobial treatment in accordance with AATCC 174 Part I (qualitative), guaranteed by the carpet manufacturer to last the life of the carpet.

2.3 ADHESIVES AND CONCRETE PRIMER

Adhesives and concrete primers shall comply with applicable regulations regarding toxic and hazardous materials. Provide release adhesive for modular tile carpet as recommended by the carpet manufacturer. Provide adhesives flashpoint of minimum 140 degrees F in accordance with ASTM D3278.

2.4 COLOR, TEXTURE, AND PATTERN

Provide color, texture, and pattern as noted on the drawings.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Do not install carpet on surfaces that are unsuitable and will prevent a proper installation. Prepare subfloor in accordance with flooring manufacturer's recommended instructions. Repair holes, cracks, depressions, or rough areas using material recommended by the carpet or adhesive manufacturer. Free floor of any foreign materials and sweep
clean. Before beginning work, test subfloor with glue and carpet to determine "open time" and bond. Submit three copies of the manufacturer's printed installation instructions for the carpet, including preparation of substrate, seaming techniques, and recommended adhesives and tapes.

3.2 MOISTURE AND ALKALINITY TESTS

Test concrete slab for moisture content and excessive alkalinity in accordance with CRI CIS. Submit three copies of test reports of moisture and alkalinity content of concrete slab stating date of test, person conducting the test, and the area tested.

3.3 PREPARATION OF CONCRETE SUBFLOOR

Do not commence installation of the carpeting until concrete substrate is at least 90 days old. Prepare the concrete surfaces in accordance with the carpet manufacturer's instructions. Match carpet, when required, and adhesives to prevent off-gassing to a type of curing compounds, leveling agents, and concrete sealer.

3.4 INSTALLATION

Isolate area of installation from rest of building. Perform all work by manufacturer's approved installers. Conduct installation in accordance with the manufacturer's printed instructions and CRI CIS. Protect edges of carpet meeting hard surface flooring as indicated in drawings. Follow ventilation, personal protection, and other safety precautions recommended by the adhesive manufacturer. Continue ventilation during installation and for at least 72 hours following installation. Do not permit traffic or movement of furniture or equipment in carpeted area for 24 hours after installation. Complete other work which would damage the carpet prior to installation of carpet. Submit three copies of installation drawings for 1) Carpet, indicating areas receiving carpet, carpet types, patterns, direction of pile and locations of edge molding.

3.4.1 Modular Tile Installation

Install modular tiles with permanent vinyl-compatible adhesive and snug joints. Use monolithic installation method for CPT-1. Provide accessibility to the subfloor where required.

3.5 CLEANING AND PROTECTION

Submit three copies of carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods, and cleaning cycles.

3.5.1 Cleaning

As specified in Section 01780 CLOSEOUT SUBMITTALS. After installation of the carpet, remove debris, scraps, and other foreign matter. Remove soiled spots and adhesive from the face of the carpet with appropriate spot remover. Cut off and remove protruding face yarn. Vacuum carpet clean with a high-efficiency particulate air (HEPA) filtration vacuum.

3.5.2 Protection

Protect the installed carpet from soiling and damage with heavy, reinforced, nonstaining kraft paper, plywood, or hardboard sheets. Lap
and secure edges of kraft paper protection to provide a continuous cover. Restrict traffic for at least 48 hours. Remove protective covering when directed by the Contracting Officer.

3.6 REMNANTS

Manage waste as specified in the Waste Management Plan. Remove non-retained scraps from site and recycle appropriately.

3.7 MAINTENANCE

3.7.1 Extra Materials

Provide extra material from same dye lot for future maintenance. Provide a minimum of 5 percent of total square yards of each carpet type, pattern, and color.

3.7.2 Maintenance Service

Collect information from the manufacturer about maintenance agreement options, and submit to Contracting Officer. Service shall reclaim materials for recycling and/or reuse. Service shall not landfill or burn reclaimed materials. When such a service is not available, seek local recyclers to reclaim the materials. Submit documentation of manufacturer's maintenance agreement and take-back program for carpet. Include contact information, summary of procedures, and the limitations and conditions applicable to the project. Indicate manufacturer's commitment to reclaim materials for recycling and/or reuse.

-- End of Section --
SECTION 09 90 00
PAINTS AND COATINGS
05/11

PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH 0100  (2001; Supplements 2002-2008)
Documentation of the Threshold Limit Values and Biological Exposure Indices

ASME INTERNATIONAL (ASME)

ASME A13.1  (2007; R 2013) Scheme for the Identification of Piping Systems

ASTM INTERNATIONAL (ASTM)


ASTM D4263  (1983; R 2012) Indicating Moisture in Concrete by the Plastic Sheet Method


ASTM F1869  (2011) Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

MASTER PAINTERS INSTITUTE (MPI)

MPI 107  (Oct 2009) Rust Inhibitive Primer (Water-Based)

MPI 138  (Oct 2009) Interior High Performance Latex, MPI Gloss Level 2
MPI 141  
(Oct 2009) Interior High Performance Latex  
MPI Gloss Level 5

MPI 147  
(Oct 2009) Institutional Low Odor / VOC  
Interior Latex, Semi-Gloss, MPI Gloss  
Level 5

MPI 163  
(Oct 2009) Exterior W.B. Light Industrial  
Coating, Semi-Gloss, MPI Gloss Level 5

MPI 23  
(Oct 2009) Surface Tolerant Metal Primer

MPI 39  
(Oct 2009) Interior Latex-Based Wood Primer

MPI 4  
(Oct 2009) Interior/Exterior Latex Block  
Filler

MPI 50  
(Oct 2009) Interior Latex Primer Sealer

MPI 52  
(Oct 2009) Interior Latex, MPI Gloss Level  
3

MPI 79  
(Oct 2009) Alkyd Anti-Corrosive Metal  
Primer

MPI 94  
(Oct 2009) Exterior Alkyd, Semi-Gloss, MPI  
Gloss Level 5

MPI 95  
(Oct 2009) Quick Drying Primer for Aluminum

MPI 99  
(Oct 2009) Sealer, Water Based, for  
Concrete Floors

SCIENTIFIC CERTIFICATION SYSTEMS (SCS)

SCS SP-01  
Specification for Architectural and  
Anti-Corrosive Paints

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4  
(2007; E 2004) Brush-Off Blast Cleaning

SSPC Guide 6  
Preparation Debris Generated During Paint  
Removal Operations

SSPC Guide 7  
(2004; E 2004) Guide to the Disposal of  
Lead-Contaminated Surface Preparation  
Debris

SSPC PA 1  
(2000; E 2004) Shop, Field, and  
Maintenance Painting of Steel

SSPC PA Guide 3  
Application

SSPC SP 1  
(1982; E 2004) Solvent Cleaning
SSPC SP 10/NACE No. 2 (2007) Near-White Blast Cleaning
SSPC SP 12/NACE No. 5 (2002) Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating
SSPC SP 3 (1982; E 2004) Power Tool Cleaning
SSPC SP 6/NACE No. 3 (2007) Commercial Blast Cleaning

U.S. DEPARTMENT OF DEFENSE (DOD)


U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)


U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-313 (Rev D; Notice 1) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910.1000 Air Contaminants
29 CFR 1910.1025 Lead
29 CFR 1926.62 Lead

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. 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 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:
The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The Contractor may choose to use a subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All coats on a particular substrate must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

Samples of specified materials may be taken and tested for compliance with specification requirements.

In keeping with the intent of Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition", products certified by SCS as meeting SCS SP-01 shall be given preferential consideration over registered products. Products that are registered shall be given preferential consideration over products not carrying any EPP designation.

SD-02 Shop Drawings

Piping identification; G
Submit color stencil codes

SD-03 Product Data

Local/Regional Materials
Materials
Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.

Coating; G
Manufacturer's Technical Data Sheets
Indicate VOC content.

Sealant; G

SD-04 Samples

Color; G
Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

SD-07 Certificates

Qualification Testing laboratory for coatings; G

SD-08 Manufacturer's Instructions

Application instructions
Mixing
Detailed mixing instructions, minimum and maximum application
temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets

Submit manufacturer's Material Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

SD-10 Operation and Maintenance Data

Coatings; G

Preprinted cleaning and maintenance instructions for all coating systems shall be provided.

1.3 QUALITY ASSURANCE

1.3.1 Field Samples and Tests

The Contracting Officer may choose up to two coatings that have been delivered to the site to be tested at no cost to the Government. Take samples of each chosen product as specified in the paragraph "Sampling Procedures." Test each chosen product as specified in the paragraph "Testing Procedure." Products which do not conform, shall be removed from the job site and replaced with new products that conform to the referenced specification. Testing of replacement products that failed initial testing shall be at no cost to the Government.

1.3.1.1 Sampling Procedure

The Contracting Officer will select paint at random from the products that have been delivered to the job site for sample testing. The Contractor shall provide one quart samples of the selected paint materials. The samples shall be taken in the presence of the Contracting Officer, and labeled, identifying each sample. Provide labels in accordance with the paragraph "Packaging, Labeling, and Storage" of this specification.

1.3.1.2 Testing Procedure

Provide Batch Quality Conformance Testing for specified products, as defined by and performed by MPI. As an alternative to Batch Quality Conformance Testing, the Contractor may provide Qualification Testing for specified products above to the appropriate MPI product specification, using the third-party laboratory approved under the paragraph "Qualification Testing" laboratory for coatings. The qualification testing lab report shall include the backup data and summary of the test results. The summary shall list all of the reference specification requirements and the result of each test. The summary shall clearly indicate whether the tested paint meets each test requirement. Note that Qualification Testing may take 4 to 6 weeks to perform, due to the extent of testing required.

Submit name, address, telephone number, FAX number, and e-mail address of the independent third party laboratory selected to perform testing of coating samples for compliance with specification requirements. Submit documentation that laboratory is regularly engaged in testing of paint samples for conformance with specifications, and that employees performing testing are qualified. If the Contractor chooses MPI to perform the Batch
Quality Conformance testing, the above submittal information is not required, only a letter is required from the Contractor stating that MPI will perform the testing.

1.4 REGULATORY REQUIREMENTS

1.4.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

1.4.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.4.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.4.4 Asbestos Content

Materials shall not contain asbestos.

1.4.5 Mercury Content

Materials shall not contain mercury or mercury compounds.

1.4.6 Silica

Abrasive blast media shall not contain free crystalline silica.

1.4.7 Human Carcinogens

Materials shall not contain ACGIH 0100 confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.5 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 5 gallons. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 40 to 95 degrees F. Do not store paint, polyurethane, varnish, or wood stain products with materials that have a high capacity to adsorb VOC emissions. Do not store paint, polyurethane, varnish, or wood stain products in occupied spaces.

1.6 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance
with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

1.6.1 Safety Methods Used During Coating Application

Comply with the requirements of SSPC PA Guide 3.

1.6.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

a. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.

b. 29 CFR 1910.1000.

c. ACGIH 0100, threshold limit values.

d. The appropriate OSHA standard in 29 CFR 1910.1025 and 29 CFR 1926.62 for surface preparation on painted surfaces containing lead. Additional guidance is given in SSPC Guide 6 and SSPC Guide 7. Refer to drawings for list of hazardous materials located on this project. Contractor to coordinate paint preparation activities with this specification section.

1.7 ENVIRONMENTAL CONDITIONS

Comply, at minimum, with manufacturer recommendations for space ventilation during and after installation.

1.7.1 Coatings

Do not apply coating when air or substrate conditions are:

a. Less than 5 degrees F above dew point;

b. Below 50 degrees F or over 95 degrees F, unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.

1.7.2 Post-Application

Vacate space for as long as possible after application. Wait a minimum of 48 hours before occupying freshly painted rooms. Maintain one of the following ventilation conditions during the curing period, or for 72 hours after application:

a. Supply 100 percent outside air 24 hours a day.

b. Supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 85 degrees F and humidity is between 30 percent and 60 percent.
c. Supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated above.

1.8 SUSTAINABLE DESIGN REQUIREMENTS

1.8.1 Local/Regional Materials

Use materials or products extracted, harvested, or recovered, as well as manufactured, within a 500 mile radius from the project site, if available from a minimum of three sources.

1.9 SCHEDULING

Allow paint, polyurethane, varnish, and wood stain installations to cure prior to the installation of materials that adsorb VOCs.

1.10 COLOR SELECTION

Colors of finish coats shall be as indicated or specified. Where not indicated or specified, colors shall be selected by the Contracting Officer. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements.

Tint each coat progressively darker to enable confirmation of the number of coats.

Color, texture, and pattern of wall coating systems shall be as indicated.

1.11 LOCATION AND SURFACE TYPE TO BE PAINTED

1.11.1 Painting Included

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

a. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

b. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.

c. Existing coated surfaces that are damaged during performance of the work.

1.11.1.1 Exterior Painting

Includes new surfaces of the building and appurtenances.

1.11.1.2 Interior Painting

Includes new surfaces, existing uncoated surfaces, and existing coated surfaces of the building and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless
indicated otherwise.

1.11.2 Painting Excluded

Do not paint the following unless indicated otherwise.

a. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.

b. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, crawl spaces, elevator shafts and chases.

c. Steel to be embedded in concrete.

d. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.

e. Hardware, fittings, and other factory finished items.

1.11.3 Mechanical and Electrical Painting

Includes field coating of interior and exterior new and existing surfaces.

a. Where a space or surface is indicated to be painted, include the following items unless indicated otherwise.

(1) Exposed piping, conduit, and ductwork;

(2) Supports, hangers, air grilles, and registers;

(3) Miscellaneous metalwork and insulation coverings.

b. Do not paint the following, unless indicated otherwise:

(1) New zinc-coated, aluminum, and copper surfaces under insulation

(2) New aluminum jacket on piping

(3) New interior ferrous piping under insulation.

1.11.3.1 Fire Extinguishing Sprinkler Systems

Clean, pretreat, prime, and paint new fire extinguishing sprinkler systems including valves, piping, conduit, hangers, supports, miscellaneous metalwork, and accessories. Apply coatings to clean, dry surfaces, using clean brushes. Clean the surfaces to remove dust, dirt, rust, and loose mill scale. Immediately after cleaning, provide the metal surfaces with one coat primer per schedules. Shield sprinkler heads with protective covering while painting is in progress. Upon completion of painting, remove protective covering from sprinkler heads. Remove sprinkler heads which have been painted and replace with new sprinkler heads. Provide primed surfaces with the following:

a. Piping in Unfinished Areas: Provide primed surfaces with one coat of red alkyd gloss enamel applied to a minimum dry film thickness of 1.0 mil in spaces above suspended ceilings, pipe chases, and spaces where walls or ceiling are not painted or not constructed of a prefinished material.
b. Piping in Finished Areas: Provide primed surfaces with two coats of paint to match adjacent surfaces, except provide valves and operating accessories with one coat of red alkyd gloss enamel applied to a minimum dry film thickness of 1.0 mil. Provide piping with 2 inch wide red enamel bands or self-adhering red plastic bands spaced at maximum of 20 foot intervals throughout the piping systems.

1.11.4 Exterior Painting of Site Work Items

Field coat the following items:

As indicated on the Site/Civil drawings.

1.11.5 Definitions and Abbreviations

1.11.5.1 Qualification Testing

Qualification testing is the performance of all test requirements listed in the product specification. This testing is accomplished by MPI to qualify each product for the MPI Approved Product List, and may also be accomplished by Contractor's third party testing lab if an alternative to Batch Quality Conformance Testing by MPI is desired.

1.11.5.2 Batch Quality Conformance Testing

Batch quality conformance testing determines that the product provided is the same as the product qualified to the appropriate product specification. This testing shall only be accomplished by MPI testing lab.

1.11.5.3 Coating

A film or thin layer applied to a base material called a substrate. A coating may be a metal, alloy, paint, or solid/liquid suspensions on various substrates (metals, plastics, wood, paper, leather, cloth, etc.). They may be applied by electrolysis, vapor deposition, vacuum, or mechanical means such as brushing, spraying, calendaring, and roller coating. A coating may be applied for aesthetic or protective purposes or both. The term "coating" as used herein includes emulsions, enamels, stains, varnishes, sealers, epoxies, and other coatings, whether used as primer, intermediate, or finish coat. The terms paint and coating are used interchangeably.

1.11.5.4 DFT or dft

Dry film thickness, the film thickness of the fully cured, dry paint or coating.

1.11.5.5 DSD

Degree of Surface Degradation, the MPI system of defining degree of surface degradation. Five (5) levels are generically defined under the Assessment sections in the MPI Maintenance Repainting Manual.

1.11.5.6 EPP

Environmentally Preferred Products, a standard for determining environmental preferability in support of Executive Order 13101.
1.11.5.7  EXT

MPI short term designation for an exterior coating system.

1.11.5.8  INT

MPI short term designation for an interior coating system.

1.11.5.9  micron / microns

The metric measurement for 0.001 mm or one/thousandth of a millimeter.

1.11.5.10  mil / mils

The English measurement for 0.001 in or one/thousandth of an inch, equal to 25.4 microns or 0.0254 mm.

1.11.5.11  mm

The metric measurement for millimeter, 0.001 meter or one/thousandth of a meter.

1.11.5.12  MPI Gloss Levels

MPI system of defining gloss. Seven (7) gloss levels (G1 to G7) are generically defined under the Evaluation sections of the MPI Manuals. Traditionally, Flat refers to G1/G2, Eggshell refers to G3, Semigloss refers to G5, and Gloss refers to G6.

Gloss levels are defined by MPI as follows:

<table>
<thead>
<tr>
<th>Gloss Level</th>
<th>Description</th>
<th>Units at 60 degrees</th>
<th>Units at 85 degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Matte or Flat</td>
<td>0 to 5</td>
<td>10 max</td>
</tr>
<tr>
<td>G2</td>
<td>Velvet</td>
<td>0 to 10</td>
<td>10 to 35</td>
</tr>
<tr>
<td>G3</td>
<td>Eggshell</td>
<td>10 to 25</td>
<td>10 to 35</td>
</tr>
<tr>
<td>G4</td>
<td>Satin</td>
<td>20 to 35</td>
<td>35 min</td>
</tr>
<tr>
<td>G5</td>
<td>Semi-Gloss</td>
<td>35 to 70</td>
<td></td>
</tr>
<tr>
<td>G6</td>
<td>Gloss</td>
<td>70 to 85</td>
<td></td>
</tr>
<tr>
<td>G7</td>
<td>High Gloss</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Gloss is tested in accordance with ASTM D523. Historically, the Government has used Flat (G1 / G2), Eggshell (G3), Semi-Gloss (G5), and Gloss (G6).

1.11.5.13  MPI System Number

The MPI coating system number in each Division found in either the MPI Architectural Painting Specification Manual or the Maintenance Repainting Manual and defined as an exterior (EXT/REX) or interior system (INT/RIN). The Division number follows the CSI Master Format.

1.11.5.14  Paint

See Coating definition.
1.11.5.15 REX

MPI short term designation for an exterior coating system used in repainting projects or over existing coating systems.

1.11.5.16 RIN

MPI short term designation for an interior coating system used in repainting projects or over existing coating systems.

PART 2 PRODUCTS

2.1 MATERIALS


PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, disintegrated coatings, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.2.1 Additional Requirements for Preparation of Surfaces With Existing Coatings

Before application of coatings, perform the following on surfaces covered by soundly-adhered coatings, defined as those which cannot be removed with a putty knife:

a. Test existing finishes for lead before sanding, scraping, or removing. If lead is present, refer to paragraph Toxic Materials.

b. Wipe previously painted surfaces to receive solvent-based coatings, except stucco and similarly rough surfaces clean with a clean, dry
cloth saturated with mineral spirits, ASTM D235. Allow surface to dry. Wiping shall immediately precede the application of the first coat of any coating, unless specified otherwise.

c. Sand existing glossy surfaces to be painted to reduce gloss. Brush, and wipe clean with a damp cloth to remove dust.

d. The requirements specified are minimum. Comply also with the application instructions of the paint manufacturer.

e. Previously painted surfaces specified to be repainted or damaged during construction shall be thoroughly cleaned of all grease, dirt, dust or other foreign matter.

f. Blistering, cracking, flaking and peeling or other deteriorated coatings shall be removed.

g. Chalk shall be removed so that when tested in accordance with ASTM D4214, the chalk resistance rating is no less than 8.

h. Slick surfaces shall be roughened. Damaged areas such as, but not limited to, nail holes, cracks, chips, and spalls shall be repaired with suitable material to match adjacent undamaged areas.

i. Edges of chipped paint shall be feather edged and sanded smooth.

j. Rusty metal surfaces shall be cleaned as per SSPC requirements. Solvent, mechanical, or chemical cleaning methods shall be used to provide surfaces suitable for painting.

k. New, proposed coatings shall be compatible with existing coatings.

3.2.2 Existing Coated Surfaces with Minor Defects

Sand, spackle, and treat minor defects to render them smooth. Minor defects are defined as scratches, nicks, cracks, gouges, spalls, alligatoring, chalking, and irregularities due to partial peeling of previous coatings.

3.2.3 Removal of Existing Coatings

Remove existing coatings from the following surfaces:

a. Surfaces containing large areas of minor defects;

b. Surfaces containing more than 20 percent peeling area; and

c. Surfaces designated by the Contracting Officer, such as surfaces where rust shows through existing coatings.

3.2.4 Substrate Repair

a. Repair substrate surface damaged during coating removal;

b. Sand edges of adjacent soundly-adhered existing coatings so they are tapered as smooth as practical to areas involved with coating removal; and

c. Clean and prime the substrate as specified.
3.3 PREPARATION OF METAL SURFACES

3.3.1 Existing and New Ferrous Surfaces

a. Ferrous Surfaces including Shop-coated Surfaces and Small Areas That Contain Rust, Mill Scale and Other Foreign Substances: Solvent clean or detergent wash in accordance with SSPC SP 1 to remove oil and grease. Where shop coat is missing or damaged, clean according to SSPC SP 2, SSPC SP 3, SSPC SP 6/NACE No.3, or SSPC SP 10/NACE No. 2. Shop-coated ferrous surfaces shall be protected from corrosion by treating and touching up corroded areas immediately upon detection.

b. Surfaces With More Than 20 Percent Rust, Mill Scale, and Other Foreign Substances: Clean entire surface in accordance with SSPC SP 6/NACE No.3/SSPC SP 12/NACE No.5 WJ-3.

3.3.2 Final Ferrous Surface Condition:

For tool cleaned surfaces, the requirements are stated in SSPC SP 2 and SSPC SP 3. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 3.

For abrasive blast cleaned surfaces, the requirements are stated in SSPC 7/NACE No.4, SSPC SP 6/NACE No.3, and SSPC SP 10/NACE No. 2. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 1.

For waterjet cleaned surfaces, the requirements are stated in SSPC SP 12/NACE No.5. As a visual reference, cleaned surfaces shall be similar to photographs in SSPC VIS 4/NACE VIS 7.

3.3.3 Galvanized Surfaces

a. New or Existing Galvanized Surfaces With Only Dirt and Zinc Oxidation Products: Clean with solvent, steam, or non-alkaline detergent solution in accordance with SSPC SP 1. If the galvanized metal has been passivated or stabilized, the coating shall be completely removed by brush-off abrasive blast. New galvanized steel to be coated shall not be "passivated" or "stabilized" If the absence of hexavalent stain inhibitors is not documented, test as described in ASTM D6386, Appendix X2, and remove by one of the methods described therein.

b. Galvanized with Slight Coating Deterioration or with Little or No Rusting: Water jetting to SSPC SP 12/NACE No.5 WJ3 to remove loose coating from surfaces with less than 20 percent coating deterioration and no blistering, peeling, or cracking. Use inhibitor as recommended by the coating manufacturer to prevent rusting.

3.3.4 Non-Ferrous Metallic Surfaces

Aluminum and aluminum-alloy, lead, copper, and other nonferrous metal surfaces.

Surface Cleaning: Solvent clean in accordance with SSPC SP 1 and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants.
3.4 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.4.1 Concrete and Masonry

a. Curing: Concrete and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

b. Surface Cleaning: Remove the following deleterious substances.

(1) Dirt, Chalking, Grease, and Oil: Wash new surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, and 4 quarts of warm water. Then rinse thoroughly with fresh water. Wash existing coated surfaces with a suitable detergent and rinse thoroughly. For large areas, water blasting may be used.

(2) Fungus and Mold: Wash new, existing coated, and existing uncoated surfaces with a solution composed of 1/2 cup trisodium phosphate, 1/4 cup household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

(3) Paint and Loose Particles: Remove by wire brushing.

(4) Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 4 square feet of surface, per workman, at one time.

c. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.

d. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not to surfaces with droplets of water. Do not apply epoxies to damp vertical surfaces as determined by ASTM D4263 or horizontal surfaces that exceed 3 lbs of moisture per 1000 square feet in 24 hours as determined by ASTM F1869. In all cases follow manufacturers recommendations. Allow surfaces to cure a minimum of 30 days before painting.

3.4.2 Gypsum Board

a. Surface Cleaning: Gypsum board shall be dry. Remove loose dirt and dust by brushing with a soft brush, rubbing with a dry cloth, or vacuum-cleaning prior to application of the first coat material. A damp cloth or sponge may be used if paint will be water-based.

b. Repair of Minor Defects: Prior to painting, repair joints, cracks, holes, surface irregularities, and other minor defects with patching plaster or spackling compound and sand smooth.

c. Allowable Moisture Content: Latex coatings may be applied to damp surfaces, but not surfaces with droplets of water. Do not apply epoxies to damp surfaces as determined by ASTM D4263.
3.5 PREPARATION OF WOOD AND PLYWOOD SURFACES

3.5.1 Existing Coated Plywood and Wood Surfaces, Except Floors:

Note: Only previously painted interior wood surfaces are to be repainted.

a. Wood surfaces shall be cleaned of foreign matter.

   Surface Cleaning: Surfaces shall be free from dust and other deleterious substances and in a condition approved by the Contracting Officer prior to receiving paint or other finish.

b. Removal of Fungus and Mold: Wash existing coated surfaces with a solution composed of 3 ounces (2/3 cup) trisodium phosphate, 1 ounce (1/3 cup) household detergent, 1 quart 5 percent sodium hypochlorite solution and 3 quarts of warm water. Rinse thoroughly with fresh water.

c. Moisture content of the wood shall not exceed 12 percent as measured by a moisture meter in accordance with ASTM D4444, Method A, unless otherwise authorized.

d. Wood surfaces adjacent to surfaces to receive water-thinned paints shall be primed and/or touched up before applying water-thinned paints.

e. Cracks and Nailheads: Set and putty stop nailheads and putty cracks after the prime coat has dried.

f. Cosmetic Repair of Minor Defects:

   (1) Knots and Resinous Wood: Prior to application of coating, cover knots and stains with two or more coats of 3-pound-cut shellac varnish, plasticized with 5 ounces of castor oil per gallon. Scrape away existing coatings from knotty areas, and sand before treating. Prime before applying any putty over shellacked area.

   (2) Open Joints and Other Openings: Fill with whiting putty, linseed oil putty. Sand smooth after putty has dried.

   (3) Checking: Where checking of the wood is present, sand the surface, wipe and apply a coat of pigmented orange shellac. Allow to dry before paint is applied.

3.6 APPLICATION

3.6.1 Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Use trigger operated spray nozzles for water hoses. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be
coated. Wear protective clothing and respirators when applying oil-based paints or using spray equipment with any paints.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.

a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.

b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats. Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

d. Thermosetting Paints: Topcoats over thermosetting paints (epoxies and urethanes) should be applied within the overcoating window recommended by the manufacturer.

e. Floors: For nonslip surfacing on level floors, as the intermediate coat is applied, cover wet surface completely with almandite garnet, Grit No. 36, with maximum passing U.S. Standard Sieve No. 40 less than 0.5 percent. When the coating is dry, use a soft bristle broom to sweep up excess grit, which may be reused, and vacuum up remaining residue before application of the topcoat.

3.6.2 Mixing and Thinning of Paints

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory to suit surface, temperature, weather conditions, application methods, or for the type of paint being used. Obtain written permission from the Contracting Officer to use thinners. The written permission shall include quantities and types of thinners to use. When thinning is allowed, paints shall be thinned immediately prior to application with not more than 1 pint of suitable thinner per gallon. The use of thinner shall not relieve the Contractor from obtaining complete hiding, full film thickness, or required gloss. Thinning shall
not cause the paint to exceed limits on volatile organic compounds. Paints of different manufacturers shall not be mixed.

3.6.3 Two-Component Systems

Two-component systems shall be mixed in accordance with manufacturer's instructions. Any thinning of the first coat to ensure proper penetration and sealing shall be as recommended by the manufacturer for each type of substrate.

3.6.4 Coating Systems

a. Systems by Substrates: Apply coatings that conform to the respective specifications listed in the following Tables:

<table>
<thead>
<tr>
<th>Table</th>
<th>Division 5. Exterior Metal, Ferrous and Non-Ferrous Paint Table</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Division 3. Interior Concrete Paint Table</td>
</tr>
<tr>
<td></td>
<td>Division 4. Interior Concrete Masonry Units Paint Table</td>
</tr>
<tr>
<td></td>
<td>Division 5. Interior Metal, Ferrous and Non-Ferrous Paint Table</td>
</tr>
<tr>
<td></td>
<td>Division 6. Interior Wood Paint Table</td>
</tr>
<tr>
<td></td>
<td>Division 9: Interior Gypsum Board Paint Table</td>
</tr>
</tbody>
</table>

b. Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 1.5 mil each coat unless specified otherwise in the Tables. Coating thickness where specified, refers to the minimum dry film thickness.

c. Coatings for Surfaces Not Specified Otherwise: Coat surfaces which have not been specified, the same as surfaces having similar conditions of exposure.

d. Existing Surfaces Damaged During Performance of the Work, Including New Patches In Existing Surfaces: Coat surfaces with the following:

   (1) One coat of primer.

   (2) One coat of undercoat or intermediate coat.

   (3) One topcoat to match adjacent surfaces.

e. Existing Coated Surfaces To Be Painted: Apply coatings conforming to the respective specifications listed in the Tables herein, except that pretreatments, sealers and fillers need not be provided on surfaces where existing coatings are soundly adhered and in good condition. Do not omit undercoats or primers.

3.7 COATING SYSTEMS FOR METAL

Apply coatings of Tables in Division 5 for Exterior and Interior.

a. Apply specified ferrous metal primer on the same day that surface is cleaned, to surfaces that meet all specified surface preparation requirements at time of application.

b. Inaccessible Surfaces: Prior to erection, use one coat of specified primer on metal surfaces that will be inaccessible after erection.
c. Shop-primed Surfaces: Touch up exposed substrates and damaged coatings to protect from rusting prior to applying field primer.

d. Surface Previously Coated with Epoxy or Urethane: Apply MPI 101, 1.5 mils DFT immediately prior to application of epoxy or urethane coatings.

e. Pipes and Tubing: The semitransparent film applied to some pipes and tubing at the mill is not to be considered a shop coat, but shall be overcoated with the specified ferrous-metal primer prior to application of finish coats.

f. Exposed Nails, Screws, Fasteners, and Miscellaneous Ferrous Surfaces. On surfaces to be coated with water thinned coatings, spot prime exposed nails and other ferrous metal with latex primer MPI 107.

3.8 COATING SYSTEMS FOR CONCRETE AND CEMENTITIOUS SUBSTRATES

Apply coatings of Tables in Division 3, 4 and 9 for Interior.

3.9 COATING SYSTEMS FOR WOOD AND PLYWOOD

a. Apply coatings of Tables in Division 6 for Exterior and Interior.

b. Prior to erection, apply two coats of specified primer to treat and prime wood surfaces which will be inaccessible after erection.

3.10 PIPING IDENTIFICATION

Piping Identification, Including Surfaces In Concealed Spaces: Provide in accordance with MIL-STD-101 ASME A13.1. Place stenciling in clearly visible locations. On piping not covered by MIL-STD-101 ASME A13.1, stencil approved names or code letters, in letters a minimum of 1/2 inch high for piping and a minimum of 2 inches high elsewhere. Stencil arrow-shaped markings on piping to indicate direction of flow using black stencil paint.

3.11 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

3.12 WASTE MANAGEMENT

As specified in the Waste Management Plan and as follows. Do not use kerosene or any such organic solvents to clean up water based paints. Properly dispose of paints or solvents in designated containers. Close and seal partially used containers of paint to maintain quality as necessary for reuse. Store in protected, well-ventilated, fire-safe area at moderate temperature. Place materials defined as hazardous or toxic waste in designated containers. Coordinate with manufacturer for take-back program. Set aside scrap to be returned to manufacturer for recycling into new product. When such a service is not available, local recyclers shall be sought after to reclaim the materials. Set aside extra paint for
future color matches or reuse by the Government. Where local options exist for leftover paint recycling, collect all waste paint by type and provide for delivery to recycling or collection facility for reuse by local organizations.

3.13 PAINT TABLES

All DFT's are minimum values. Use only materials with a GPS green check mark having a minimum MPI "Environmentally Friendly" E1 rating based on VOC (EPA Method 24) content levels. Acceptable products are listed in the MPI Green Approved Products List, available at http://www.specifygreen.com/APL/ProductIdxByMPInum.asp.

3.13.1 EXTERIOR PAINT TABLES

DIVISION 5: EXTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

STEEL / FERROUS SURFACES

A. New Steel that has been hand or power tool cleaned to SSPC SP 2 or SSPC SP 3

1. Alkyd

   New; MPI EXT 5.1Q-G5 (Semigloss) Existing; MPI REX 5.1D-G5
   Primer: Intermediate: Topcoat:
   MPI 23         MPI 94         MPI 94
   System DFT: 5.25 mils

B. Existing hollow metal frames and doors (as indicated on the drawings):

   1. Surface previously coated with alkyd or latex:

      Waterborne Light Industrial Coating
      MPI REX 5.1C-G5 (Semigloss)
      Spot Primer: Intermediate: Topcoat:
      MPI 79         MPI 163        MPI 163
      System DFT: 5 mils

3.13.2 INTERIOR PAINT TABLES

DIVISION 3: INTERIOR CONCRETE PAINT TABLE

Existing, previously painted, concrete, vertical surfaces and ceilings, not specified otherwise:

Existing; MPI RIN 3.1A-G3 (Eggshell)

   Primer: Intermediate: Topcoat:
   MPI 50         MPI 52         MPI 52
   System DFT: 4 mils

A. New and uncoated existing and Existing, previously painted concrete floors:

   1. Acrylic Water based sealer

      New; MPI INT 3.2C-G6 (Gloss) / Existing; MPI RIN 3.2C-G6 (Gloss)
      Primer: Intermediate: Topcoat:
      MPI 99         MPI 99         MPI 99
      System DFT: 5 mils

      Note: Primer may be reduced for penetration per manufacturer's
DIVISION 3: INTERIOR CONCRETE PAINT TABLE

instructions.

DIVISION 4: INTERIOR CONCRETE MASONRY UNITS PAINT TABLE

A. New and uncoated Existing Concrete masonry:

1. Institutional Low Odor / Low VOC Latex
   New; MPI INT 4.2E-G5 (Semigloss)
   Filler: MPI 4  
   Primer: N/A  
   Intermediate: MPI 147  
   Topcoat: MPI 147  
   System DFT: 4 mils

   Fill all holes in masonry surface

B. Existing, previously painted Concrete masonry:

1. Institutional Low Odor / Low VOC Latex
   Existing; MPI RIN 4.2L-G5 (Semigloss)
   Spot Primer: MPI 50  
   Intermediate: MPI 147  
   Topcoat: MPI 147  
   System DFT: 4 mils

DIVISION 5: INTERIOR METAL, FERROUS AND NON-FERROUS PAINT TABLE

INTERIOR STEEL / FERROUS SURFACES

A. Metal, Mechanical, Electrical, Fire extinguishing sprinkler systems including:
   valves, conduit, hangers, supports, surfaces adjacent to painted surfaces (Match surrounding finish), and miscellaneous metal items not otherwise specified except floors, hot metal surfaces, and new prefinished equipment:

High Performance Architectural Latex

MPI INT 5.1R-G2 (Flat)
   Primer: MPI 79  
   Intermediate: MPI 138  
   Topcoat: MPI 138  
   System DFT: 5 mils

   Miscellaneous ferrous metal items including new and existing hollow metal door frames. Not otherwise specified except floors, hot metal surfaces, and new prefinished equipment.

1. High Performance Architectural Latex
   MPI INT 5.4F-G5 (Semigloss)
   Primer: MPI 95  
   Intermediate: MPI 141  
   Topcoat: MPI 141  
   System DFT: 5 mils

DIVISION 6: INTERIOR WOOD PAINT TABLE

A. New Wood and plywood not otherwise specified: 1. Institutional Low Odor / Low VOC Latex
   New; MPI INT 6.3V-G5 (Semigloss)
   Primer: MPI 39  
   Intermediate: MPI 147  
   Topcoat: MPI 147

SECTION 09 90 00  Page 21
DIVISION 6: INTERIOR WOOD PAINT TABLE
System DFT:  4 mils

B. Existing, previously painted Wood and plywood not otherwise specified:

1. Institutional Low Odor / Low VOC Latex
   Existing; MPI RIN 6.4D-G5 (Semigloss)
   Primer:             Intermediate:       Topcoat:
   MPI 39             MPI 147             MPI 147
   System DFT:  4 mils

DIVISION 9: INTERIOR GYPSUM BOARD PAINT TABLE

A. New and Existing, previously painted Wallboard not otherwise specified:

1. Institutional Low Odor / Low VOC Latex

   New; MPI INT 9.2M-G5 (Semigloss) / Existing; MPI RIN 9.2M-G5 (Semigloss)
   Primer:             Intermediate:       Topcoat:
   MPI 50             MPI 147             MPI 147
   System DFT:  4 mils

-- End of Section --
PART 1   GENERAL

1.1  SUMMARY

The term visual display units when used herein includes projection screens; submit manufacturer's descriptive data and catalog cuts plus manufacturer's installation instructions, and cleaning and maintenance instructions. Visual display units shall be from manufacturer's standard product line. Submit certificate of compliance signed by Contractor attesting that visual display units conform to the requirements specified.

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Visual Display Units; G

1.3  DELIVERY, STORAGE, AND HANDLING

Deliver materials to the building site in the manufacturer's original unopened containers and store them in a clean dry area with temperature maintained above 50 degrees F. Stack materials according to manufacturer's recommendations. Visual display units shall be allowed to acclimate to the building temperature for 24 hours prior to installation.

1.4  WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a one year period.

PART 2   PRODUCTS

2.1  PROJECTION SCREEN

Recessed mount motorized projection screen shall have 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Recessed mount projection screens shall have an operable closure door and access panel. Screen shall be flame retardant, mildew resistant, and white matte with black masking borders. Bottom of screen fabric shall be weighted with metal rod. Roller shall be a rigid metal at least 3 inches in diameter mounted on sound absorbing supports. Motor will be motor-in-roller design. Screen shall have a 3 position control switch to stop or reverse screen at any point. The switch shall be installed in a flush electrical box with cover plate, location(s) as shown on the electrical drawings. All conduit
and wiring from the control switch to the projection screen shall be furnished and installed by the Contractor. Ceiling recessed case shall be extruded aluminum. Screen shall be UL listed. The size shall be as shown in the drawings.

PART 3   EXECUTION

3.1  PLACEMENT SCHEDULE

Projection screen shall be located as indicated in Conference Room #102.

3.2  INSTALLATION

Perform installation and assembly in accordance with manufacturer's printed instructions. Conceal all mounting. Furnish and install trim items, accessories and miscellaneous items in total, including but not limited to hardware, grounds, clips, backing materials, adhesives, brackets, and anchorages incidental to or necessary for a sound, secure, complete and finished installation. Damaged units shall be repaired or replaced as directed by the Contracting Officer.

3.3  CLEANING

Clean in accordance with manufacturer's instructions.

-- End of Section --
SECTION 10 14 00.10

EXTERIOR SIGNAGE

04/06

PART 1   GENERAL

1.1   GENERAL REQUIREMENTS

This specification is included as a guide to the relocation of existing building dimensional letters.

1.2   SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Approved Detail Drawings; G

SD-03 Product Data
   Installation Procedures

1.3   REMOVAL AND STORAGE

Carefully remove and properly store existing dimensional letters indicated for reuse.

PART 2   PRODUCTS

2.1   DIMENSIONAL BUILDING LETTERS

2.1.1   Fabrication

Existing letters to be reused. Letters shall be packaged for protection until installation.

2.1.2   Typeface

Existing letters to be reused.

2.1.3   Size

Existing letters to be reused.

2.1.4   Finish

Existing letters to be reused.

2.1.5   Mounting

Threaded studs of existing number and size shall be used for concealed
anchorage. Letters shall project from the building line as previously existing mounting. Letters shall have new stud spacer sleeves to match existing. Letters, studs, and sleeves shall be of the same material. Supply templates for mounting from existing dimensional letter pattern.

PART 3 EXECUTION

3.1 INSTALLATION

Dimensional letters shall be installed in accordance with manufacturer's instructions at locations shown in the approved detail drawings. Submit drawings showing dimensions and elevations of existing dimensional letters and new configuration indicated using existing spacing dimensions. Indicate methods of mounting.

3.1.1 Anchorage

Anchorage and fastener materials shall be previously installed system.

3.1.2 Protection and Cleaning

The work shall be protected against damage during construction. After signs are completed and inspected, cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Signs shall be cleaned prior to installation, and of any construction or installation related dust or smears..

-- End of Section --
SECTION 10 14 00.20

INTERIOR SIGNAGE

11/12

PART 1  GENERAL

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.

ALUMINUM ASSOCIATION (AA)

AA DAF45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AA PK-1 (2009) Pink Sheets: Designations and Chemical Composition Limits for Aluminum Alloys in the Form of Castings & Ingot

AMERICAN WELDING SOCIETY (AWS)

AWS D1.2/D1.2M (2014) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

1.2  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings

Detail Drawings; G

SD-03 Product Data
1.3 EXTRA MATERIALS

Provide 1 extra frame and extra stock of the following: Changeable message strips for sign type with this feature as noted on drawings. Provide 10 paper inserts and one copy of the software for user produced signs and inserts after project completion.

1.4 QUALITY ASSURANCE

1.4.1 Samples

Submit interior signage samples of each of the following sign types showing typical quality, workmanship and color: Directional sign, Standard Room sign, Changeable message strip sign. The samples may be installed in the work, provided each sample is identified and location recorded.

1.4.2 Detail Drawings

Submit detail drawings showing elevations of each type of sign, dimensions, details and methods of mounting or anchoring, mounting height, shape and thickness of materials, and details of construction. Include a schedule showing the location, each sign type, and message.

1.5 DELIVERY, STORAGE, AND HANDLING

Materials shall be packaged to prevent damage and deterioration during shipment, handling, storage and installation. Product shall be delivered to the jobsite in manufacturer's original packaging and stored in a clean, dry area in accordance with manufacturer's instructions.

1.6 WARRANTY

Warrant the interior signage for a period of 2 years against defective workmanship and material. Warranties shall be signed by the authorized representative of the manufacturer. Submit warranty accompanied by the document authenticating the signer as an authorized representative of the guarantor. Guarantee that the signage products and the installation are free from any defects in material and workmanship from the date of delivery.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

Signs shall be the standard product of a manufacturer regularly engaged in the manufacture of such products that essentially duplicate signs that
have been in satisfactory use at least 2 years prior to bid opening. Obtain signage from a single manufacturer with edges and corners of finished letterforms and graphics true and clean.

2.2 ROOM IDENTIFICATION/DIRECTIONAL SIGNAGE SYSTEM

2.2.1 Standard Room Signs

Signs shall consist of 6063-T5 extruded aluminum in accordance with ASTM B221 and ASTM B209 and shall conform to the following:

a. Frames shall be aluminum, flat 1/4 inch thick.

b. End caps shall be aluminum with square style corners.

c. Units shall be frameless. Corners of signs shall be squared.

2.2.2 Changeable Message Strip Signs

Changeable message strip signs shall be of same construction as standard room signs to include a clear sleeve that will accept a paper or plastic insert identifying changeable text. The insert shall be prepared die-cut vinyl letters applied to 0.015 inch rigid vinyl film. Provide paper and software for creating text and symbols for computers identified by owner for Owner production of paper inserts after project completion. Sliding inserts or slide knobs that slide horizontally exposing different graphic information shall be provided as identified in the signage placement schedule and drawings.

2.2.3 Type of Mounting For Signs

Surface mounted signs shall be mounted with 1/16 inch thick closed cell vinyl foam with adhesive backing. Adhesive shall be transparent, long aging, high tech formulation on two sides of the vinyl foam.

2.2.4 Graphics

Signage graphics for modular signs shall conform to the following:

2.2.4.1 Surface Applied Photopolymer

Integral graphics and Braille achieved by photomechanical stratification processes. Photopolymer used for ADA compliant graphics shall be of the type that has a minimum durometer reading of 90. Tactile graphics shall be raised 1/32 inch from the first surface of plaque by photomechanical stratification process.

2.2.5 Character Proportions and Heights

Letters and numbers on signs conform to 36 CFR 1191.

2.2.6 Tactile Letters, Symbols and Braille

Raised letters and numbers on signs shall conform to 36 CFR 1191.

2.3 ALUMINUM ALLOY PRODUCTS

Aluminum extrusions shall be at least 1/8 inch thick, and aluminum plate or sheet shall be at least 0.0508 inch thick. Extrusions shall conform to
ASTM B221; plate and sheet shall conform to ASTM B209. Where anodic coatings are specified, alloy shall conform to AA PK-1 alloy designation 514.0. Exposed anodized aluminum finishes shall be as shown. Welding for aluminum products shall conform to AWS D1.2/D1.2M.

2.4 ANODIC COATING

Anodized finish shall conform to AA DAF45 as follows:

a. Clear (natural) designation AA-M10-C22-A31, Architectural Class II 0.4 mil or thicker.

2.5 FABRICATION AND MANUFACTURE

2.5.1 Factory Workmanship

Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practicable.

2.5.2 Dissimilar Materials

Where dissimilar metals are in contact, the surfaces will be protected to prevent galvanic or corrosive action.

2.6 COLOR, FINISH, AND CONTRAST

Color shall be as indicated on drawings. Finish of all signs shall be eggshell, matte, or other non-glare finish as required in handicapped-accessible buildings.

2.7 TYPEFACE

ADA-ABA compliant font for Room Signs as indicated on drawings.

PART 3 EXECUTION

3.1 INSTALLATION

Signs shall be installed plumb and true and in accordance with approved manufacturer's instructions at locations shown on the detail drawings. Submit six copies of operating instructions outlining the step-by-step procedures required for system operation. The instructions shall include simplified diagrams for the system as installed, the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features. Each set shall be permanently bound and shall have a hard cover. The following identification shall be inscribed on the covers: the words "OPERATING AND MAINTENANCE INSTRUCTIONS", name and location of the facility, name of the Contractor, and contract number. Mounting height and mounting location shall conform to 36 CFR 1191. Required blocking shall be installed. Signs on doors or other surfaces shall not be installed until finishes on such surfaces have been installed. Signs installed on glass surfaces shall be installed with matching blank back-up plates in accordance with manufacturer's instructions.
3.1.1 Anchorage

Anchorage shall be in accordance with approved manufacturer's instructions. Anchorage not otherwise specified or shown shall include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood. Exposed anchor and fastener materials shall be compatible with metal to which applied and shall have matching color and finish.

a. Signs mounted to painted gypsum board surfaces shall be removable for painting maintenance.

3.1.2 Protection and Cleaning

Protect the work against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned at completion of sign installation in accordance with the manufacturer's approved instructions and the requirements of Section 01730 OPERATIONS AND MAINTENANCE DATA. Submit six copies of maintenance instructions listing routine procedures, repairs, and guides.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

ALUMINUM ASSOCIATION (AA)

AA DAF45 (2003; Reaffirmed 2009) Designation System for Aluminum Finishes

ASTM INTERNATIONAL (ASTM)


INTERNATIONAL CODE COUNCIL (ICC)


U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-60003 (Basic) Partitions, Toilet, Complete

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines
1.2 SYSTEM DESCRIPTION

Provide a complete and usable toilet partition system, including toilet enclosures, urinal screens, system of panels, hardware, and support components. Furnish the partition system from a single manufacturer, with a standard product as shown in the most recent catalog data. Submit manufacturer's Cleaning and Maintenance Instructions with Fabrication Drawings for review.

1.2.1 Plastic Identification

Verify that plastic products to be incorporated into the project are labeled in accordance with ASTM D7611/D7611M. Where products are not labeled, provide product data indicating polymeric information in the Operation and Maintenance Manual.

| Type 2 | High Density Polyethylene (HDPE) |

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
- Fabrication Drawings; G
- Installation Drawings; G

SD-03 Product Data
- Cleaning and Maintenance Instructions; G
- Anchoring Devices and Fasteners; G
- Hardware and Fittings; G
- Brackets; G
- Door Hardware; G
- Environmental Data
- Toilet Enclosures
- Urinal Screens
- Pilaster Shoes

SD-04 Samples
- Colors and Finishes; G
- Hardware and Fittings
- Anchoring Devices and Fasteners

SD-10 Operation and Maintenance Data
- Plastic Identification

SD-11 Closeout Submittals
- Toilet Enclosures
- Urinal Screens
Pilaster Shoes

1.4 REGULATORY REQUIREMENTS

Conform to ICC A117.1 code for access for the handicapped operation of toilet compartment door and hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver materials in the manufacturer's original unopened packages with the brand, item identification, and project reference clearly marked. Store components in a dry location that is adequately ventilated; free from dust, water, other contaminants, and damage during delivery, storage, and construction.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Anchoring Devices and Fasteners

Provide steel anchoring devices and fasteners hot-dipped galvanized after fabrication, in conformance with ASTM A385/A385M and ASTM A123/A123M. Conceal all galvanized anchoring devices.

2.1.2 Brackets

Wall brackets shall be two-ear panel brackets, T-style, 1-inch stock. Provide stirrup style panel-to-pilaster brackets.

2.1.3 Hardware and Fittings

2.1.3.1 General Requirements

Conform hardware for the toilet partition system to CID A-A-60003 for the specified type and style of partitions. Provide hardware finish highly resistant to alkalis, urine, and other common toilet room acids. Comply latching devices and hinges for handicap compartments with 36 CFR 1191; provide stainless steel devices and hinges with door latches that operate without either tight grasping or twisting of the wrist of the operator. Submit three samples of each item, including anchoring devices and fasteners. Approved hardware samples may be installed in the work if properly identified.

<table>
<thead>
<tr>
<th>Material</th>
<th>Conformance Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zinc-base alloy</td>
<td>ASTM B86, Alloy AC41-A</td>
</tr>
<tr>
<td>Corrosion-resistant steel</td>
<td>ASTM A167, Type 304</td>
</tr>
</tbody>
</table>

2.1.3.2 Finishes

a. Corrosion-resistant steel shall have a No. 4 finish.

b. Exposed fasteners shall match the hardware and fittings.
2.1.4 Door Hardware

2.1.4.1 Hinges

Hinges shall be adjustable to hold in-swinging doors open at any angle up to 90 degrees and outswinging doors to 10 degrees. Provide self-lubricating hinges with the indicated swing. Hinges shall have the following type of return movement:

a. Gravity return movement

2.1.4.2 Latch and Pull

Latch and pull shall be a combination rubber-faced door strike and keeper equipped with emergency access.

2.1.4.3 Coat Hooks

Coat hooks shall be combination units with hooks and rubber tipped pins.

2.2 PARTITION PANELS AND DOORS

Fabricate partition panels and doors not less than 1 inch thick.

2.2.1 Toilet Enclosures

Conform toilet enclosures to CID A-A-60003, Type I, Style A, floor supported C, overhead braced. Furnish width, length, and height of toilet enclosures as shown. Provide a width of 1 inch. Finish surface of panels shall be solid polyethylene, Finish 5; water resistant; graffiti resistant; non-absorbent; 1/4 inch radius beveled edges. Reinforce panels indicated to receive toilet paper holders for mounting of the items required.

2.2.2 Urinal Screens

Conform urinal screens to CID A-A-60003, Type III, Style Wall Hung. Provide finish for surface of screens as solid polyethylene, Finish 5; water resistant; graffiti resistant; non-absorbent; 1/4 inch radius beveled edges. Furnish width and height of urinal screens as shown. Provide thickness of 1 inch. Secure wall hung urinal screens with 42 inch long, continuous flanges. Fabricate screens from the same types of panels and pilasters as the toilet partitions. Use corrosion-resistant steel fittings and fasteners.

2.3 OVERHEAD-BRACED PARTITIONS

Pilasters shall be not less than 1-1/4 inch thick. Provide anchoring device at the bottom of the pilaster consisting of a channel-shaped floor stirrup fabricated from not less than 0.0635 inch thick material and a leveling bolt. Secure the stirrup to the pilaster with not less than a 3/16 inch bolt and nut after the pilaster is leveled. Secure the stirrup to the floor with not less than two lead expansion shields and sheetmetal screws. Fabricate overhead brace from a continuous extruded aluminum tube not less than 1 inch wide by 1-1/2 inch high, 0.125-inch wall thickness. Finish shall be AA-C22A31 in accordance with AA DAF45. Set and secure brace into the top of each pilaster. Fabricate 4 inch high trim piece at the floor from not less than 0.030 inch thick corrosion-resistant steel.
2.4 PILASTER SHOES

Provide shoes at pilasters to conceal floor-mounted anchorage. Pilaster shoes shall be stainless steel. Height shall be 4 inches.

2.5 HARDWARE

Hardware for the toilet partition system shall conform to CID A-A-60003 for the specified type and style of partitions. Hardware shall be pre-drilled by manufacturer. Hardware finish shall be highly resistant to alkalis, urine, and other common toilet room acids. Hardware shall include: chrome plated non ferrous cast pivot hinges, gravity type, adjustable for door close positioning; nylon bearings; black anodized aluminum door latch; door strike and keeper with rubber bumper; and cast alloy chrome plated coat hook and bumper. Latching devices and hinges for handicap compartments shall comply with 36 CFR 1191 and shall be stainless steel door latches that operate without either tight grasping or twisting of the wrist of the operator. Screws and bolts shall be stainless steel, tamper proof type. Wall mounting brackets shall be continuous, full height, stainless steel, in accordance with toilet compartment manufacturer's instructions. Floor-mounted anchorage shall consist of corrosion-resistant anchoring assemblies with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor.

2.6 COLORS AND FINISHES

2.6.1 Colors

Provide manufacturer's standard color as indicated on drawings. Submit three samples showing a finished edge on two adjacent sides and core construction, each not less than 12-inch square.

2.6.2 Finish No. 5

Provide solid plastic fabricated of polymer resins (polyethylene) formed under high pressure rendering a single component section not less than one inch thick. Colors shall extend throughout the panel thickness. Provide exposed finish surfaces: smooth, waterproof, non-absorbent, and resistant to staining and marking with pens, pencils, or other writing devices. Solid plastic partitions shall not show any sign of deterioration when immersed in the following chemicals and maintained at a temperature of 80 degrees F for a minimum of 30 days:

<table>
<thead>
<tr>
<th>Acetic Acid (80 percent)</th>
<th>Hydrochloric Acid (40 percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetone</td>
<td>Hydrogen Peroxide (30 percent)</td>
</tr>
<tr>
<td>Ammonia (liquid)</td>
<td>Isopropyl Alcohol</td>
</tr>
<tr>
<td>Ammonia Phosphate</td>
<td>Lactic Acid (25 percent)</td>
</tr>
<tr>
<td>Bleach (12 percent)</td>
<td>Lime Sulfur</td>
</tr>
<tr>
<td>Borax</td>
<td>Nicotine</td>
</tr>
<tr>
<td>Brine</td>
<td>Potassium Bromide</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Caustic Soda</td>
<td>Soaps</td>
</tr>
<tr>
<td>Chlorine Water</td>
<td>Sodium Bicarbonate</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>Trisodium Phosphate</td>
</tr>
<tr>
<td>Copper Chloride</td>
<td>Urea; Urine</td>
</tr>
<tr>
<td>Core Oils</td>
<td>Vinegar</td>
</tr>
</tbody>
</table>

**PART 3 EXECUTION**

**3.1 PREPARATION**

Take field measurements prior to the preparation of drawing and fabrication to ensure proper fits. Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive work. Verify correct spacing of plumbing fixtures. Verify correct location of built in framing, anchorage, and bracing. Report in writing to Contracting Officer prevailing conditions that will adversely affect satisfactory execution of the work of this section. Do not proceed with work until unsatisfactory conditions have been corrected.

**3.2 INSTALLATION**

Install partitions rigid, straight, plumb, and level, with the panels centered between the fixtures. Provide a panel clearance of not more than 1/2 inch and secure the panels to walls and pilasters with not less than two wall brackets attached near the top and bottom of the panel. Locate wall brackets so that holes for wall bolts occur in masonry or tile joints. Secure Panels to pilasters with brackets matching the wall brackets. Provide for adjustment due to minor floor variations. Locate head rail joints at pilaster center lines. Install adjacent components for consistency of line and plane. Equip each door with hinges, one door latch, and one coat hook and bumper. Align hardware to uniform clearance at vertical edges of doors.

a. Secure panels to ceramic tile on hollow gypsum board with toggle bolts using not less than 1/4-20 screws of the length required for the wall thickness. Toggle bolts shall have a load-carrying strength of not less than 600 pounds per anchor.

**3.3 OVERHEAD-BRACED PARTITIONS**

Secure pilasters to the floor with the anchorage device specified. Make all leveling devices readily accessible for leveling, plumbing, and tightening the installation. Secure overhead brace to the pilaster face with not less than two fasteners per face. Expansion shields shall have a minimum 2-inch penetration into the concrete slab. Make tops of doors parallel with the overhead brace when doors are in a closed position.

**3.4 FINAL ADJUSTMENT**

After completion of the installation, make final adjustments to the pilaster-leveling devices, door hardware, and other working parts of the
partition assembly. Doors shall have a uniform vertical edge clearance of approximately 3/16 inch and shall rest open at approximately 30 degrees when unlatched.

3.5 CLEANING

Clean all surfaces of the work, and adjacent surfaces soiled as a result of the work, in an approved manner compliant with the manufacturer's recommended cleaning and protection from damage procedures until accepted. Remove all equipment, tools, surplus materials, and work debris from the site.

-- End of Section --
SECTION 10 26 13
CORNER GUARDS
08/10

PART 1   GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)


SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
Corner Guards; G

SD-03 Product Data
Corner Guards; G
SD-04 Samples
Finish; G
SD-06 Test Reports
Corner Guards
SD-07 Certificates
Corner Guards

1.3 DELIVERY, STORAGE, AND HANDLING

Deliver materials to the project site in manufacturer's original unopened containers with seals unbroken and labels and trademarks intact. Keep materials dry, protected from weather and damage, and stored under cover. Materials shall be stored at approximately 70 degrees F for at least 48 hours prior to installation.

1.4 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.1 STANDARD PRODUCTS

To the maximum extent possible, corner guards shall be the standard products of a single manufacturer and shall be furnished as detailed. Drawings show general configuration of products required, and items differing in minor details from those shown will be acceptable.

2.1.1 Resilient Material

Provide resilient material consisting of high impact resistant extruded acrylic vinyl, polyvinyl chloride, or injection molded thermal plastic conforming to the following:

2.1.1.1 Minimum Impact Resistance

Minimum impact resistance shall be 18 ft-lbs/sq. inch when tested in accordance with ASTM D256, (Izod impact, ft-lbs per sq inch notched).

2.1.1.2 Fire Rating

Fire rating shall be Class 1 when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less. Material shall be rated self extinguishing when tested in accordance with ASTM D635. Material shall be labeled and tested by an approved nationally known testing laboratory. Resilient material used for protection on fire rated doors and frames shall be listed by the testing laboratory performing the tests. Resilient material installed on fire rated wood/steel door and frame assemblies shall have been tested on similar type assemblies. Test results of material tested on any other combination of door/frame assembly will not be acceptable.
2.1.1.3 Integral Color

Colored components shall have integral color and shall be matched in accordance with SAE J1545 to within plus or minus 1.0 on the CIE-LCH scales.

2.1.1.4 Chemical and Stain Resistance

Materials shall be resistant to chemicals and stains reagents in accordance with ASTM D543.

2.1.1.5 Fungal and Bacterial Resistance

Materials shall be resistant to fungi and bacteria in accordance with ASTM G21, as applicable.

2.2 CORNER GUARDS

2.2.1 Resilient Corner Guards

Corner guard units shall be 1 1/2" x 1 1/2" surface mounted extruded type, radius formed to profile shown. Corner guards shall extend from floor to ceiling.

2.3 FINISH

Submit three samples indicating color and texture of materials requiring color and finish.

2.3.1 Resilient Material Finish

Finish for resilient material shall be embossed pebble texture with colors in accordance with SAE J1545.

2.4 ADHESIVES

Adhesive for resilient material shall be in accordance with manufacturers recommendations.

2.5 COLOR

Color shall be as indicated. Color listed is not intended to limit the selection of equal colors from other manufacturers.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Corner Guards

Material shall be mounted at location indicated in accordance with manufacturer's recommendations.
SECTION 10 28 13

TOILET, LOCKER, AND DECONTAMINATION ROOM ACCESSORIES

07/06

PART 1   GENERAL

1.1  SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-03 Product Data

Finishes; G
Accessory Items; G

1.2  DELIVERY, STORAGE, AND HANDLING

Wrap toilet accessories for shipment and storage, then deliver to the jobsite in manufacturer's original packaging, and store in a clean, dry area protected from construction damage and vandalism.

1.3  WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2   PRODUCTS

2.1  MANUFACTURED UNITS

Provide toilet accessories where indicated in accordance with paragraph SCHEDULE. Provide each accessory item complete with the necessary mounting plates of sturdy construction with corrosion resistant surface.

2.1.1  Anchors and Fasteners

Provide anchors and fasteners capable of developing a restraining force commensurate with the strength of the accessory to be mounted and suited for use with the supporting construction. Provide tamperproof design exposed fasteners with finish to match the accessory.

2.1.2  Finishes

Except where noted otherwise, provide the following finishes on metal:

<table>
<thead>
<tr>
<th>Metal</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>No. 4 satin finish</td>
</tr>
</tbody>
</table>
2.2 ACCESSORY ITEMS AND MANUFACTURER

Conform to the requirements for accessory items specified below. Submit certificate for each type of accessory specified, attesting that the items meet the specified requirements. Model numbers are based on standard items manufactured by Bobrick Washroom Equipment Inc. Similar items by other manufacturers are acceptable provided they are of equal design and construction.

2.2.1 Grab Bar (GB-1)

Bobrick No. B-6806.99 x 42 or equal by other manufacturers.

2.2.2 Grab Bar (GB-2)

Bobrick No. B-6806.99 x 36 or equal by other manufacturers.

2.2.3 Shower Grab Bar (SGB)

Bobrick No. B-6861.99 or equal by other manufacturers.

2.2.4 Mirror, Glass (MG)

Bobrick No. B-165 2436 or equal by other manufacturers.

2.2.5 Hookless Shower Curtain and Liner (SC)

Provide shower curtain with snap-on liner sized to suit conditions. Provide anti-bacterial, plain weave polyester fabric outer curtain with snap-on water-repellant fabric liner. Curtain shall have sheer panel at top and built-in split ring grommets to facilitate hanging curtain on rod. Both curtain and liner shall be machine washable. Furnish curtain and liner in white color.

2.2.6 Shower Curtain Rods (SCR)

Provide Type 304 stainless steel shower curtain rods 1-1/4 inch OD by 0.049 inch minimum straight to meet installation conditions.

2.2.7 Soap Dispenser (SD)

Government Furnished, Contractor Installed

2.2.8 Paper Towel Dispenser (PTD)

Government Furnished, Contractor Installed

2.2.9 Towel Bar (TB)

Bobrick No. B-6737 x 24 or equal by other manufacturers.
2.2.10 Fixed Locker Bench (FLB)

Locker benches shall be laminated selected hardwood, 1-1/4" full finished thickness. All corners are to be rounded and sanded. Surfaces shall be finished with two coats of clear lacquer. Bench tops are to be 12"x48" wide and furnished in lengths as shown on the drawings in even foot increments. Pedestals shall consist of steel tubing with 10 gauge steel flanges welded to each end. The overall height of the pedestal shall be 16-3/4" for a total height of 18". Pedestals shall be painted black.

2.2.11 Stainless Steel Shelf w/ Pot Hook Rack (SSS/PHR)

Wall mounted 12"x60", 18 gauge, type 430, stainless steel shelf w/ 2"x1/4" stainless steel flat bar and 9 plated pot hooks.

2.2.12 Toilet Tissue Dispenser, Jumbo (TTDJ)

Government Furnished, Contractor Installed

2.2.13 Mop and Broom Holder (MH)

Stainless steel with grip jaw cam mechanism securing 3 mop or broom handles. Also includes hooks and storage shelf.

PART 3 EXECUTION

3.1 INSTALLATION

Provide the same finish for the surfaces of fastening devices exposed after installation as the attached accessory. Provide oval exposed screw heads. Install accessories at the location and height indicated. Protect exposed surfaces of accessories with strippable plastic or by other means until the installation is accepted. After acceptance of accessories, remove and dispose of strippable plastic protection. Coordinate accessory manufacturer's mounting details with other trades as their work progresses. Use sealants for brackets, plates, anchoring devices and similar items in showers (a silicone or polysulfide sealant) as they are set to provide a watertight installation. After installation, thoroughly clean exposed surfaces and restore damaged work to its original condition or replace with new work.

3.1.1 Surface Mounted Accessories

Mount on concealed backplates, unless specified otherwise. Conceal fasteners on accessories without backplates. Install accessories with sheet metal screws in lead-lined braided jute, PTFE or neoprene sleeves, or lead expansion shields, or with toggle bolts or other approved fasteners as required by the construction. Install backplates in the same manner, or provide with lugs or anchors set in mortar, as required by the construction. Fasten accessories mounted on gypsum board to metal backplates secured to metal studs.

3.1.2 Fixed Locker Benches

Install per manufacturers installation.
3.2 CLEANING

Clean material in accordance with manufacturer's recommendations. Do not use alkaline or abrasive agents. Take precautions to avoid scratching or marring exposed surfaces.

-- End of Section --
PART 1 GENERAL

1.1 REFERENCES

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


NFPA 10 (2013) Standard for Portable Fire Extinguishers


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)


UNDERWRITERS LABORATORIES (UL)

UL 299 (2012) Dry Chemical Fire Extinguishers

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-01 Preconstruction Submittals

Manufacturer's Data

SD-03 Product Data

Fire Extinguishers; G

Accessories; G

Cabinets; G

Wall Brackets; G

Replacement Parts List; G

SD-07 Certificates

Fire Extinguishers; G
1.3  DELIVERY, STORAGE, AND HANDLING

Protect materials from weather, soil, and damage during delivery, storage, and construction.

Deliver materials in their original packages, containers, or bundles bearing the brand name and the name and type of the material.

1.4  WARRANTY

Guarantee that Fire Extinguishers are free of defects in materials, fabrication, finish, and installation and that they will remain so for a period of not less than 1 year after completion.

PART 2  PRODUCTS

Submit assembly details performed in the factory and product data for the following items: Fire Extinguishers; Accessories, Cabinets, Wall Brackets.

2.1  SYSTEM DESCRIPTION

2.1.1  Types

Submit certificates that show fire extinguishers comply with local codes and regulations.


Provide dry chemical type fire extinguishers compliant with UL 299.

Submit manufacturer's data for each type of Fire Extinguisher required, detailing all related Cabinet, Wall Mounting and Accessories information, complete with manufacturer's warranty with inspection tag.

2.1.2  Material

Provide enameled steel extinguisher shell.

2.1.3  Size

10 pounds extinguishers.

2.1.4  Accessories

Forged brass valve

Pressure gage
2.2 EQUIPMENT

2.2.1 Cabinets

2.2.1.1 Material

Provide aluminum cabinets.

2.2.1.2 Type

Provide semi-recessed cabinet for a 4-inch wall.

2.2.1.3 Size

Dimension cabinets to accommodate the specified fire extinguishers.

2.2.2 Wall Brackets

Provide wall-hook fire extinguisher wall brackets.

Provide wall bracket and accessories as approved.

PART 3 EXECUTION

3.1 INSTALLATION

Fire Extinguishers where indicated on the drawings. Verify exact locations prior to installation.

Provide extinguishers which are fully charged and ready for operation upon installation. Provide extinguishers complete with Manufacturer's Warranty with Inspection Tag attached.

Comply with the manufacturer's recommendations for all installations.

3.2 PROTECTION

3.2.1 Repairing

Remove and replace damaged and unacceptable portions of completed work with new work at no additional cost to the Government.

Submit replacement parts list indicating specified items replacement part, replacement cost, and name, address and contact for replacement parts distributor.

3.2.2 Cleaning

Clean all surfaces of the work, and adjacent surfaces which are soiled as a result of the work. Remove from the site all construction equipment, tools, surplus materials and rubbish resulting from the work.

-- End of Section --
PART 1   GENERAL

1.1 REFERENCES

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

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
ASCE 7  (2010; Errata 2011; Supp 1 2013) Minimum Design Loads for Buildings and Other Structures

AMERICAN WELDING SOCIETY (AWS)

ASTM INTERNATIONAL (ASTM)

ASTM D2244 (2015a) Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates


ASTM D3363 (2005; E 2011; R 2011; E 2012) Film Hardness by Pencil Test


ASTM D522 (1993a; R 2008) Mandrel Bend Test of Attached Organic Coatings


ASTM D714 (2002; R 2009) Evaluating Degree of Blistering of Paints

ASTM D822 (2001; R 2006) Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings


ASTM E1592 (2005; R 2012) Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference


ASTM F436 (2011) Hardened Steel Washers


1.2 GENERAL REQUIREMENTS

1.2.1 Structural Performance

Provide canopy systems capable of withstanding the effects of gravity loads and the following loads and stresses within the limits and conditions as required by the latest codes.

1.2.1.1 Engineering

Design canopy systems conforming to procedures described in MBMA MBSM.

1.2.1.2 Design Loads

Conform to the requirements of ASCE 7 and all building codes applicable to the project geographical location.

1.2.1.3 Live Loads

Include all vertical loads induced by the building occupancy indicated on the drawings, as well as loads induced by maintenance workers, materials and equipment for roof live loads.

1.2.1.4 Wind Loads

Include horizontal loads induced by a basic wind speed of 120 mph and as indicated in UFC 3-301-01 dated 1 June 2013 w/ change 1 dated 15 May 2014.

1.2.1.5 Collateral Loads

Include additional dead loads other than the weight of the canopy system for any permanent items such as electrical systems.

1.2.1.6 Load Combinations

Design canopy system to withstand the most critical effects of load factors and load combinations as required by MBMA MBSM, ASCE 7, and the building code applicable to the project location.
1.2.1.7 Deflection Limits

Engineer assemblies to withstand design loads with deflections no greater than the following:

a. Beams, Channels, and Gutter Beams; vertical deflection of 1/180 of the span.

b. Metal Roof Panels; vertical deflection of 1/180 of the span.

Design any secondary framing system to accommodate deflection of primary structure and construction tolerances, and to maintain clearances at openings. Provide metal panel assemblies capable of withstanding the effects of loads and stresses indicated, based on testing according to ASTM E1592.

1.2.2 Thermal Movements

Provide systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss as follows:

Temperature Change (Range); 120 F, ambient; 180 F, material surfaces.

1.2.3 Wind-Uplift Resistance

Provide metal roof panel assemblies that comply with ASCE 7, IBC 2012, and UFC 3-301-01 dated 1 June 2013 w/ change 1 dated 15 May 2014.

1.3 SYSTEMS DESCRIPTION: POST AND BEAM

General: Provide a complete, integrated set of manufacturer's mutually dependent components and assemblies that form an aluminum canopy system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure. Include primary and secondary framing, Aluminum roof panels, beams, columns, gutters, and accessories complying with requirements indicated.

Provide aluminum canopy system of size and with spacing, slopes, and spans indicated. Systems are post and beam type.

1.3.1 Primary Frame Type

a. Rigid Clear Span: Solid-member, structural-framing system with support columns.

1.3.2 Secondary Frame Type

Provide manufacturer's standard additional framing systems required to provide a complete code compliant system.

1.3.3 Eave Height

Eave height must be as indicated by nominal height on Drawings.
1.3.4 Bay Spacing

Bay Spacing must be as indicated on the drawings.

1.3.5 Roof Slope

Roof slope must be as indicated on the drawings.

1.3.6 Roof System

Provide manufacturer's cap and pan and corrugated per manufacturers standard.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
- Detail Drawings; G,

SD-03 Product Data
- Manufacturer's catalog data; G,

SD-04 Samples
- Fascia, Beam, Column, and Roof Panels, 12 inches long by actual panel width; G,
- Fasteners; G,
- Manufacturer's color charts and chips, 4 by 4 inches; G,

SD-05 Design Data
- Manufacturer's descriptive and technical literature; G,
- Manufacturer's canopy design analysis; G,

SD-06 Test Reports
- Coatings and base metals; G,
- Factory Color Finish Performance Requirements; G,

SD-07 Certificates
- System components; G,
- Repair Paint; G,
- Qualification of Manufacturer; G,
Qualification of Erector; G,
SD-08 Manufacturer's Instructions

Installation of Roof and Fascia panels; G,
SD-11 Closeout Submittals

Manufacturer's Warranty; G,

1.5 QUALITY ASSURANCE

1.5.1 Pre-Erection Conference

After submittals are received and approved but before aluminum canopy system work, including associated work, is performed, the Contracting Officer will hold a pre-erection conference to review the following:

a. The detail drawings, specifications, and manufacturer's descriptive and technical literature.

b. Methods and procedures related to system erection, including, but not limited to: qualification of manufacturer, qualification of erector, manufacturer's catalog data, design analysis, written instructions and test reports.

c. Support conditions for compliance with requirements, including alignment between and erection of structural members.

d. Temporary protection requirements for assembly during and after installation.

1.5.1.1 Pre-Roofing Conference

After structural framing systems erection and approval but before roofing work, including associated work, is performed; the Contracting Officer will hold a pre-roofing conference to review the following:

a. Examine framing and formed shapes conditions for compliance with requirements, including flatness and attachment to structural members.

b. Review flashings, roof drainage, roof, and condition of other construction that will affect the systems.

c. Review temporary protection requirements for metal roof assembly during and after installation.

d. Review roof observation and repair procedures after systems erection.

1.5.2 Manufacturer's Technical Representative

The representative must have authorization from manufacturer to approve field changes and be thoroughly familiar with the products, erection of structural framing and installation of roof and wall panels in the geographical area where construction will take place.
1.5.3 Manufacturer's Qualifications

System manufacturer must have a minimum of five (5) years experience as a qualified manufacturer of aluminum canopy systems and accessory products.

Provide engineering services by an authorized currently licensed engineer in the geographical area where construction will take place, having a minimum of four years experience as an engineer knowledgeable in canopy design analysis, ASCE 7, the building code in the geographic area where the construction will take place and ASTM E1592.

Provide certified engineering calculations using the products submitted for:

a. Roof Wind Loads with basic wind speed, exposure category, co-efficient, importance factor, designate type of facility, negative pressures for each zone, methods and requirements of attachment.
b. Roof Dead and Live Loads
c. Collateral Loads
d. Foundation Loads

1.5.4 Qualification of Erection Contractor

An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and must be approved and certified by the canopy system manufacturer.

1.5.5 Single Source

Obtain primary and secondary components and structural framing members, metal roof, closures and other accessories from the standard products of the single source from a single manufacturer to operate as a complete system for the intended use.

1.5.6 Welding

Qualify procedures and personnel according to AWS A5.1/A5.1M, AWS D1.1/D1.1M, and AWS D1.3/D1.3M.

1.5.7 Fabrication

Fabricate and finish all components and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles with dimensional and structural requirements

Provide panel profile, cap and pan construction.

Aluminum Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA 1793 that apply to the design, dimensions, metal, and other characteristics of item indicated:

a. Form exposed aluminum accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
b. End Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.

c. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

d. Conceal fasteners and expansion provisions where possible.

e. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA or by canopy system manufacturer for application, but not less than thickness of metal being secured.

1.5.8 Finishes

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes.

Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

1.6 SHIPPING, HANDLING AND STORAGE

1.6.1 Delivery

Package and deliver components, sheets, aluminum panels, and other manufactured items so as not to be damaged or deformed and protected during transportation and handling.

Stack and store panels horizontally on platforms or pallets, covered with suitable weather-tight and ventilated covering to ensure dryness, with positive slope for drainage of water. Store in a manner to prevent bending, warping, twisting, and surface damage. Do not store materials that might cause staining, denting, or other surface damage. Retain strippable protective covering for entire period up to metal panel installation.

1.7 PROJECT CONDITIONS

1.7.1 Weather Limitations

Proceed with installation preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing building.

1.7.2 Field Measurements

1.7.2.1 Established Dimensions for Foundations

Comply with established dimensions on approved anchor-bolt plans, established foundation dimensions, and proceed with fabricating structural framing. Do not proceed without verifying field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.
1.7.2.2 Established Dimensions for Aluminum Canopy System

Coordinate construction to ensure that actual canopy dimensions, and locations of structural members correspond to established dimensions and existing field conditions including footing locations.

1.7.2.3 Verification Record

Verify locations of all new footings, framing dimensions, and existing building clearances by field measurements before metal roof panel fabrication. Indicate measurements on Shop Drawings.

1.8 COORDINATION

Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation footings. Concrete, reinforcement, and formwork requirements are specified in Section 03 30 00 CAST-IN-PLACE CONCRETE.

Coordinate metal roof panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leak-proof, secure, and non-corrosive installation.

1.9 WARRANTY

1.9.1 Building System Warranty

Furnish manufacturer's no-dollar-limit warranty for the aluminum canopy system. The warranty period is to be no less than 10 years from the date of acceptance of the work and be issued directly to the Government. The warranty must provide that if within the warranty period, the canopy system shows evidence of deterioration resulting from defective materials and/or workmanship, correcting of any defects is the responsibility of the system manufacturer. Repairs that become necessary because of defective materials and workmanship while system is under warranty are to be performed within 32 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 32 hours of notification will constitute grounds for having emergency repairs performed by others and will not void the warranty.

1.9.2 Roof and Wall Panel Finish Warranty

Furnish manufacturer's no-dollar-limit warranty for the Aluminum Roof panel systems. The warranty period is to be no less than 10 years from the date of acceptance of the work and be issued directly to the Government.

The warranty is to provide that if within the warranty period the metal panel system shows evidence of checking, delaminating cracking, peeling, chalk in excess of a numerical rating of eight, as determined by ASTM D4214 test procedures; or change colors in excess of five CIE or Hunter units in accordance with ASTM D2244 or excess weathering due to deterioration of the panel system resulting from defective materials and finish or correction of the defective workmanship is to be the responsibility of the metal building system manufacturer.

Liability under this warranty is exclusively limited to replacing the defective coated materials.
Repairs that become necessary because of defective materials and workmanship while roof system is under warranty are to be performed within 32 hours after notification, unless additional time is approved by the Contracting Officer. Failure to perform repairs within 32 hours of notification will constitute grounds for having emergency repairs performed by others and not void the warranty.

PART 2  PRODUCTS

2.1  STRUCTURAL FRAMING MATERIALS

2.1.1  Aluminum Extrusions

Standard and Custom per pre-engineering requirements for structural conformance specified herein. All components are to be Alloy 6063 with a T-6 temper.

2.1.2  Anchor Rods

ASTM F1554.

e. Finish: Hot-dip zinc coating, ASTM A153/A153M.

2.1.3  Deck Screws (rivets not permitted)

Type 18-8 non-magnetic stainless steel sealed with a neoprene "O" ring beneath 5/8" outside dimension, conical washer.

2.1.4  Fascia Rivets

Size 3/16" by 1/2" grip range aluminum rivets with aluminum mandrel.

2.1.5  Bolts

All bolts, nuts, and washers to be 18-8 non-magnetic stainless steel.

2.1.6  Tek Screws

Not permitted.

2.2  FABRICATION

2.2.1  General

Comply with MBMA MBSM - "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

2.3  PRE-ENGINEERED METAL CANOPY SYSTEM

2.3.1  General

Provide a complete, integrated set of manufacturer's standard fixed base design canopy components wherein the aluminum framing system uses Gutter, Beam, and Column construction transferring the moment to the concrete footing. The beam arrangements allow for a post and beam design. These
mutually dependent components form a pre-engineered canopy, ready for construction on project site. Said pre-engineered aluminum canopy will be designed to meet all site structural and wind requirements. Systems are to be internally drained as indicated on the drawings.

2.3.2 Canopy Fascia

Aluminum Composite Panel (ACM): Available with a fluorocarbon paint finish, masked on one side. Shall be warranted for 10 years depending on color and finish.

2.3.3 Canopy Finishes

Comply with NAAMM MFM for recommendations for applying and designating finishes. All painted components are to be Kynar 500.

Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.3.4 Fabrication

Fabricate pre-engineered canopies, to the greatest extent possible, in factory.

2.3.5 Primary Framing

Manufacturer's standard structural primary framing system includes single slope; canopy beams; intermediate, and corner columns; and wind bracing designed to withstand required loads and specified requirements. Provide frames with attachment plates, bearing plates, and splice members as required. Provide frame span and spacing indicated.

Shop fabricate framing components by welding or by using high-strength bolts to the indicated size and section with base-plates, bearing plates, stiffeners, and other items required. Cut, form, punch, drill, and weld framing for bolted field erection.

2.3.6 Secondary Framing

Manufacturer's standard secondary framing members, including flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from Aluminum.

2.4 PANEL MATERIALS

2.4.1 Finish

All non-stainless steel components are to receive a factory-applied Kynar 500/Hylar 5000 finish consisting of a baked-on top-coat with a manufacturer's recommended prime coat conforming to the following:

a. Metal Preparation: All metal is to have the surfaces carefully prepared for painting on a continuous process coil coating line by alkali cleaning, hot water rinsing, application of chemical conversion
coating, cold water rinsing, sealing with acid rinse, and thorough drying.

b. Prime Coating: A base coat of epoxy paint, specifically formulated to interact with the top-coat, is to be applied to the prepared surfaces by roll coating to a dry film thickness of 0.20 plus 0.05 mils. This prime coat must be oven cured prior to application of finish coat.

c. Exterior Finish Coating: Apply the finish coating over the primer by roll coating to dry film thickness of 0.80 plus 5 mils for a total dry film thickness of 1.00 plus 0.10 mils. This finish coat must be oven-cured.

d. Color: The exterior finish chosen from the manufacturer's color charts and chips.

e. Physical Properties: Coating must conform to the industry and manufacturer's standard performance criteria as listed by the following certified test reports:

- Chalking: ASTM DEFONLINE
- Color Change and Conformity: ASTM D2244
- Weatherometer: ASTM G152, ASTM G153 and ASTM D822
- Humidity: ASTM D2247 and ASTM D714
- Salt Spray: ASTM B117
- Chemical Pollution: ASTM D1308
- Gloss at 60 degrees: ASTM D523
- Pencil Hardness: ASTM D3363
- Reverse Impact: ASTM D2794
- Flexibility: ASTM D522
- Abrasion: ASTM D968
- Flame Spread: ASTM E84

2.4.2 Repair Of Finish Protection

Repair paint for systems must be compatible paint of the same formula and color as the specified finish furnished by the metal panel manufacturer, conforming to ASTM A780/A780M.

2.5 MISCELLANEOUS METAL FRAMING

2.5.1 General

Aluminum type 6063-T6.

2.5.2 Fasteners for Miscellaneous Metal Framing

Refer to the following paragraph "FASTENERS".

2.6 FASTENERS

2.6.1 General

Type, material, corrosion resistance, size and sufficient length to penetrate the supporting member a minimum of 1 inch with other properties required to fasten miscellaneous metal framing members to substrates in accordance with the metal panel manufacturer's and ASCE 7 requirements.
2.6.2 Exposed Fasteners

Fasteners for metal panels to be stainless steel, compatible with the panel or flashing and of a type and size recommended by the manufacturer to meet the performance requirements and design loads. Fasteners for accessories to be the manufacturer's standard. Provide an integral metal washer matching the color of attached material with compressible sealing EPDM gasket approximately 3/32 inch thick.

2.6.3 Screws

Screws to be stainless steel being the type and size recommended by the manufacturer to meet the performance requirements.

2.6.4 Rivets

Rivets to be stainless steel where watertight connections are required.

2.7 ACCESSORIES

2.7.1 Joint Sealants

2.7.1.1 Sealants

Sealants are to be an approved gun type for use in hand or air-pressure caulking guns at temperatures above 40 degrees F (or frost-free application at temperatures above 10 degrees F) with minimum solid content of 85 percent of the total volume. Sealant is to dry with a tough, durable surface skin which permits it to remain soft and pliable underneath, providing a weather-tight joint. No migratory staining is permitted on painted or unpainted metal, stone, glass, vinyl, or wood.

Prime all joints to receive sealants with a compatible one-component or two-component primer as recommended by the metal panel manufacturer.

2.7.1.2 Shop-Applied

Sealant for shop-applied caulking must be an approved gun grade, non-sag one component polysulfide or silicone conforming to ASTM C920, Type II, and with a curing time to ensure the sealant's plasticity at the time of field erection.

2.7.1.3 Field-Applied

Sealant for field-applied caulking must be an approved gun grade, non-sag one component polysulfide or two-component polyurethane with an initial maximum Shore A durometer hardness of 25, and conforming to ASTM C920, Type II. Color to match panel colors.

2.7.1.4 Tape Sealant

Pressure sensitive, 100 percent solid with a release paper backing; permanently elastic, non-sagging, non-toxic and non-staining as approved by the metal panel manufacturer.
2.8 SHEET METAL FLASHING AND TRIM

2.8.1 Fabrication

Shop fabricate aluminum flashing and trim where practicable to comply with recommendations in SMACNA 1793 that apply to design, dimensions, metal, and other characteristics of item indicated. Obtain field measurements for accurate fit before shop fabrication.

Fabricate aluminum flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

2.9 FINISHES

2.9.1 General

Comply with NAAMM AMP 500 for recommendations for applying and designating finishes.

2.9.2 Appearance of Finished Work

Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

Before erection proceeds examine with the erector present the concrete foundation dimensions, concrete bearing surfaces, anchor bolt size and placement, survey slab elevation, locations of bearing plates, and other embedment's to receive structural framing with the system manufacturer's templates and drawings before erecting any components for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

Examine primary and secondary framing to verify that beams, angles, channels, and other structural and panel support members and anchorages have been installed within alignment tolerances required by aluminum canopy manufacturer, UL, ASTM, ASCE 7 and as required by the building code for the geographical area where construction will take place.

Examine roughing-in for components and systems penetrating roof to verify actual locations of penetrations relative to seam locations of panels before roof panel installation.

Submit to the Contracting Officer a written report, endorsed by Erector, listing conditions detrimental to performance of the Work.

Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

Provide temporary shoring, guys, braces, and other supports during
erection to keep the structural framing secure, plumb, and in alignment against temporary construction loading or loads equal in intensity of the canopy design loads. Remove temporary support systems when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

The work area shall be required extending 10 feet beyond canopy in all directions practical. The work area shall be free of open excavation and debris. Site to meet OSHA guidelines to allow lift equipment and scaffolding to maneuver the work area.

Provide pedestrian protection and warnings during construction which comply with local, Federal, and OSHA codes.

Miscellaneous Framing: Install miscellaneous support members or anchorage for the system according to manufacturer's written instructions.

3.3 ERECTION OF STRUCTURAL FRAMING

Erect system according to manufacturer's written erection instructions, approved shop drawings and other erection documents in accordance with MBMA MBSM - "Metal Building Systems Manual".

Do not field cut, drill, or alter structural members without written approval from system manufacturer's professional engineer and the Contracting Officer.

Set structural framing accurately in locations and to elevations indicated and according to AISC 325 specifications. Maintain structural stability of frame during erection.

Clean concrete bearing surfaces prior to setting plates. Clean bottom surface of plates.

Align and adjust structural framing before permanent bolt-up and connections. Perform necessary adjustments and alignment to compensate for changes or discrepancies in elevations.

Maintain erection tolerances of structural framing in accordance with AISC 360.

3.4 ROOF PANEL INSTALLATION

Provide roof panels of full length from eave to gutter or ridge as indicated, unless otherwise indicated or restricted by shipping limitations. Anchor roof panels and other components of the Work securely in place in accordance with NRCA RoofMan and MBMA MBSM.

Erect roofing system in accordance with the approved erection drawings, the printed instructions and safety precautions of the canopy manufacturer.

Sheets are not to be subjected to overloading, abuse, or undue impact. Do not install bent, chipped, or defective sheets.

Sheets must be erected true and plumb and in exact alignment with the horizontal and vertical edges of the building, securely anchored, and with the indicated rake and eave overhang.

Work must allow for thermal movement of the roofing, movement of the
building structure, and provide permanent freedom from noise due to wind pressure.

Field cutting roof panels by torch is not permitted.

Do not permit storage, walking, wheeling, and trucking directly on applied roofing materials. Provide temporary walkways, runways, and platforms of smooth clean boards or planks as necessary to avoid damage to the installed roofing materials, and to distribute weight to conform to the indicated live load limits of roof construction.

3.5 FLASHING, TRIM AND CLOSURE INSTALLATION

a. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA 1793. Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

b. Sheet metalwork is to be accomplished to form leak free construction without waves, warps, buckles, fastening stresses or distortion, and allow for expansion and contraction. Cutting, fitting, drilling, and other operations in connection with sheet metal required to accommodate the work of other trades is to be performed by sheet metal mechanics.

3.6 ACCESSORY INSTALLATION

3.6.1 General

Install accessories with positive anchorage and provide for thermal expansion. Coordinate installation with flashings and other components.

3.6.2 Dissimilar Metals

Where dissimilar metals contact one another or corrosive substrates are present, protect against galvanic action by painting dissimilar metal surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each surface, or by other permanent separation techniques as recommended by the canopy manufacturer.

3.6.3 Gutters and Downspouts-Internal System as indicated

Comply with performance requirements, manufacturer's written installation instructions, and install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA 1793 recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

3.7 CLEAN-UP AND PROTECTION

3.7.1 Structural Framing

Clean all exposed structural framing at completion of installation. Remove metal shavings, filings, bolts, and wires from work area. Remove grease and oil films, excess sealants, handling marks, contamination from steel wool, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.
3.7.2 Aluminum Panels

Clean all exposed sheet metal work at completion of installation. Remove metal shavings, filings, nails, bolts, and wires from work area. Remove protective coverings/films, grease and oil films, excess sealants, handling marks, contamination, fittings and drilling debris and scrub the work clean. Exposed metal surfaces to be free of dents, creases, waves, scratch marks, solder or weld marks, and damage to the finish coating.

3.7.3 Touch-Up Painting

After erection, promptly clean, prepare, and prime or re-prime field connections, rust spots, and abraded surfaces of all framing and accessories. Clean and touch-up paint with manufacturer's touch-up paint, unless otherwise indicated.

3.8 WASTE MANAGEMENT

Separate waste in accordance with the Waste Management Plan, placing copper materials, ferrous materials, and galvanized sheet metal in designated areas for reuse. Close and seal tightly all partly used adhesives and solvents; store protected in a well-ventilated, fire-safe area at moderate temperature.

Collect and place scrap/waste debris in containers. Promptly dispose of scrap/waste debris. Do not allow scrap/waste debris to accumulate on-site; transport scrap/waste debris from government property and legally dispose of them.

3.9 WARRANTY

3.9.1 MANUFACTURER'S WARRANTY

Submit all manufacturers' signed warranties to Contracting Officer prior to final acceptance.

-- End of Section --
PART 1   GENERAL

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.

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)


1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS

SD-02 Shop Drawings

Installation

SD-03 Product Data

Window Blinds; G,
Installation Certification

SD-04 Samples

Window Blinds; G,
Valance; G,

SD-06 Test Reports

Window Blinds

SD-08 Manufacturer's Instructions

Window Blinds; G,

SD-10 Operation and Maintenance Data

Window Blinds; G,

1.3 SYSTEM DESCRIPTION

Provide window treatment, conforming to NFPA 701, complete with necessary
brackets, fittings, and hardware. Each window treatment type shall be a complete unit and installed at locations indicated on drawings. Mount and operate equipment in accordance with manufacturer's instructions. Windows to receive a treatment shall be completely covered.

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver components to the jobsite in the manufacturer's original packaging with the brand or company name, item identification, and project reference clearly marked. Store components in a dry location that is adequately ventilated and free from dust, water, or other contaminants and has easy access for inspection and handling. Store materials flat in a clean dry area with temperature maintained above 50 degrees F. Do not open containers until needed for installation unless verification inspection is required.

1.5 WARRANTY

Provide manufacturer's standard performance guarantees or warranties that extend beyond a 1 year period.

PART 2 PRODUCTS

2.1 WINDOW BLINDS

Provide each blind, including hardware, accessory items, mounting brackets and fastenings, as a complete unit produced by one manufacturer. All parts shall be one color, unless otherwise indicated, to match the color of the blind slat. Treat steel features for corrosion resistance. Submit samples of each type and color of window treatment. Provide aluminum horizontal louver blind slats 6 inch in length for each color. Provide 6 inch sample of horizontal blind slats in each color specified. Also submit results of Fire resistance, Flame Spread, and Smoke contribution tests.

2.1.1 Horizontal Blinds

Provide horizontal blinds with 1 inch (WB-1) slats. Blind units shall be capable of nominally 180 degree partial tilting operation and full-height raising. Blinds shall be inside mount. Tapes for 1 inch slats shall be braided polyester or nylon.

2.1.1.1 Head Channel and Slats

Provide head channel made of steel or aluminum with corrosion-resistant finish nominal 0.025 inch for 1 inch slats. Provide slats of aluminum, not less than 0.006 inch thick, and of sufficient strength to prevent sag or bow in the finished blind. Provide a sufficient amount of slats to assure proper control, uniform spacing, and adequate overlap. Enclose all hardware in the headrail.

2.1.1.2 Controls

The slats shall be tilted by a transparent tilting wand, hung vertically by its own weight, and shall swivel for easy operation. Provide a tilter control of enclosed construction. Provide moving parts and mechanical drive made of compatible materials which do not require lubrication during normal expected life. The tilter shall tilt the slats to any desired angle and hold them at that angle so that any vibration or movement of
ladders and slats will not drive the tilter and change the angle of slats. Include a mechanism to prevent over tightening. Provide a wand of sufficient length to reach to within 5 feet of the floor.

2.1.1.3 Intermediate Brackets

Provide intermediate brackets for installation, as recommended by the manufacturer, of blinds over 60 inches wide.

2.1.1.4 Bottom Rail

Provide bottom rail made of corrosion-resistant steel with factory applied finish. Provide closed oval shaped bottom rail with double-lock seam for maximum strength. Bottom rail and end caps to match slats in color.

2.1.1.5 Braided Ladders

Provide braided ladders of 100 percent polyester yarn, color to match the slat color. Space ladders 15.2 slats per foot of drop in order to provide a uniform overlap of the slats in a closed position.

2.1.1.6 Hold-Down Brackets

Provide universal type hold-down brackets for sill or jamb mount where indicated on placement list.

2.1.2 Blinds

2.1.2.1 Valance

Attach the manufacturer's standard valance to the headrail by metal or plastic holders which grip the top and bottom edge of the valance and accept an insert of the same material as the slats. Provide sufficient clearance behind the valance to permit the louvers to tilt without interference. Extend the headrail cover the full width of the blind.

2.2 COLOR

Provide color, pattern and texture as indicated on the drawings, and as selected from manufacturer's standard colors. Color listed is not intended to limit the selection of equal colors from other manufacturers.

PART 3 EXECUTION

3.1 EXAMINATION

After becoming familiar with details of the work, verify all dimensions in the field, and advise the Contracting Officer of any discrepancy before performing the work.

3.2 INSTALLATION

Submit drawings showing fabrication and installation details. Show layout and locations of track, direction of draw, mounting heights, and details.

3.2.1 Horizontal Blinds

Perform installation of Horizontal Blinds in accordance with the approved detail drawings and manufacturer's installation instructions. Install
units level, plumb, secure, and at proper height and location relative to window units. Provide and install supplementary or miscellaneous items in total, including clips, brackets, or anchorages incidental to or necessary for a sound, secure, and complete installation. Do not start installation until completion of room painting and finishing operations.

3.3 CLEAN-UP

Upon completion of the installation, free window treatments from soiling, damage or blemishes; and adjust them for form and appearance and proper operating condition. Repair or replace damaged units as directed by the Contracting Officer. Isolate metal parts from direct contact with concrete, mortar, or dissimilar metals. Ensure blinds installed in recessed pockets can be removable without disturbing the pocket. The entire blind, when retracted, shall be contained behind the pocket. For blinds installed outside the jambs and mullions, overlap each jamb and mullion 0.75 inch or more when the jamb and mullion sizes permit. Include all hardware, brackets, anchors, fasteners, and accessories necessary for a complete, finished installation.

-- End of Section --
SECTION 12 48 13
ENTRANCE FLOOR MATS AND FRAMES
02/14

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)


ASTM D2047 (2011) Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine


U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01300 SUBMITTALS AND CONTRACTOR-FURNISHED ITEMS:

SD-02 Shop Drawings
   Installation Drawings; G
   Detail Drawings; G

SD-03 Product Data
   Entrance Floor Mats and Frames; G
   Adhesives and Concrete Primers; G

SD-04 Samples
   Entrance Floor Mats and Frames; G
1.3 QUALITY ASSURANCE

Comply with 36 CFR 1191 Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines for installed entrance floor mats and frames. Ensure entrance floor mats and frames are slip resistant in accordance with ASTM D2047, Coefficient of Friction, minimum 0.60 for accessible routes and be structurally capable of withstanding a wheel load of 1000 lb./wheel. Ensure flammability is in accordance with ASTM E648, Class 1, Critical Radiant Flux, minimum 0.45 watts/m2.

1.4 DELIVERY OF MATERIALS

Deliver materials to the project site in their original packages or containers bearing labels clearly identifying the manufacturer, brand name, and quality or grade.

Store materials in their original unbroken packages or containers in the area in which they will be installed. Unwrap, inspect, and place mats at indicated location. Remove all excess packing materials.

PART 2 PRODUCTS

2.1 Entrance Floor Mats and Frames

Submit manufacturer's catalog data. Submit sample of assembled sections of floor mat showing corners, intersections, and other details of construction. Submit samples of exposed floor mat, frame finish and accessories, and custom graphics.

2.1.1 Floor Grids

Floor grid consists of a series of anodized aluminum tread rails spaced 1.5 inch on center and running counter to the traffic flow. Ensure floor grids allow debris to fall to sub-floor. Rest grid assemblies on continuous vinyl cushion mounted to each continuous foot. Provide all anchors, fasteners, accessories and other necessary parts required for a complete installation.

2.1.2 Frames

Recessed frames in extruded aluminum Alloy 6063-T6 ASTM B221. Ensure frame depth accommodates mat and/or system specified. Color is bronze. Edge-frame members are fabricated in single lengths or minimum pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins. Ensure concealed surfaces of aluminum frames that contact cementous material are coated with manufacturer's standard protective coating. Frames include accessories and devices necessary for a complete installation.
2.1.3 Tread Insert Options

Tread inserts consist of carpet composed of polypropylene carpet fibers fusion-bonded to a rigid two-ply backing to prevent fraying and supplied in continuous splice-free lengths; carpet has anti-static and anti-stain treatments. Pile weight is a minimum 33 ounces per square yard carpet/bristle filament mix.

2.2 ADHESIVES AND CONCRETE PRIMERS

Provide adhesives and concrete primers, where required, according to manufacturer's recommendations.

2.3 COLOR AND SIZE

Ensure color is in accordance with the drawings. Size of mat as indicated on the drawings.

PART 3 EXECUTION

3.1 EXAMINATION

Comply with manufacturer's requirements of substrates and floor conditions affecting installation of floor mats and frames. Installation cannot occur until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

Install floor mats and frames according to manufacturer's instructions. Set mat tops at height recommended by manufacturer for most effective cleaning action. Coordinate top of mat surfaces with bottom of doors that swing across mats to provide clearance between door and mat. Coordinate recess frame installation with concrete construction to ensure frame anchorage is correct and that the base is level and flat. Install grout and fill around frames and, if required to set mat tops at proper elevations, in recesses under mats. Finish grout and fill smooth and level.

Submit detail drawings as required. Provide installation drawings. Provide manufacturer's protection, maintenance, and repair information.

-- End of Section --