

Spec. No.

Proj. No. 534-325



**Department of  
Veterans Affairs**

## Specifications

**For:** Expand/Repair Intensive Care Unit, Step Down Unit and  
Pulmonary  
Volume 2 of 4  
Divisions 07 through 14  
May 29, 2015

**At:** Department of Veterans Affairs  
Ralph H. Johnson VA Medical Center  
109 Bee Street  
Charleston, SC 29402

**Issue** Construction Documents

Amendment

No.	Date

Property of Department of Veterans Affairs



**DEPARTMENT OF VETERANS AFFAIRS  
VHA MASTER SPECIFICATIONS**

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**SECTION 07 08 00**

**FACILITY EXTERIOR CLOSURE COMMISSIONING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. The requirements of this Section apply to all sections of Division 07 and Division 08.
- B. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned is specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the Contractor is responsible to execute, is defined in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS. A Commissioning Agent (CxA) appointed by the VA will manage the commissioning process.

**1.2 RELATED WORK**

- A. Section 01 00 00 GENERAL REQUIREMENTS.
- B. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.
- C. Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

**1.3 SUMMARY**

- A. This Section includes requirements for commissioning the Facility exterior closure, related subsystems and related equipment. This Section supplements the general requirements specified in Section 01 91 00 General Commissioning Requirements.
- B. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for more details regarding commissioning processes and procedures, as well as roles and responsibilities for all Commissioning Team members.

**1.4 DEFINITIONS**

- A. Refer to Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for definitions.

**1.5 COMMISSIONED SYSTEMS**

- A. Commissioning of a system or systems specified in Division 07 and Division 08 is part of the construction process. Documentation and testing of these systems, as well as training of the VA's Operation and Maintenance personnel in accordance with the requirements of Section 01 91 00 and of Division 07 and 08, is required in cooperation with the VA and the Commissioning Agent.
- B. The Facility exterior closure systems commissioning will include the systems listed in Section 01 19 00 General Commissioning Requirements:

## **1.6 SUBMITTALS**

- A. The commissioning process requires review of selected Submittals that pertain to the systems to be commissioned. The Commissioning Agent will provide a list of submittals that will be reviewed by the Commissioning Agent. This list will be reviewed and approved by the VA prior to forwarding to the Contractor. Refer to Section 01 33 23 SHOP DRAWINGS, PRODUCT DATA, and SAMPLES for further details.
- B. The commissioning process requires Submittal review simultaneously with engineering review. Specific submittal requirements related to the commissioning process are specified in Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 CONSTRUCTION INSPECTIONS**

- A. Commissioning of the building envelope systems will require inspection of individual elements of the envelope construction throughout the construction period. The Contractor shall coordinate with the Commissioning Agent in accordance with Section 01 19 00 and the Commissioning plan to schedule envelope inspections as required to support the Commissioning Process.

### **3.2 PRE-FUNCTIONAL CHECKLISTS**

- A. The Contractor shall complete Pre-Functional Checklists to verify systems, subsystems, and equipment installation is complete and systems are ready for Systems Functional Performance Testing. The Commissioning Agent will prepare Pre-Functional Checklists to be used to document equipment installation. The Contractor shall complete the checklists. Completed checklists shall be submitted to the VA and to the Commissioning Agent for review. The Commissioning Agent may spot check a sample of completed checklists. If the Commissioning Agent determines that the information provided on the checklist is not accurate, the Commissioning Agent will return the marked-up checklist to the Contractor for correction and resubmission. If the Commissioning Agent determines that a significant number of completed checklists for similar equipment are not accurate, the Commissioning Agent will select a broader sample of checklists for review. If the Commissioning Agent determines that a significant number of the broader sample of checklists is also inaccurate, all the checklists for the



type of equipment will be returned to the Contractor for correction and resubmission. Refer to SECTION 01 91 00 GENERAL COMMISSIONING REQUIREMENTS for submittal requirements for Pre-Functional Checklists, Equipment Startup Reports, and other commissioning documents.

### **3.3 CONTRACTORS TESTS**

- A. Contractor tests as required by other sections of Division 07 or Division 08 shall be scheduled and documented in accordance with Section 01 00 00 GENERAL REQUIREMENTS. All testing shall be incorporated into the project schedule. Contractor shall provide no less than 7 calendar days' notice of testing. The Commissioning Agent will witness selected Contractor tests at the sole discretion of the Commissioning Agent. Contractor tests shall be completed prior to scheduling Systems Functional Performance Testing.

### **3.4 SYSTEMS FUNCTIONAL PERFORMANCE TESTING:**

- A. The Commissioning Process includes Systems Functional Performance Testing that is intended to test systems functional performance under steady state conditions, to test system reaction to changes in operating conditions, and system performance under emergency conditions. The Commissioning Agent will prepare detailed Systems Functional Performance Test procedures for review and approval by the COR. The Contractor shall review and comment on the tests prior to approval. The Contractor shall provide the required labor, materials, and test equipment identified in the test procedure to perform the tests. The Commissioning Agent will witness and document the testing. The Contractor shall sign the test reports to verify tests were performed. See Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS, for additional details.

### **3.5 TRAINING OF VA PERSONNEL**

- A. Training of the VA operation and maintenance personnel is required in cooperation with the COR and Commissioning Agent. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems. Contractor shall submit training agendas and trainer resumes in accordance with the requirements of Section 01 19 00. The instruction shall be scheduled in coordination with the COR after submission and approval of formal training plans. Refer to Section 01 91 00 GENERAL COMMISSIONING

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REQUIREMENTS and Division 07 and 08 Sections for additional Contractor  
training requirements.

----- END -----

**SECTION 07 21 13**  
**THERMAL INSULATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies thermal and acoustical insulation for buildings.
- B. Acoustical insulation is identified by thickness and words "Acoustical Insulation".

**1.2 RELATED WORK**

- A. Insulation in connection with roofing and waterproofing: Section 07 22 00, ROOF AND DECK INSULATION.
- B. Safing insulation: Section 07 84 00, FIRESTOPPING.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Insulation, each type used
  - 2. Adhesive, each type used.
  - 3. Tape
- C. Certificates: Stating the type, thickness and "R" value (thermal resistance) of the insulation to be installed.

**1.4 STORAGE AND HANDLING:**

- A. Store insulation materials in weathertight enclosure.
- B. Protect insulation from damage from handling, weather and construction operations before, during, and after installation.

**1.5 APPLICABLE PUBLICATIONS:**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C552-07.....Cellular Glass Thermal Insulation.
  - C553-08.....Mineral Fiber Blanket Thermal Insulation for  
Commercial and Industrial Applications
  - C578-10.....Rigid, Cellular Polystyrene Thermal Insulation
  - C591-09.....Unfaced Preformed Rigid Cellular  
Polyisocynurate Thermal Insulation
  - C612-10.....Mineral Fiber Block and Board Thermal  
Insulation

C665-06.....Mineral Fiber Blanket Thermal Insulation for  
Light Frame Construction and Manufactured  
Housing  
C728-05 (R2010).....Perlite Thermal Insulation Board  
C954-10.....Steel Drill Screws for the Application of  
Gypsum Panel Products or Metal Plaster Base to  
Steel Studs From 0.033 (0.84 mm) inch to 0.112  
inch (2.84 mm) in thickness  
C1002-07.....Steel Self-Piercing Tapping Screws for the  
Application of Gypsum Panel Products or Metal  
Plaster Bases to Wood Studs or Steel Studs  
D312-00(R2006).....Asphalt Used in Roofing  
E84-10.....Surface Burning Characteristics of Building  
Materials  
F1667-11.....Driven Fasteners: Nails, Spikes and Staples.

## **PART 2 - PRODUCTS**

### **2.1 INSULATION - GENERAL:**

- A. Where thermal resistance ("R" value) is specified or shown for insulation, the thickness shown on the drawings is nominal. Use only insulation with actual thickness that is not less than that required to provide the thermal resistance specified.
- B. Where "R" value is not specified for insulation, use the thickness shown on the drawings.
- C. Where more than one type of insulation is specified, the type of insulation for each use is optional, except use only one type of insulation in any particular area.
- D. Insulation Products shall comply with following minimum content standards for recovered materials:

Material Type	Percent by Weight
Perlite composite board	23 percent post consumer recovered paper
Polyisocyanurate/polyurethane	
Rigid foam	9 percent recovered material
Foam-in-place	5 percent recovered material
Glass fiber reinforced	6 percent recovered material
Phenolic rigid foam	5 percent recovered material
Rock wool material	75 percent recovered material

The minimum-content standards are based on the weight (not the volume) of the material in the insulating core only.

**2.2 MASONRY CAVITY WALL INSULATION - NOT USED**

**2.3 PERIMETER INSULATION IN CONTACT WITH SOIL - NOT USED**

**2.4 EXTERIOR FRAMING OR FURRING INSULATION:**

- A. Open-Cell Polyurethane Foam Insulation: Spray-applied polyurethane foam using water as a blowing agent, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84. Minimum density of 0.4 lb/cu. ft. (6.4 kg/cu. m), thermal resistivity of 3.4 deg F x h x sq. ft./Btu x in. at 75 deg F (24 K x m/W at 24 deg C).

**2.5 ACOUSTICAL INSULATION - NOT USED**

**2.6 SOUND DEADENING BOARD:**

- A. Mineral Fiber Board: ASTM C612, Type IB, 13 mm (1/2 inch thick).  
B. Perlite Board: ASTM C728, 13 mm (1/2 inch thick).

**2.7 RIGID INSULATION:**

- A. On the outside face of exterior walls, spandrel beams, floors, bottom of slabs, and where shown.  
B. Polystyrene Board: ASTM C578, Type X.

**2.8 MASONRY FILL INSULATION - NOT USED**

**2.9 FASTENERS:**

- A. Staples or Nails: ASTM F1667, zinc-coated, size and type best suited for purpose.  
B. Screws: ASTM C954 or C1002, size and length best suited for purpose with washer not less than 50 mm (two inches) in diameter.

- C. Impaling Pins: Steel pins with head not less than 50 mm (two inches) in diameter with adhesive for anchorage to substrate. Provide impaling pins of length to extend beyond insulation and retain cap washer when washer is placed on the pin.

**2.10 ADHESIVE:**

- A. As recommended by the manufacturer of the insulation.
- B. Asphalt: ASTM D312, Type III or IV.
- C. Mortar: ASTM C270, Type 0.

**2.11 TAPE:**

- A. Pressure sensitive adhesive on one face.
- B. Perm rating of not more than 0.50.

**2.12 RADIANT BARRIERS:**

- A. Sheet Radiant Barriers: ASTM C 1313 and as follows:
  - 1. Sheet Construction: Foil on both sides of substrate.
  - 2. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes of 5 and 10, respectively.
  - 3. Sheet Width: Manufacturer's standard.
- B. Interior Radiation Control Coating System: Silver-colored, not thickness-dependent, low-emissivity, water-based coating; formulated for adherence to substrates indicated and with a surface emittance value of 0.25 or less as measured per ASTM C 1371.

**PART 3 - EXECUTION**

**3.1 INSTALLATION - GENERAL**

- A. Install insulation with the vapor barrier facing the heated side, unless specified otherwise.
- B. Install rigid insulating units with joints close and flush, in regular courses and with cross joints broken.
- C. Install batt or blanket insulation with tight joints and filling framing void completely. Seal cuts, tears, and unlapped joints with tape.
- D. Fit insulation tight against adjoining construction and penetrations, unless specified otherwise.

**3.2 MASONRY CAVITY WALLS - NOT USED**

**3.3 PERIMETER INSULATION - NOT USED**

**3.4 EXTERIOR FRAMING OR FURRING BLANKET INSULATION**

- A. Spray-applied insulation: apply spray-applied insulation according to manufacturer's written instructions. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs by using method recommended by insulation manufacturer.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
  - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

**3.5 RIGID INSULATION ON SURFACE OF EXTERIOR WALLS, FLOORS, AND UNDERSIDE OF FLOORS:**

- A. On the exterior face of solid masonry and concrete walls, beams, beam soffits, underside of floors, and to the face of studs for interior wall finish where shown.
- B. Bond to solid vertical surfaces with adhesive as recommended by insulation manufacturer. Fill joints with adhesive cement.
- C. Use impaling pins for attachment to underside of horizontal surfaces. Space fastenings as required to hold insulation in place and prevent sagging.

**3.6 MASONRY FILL INSULATION - NOT USED**

**3.7 ACOUSTICAL INSULATION:**

- A. Fasten blanket insulation between metal studs and wall furring with continuous pressure sensitive tape along edges or adhesive.
- B. Pack insulation around door frames and windows and in cracks, expansion joints, control joints, door soffits and other voids. Pack behind outlets, around pipes, ducts, and services encased in wall or partition. Hold insulation in place with pressure sensitive tape or adhesive.
- C. Do not compress insulation below required thickness except where embedded items prevent required thickness.

- D. Where acoustical insulation is installed above suspended ceilings install blanket at right angles to the main runners or framing. Extend insulation over wall insulation systems not extending to structure above.
- E. Where semirigid insulation is used which is not full thickness of cavity, adhere to one side of cavity maintaining continuity of insulation and covering penetrations or embedments in insulation.
- F. Where sound deadening board is shown, secure with adhesive to masonry or concrete walls and with screws to metal or wood framing. Secure sufficiently in place until subsequent cover is installed. Seal all cracks with caulking.

**3.8 INSTALLATION OF RADIANT BARRIERS:**

- A. Install interior radiation control sheeting or coating system according to ASTM C 1321 to fully conceal all exposed spray-applied foam insulation.

- - - E N D - - -



**SECTION 07 22 00**  
**ROOF AND DECK INSULATION**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Roof and deck insulation, and cover board on new construction ready to receive roofing or waterproofing membrane.
- B. Repairs and alteration work to existing roof insulation.

**1.2 RELATED WORK**

- A. Perimeter, rigid, and batt or blanket insulation not part of roofing system: Section 07 21 13, THERMAL INSULATION.
- B. Sheet metal components and wind uplift requirements for roof-edge design: Section 07 60 00, FLASHING AND SHEET METAL.
- C. Fluid-applied roofing installed over roof insulation. Section 07 56 00, FLUID-APPLIED ROOFING-INSULATED.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
- B. American Society of Heating, Refrigeration and Air Conditioning (ASHRAE):
  - 90.1-07.....Energy Standard for Buildings Except Low-Rise Residential Buildings
- C. ASTM International (ASTM):
  - C208-08.....Cellulosic Fiber Insulating Board
  - C552-07.....Cellular Glass Thermal Insulation
  - C726-05.....Mineral Fiber Roof Insulation Board
  - C728-05.....Perlite Thermal Insulation Board
  - C1177/C1177M-08.....Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - C1278/C1278M-07.....Standard Specification for Fiber-Reinforced Gypsum Panel
  - C1289-10.....Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
  - C1396/C1396M-09.....Standard Specification for Gypsum Board

- D41-05.....Asphalt Primer Used in Roofing, Dampproofing,  
and Waterproofing
- D312-06.....Asphalt Used in Roofing
- D1970-09.....Standard Specification for Self-Adhering  
Polymer Modified Bituminous Sheet Materials  
Used as Steep Roofing Underlayment for Ice Dam  
Protection
- D2178-04.....Asphalt Glass Felt Used in Roofing and  
Waterproofing
- D2822-05.....Asphalt Roof Cement
- D4586-07.....Standard Specification for Asphalt Roof Cement,  
Asbestos-Free
- E84-09.....Standard Test Method for Surface Burning  
Characteristics of Building Material
- F1667-05.....Driven Fasteners: Nails, Spikes, and Staples
- D. FM Approvals: RoofNav Approved Roofing Assemblies and Products.
  - 4450-89.....Approved Standard for Class 1 Insulated Steel  
Deck Roofs
  - 4470-10.....Approved Standard for Class 1 Roof Coverings
  - 1-28-09.....Loss Prevention Data Sheet: Design Wind Loads.
  - 1-29-09.....Loss Prevention Data Sheet: Above-Deck Roof  
Components
  - 1-49-09.....Loss Prevention Data Sheet: Perimeter Flashing
- E. National Roofing Contractors Association: Roofing and Waterproofing  
Manual
- F. U.S. Department of Agriculture (USDA): USDA BioPreferred Catalog,  
[www.biopreferred.gov](http://www.biopreferred.gov)
- G. Underwriters Laboratories, Inc. (UL): Fire Resistance Directory (2009)
- H. U.S. Department of Commerce National Institute of Standards and  
Technology (NIST):
  - DOC PS 1-09.....U.S. Product Standard for Construction and  
Industrial Plywood
  - DOC PS 2-04.....Performance Standard for Wood-Based Structural-  
Use Panels.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Thermal Performance: Provide roof insulation meeting minimum overall  
average R-value of 33, with minimum R-value at any location of 10.

- B. FM Approvals: Provide roof insulation complying with requirements in FM Approvals 4450 and 4470 as part of specified roofing system, listed in FM Approvals "RoofNav" as part of roofing system meeting Fire/Windstorm Classification in Division 07 roofing section.

#### **1.5 QUALITY CONTROL**

- A. Requirements of Division 07 roofing section for qualifications of roofing system insulation Installer; Work of this Section shall be performed by same Installer.
- B. Requirements of Division 07 roofing section for inspection of Work of this Section and qualifications of Inspector.
- C. Unless specified otherwise, comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to insulation for storage, handling, and application.
- D. Requirements of roofing system uplift pressure design for specified roofing system.
- E. Requirements of applicable FM Approval for specified roofing system insulation attachment.
- F. Requirements of applicable Miami-Dade County approval for high-wind zone design.
- G. Bio-Based Materials: Where applicable, provide products designated by USDA and meeting or exceeding USDA recommendations for bio-based content, and products meeting Rapidly Renewable Materials and certified sustainable wood content definitions; refer to [www.biopreferred.gov](http://www.biopreferred.gov).

#### **1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
1. Asphalt and adhesive materials, each type.
  2. Roofing cement, each type.
  3. Roof insulation, each type.
  4. Cover board, each type.
  5. Fastening requirements.
  6. Insulation span data for flutes of metal decks.
- C. LEED and Federal Sustainable Design Submittals:
1. Product Data for Credit IEQ 4.1: For adhesives and sealants used inside the weatherproofing system, documentation including printed statement of VOC content.

2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
3. Product Data for Federally-Mandated Bio-Based Materials: For roof materials, indicating USDA designation and compliance with definitions for bio-based products, Rapidly Renewable Materials, and certified sustainable wood content.
- D. Shop Drawings: Include plans, sections, details, and attachments.
  1. Nailers, cants, and terminations.
  2. Layout of insulation showing slopes, tapers, penetration, and edge conditions.
- E. Samples:
  1. Roof insulation, each type.
  2. Nails and fasteners, each type.
- F. Certificates:
  1. Indicating type, thermal conductance, and minimum and average thickness of insulation.
  2. Indicating materials and method of application of insulation system meet the requirements of FM Approvals for specified roofing system.
- G. Laboratory Test Reports: Thermal values of insulation products.
- H. Layout of tapered roof system showing units required.
- I. Documentation of supervisors' and inspectors' qualifications.

#### **1.7 DELIVERY, STORAGE AND MARKING**

- A. Comply with the recommendations of the NRCA "Roofing and Waterproofing Manual" applicable to built-up roofing for storage, handling and installation requirements.

#### **1.8 QUALITY ASSURANCE:**

- A. Roof insulation on combustible or steel decks shall have a flame spread rating not greater than 75 and a smoke developed rating not greater than 150, exclusive of covering, when tested in accordance with ASTM E84, or shall have successfully passed FM Approvals 4450.
  1. Insulation bearing the UL label and listed in the UL Building Materials Directory as meeting the flame spread and smoke developed ratings will be accepted in-lieu-of copies of test reports.
  2. Compliance with flame spread and smoke developed ratings will not be required when insulation has been tested as part of a roof

construction assembly of the particular type used for this project and the construction is listed as fire-classified in the UL Building Materials Directory or listed as Class I roof deck construction in the FM Approvals "RoofNav."

3. Insulation tested as part of a roof construction assembly shall bear UL or FM labels attesting to the ratings specified herein.

## **PART 2 - PRODUCTS**

### **2.1 ADHESIVE MATERIALS**

- A. Adhesive Materials, General: Adhesive and sealant materials recommended by roofing system manufacturer for intended use, identical to materials utilized in approved listed roofing system, and compatible with roofing membrane.
  1. Liquid-type adhesive materials shall comply with VOC limits of authorities having jurisdiction.
  2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Multipurpose Construction Adhesives: 70 g/L.
    - c. Fiberglass Adhesives: 80 g/L.
    - d. Contact Adhesives: 80 g/L.
    - e. Other Adhesives: 250 g/L.
    - f. Nonmembrane Roof Sealants: 300 g/L.
    - g. Sealant Primers for Nonporous Substrates: 250 g/L.
    - h. Sealant Primers for Porous Substrates: 775 g/L.
- B. Primer: ASTM D41.
- C. Asphalt: ASTM D312, Type III or IV for vapor retarders and insulation.
- D. Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphaltic, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- E. Bead-Applied Urethane Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- F. Full-Spread Applied Urethane Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component

urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

- G. Roof Cement: Asbestos free, ASTM D2822, Type I or Type II, ; or, D4586, Type I or Type II.

## **2.2 ROOF AND DECK INSULATION**

- A. Roof and Deck Insulation, General: Preformed roof insulation boards approved by roofing manufacturer and listed as component of FM Approvals-approved roofing system.
- B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Cellulosic Fiber Board Insulation: ASTM C208, Type II, Grade 1 for built-up asphalt or modified bitumen roofing.
- D. Tapered Roof Insulation System:
1. Fabricate of polyisocyanurate. Use only one insulation material for tapered sections. Use only factory-tapered insulation.
  2. Cut to provide high and low points with crickets and slopes as shown.
  3. Minimum thickness of tapered sections; 38 mm (1-1/2 inch).
  4. Minimum slope 1:48 (1/4 inch per 12 inches).

## **2.3 INSULATION ACCESSORIES**

- A. Glass (Felt): ASTM D2178, Type VI, heavy duty ply sheet.
- B. Cants and Tapered Edge Strips:
1. Insulation Cant Strips: ASTM C208, Type II, Grade 1, cellulosic-fiber insulation board.
  2. Tapered Edge Strips: 1:12 (one inch per foot), from 0 mm (0 inches), 300 mm to 450 mm (12 inches to 18 inches) wide.
    - a. Cellulosic Fiberboard: ASTM C208.
    - b. Mineral Fiberboard: ASTM C726.
    - c. Perlite Board: ASTM C728.

## **2.4 FASTENERS**

- A. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with FM Approvals 4470, designed for fastening substrate board to roof deck.
- B. Staples and Nails: ASTM F1667. Type as designated for item anchored and for substrate.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Comply with requirements of Division 07 roofing section.

#### **3.2 PREPARATION**

- A. Comply with requirements of Division 07 roofing section.

#### **3.3 SUBSTRATE BOARD INSTALLATION - NOT USED**

#### **3.4 VAPOR RETARDER INSTALLATION - NOT USED**

#### **3.5 RIGID INSULATION INSTALLATION**

- A. Insulation Installation, General:

1. Install roof insulation in accordance with roofing system manufacturer's written instructions.
2. Install roof insulation in accordance with requirements of FM Approval's Listing for specified roofing system.
3. Base Sheet: Where required by roofing system, install one lapped base sheet specified in Division 07 roofing section by mechanically fastening to roofing substrate prior to installation of insulation.
4. Cant Strips: Install preformed insulation cant strips at junctures of roofing system with vertical construction.
5. Use same insulation as existing for roof repair and alterations unless specified otherwise.

- B. Insulation Thickness:

1. Thickness of roof insulation shown on drawings is nominal. Actual thickness shall provide the average thermal resistance "R" value of not less than that specified in Performance Requirements Article.
2. Insulation on Metal Decks: Provide minimum thickness of insulation for metal decks recommended by the insulation manufacturer to span rib opening (flute size) of metal deck used. Support edges of insulation on metal deck ribs.
3. When thickness of insulation to be used is more or less than that shown on the drawings, make adjustments in the alignment and location of roof drains, flashing, gravel stops, fascias and similar items at no additional cost to the Government.
4. Where tapered insulation is used, the thickness of the insulation at high points and roof edges shall be as shown on the drawings; the thickness at the low point (drains) shall be not less than 38 mm (1-1/2 inches).

5. Use not less than two layers of insulation when insulation is 68 mm (2.7 inch) or more in thickness unless specified otherwise. Stagger joints minimum 150 mm (6 inches).
- C. Lay insulating units with close joints, in regular courses and with cross joints broken. When laid in more than one layer, break joints of succeeding layers of roof insulation with those in preceding layer.
- D. Lay units with long dimension perpendicular to the rolled (longitudinal) direction of the roofing felt.
- E. Seal all cut edges at penetrations and at edges against blocking with bitumen or roof cement.
- F. Cut to fit tight against blocking or penetrations.
- G. Cover all insulation installed on the same day; comply with temporary protection requirements of Division 07 roofing section.
- H. Installation Method:
  1. Mechanically Fastened Insulation:
    - a. Fasten insulation in accordance with FM Approval's "RoofNav" requirement in Division 07 roofing section.
    - b. Fasten insulation to resist uplift pressures specified in Division 07 roofing section.
  2. Mechanically Fastened and Adhered Insulation:
    - a. Fasten first layer of insulation according to "Mechanically Fastened Insulation" requirements.
    - b. Fasten each subsequent layer of insulation according to "Adhered Insulation" requirements.
  3. Cover Board: Install cover boards over insulation with long joints in continuous straight lines with staggered end joints. Offset cover board joints from insulation joints minimum 150 mm (6 inches). Fasten cover boards according to "Mechanically Fastened Insulation" requirements.

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**SECTION 07 27 26**  
**FLUID-APPLIED MEMBRANE AIR BARRIERS, VAPOR PERMEABLE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies fluid-applied vapor-permeable membrane air barrier material and accessories used for exterior above grade wall assembly air barriers and their extension and connection to adjacent air barrier components in roof and opening construction to provide a durable, continuous, air- and moisture- impermeable full-building system.

**1.2 RELATED WORK**

- A. General quality assurance and quality control requirements: Section 01 45 29 TESTING LABORATORY SERVICES.
- B. General sustainable design documentation requirements: Section 01 81 13 SUSTAINABLE DESIGN REQUIREMENTS.
- C. Commissioning of building envelope components: Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS.
- D. Membrane base flashings and stripping to which membrane air barriers will transition: Section 07 56 00 FLUID-APPLIED ROOFING - INSULATED.
- E. Flashing components of factory finished roofing and wall systems to which membrane air barriers will transition: Division 07 roofing and wall system sections.
- F. Other flashing components to which membrane air barriers will transition: Section 07 60 00 FLASHING AND SHEET METAL.
- G. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- H. Division 08 exterior openings sections for opening transitions providing airtight seal between membrane air barrier and aluminum windows.
- I. Wall sheathings serving as substrate for membrane air barriers: Section 09 29 00 GYPSUM BOARD.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
  - 1. Air Barrier Association of America (ABAA):Quality Assurance Program
  - 2. American Society of Testing and Materials (ASTM):

- C920-10.....Standard Specification for Elastomeric Joint Sealants
- C1193-09.....Standard Guide for Use of Joint Sealants
- D412-06.....Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D2369-10.....Standard Test Method for Volatile Content of Coatings
- E96/E96M-05.....Standard Test Methods for Water Vapor Transmission of Materials
- E162-09.....Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source
- E783-02.....Standard Test Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors
- E1186-03(2009).....Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems
- E2178-03.....Standard Test Method for Air Permeance of Building Materials
- E2357-05.....Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- 3. U.S. Environmental Protection Agency (EPA)
- 40 CFR 59, Subpart D....National Volatile Organic Compound Emission Standards for Consumer and Commercial Products
- 4. SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD):
- 1168-89(2003).....Adhesive and Sealant Applications

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. General: Membrane air barrier shall be capable of performing as a continuous vapor- permeable air barrier and as a moisture drainage plane transitioned to adjacent flashings and discharging water to the building exterior. Membrane air barriers shall accommodate substrate movement and seal expansion and control joints, construction material transitions, opening transitions, penetrations, and perimeter conditions without moisture deterioration and air leakage exceeding performance requirements.

- B. Air-Barrier Assembly Air Leakage: Maximum 0.2 L/s x sq. m of surface area at 75 Pa (0.04 cfm/sq. ft. of surface area at 1.57 lbf/sq. ft.) per ASTM E 2357.
- C. Material Compatibility: Provide membrane air barrier materials that are compatible with one another and with adjacent materials under conditions of service and application required, as demonstrated by membrane air barrier manufacturer based on testing and field experience.

#### **1.5 QUALIFICATIONS:**

- A. Approvals: Approval by Contracting Officer is required of products and services of proposed manufacturers, and installers, and will be based upon submission by Contractor that:
- B. Manufacturer Qualifications: Manufacturer regularly and presently manufactures fluid-applied membrane air barrier material meeting section requirements as one of its principal products.
  - 1. Manufacturer's product submitted has been in satisfactory and efficient operation on five similar installations for at least five years.
    - a. Submit list of installations, include name and location of project and name of owner.
  - 2. Accreditation: Manufacturer is accredited by the Air Barrier Association of America.
- C. Installer Qualifications: Installer has technical qualifications, experience, certifications, trained personnel, membrane air barrier manufacturer's approval, and facilities to install specified items.
  - 1. Accreditation: Installer shall be accredited by the Air Barrier Association of America (ABAA) and whose installers are certified in accordance with the site Quality Assurance Program used by ABAA.
  - 2. Installer's applicators shall be trained and certified by manufacturer of air barrier system.
  - 3. Installer's full time on-site field supervisor shall have completed three projects of similar scope within last year, be able to communicate verbally with Contractor, Architect, testing agency, and employees.
    - a. Certification: Installer's supervisor shall hold Sealant, Waterproofing, and Restoration Institute (SWRI) Wall Coating

Validation Program Certificate, or similar qualification acceptable to COR.

- b. Accreditation: Installer's supervisor shall be a Level 3 Accredited Installer by the ABAA.

D. Testing Agency Qualifications: Testing laboratory accredited by International Accreditation Service, Inc. or American Association for Laboratory Accreditation.

1. Testing agencies personnel shall be experienced in the installation of specified air barrier system and qualified to perform observation and inspection specified in Field Quality Control Article to determine Installer's compliance with the requirements of this Project.
2. Accreditation: Contractor's testing agency performing Field Quality Control testing and inspection shall also be certified by ABAA to perform ABAA Quality Assurance Program installer audits.

#### **1.6 SUBMITTALS:**

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Literature and Data:

1. Fluid-applied membrane air barrier.
2. Primer.
3. Mastic.
4. Counterflashing strip.
5. Modified bituminous strip.
6. Sprayed polyurethane foam sealant.
7. Opening transition assembly.
8. Joint sealant.
9. Printed installation instructions for conditions specified.

C. Certificates:

1. Indicating membrane air barrier manufacturer's qualifications as specified.
2. Indicating approval of installer by membrane air barrier manufacturer.
3. Indicating qualifications of installer and installer's personnel.
4. Indicating air barrier manufacturer's determination that proposed materials are chemically and adhesively compatible with adjacent materials.

5. Indicating products meet project limitations on VOC content.

- D. Inspection Reports: Daily reports of testing agency and reports of testing and inspection agency. Include weather conditions, description of work performed, tests performed, defective work observed, and corrective actions taken to correct defective work.

**1.7 COORDINATION:**

- A. Coordinate installation of work of this Section with adjacent and related work to ensure provision of continuous, unbroken, durable air barrier system.
- B. Installation Audit: Incorporate audit requirements of ABAA QAP. Coordinate and cooperate with ABAA auditors. Ensure air barrier assembly remains exposed to facilitate inspection, testing, and correction activities.

**1.8 PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to job in manufacturer's original unopened containers.
- B. Do not store material in areas where temperature is lower than 10 degrees C (50 degrees F,) or where prolonged temperature is above 32 degrees C (90 degrees F).

**1.9 ENVIRONMENTAL REQUIREMENTS:**

Ambient Surface and Material Conditions: Not less than 4 degrees C (40 degrees F), during application of waterproofing, visibly dry, and complying with manufacturer's written instructions.

**1.10 WARRANTY:**

Warrant membrane air barrier installation against air and moisture leaks subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period is two years.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Source Limitations: Obtain membrane air barrier materials and accessories from single manufacturer.
- B. VOC Content: Maximum 250 g/L per 40 CFR 59, Subpart D (EPA Method 24).

**2.2 MEMBRANE AIR BARRIER:**

- A. Fluid-Applied, Vapor-Permeable Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane, meeting the following:

1. Air Permeance, ASTM E 2178: 0.02 L/s x sq. m of surface area at 75-Pa (0.004 cfm/sq. ft of surface area at 1.57-lbf/sq. ft.) pressure difference.
2. Vapor Permeance, ASTM E 96/E96M: Minimum 580 ng/Pa x s x sq. m (10 perms).
3. Elongation, Ultimate, ASTM D 412, Die C: 200 percent, minimum.
4. Combustion Characteristics: Flame spread, not greater than 25; smoke developed, not greater than 450, ASTM E 84.
5. Thickness of Membrane Air Barrier: Not less than 1.0 mm (40 mils), applied in single continuous coat.

### **2.3 ACCESSORY MATERIALS:**

- A. Primer: Liquid waterborne primer meeting VOC requirements, recommended for substrate by membrane air barrier manufacturer.
- B. Counterflashing Sheet: Modified bituminous, 1.0-mm- (40-mil- thick self-adhering composite sheet consisting of 0.9 mm (36 mils) of rubberized asphalt laminated to polyethylene film.
- C. Substrate Patching Material: Manufacturer's standard trowel-grade filler material.
- D. Sprayed Polyurethane Foam Sealant: Foamed-in-place, 24- to 32-kg.cu. m (1.5- to 2.0-lb/cu. ft) density, with flame-spread index of 25 or less per ASTM E 162.
- E. Flexible Opening Transition: Cured low-modulus silicone extrusion with reinforcing ribs, sized to fit opening widths, designed for adhesion to or insertion into aluminum framing extrusions, and compatible with air barrier system materials and accessories.
- F. Joint Sealant: ASTM C 920, single-component, neutral-curing silicone; Class 100/50 (low modulus), Grade NS, Use NT related to exposure, approved by membrane air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION:**

- A. Surface Condition: Before applying membrane air barrier materials, ensure substrates are fully cured, smooth, clean, dry, and free from high spots, depressions, loose and foreign particles and other deterrents to adhesion.

- B. Verify concrete surfaces have cured for time period recommended by membrane air barrier manufacturer, free from release agents, concrete curing agents, and other contaminants.
- C. Verify masonry joints are flush and filled with mortar.

### **3.2 INTERFACE WITH OTHER WORK**

- A. Commencement of Work: Commence work once membrane air barrier substrates are adequately protected from weather and will remain protected during remainder of construction.
- B. Sequencing of Work: Coordinate sequencing of work with work of other sections that form portions of building envelope air barrier to ensure that flashings and transition materials can be properly installed.
- C. Subsequent Work: Coordinate work with work of other sections installed subsequent to membrane air barrier to ensure complete inspection of installed membrane air barrier and sealing of membrane air barrier penetrations necessitated by subsequent work.

### **3.3 AIR BARRIER INSTALLATION**

- A. General: Prepare substrates and install and apply air barrier components in accordance with air barrier manufacturer's written instructions consistent with manufacturer's qualifying tested assemblies.
  - 1. Compliance: Prepare substrates and install and apply air barrier components in accordance with requirements of ABAA QAP.

### **3.4 PREPARATION**

- A. Prepare and treat substrate in accordance with membrane air barrier manufacturer's written instructions.
- B. Mask adjacent finished surfaces.
- C. Remove contaminants and film-forming coatings from concrete.
- D. Remove projections and excess materials and fill voids with substrate patching material.
- E. Prepare and treat joints and cracks in substrate per ASTM C 1193 and membrane air barrier manufacturer's written instructions.
- F. Apply primer to substrates.

### **3.5 APPLICATION OF TRANSITION STRIPS**

- A. Install transition strips and accessory materials according to membrane air barrier manufacturer's written instructions.
- B. Connect and seal membrane air barrier material to adjacent components of building air barrier system, including, but not limited to, roofing

system air barrier, exterior glazing and window systems, curtain wall systems, door framing, and other openings.

- C. Flexible Opening Transition: Prime concealed perimeter frame surfaces of windows, storefronts, curtain walls, louvers, and doors. Apply flexible opening transition so that a minimum of 75 mm (3 inches) over coverage is achieved over each substrate.

1. Fill gaps at perimeter of openings with foam sealant.

- D. Penetrations: Fill gaps at perimeter of penetrations with foam sealant. Seal transition strips around penetrating objects with termination mastic.

- E. Flashings: Seal top of through-wall flashings to membrane air barrier with continuous transitions strip of type recommended by membrane air barrier manufacturer for type of flashing.

### **3.6 FLUID AIR-BARRIER MEMBRANE INSTALLATION**

- A. Apply fluid membrane air barrier material in full contact with substrate to produce a continuous seal with transition strips according to membrane air barrier manufacturers written instructions.

1. Apply fluid membrane in thickness recommended by manufacturer, but not less than thickness specified in this section.

- B. Leave membrane air barrier exposed until tested and inspected by Owner's testing agency and approved by COR.

- C. Correct deficient applications not passing tests and inspections, make necessary repairs, and retest as required to demonstrate compliance with requirements.

### **3.7 TESTING:**

- A. Testing Agency: Contractor shall engage a qualified testing agency to perform tests and inspections, including documenting of membrane air barrier prior to concealment.

1. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements, including the following:

2. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.

3. Continuous structural support of air-barrier system has been provided.

4. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.



5. Site conditions for application temperature and dryness of substrates have been maintained.
  6. Maximum exposure time of materials to UV deterioration has not been exceeded.
  7. Surfaces have been primed, if applicable.
  8. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
  9. Termination mastic has been applied on cut edges.
  10. Strips and transition strips have been firmly adhered to substrate.
  11. Compatible materials have been used.
  12. Transitions at changes in direction and structural support at gaps have been provided.
  13. Connections between assemblies (air-barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
  14. All penetrations have been sealed.
  15. Inspections and testing shall be carried out at the following rate:
    - a. Up to 10,000 square feet (930 square meters) - one inspection
    - b. 10,001 - 35,000 square feet (931 - 3,250 square meters) - two inspections
    - c. 35,001 - 75,000 square feet (3,251 - 6,970 square meters) - three inspections
    - d. 75,001 - 125,000 square feet (6,971 - 11,610 square meters) - four inspections
    - e. 125,001 - 200,000 square feet (11,611 - 18,580 square meters) - five inspections
    - f. Over 200,00 square feet (18,580 square meters) - six inspections.
  16. Forward written inspection reports to the COR within 5 working days of the inspection and test being performed.
  17. If the inspections reveal any defects, promptly remove and replace defective work at no additional cost to the Owner.
- B. Inspections shall include:
1. Compatibility of materials within membrane air barrier system and with adjacent materials.
  2. Suitability of substrate and support for membrane air barrier materials.

3. Suitability of conditions under which membrane air barrier will be applied.
  4. Adequacy of substrate priming.
  5. Proper application and joint and edge treatment of transition strips, flexible opening transitions, and accessory materials.
  6. Continuity and gap-free installation of membrane air barrier, transition strips, and accessory materials.
- C. Audit: Provide installer audit by ABAA. Coordinate scheduling of work and associated audit inspections. Cooperate with ABAA's testing agency. Allow access to work areas and staging. Notify ABAA in writing of schedule for Work of this Section to allow sufficient time for testing and inspection. Do not cover Work of this Section until testing and inspection is accepted. Arrange and pay for site inspections by ABAA to verify conformance with the manufacturer's instructions, the site Quality Assurance Program used by ABAA, and this section of the project specification.

### **3.8 CLEANING AND PROTECTION**

- A. Clean spills, stains, and overspray resulting application utilizing cleaning agents recommended by manufacturers of affected construction. Remove masking materials.
- B. Protect membrane air barrier from damage from subsequent work. Protect membrane materials from exposure to UV light in excess of that acceptable to membrane air barrier manufacturer; replace overexposed materials and retest.

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**SECTION 07 40 00**  
**SIDING PANELS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies uninsulated composite metal wall panels, perforated aluminum wall panels and accessories as shown.

**1.2 RELATED WORK**

- A. Sealant: Section 07 92 00, JOINT SEALANTS.
- B. Color and texture of finish: MATCH EXISTING.

**1.3 MANUFACTURER'S QUALIFICATIONS**

- A. Composite metal wall panels shall be products of a manufacturer regularly engaged in the fabrication and erection of composite metal panels of the type and design shown and specified.

**1.4 FIRE RATING - NOT USED**

**1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples: Metal panel, 150 mm (six inch) square, showing finish, each color and texture.
- C. Shop Drawings: Wall and roof panels, showing details of construction and installation. Collateral steel framing, U value, thickness and kind of material, closures, flashing, fastenings and related components and accessories.
- D. Manufacturer's Literature and Data: Wall panels

**1.6 APPLICABLE PUBLICATIONS**

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

**PART 2 - PRODUCTS**

**2.1 GENERAL**

- A. Composite panels are to match existing panels at 1<sup>st</sup> floor mental health clinic exterior. Existing panels are Cynergy Systems Inc. 4mm Standard PE Core ACM panels with 1/2" reveal joints.
- B. Basis-of-design for aluminum perforated panels: Hendrick DWF120 1 1/8 inch deep by 20 inch wide by .195 inch thickness flush faced panels for horizontal installation. Perforations to be 3/4 inch diameter holes at 1 inch on center.

**2.2 ALUMINUM PLATE AND SHEET**

- A. ASTM B209/209M

### **2.3 FASTENERS**

- A. Fasteners for aluminum panels shall be aluminum or stainless steel.
- B. Fasteners of size, type and holding strength as recommended by manufacturer.

### **2.4 ACCESSORIES**

- A. Preformed, prefinished flashings, copings, fasteners and trim. Provide accessories as indicated and as required to ensure a complete exterior envelope.
  - 1. Finish exposed accessories to match siding panels.
  - 2. Concealed fasteners to be stainless steel.

### **2.5 GYPSUM BACKING BOARD - NOT USED**

### **2.6 THERMAL INSULATING MATERIALS - NOT USED**

### **2.7 FABRICATION**

- A. Uninsulated metal wall and roof panels shall be single sheets, of approximate overall depth and configuration shown on drawings. Connection between panels shall be by interlocking joints filled with sealing compound as specified in Section 07 92 00, JOINT SEALANTS. Furnish wall panels in one continuous length for full height or at least one story height with no horizontal joints, except at openings. Furnish roof panels in one continuous length of roof span and provide cut-outs as required for passage of pipes, conduits, vents and the like. Construct panels as follows:
  - 1. Wall panels:
    - a. 4 mm overall panel thickness with face and core layers bonded together by thermo bonding.
    - b. Outer and inner faces to be .05 mm thick aluminum.
    - c. Core to be 3 mm thick polyethylene.
  - 3. Accessories and flashing shall be the same material as the panels. Thickness and installation of accessories and flashing shall be as recommended by the panel manufacturer.
- B. Composite metal wall system shall consist of exterior face sheet, sub-girts, gypsum backing board panels and insulated interior liner sheet. Furnish wall system in one continuous length for full height with no horizontal joints, except at openings. Thickness of wall system is shown on the drawings. Provide connection between panels with joints filled with sealant specified in Section 07 92 00, JOINT SEALANTS. Seal joints between related components as required to make the work water-tight. Work for wall system shall include steel framing members, insulation, gypsum backing board, louvers and frames, door frames, closures, fastenings, flashings, coping clips, caulking, reinforcements

for support of mechanical and electrical work shown on drawings, steel angles at curbs and beams, vertical steel angles at existing building and all related components and accessories. Construct wall system as follows:

1. Exterior face sheet of 0.9 mm (0.0359 inch) thick sheet steel of indicated configuration and pattern.

## **2.8 FINISH**

- A. For composite wall panels, Aluminum alloy used for color coating shall be as required to produce specified color. Panels shall match finish of existing panels at first floor. Finish for sheet aluminum shall not deviate more than the colors of extrusion samples.
- B. For perforated aluminum panels, AA-M10C22A41 finish- (Unspecified) as fabricated, chemically etched medium matte finish, clear anodized 0.7 mil thick.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General: Install panels in accordance with the manufacturer's approved erection instructions and diagrams, except as specified otherwise. Panels shall be in full and firm contact with supports and with each other at side and end laps. Where panels are cut in the field, or where any of the factory applied coverings or coatings are abraded or damaged in handling or installation, they shall, after the necessary repairs have been made with material of the same type and color as the weather coating, be approved before being installed. All cut ends and edges, including those at openings through the sheets shall be sealed completely. Correct defects or errors in the materials in an approved manner. Replace materials which cannot be corrected in an approved manner with nondefective material. Provide molded closure strips where indicated and whenever sheets terminate with open ends after installation.
- B. Wall Panels: Apply panels with the configuration in a vertical position. Provide panels in full heights from base to eave with no horizontal joints except at the junctions of door frames, window frames, louver panels, and similar locations. Seal side and end laps with joint sealing material. Flash and seal walls at the base, at the top, around windows, door frames, framed louvers, and other similar openings. Install closure strips, flashings, and sealing material in an approved manner that will assure complete weather tightness. Flashing will not be required where approved "self-flashing" panels are used.

### **3.2 ISOLATION OF ALUMINUM**

- A. Isolate aluminum in contact with or fastened to dissimilar metals other than stainless steel, white bronze, or other metal compatible with aluminum by one of the following:
  - 1. Painting the dissimilar metal with a prime coat of Zinc-Molybdate followed by two coats of aluminum paint.
  - 2. Placing a non-abrasive tape, gasket or shim block between the aluminum and the dissimilar metal.
- B. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of alkali-resistant bituminous paint.
- C. Paint aluminum in contact with wood or other absorptive materials that may become repeatedly wet, with two coats of bituminous paint, or two coats of aluminum paint. Seal joints with caulking material.

### **3.3 PROTECTION AND CLEANING**

- A. Protect panels and other components from damage during and after erection, and until project is accepted by the Government.
- B. After completion of work, all exposed finished surfaces of panels shall be cleaned of soil, discoloration and disfiguration. Touch-up abraded surfaces of panels.

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**SECTION 07 56 00**  
**FLUID-APPLIED ROOFING - INSULATED**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies cold fluid-applied hybrid roofing systems installed on new construction

**1.1 RELATED WORK:**

- A. Sheet and tapered roof board insulation: Section 07 22 00 ROOF AND DECK INSULATION.

**1.2 QUALITY CONTROL:**

- A. Work shall be performed by VA-approved roofing contractor, TREMCO; no exceptions.
- B. Installation shall comply with printed instructions of roofing materials manufacturer.
- C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
  - 1. An authorized full-time technical employee of the manufacture.
  - 2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. 150 mm (6 inch) square cured sample of roofing system without backing, showing color, and texture.
  - 2. System proposed for flashing and reinforcing.
- C. Manufacturer's Certificates:
  - 1. Installer approval.

2. Certificate stating that material utilized on the job will be of the same formulation as materials covered by the test report.

D. Manufacturer's Literature and Data:

1. Roofing system materials giving physical properties, wet mil thickness in relation to dry mil thickness, and other related information.
2. Manufacturer's printed instructions for application of roofing materials to be installed.
3. Sample Warranty.

E. Test Reports: Test report from an independent commercial testing laboratory showing that polyurethane materials meet specified requirements.

F. Shop Drawings:

1. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work. Provide roof plan(s) showing orientation and types of roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened components.
2. Prepare and submit details for waterproofing of all equipment and stair supports at the existing 5<sup>th</sup> floor roof.

**1.4 PRODUCT DELIVERY, STORAGE AND HANDLING:**

- A. Deliver materials to job site in manufacturer's original factory sealed containers labeled to identify product, manufacturer and point of manufacture.
- B. Observe precautions appropriate to flammable materials and "safety notes" included in roofing material manufacturer's printed instructions to installer before, during, and immediately following application of these materials.

**1.5 JOB CONDITIONS:**

- A. Work shall proceed only on dry surfaces free of water, surface condensation, rain, snow, ice, and frost.
- B. Do not proceed when temperature of surfaces to receive roofing and flashing, is lower than 5°C (40 degrees F).
- C. Complete work on roof deck and install penetrations and projections through roof deck before roofing and flashing work as this section is applied.



#### **1.6 WARRANTY:**

A. Special Warranty: Written warranty in which Manufacturer agrees to repair roof installations that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of completion of roofing work.

#### **PART 2 - PRODUCTS**

##### **2.1 ROOFING MATERIALS:**

A. Base Sheet: ASTM D4601, Type II, nonperforated, SBS modified, asphalt-coated, polyester/fiberglass/polyester reinforced sheet dusted with fine mineral surfacing on both sides.

1. Tensile Strength, minimum, ASTM D 5147: machine direction, 220 lbf/in; cross machine direction, 230 lbf/in.

2. Tear Strength, minimum, ASTM D 5147: machine direction, 380 lbf; cross machine direction, 380 lbf.

3. Elongation at 77 deg. F, minimum, ASTM D 5147: machine direction, 6.0 percent; cross machine direction, 6.0 percent.

4. Thickness, minimum, ASTM D 146: 0.05 inch.

B. Base Sheet Adhesive: One-part, solvent-free, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with specified roofing membranes and flashings

C. Polyurethane Elastomeric Fluid-Applied System: Elastomeric, two-coat single-component moisture triggered polyurethane fluid-applied roofing formulated for application to existing built-up roofing, with the following minimum physical properties:

1. Aliphatic Urethane Base Coat:

A. Asbestos Content, EPA/600/R-93/116: None.

B. Volatile Organic Compounds (VOC), ASTM D 3960: Not greater than 40 g/L.

C. Percent solids (by weight), ASTM D 1644: Not less than 85%.

2. Aliphatic Urethane Top Coat: UV-stabilized, chemical-resistant top coat:

A. Asbestos Content, EPA/600/R-93/116: None.

B. Volatile Organic Compounds (VOC), ASTM D 3960: LESS than 45 g/L.  
Elongation at break, ASTM D 412: Not less than 340 percent

C. Tensile Strength, ASTM D 412: Not less than 1,400 lbf/sq. in.

D. Tear Resistance, ASTM D 624: Not less than 150 lbf/in.

- E. Percent solids (by weight), ASTM D 1353: Not less than 85 percent.
- F. Color: White, with Solar Reflectance Index not less than 78.
- D. Fiberglass Reinforcing Fabric: Medium to fine fiber, rapid wetting chopped strand glass mat for fluid applied membrane and flashing.
- E. Primer: Single component, multi-substrate primer to promote adhesive of base coat to surfaces recommended by manufacturer.

## **2.3 ROOFING ACCESSORIES**

- A. General: Roof system accessories recommended by insulation manufacturer for intended use and compatible with fluid-applied roofing.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- C. Insulation Adhesive: Solvent-free, low rise, multi-component urethane adhesive formulated to adhere roof insulation to substrate, with the following minimum physical properties:

## **PART 3 - EXECUTION**

### **3.1 PREPARATION OF SURFACE**

- A. Surfaces to receive roofing and flashing shall be in sound condition and free of projections, depressions, grease, oil, asphalt, tar, paint, wax, dust or other debris that will prevent proper application of roofing.
- B. Allow concrete surfaces to cure a minimum of 28 days and clean free of any waterproofing agents, form release agents, and curing agents that might act as bond breakers. Proceed only when maximum moisture content of the substrate as measured with a moisture meter is 16 percent.
- C. Installer shall report adverse roof deck conditions of any type in writing to the Contractor with copy to COR. Commencement of work constitutes acceptance of roof surfaces by installer as satisfactory for application of roofing and flashing.

### **3.2 CLEANING**

- A. Broom-clean surfaces to remove all dust, dirt, loose aggregate, and other foreign particles. Remove excessive alkaline efflorescence on

concrete by flushing with 10 percent muriatic acid solution, rinsed,  
and dried.

### **3.3 BASE SHEET INSTALLATION**

- A. Install base sheet starting at low point of roofing. Align base sheet without stretching. Shingle side laps of base a minimum of 4 inches. Shingle in direction to shed water. Extend base sheets over edges and terminate above cants.
  - 1. Embed base sheet in cold-applied membrane adhesive applied at rate required by roofing manufacturer, to form a uniform membrane without ply sheets touching.
- B. Extend base flashing up walls or parapets a minimum of 8 inches above roofing and 6 inches onto field of roofing.
- C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
  - 1. Seal top termination of base flashing with a strip of glass-fiber fabric set in asphalt roofing cement.
- D. Install stripping according to roofing manufacturer's written instructions where metal flanges and edgings are set on roofing.
  - 1. Flashing Sheet Stripping: Install flashing sheet stripping in specified cold adhesive and extend onto roofing membrane.
- E. Roof Drains: Install base sheet in cold adhesive around drain bowl. Base sheet must be installed so that it will be under compression from the clamping ring. Install base coat, fiberglass reinforcement, and top coat over base sheet. Install drain clamping ring and strainer.

### **3.4 FLUID-APPLIED MEMBRANE APPLICATION**

- A. Fluid-Applied Flashing Application: Complete base coat and fiberglass reinforcement at parapets, curbs, penetrations, and drains prior to application of field of fluid-applied membrane.
  - 1. Extend coating minimum of 8 inches up vertical surfaces and 4 inches onto horizontal surfaces.
  - 2. Roof Drains: Install base coat onto surrounding membrane surface and metal drain bowl flange. Install target piece of reinforcing fabric immediately into wet base coat and roll to fully embed and saturate fabric. Reinstall clamping ring and strainer following application of top coat. Replace broken drain ring clamping bolts.
- B. Base Coat: Apply coating base coat to asphaltic base sheet surfaces in accordance with manufacturer's written instructions. Back roll to

achieve minimum wet mil coating thickness of 48 mils unless otherwise recommended by manufacturer; verify thickness of base coat as work progresses.

1. Apply base coat on prepared and primed surfaces and spread coating evenly.
  2. Embed fiberglass reinforcing fabric into wet base coat. Lap adjacent flashing pieces of fiberglass minimum 3 inches along edges and 6 inches at end laps.
  3. Roll surface of fiberglass reinforcing fabric to completely embed and saturate fabric. Leave finished base coat with fabric free of pin holes, voids, or openings.
  4. Allow base coat to cure prior to application of top coat.
  5. Following curing of base coat and prior to application of top coat, sand raised or exposed edges of fiberglass reinforcement.
- C. Top Coat: Apply top coat uniformly in a complete installation to flashings and field of roof.
1. Prime base coat prior to application of top coat if top coat is not applied within 72 hours of the base coat application, using manufacturer's recommended primer.
  2. Apply top coat to flashings extending coating up vertical surfaces and out onto horizontal surfaces 4 inches. Install top coat over field base coat and spread coating evenly.
  3. Back roll to achieve wet mil thickness of 32 mils unless otherwise recommended by manufacturer.
  4. Avoid foot traffic on new fluid-applied membrane for a minimum of 24 hours.

### **3.5 PROTECTION AND CLEAN UP**

- A. Keep completed roofing system free of non essential traffic and unrelated work until at least 48 hours after completion of roofing application.
- B. Provide temporary support, such as insulation board, for materials and equipment stored on roof during application.
- C. Protect adjacent construction from disfiguration by run, spillage or overspray, and repair work defaced in this manner.
- D. Remove tools, equipment and surplus materials and clear roof area of debris on completion of work.

### 3.6 REPAIRS

- A. Roof Inspection: Contractor shall engage roofing system manufacturer's technical personnel to inspect roofing installation, and submit report to the Architect. Notify Architect or Owner 48 hours in advance of dates and times of inspections. Inspect work as follows:
1. Upon completion of preparation of first component of work, prior to application of re-coating materials.
  2. Following application of re-coating to flashings and application of base coat to field of roof.
  3. Upon completion of re-coating but prior to re-installation of other roofing components.
- B. Repair fluid-applied membrane where test inspections indicate that they do not comply with specified requirements.
- C. Arrange for additional inspections, at Contractor's expense, to verify compliance of replaced or additional work with specified requirements.

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**SECTION 07 60 00**  
**FLASHING AND SHEET METAL**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Formed sheet metal work for wall and roof flashing, copings, roof edge metal, fasciae, drainage specialties, and formed expansion joint covers are specified in this section.

**1.2 RELATED WORK**

- A. Manufactured flashing, copings, roof edge metal, and fasciae: Section 07 40 00 SIDING PANELS.
- B. Membrane base flashings and stripping: Section 07 56 00 FLUID-APPLIED ROOFING-INSULATED.
- C. Flashing components of factory finished roofing and wall systems: Division 07 roofing and wall system sections.
- D. Joint Sealants: Section 07 92 00, JOINT SEALANTS.
- E. Color of factory coated exterior architectural metal and anodized aluminum items: Section 09 06 00, SCHEDULE FOR FINISHES.
- F. Integral flashing components of manufactured roof specialties and accessories or equipment: Section 07 71 00, ROOF SPECIALTIES, Section 07 72 00, ROOF ACCESSORIES, Division 22, PLUMBING sections and Division 23 HVAC sections.
- G. Paint materials and application: Section 09 91 00, PAINTING.
- H. Flashing of Roof Drains: Section 22 14 00, FACILITY STORM DRAINAGE.

**1.3 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only. Editions of applicable publications current on date of issue of bidding documents apply unless otherwise indicated.
- B. Aluminum Association (AA):
- AA-C22A41.....Aluminum Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick
- AA-C22A42.....Chemically etched medium matte, with integrally colored anodic coating, Class I Architectural, 0.7 mils thick

- AA-C22A44.....Chemically etched medium matte with  
electrolytically deposited metallic compound,  
integrally colored coating Class I  
Architectural, 0.7-mil thick finish
- C. American National Standards Institute/Single-Ply Roofing Institute  
(ANSI/SPRI):
- ANSI/SPRI ES-1-03.....Wind Design Standard for Edge Systems Used with  
Low Slope Roofing Systems
- D. American Architectural Manufacturers Association (AAMA):
- AAMA 620.....Voluntary Specification for High Performance  
Organic Coatings on Coil Coated Architectural  
Aluminum
- AAMA 621.....Voluntary Specification for High Performance  
Organic Coatings on Coil Coated Architectural  
Hot Dipped Galvanized (HDG) and Zinc-Aluminum  
Coated Steel Substrates
- E. ASTM International (ASTM):
- A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet, and Strip
- A653/A653M-11.....Steel Sheet Zinc-Coated (Galvanized) or Zinc  
Alloy Coated (Galvanized) by the Hot- Dip  
Process
- B32-08.....Solder Metal
- B209-10.....Aluminum and Aluminum-Alloy Sheet and Plate
- B370-12.....Copper Sheet and Strip for Building  
Construction
- D173-03(R2011).....Bitumen-Saturated Cotton Fabrics Used in  
Roofing and Waterproofing
- D412-06(R2013).....Vulcanized Rubber and Thermoplastic Elastomers-  
Tension
- D1187-97(R2011).....Asphalt Base Emulsions for Use as Protective  
Coatings for Metal
- D1784-11.....Rigid Poly (Vinyl Chloride) (PVC) Compounds and  
Chlorinated Poly (Vinyl Chloride) (CPVC)  
Compounds
- D3656-07.....Insect Screening and Louver Cloth Woven from  
Vinyl-Coated Glass Yarns



- D4586-07.....Asphalt Roof Cement, Asbestos Free
- F. Sheet Metal and Air Conditioning Contractors National Association  
(SMACNA): Architectural Sheet Metal Manual.
- G. National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500-06.....Metal Finishes Manual
- H. Federal Specification (Fed. Spec):  
A-A-1925A.....Shield, Expansion; (Nail Anchors)  
UU-B-790A.....Building Paper, Vegetable Fiber
- I. International Code Commission (ICC): International Building Code,  
Current Edition

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. Wind Uplift Forces: Resist the forces indicated on the drawings.
- B. Wind Design Standard: Fabricate and install copings, roof-edge  
flashings tested per ANSI/SPRI ES-1 to resist design pressure indicated  
on Drawings.

#### **1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT  
DATA, AND SAMPLES.
- B. Shop Drawings: For all specified items, including:
1. Flashings
  2. Copings
  3. Gravel Stop-Fascia
  4. Gutter and Conductors
  5. Expansion joints
  6. Fascia-cant
- C. Manufacturer's Literature and Data: For all specified items, including:
1. Two-piece counterflashing
  2. Thru wall flashing
  3. Expansion joint cover, each type
  4. Nonreinforced, elastomeric sheeting
  5. Bituminous coated copper
  6. Fascia-cant
- D. Certificates: Indicating compliance with specified finishing  
requirements, from applicator and contractor.

## **PART 2 - PRODUCTS**

### **2.1 FLASHING AND SHEET METAL MATERIALS**

- A. Stainless Steel: ASTM A167, Type 302B, dead soft temper.
- B. Aluminum Sheet: ASTM B209, alloy 3003-H14 except alloy used for color anodized aluminum shall be as required to produce specified color.  
Alloy required to produce specified color shall have the same structural properties as alloy 3003-H14.

### **2.2 FLASHING ACCESSORIES**

- A. Solder: ASTM B32; flux type and alloy composition as required for use with metals to be soldered.
- B. Rosin Paper: Fed-Spec. UU-B-790, Type I, Grade D, Style 1b, Rosin-sized sheathing paper, weighing approximately 3 Kg/10 m<sup>2</sup>( 6 lbs/100 sf).
- C. Bituminous Paint: ASTM D1187, Type I.
- D. Fasteners:
  - 1. Use stainless steel for stainless steel and aluminum alloy. Use galvanized steel or stainless steel for galvanized steel.
  - 2. Nails:
    - a. Minimum diameter for copper nails: 3 mm (0.109 inch).
    - b. Minimum diameter for aluminum nails 3 mm (0.105 inch).
    - c. Minimum diameter for stainless steel nails: 2 mm (0.095 inch) and annular threaded.
    - d. Length to provide not less than 22 mm (7/8 inch) penetration into anchorage.
  - 3. Rivets: Not less than 3 mm (1/8 inch) diameter.
  - 4. Expansion Shields: Fed Spec A-A-1925A.
- E. Sealant: As specified in Section 07 92 00, JOINT SEALANTS for exterior locations.
- F. Insect Screening: ASTM D3656, 18 by 18 regular mesh.
- G. Roof Cement: ASTM D4586.

### **2.3 SHEET METAL THICKNESS**

- A. Except as otherwise shown or specified use thickness or weight of sheet metal as follows:
- B. Concealed Locations (Built into Construction):
  - 1. Stainless steel: 0.25 mm (0.010 inch) thick.
- C. Exposed Locations:
  - 1. Stainless steel: 0.4 mm (0.015 inch).

D. Thickness of aluminum or galvanized steel is specified with each item.

## **2.4 FABRICATION, GENERAL**

### **A. Jointing:**

1. In general, stainless steel and copper clad stainless steel joints, except expansion and contraction joints, shall be locked and soldered.
2. Jointing of stainless steel over 0.45 mm (0.018 inch) thick shall be done by lapping, riveting and soldering.
3. Joints shall conform to following requirements:
  - a. Flat-lock joints shall finish not less than 19 mm (3/4 inch) wide.
  - b. Lap joints subject to stress shall finish not less than 25 mm (one inch) wide and shall be soldered and riveted.
  - c. Unsoldered lap joints shall finish not less than 100 mm (4 inches) wide.
4. Flat and lap joints shall be made in direction of flow.
5. Soldering:
  - a. Pre tin both mating surfaces with solder for a width not less than 38 mm (1 1/2 inches) of uncoated copper, stainless steel, and copper clad stainless steel.
  - b. Wire brush to produce a bright surface before soldering lead coated copper.
  - c. Treat in accordance with metal producers recommendations other sheet metal required to be soldered.
  - d. Completely remove acid and flux after soldering is completed.

### **B. Expansion and Contraction Joints:**

1. Fabricate in accordance with the Architectural Sheet Metal Manual recommendations for expansion and contraction of sheet metal work in continuous runs.
2. Space joints as shown or as specified.
3. Space expansion and contraction joints for stainless steel at intervals not exceeding 7200 mm (24 feet).
4. Space expansion and contraction joints for aluminum at intervals not exceeding 5400 mm (18 feet), except do not exceed 3000 mm (10 feet) for gravel stops and fascia-cant systems.
5. Fabricate slip-type or loose locked joints and fill with sealant unless otherwise specified.

6. Fabricate joint covers of same thickness material as sheet metal served.

C. Cleats:

1. Fabricate cleats to secure flashings and sheet metal work over 300 mm (12 inches) wide and where specified.
2. Provide cleats for maximum spacing of 300 mm (12 inch) centers unless specified otherwise.
3. Form cleats of same metal and weights or thickness as the sheet metal being installed unless specified otherwise.
4. Fabricate cleats from 50 mm (2 inch) wide strip. Form end with not less than 19 mm (3/4 inch) wide loose lock to item for anchorage. Form other end of length to receive nails free of item to be anchored and end edge to be folded over and cover nail heads.

D. Edge Strips or Continuous Cleats:

1. Fabricate continuous edge strips where shown and specified to secure loose edges of the sheet metal work.
2. Except as otherwise specified, fabricate edge strips or minimum 0.6 mm (0.024 inch) thick stainless steel or 1.25 mm (0.050 inch) thick aluminum.
3. Use material compatible with sheet metal to be secured by the edge strip.
4. Fabricate in 3000 mm (10 feet) maximum lengths with not less than 19 mm (3/4 inch) loose lock into metal secured by edge strip.
5. Fabricate Strips for fascia anchorage to extend below the supporting wood construction to form a drip and to allow the flashing to be hooked over the lower edge at least 19 mm (3/4-inch).
6. Fabricate anchor edge maximum width of 75 mm (3 inches) or of sufficient width to provide adequate bearing area to insure a rigid installation using 0.8 mm (0.031 inch) thick stainless steel or 1.6 mm (0.0625 inch) thick aluminum.

E. Drips:

1. Form drips at lower edge of sheet metal counter-flashings (cap flashings), fascias, gravel stops, wall copings, by folding edge back 13 mm (1/2 inch) and bending out 45 degrees from vertical to carry water away from the wall.
2. Form drip to provide hook to engage cleat or edge strip for fastening for not less than 19 mm (3/4 inch) loose lock where shown.

F. Edges:

1. Edges of flashings concealed in masonry joints opposite drain side shall be turned up 6 mm (1/4 inch) to form dam, unless otherwise specified or shown otherwise.
2. Finish exposed edges of flashing with a 6 mm (1/4 inch) hem formed by folding edge of flashing back on itself when not hooked to edge strip or cleat. Use 6 mm (1/4 inch) minimum penetration beyond wall face with drip for through-wall flashing exposed edge.
3. All metal roof edges shall meet requirements of IBC, current edition.

G. Metal Options:

1. Where options are permitted for different metals use only one metal throughout for each application.
2. Stainless steel may be used in concealed locations for fasteners of other metals exposed to view.

## 2.5 FINISHES

- A. Use same finish on adjacent metal or components and exposed metal surfaces unless specified or shown otherwise.
- B. In accordance with NAAMM Metal Finishes Manual AMP 500, unless otherwise specified.
- C. Finish exposed metal surfaces as follows, unless specified otherwise:
1. Stainless Steel: Finish No. 2B or 2D.
  2. Aluminum:
    - a. Clear Finish: AA-C22A41 medium matte, clear anodic coating, Class 1 Architectural, 18 mm (0.7 mils) thick.
    - b. Fluorocarbon Finish: AAMA 620, high performance organic coating.

## 2.6 THROUGH-WALL FLASHINGS

- A. Form through-wall flashing to provide a mechanical bond or key against lateral movement in all directions. Install a sheet having 2 mm (1/16 inch) deep transverse channels spaced four to every 25 mm (one inch), or ribbed diagonal pattern, or having other deformation unless specified otherwise.
1. Fabricate in not less than 2400 mm (8 feet) lengths; 3000 mm (10 feet) maximum lengths.
  2. Fabricate so keying nests at overlaps.
- B. Window Sill Flashing and Lintel Flashing:

1. Use stainless steel.
2. Fabricate flashing at ends with folded corners to turn up 5 mm (3/16 inch) in first vertical masonry joint beyond masonry opening.
3. Turn up back edge as shown.
4. Form exposed portion with drip as specified or receiver.

## **2.7 BASE FLASHING**

- A. Use metal base flashing at vertical surfaces intersecting built-up roofing without cant strips or where shown.
  1. Use stainless steel, thickness specified unless specified otherwise.
  2. When flashing is over 250 mm (10 inches) in vertical height or horizontal width use 0.5 mm (0.018 inch) stainless steel.
  3. Use stainless steel at aluminum roof curbs where flashing contacts the aluminum.
  4. Use stainless steel at pipe flashings.
- B. Fabricate metal base flashing up vertical surfaces not less than 200 mm (8 inch) nor more than 400 mm (16 inch).
- C. Fabricate roof flange not less than 100 mm (4 inches) wide unless shown otherwise. When base flashing length exceeds 2400 mm (8 feet) form flange edge with 13 mm (1/2 inch) hem to receive cleats.
- D. Form base flashing bent from strip except pipe flashing. Fabricate ends for riveted soldered lap seam joints. Fabricate expansion joint ends as specified.
- E. Pipe Flashing: (Other than engine exhaust or flue stack)
  1. Fabricate roof flange not less than 100 mm (4 inches) beyond sleeve on all sides.
  2. Extend sleeve up and around pipe and flange out at bottom not less than 13 mm (1/2 inch) and solder to flange and sleeve seam to make watertight.
  3. At low pipes 200 mm (8 inch) to 450 mm (18 inch) above roof:
    - a. Form top of sleeve to turn down into the pipe at least 25 mm (one inch).
    - b. Allow for loose fit around and into the pipe.
  4. At high pipes and pipes with goosenecks or other obstructions which would prevent turning the flashing down into the pipe:
    - a. Extend sleeve up not less than 300 mm (12 inch) above roofing.
    - b. Allow for loose fit around pipe.

## **2.8 COUNTERFLASHING (CAP FLASHING OR HOODS)**

- A. Either stainless steel or aluminum, unless specified otherwise.
- B. Fabricate to lap base flashing a minimum of 100 mm (4 inches) with drip:
  - 1. Form lock seams for outside corners. Allow for lap joints at ends and inside corners.
  - 2. In general, form flashing in lengths not less than 2400 mm (8 feet) and not more than 3000 mm (10 feet).
  - 3. Two-piece, lock in type flashing may be used in-lieu-of one piece counter-flashing.
  - 4. Manufactured assemblies may be used.
  - 5. Where counterflashing is installed at new work use an integral flange at the top designed to be extended into the masonry joint or reglet in concrete.
  - 6. Where counterflashing is installed at existing work use surface applied type, formed to provide a space for the application of sealant at the top edge.
- C. Pipe Counterflashing:
  - 1. Form flashing for water-tight umbrella with upper portion against pipe to receive a draw band and upper edge to form a "V" joint sealant receiver approximately 19 mm (3/4 inch) deep.
  - 2. Fabricate 100 mm (4 inch) over lap at end.
  - 3. Fabricate draw band of same metal as counter flashing. Use 0.33 mm (0.013 inch) thick stainless steel.
  - 4. Use stainless steel bolt on draw band tightening assembly.
  - 5. Vent pipe counter flashing may be fabricated to omit draw band and turn down 25 mm (one inch) inside vent pipe.
- D. Where vented edge decks intersect vertical surfaces, form in one piece, shape to slope down to a point level with and in front of edge-set notched plank; then, down vertically, and overlapping base flashing.

## **2.9 GRAVEL STOPS - NOT USED**

## **2.10 BITUMEN STOPS - NOT USED**

## **2.11 HANGING GUTTERS**

- A. Fabricate gutters of not less than the following:
  - 1. 0.8 mm (0.031 inch) thick stainless steel
  - 2. 1.3 mm (0.051 inch) thick aluminum

- B. Fabricate hanging gutters in sections not less than 2400 mm (8 feet) long, except at ends of runs where shorter lengths are required.
- C. Building side of gutter shall be not less than 38 mm (1 1/2 inches) higher than exterior side.
- D. Gutter Bead: Stiffen outer edge of gutter by folding edge over approximately 19 mm (3/4 inch) toward roof and down approximately 19 mm (3/4 inch) unless shown otherwise.
- E. Gutter Spacers:
  - 1. Fabricate of same material and thickness as gutter.
  - 2. Fabricate 25 mm (one inch) wide strap and fasten to gutters not over 900 mm (36 inches) on center.
  - 3. Turn back edge up 25 mm (one inch) and lap front edge over gutter bead.
  - 4. Rivet and solder to gutter except rivet and seal to aluminum.
- F. Outlet Tubes:
  - 1. Form outlet tubes to connect gutters to conductors of same metal and thickness as gutters extend into the conductor 75 mm (3 inch). Flange upper end of outlet tube 13 mm (1/2 inch).
  - 2. Lock and solder longitudinal seam except use sealant in lieu of solder with aluminum.
  - 3. Solder tube to gutter. Seal aluminum tube to gutter and rivet to gutter.
  - 4. Fabricate basket strainers of same material as gutters.
- G. Gutter Brackets:
  - 1. Fabricate of same metal as gutter. Use the following:
    - a. 3 by 25 mm (1/8 by 1 inch) stainless steel.
    - b. 5 by 25 mm (3/16 by 1 inch) aluminum.
  - 2. Fabricate to gutter profile.
  - 3. Drill two 5 mm (3/16 inch) diameter holes in anchor leg for countersunk flat head screws.

## **2.12 CONDUCTORS (DOWNSPOUTS)**

- A. Fabricate conductors of same metal and thickness as gutters in sections approximately 3000 mm (10 feet) long [with 19 mm (3/4 inch) wide flat locked seams].
  - 1. Fabricate open face channel shape with hemmed longitudinal edges.



- B. Fabricate elbows by mitering, riveting, and soldering except seal aluminum in lieu of solder. Lap upper section to the inside of the lower piece.
- C. Fabricate conductor brackets or hangers of same material as conductor, 2 mm (1/16 inch) thick by 25 mm (one inch) minimum width. Form to support conductors 25 mm (one inch) from wall surface in accordance with Architectural Sheet Metal Manual Plate 34, Design C for rectangular shapes and E for round shapes.
- D. Conductor Heads:
  - 1. Fabricate of same material as conductor.
  - 2. Fabricate conductor heads to not less than 250 mm (10 inch) wide by 200 mm (8 inch) deep by 200 mm (8 inches) from front to back.
  - 3. Form front and side edges channel shape not less than 13 mm (1/2 inch) wide flanges with edge hemmed.
  - 4. Slope bottom to sleeve to conductor or downspout at not less than 60 degree angle.
  - 5. Extend wall edge not less than 25 mm (one inch) above front edge.
  - 6. Solder joints for water tight assembly.
  - 7. Fabricate outlet tube or sleeve at bottom not less than 50 mm (2 inches) long to insert into conductor.

### **2.13 SPLASHPANS**

- A. Fabricate splashpans from the following:
  - 1. 0.4 mm (0.015 inch) thick stainless steel.
  - 2. 1.25 mm (0.050 inch) thick aluminum.
- B. Fabricate in accordance with Architectural Sheet Metal Manual Plate 35 with not less than two ribs as shown in alternate section.

### **2.14 REGLETS**

- A. Fabricate reglets of one of the following materials:
  - 1. Stainless steel, not less than 0.3 mm (0.012 inch) thick.
- B. Fill open-type reglets with fiberboard or other suitable separator, to prevent crushing of the slot during installation.
- C. Bend edges of reglets for setting into concrete to an angle of not less than 45 degrees, and make wide enough to provide firm anchorage in the concrete.

- D. Fabricate reglets for building into horizontal masonry mortar joints not less than 19 mm (3/4 inch) deep, nor more than 25 mm (one inch) deep.
- E. Fabricate mitered corners, fittings, and special shapes as may be required by details.
- F. Reglets for concrete may be formed to receive flashing and have a 10 mm (3/8 inch), 45 degree snap lock.

## **2.15 EXPANSION JOINT COVERS**

- A. Either type optional, use only one type throughout.
- B. Types:
  - 1. Fabricate covers of, aluminum, not less than 1.27 mm (0.050 inch) thick, per SMΔCNΔ Figure 5.6A.

## **2.16 ENGINE EXHAUST PIPE OR FLUE OR STACK FLASHING - NOT USED**

## **2.17 SCUPPERS - NOT USED**

## **2.18 GOOSENECK ROOF VENTILATORS - NOT USED**

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. General:
  - 1. Install flashing and sheet metal items as shown in Sheet Metal and Air Conditioning Contractors National Association, Inc., publication, ARCHITECTURAL SHEET METAL MANUAL, except as otherwise shown or specified.
  - 2. Apply Sealant as specified in Section 07 92 00, JOINT SEALANTS.
  - 3. Apply sheet metal and other flashing material to surfaces which are smooth, sound, clean, dry and free from defects that might affect the application.
  - 4. Remove projections which would puncture the materials and fill holes and depressions with material compatible with the substrate. Cover holes or cracks in wood wider than 6 mm (1/4 inch) with sheet metal compatible with the roofing and flashing material used.
  - 5. Coordinate with masonry work for the application of a skim coat of mortar to surfaces of unit masonry to receive flashing material before the application of flashing.
  - 6. Apply a layer of 7 Kg (15 pound) saturated felt followed by a layer of rosin paper to wood surfaces to be covered with copper. Lap each ply 50 mm (2 inch) with the slope and nail with large headed copper nails.

7. Confine direct nailing of sheet metal to strips 300 mm (12 inch) or less wide. Nail flashing along one edge only. Space nail not over 100 mm (4 inches) on center unless specified otherwise.
8. Install bolts, rivets, and screws where indicated, specified, or required in accordance with the SMACNA Sheet Metal Manual. Space rivets at 75 mm (3 inch) on centers in two rows in a staggered position. Use neoprene washers under fastener heads when fastener head is exposed.
9. Coordinate with roofing work for the installation of metal base flashings and other metal items having roof flanges for anchorage and watertight installation.
10. Nail continuous cleats on 75 mm (3 inch) on centers in two rows in a staggered position.
11. Nail individual cleats with two nails and bend end tab over nail heads. Lock other end of cleat into hemmed edge.
12. Install flashings in conjunction with other trades so that flashings are inserted in other materials and joined together to provide a water tight installation.
13. Where required to prevent galvanic action between dissimilar metal isolate the contact areas of dissimilar metal with sheet lead, waterproof building paper, or a coat of bituminous paint.
14. Isolate aluminum in contact with dissimilar metals others than stainless steel, white bronze or other metal compatible with aluminum by:
  - a. Paint dissimilar metal with a prime coat of zinc-chromate or other suitable primer, followed by two coats of aluminum paint.
  - b. Paint dissimilar metal with a coat of bituminous paint.
  - c. Apply an approved caulking material between aluminum and dissimilar metal.
15. Paint aluminum in contact with or built into mortar, concrete, plaster, or other masonry materials with a coat of bituminous paint.
16. Paint aluminum in contact with absorptive materials that may become repeatedly wet with two coats of bituminous paint or two coats of aluminum paint.
17. Bitumen Stops:
  - a. Install bitumen stops for built-up roof opening penetrations through deck and at formed sheet metal gravel stops.

- b. Nail leg of bitumen stop at 300 mm (12 inch) intervals to nailing strip at roof edge before roofing material is installed.

### **3.2 THROUGH-WALL FLASHING**

#### **A. General:**

1. Install continuous through-wall flashing between top of concrete foundation walls and bottom of masonry building walls; at top of concrete floors; under masonry, concrete, or stone copings and elsewhere as shown.
2. Where exposed portions are used as a counterflashings, lap base flashings at least 100 mm (4 inches) and use thickness of metal as specified for exposed locations.
3. Exposed edge of flashing may be formed as a receiver for two piece counter flashing as specified.
4. Terminate exterior edge beyond face of wall approximately 6 mm (1/4 inch) with drip edge where not part of counter flashing.
5. Turn back edge up 6 mm (1/4 inch) unless noted otherwise where flashing terminates in mortar joint or hollow masonry unit joint.
6. Terminate interior raised edge in masonry backup unit approximately 38 mm (1 1/2 inch) into unit unless shown otherwise.
7. Under copings terminate both edges beyond face of wall approximately 6 mm (1/4 inch) with drip edge.
8. Lap end joints at least two corrugations, but not less than 100 mm (4 inches). Seal laps with sealant.
9. Where dowels, reinforcing bars and fastening devices penetrate flashing, seal penetration with sealing compound. Sealing compound is specified in Section 07 92 00, JOINT SEALANTS.
10. Coordinate with other work to set in a bed of mortar above and below flashing so that total thickness of the two layers of mortar and flashing are same as regular mortar joint.
11. Where ends of flashing terminate turn ends up 25 mm (1 inch) and fold corners to form dam extending to wall face in vertical mortar or veneer joint.
12. Turn flashing up not less than 200 mm (8 inch) between masonry or behind exterior veneer.
13. When flashing terminates in reglet extend flashing full depth into reglet and secure with lead or plastic wedges spaced 150 mm (6 inch) on center.

14. Continue flashing around columns:
  - a. Where flashing cannot be inserted in column reglet hold flashing vertical leg against column.
  - b. Counterflash top edge with 75 mm (3 inch) wide strip of saturated cotton unless shown otherwise. Secure cotton strip with roof cement to column. Lap base flashing with cotton strip 38 mm (1 1/2 inch).
- B. Flashing at Top of Concrete Foundation Walls Where concrete is exposed. Turn up not less than 200 mm (8 inch) high and into masonry backup mortar joint or reglet in concrete backup as specified.
- C. Flashing at Top of Concrete Floors (except where shelf angles occur): Place flashing in horizontal masonry joint not less than 200 mm (8 inch) below floor slab and extend into backup masonry joint at floor slab 38 mm (1 1/2 inch).
- D. Flashing at Cavity Wall Construction: Where flashing occurs in cavity walls turn vertical portion up against backup under waterproofing, if any, into mortar joint. Turn up over insulation, if any, and horizontally through insulation into mortar joint.
- E. Flashing at Veneer Walls:
  1. Install near line of finish floors over shelf angles or where shown.
  2. Turn up against sheathing.
  3. At stud framing, hem top edge 19 mm (3/4 inch) and secure to each stud with stainless steel fasteners through sheathing.
  4. At concrete backing, extend flashing into reglet as specified.
  5. Coordinate with installation of waterproofing or asphalt felt for lap over top of flashing.
- F. Lintel Flashing when not part of shelf angle flashing:
  1. Install flashing full length of lintel to nearest vertical joint in masonry over veneer.
  2. Turn ends up 25 mm (one inch) and fold corners to form dam and extend end to face of wall.
  3. Turn back edge up to top of lintel; terminate back edge as specified for back-up wall.
- G. Window Sill Flashing:
  1. Install flashing to extend not less than 100 mm (4 inch) beyond ends of sill into vertical joint of masonry or veneer.
  2. Turn back edge up to terminate under window frame.

3. Turn ends up 25 mm (one inch) and fold corners to form dam and extend to face of wall.

H. Door Sill Flashing:

1. Install flashing under bottom of plate sills of doors over curbs opening onto roofs. Extend flashing out to form counter flashing or receiver for counter flashing over base flashing. Set in sealant.
2. Extend sill flashing 200 mm (8 inch) beyond jamb opening. Turn ends up one inch in vertical masonry joint, extend end to face of wall. Join to counter flashing for water tight joint.
3. Where doors thresholds cover over waterproof membranes install sill flashing over water proof membrane under thresholds. Extend beyond opening to cover exposed portion of waterproof membrane and not less than 150 mm (6 inch) beyond door jamb opening at ends. Turn up approximately 6 mm (1/4 inch) under threshold.

**3.3 BASE FLASHING**

- A. Install where roof membrane type base flashing is not used and where shown.
1. Install flashing at intersections of roofs with vertical surfaces or at penetrations through roofs, to provide watertight construction.
  2. Install metal flashings and accessories having flanges extending out on top of the built-up roofing before final bituminous coat and roof aggregate is applied.
  3. Set flanges in heavy trowel coat of roof cement and nail through flanges into wood nailers over bituminous roofing.
  4. Secure flange by nailing through roofing into wood blocking with nails spaced 75 mm (3 inch) on centers or, when flange over 100 mm (4 inch) wide terminate in a 13 mm (1/2 inch) folded edge anchored with cleats spaced 200 mm (8 inch) on center. Secure one end of cleat over nail heads. Lock other end into the seam.
- B. For long runs of base flashings install in lengths of not less than 2400 mm (8 feet) nor more than 3000 mm (ten feet). Install a 75 mm (3 inch) wide slip type, loose lock expansion joint filled with sealant in joints of base flashing sections over 2400 mm (8 feet) in length. Lock and solder corner joints at corners.
- C. Extend base flashing up under counter flashing of roof specialties and accessories or equipment not less than 75 mm (3 inch).

### **3.4 COUNTERFLASHING (CAP FLASHING OR HOODS)**

#### **A. General:**

1. Install counterflashing over and in conjunction with installation of base flashings, except as otherwise specified or shown.
2. Install counterflashing to lap base flashings not less than 100 mm (4 inch).
3. Install upper edge or top of counterflashing not less than 225 mm (9 inch) above top of the roofing.
4. Lap joints not less than 100 mm (4 inch). Stagger joints with relation to metal base flashing joints.
5. Use surface applied counterflashing on existing surfaces and new work where not possible to integrate into item.
6. When fastening to concrete or masonry, use screws driven in expansion shields set in concrete or masonry. Use screws to wood and sheet metal. Set fasteners in mortar joints of masonry work.

#### **B. Two-Piece Counterflashing:**

1. Where receiver is installed at new masonry coordinate to insure proper height, embed in mortar, and lap.
2. Surface applied type receiver:
  - a. Secure to face construction in accordance, with manufacturers instructions.
  - b. Completely fill space at the top edge of receiver with sealant.
3. Insert counter flashing in receiver in accordance with fabricator or manufacturer's instructions and to fit tight against base flashing.

#### **D. Where vented edge occur install so lower edge of counterflashing is against base flashing.**

#### **E. When counter flashing is a component of other flashing install as shown.**

### **3.5 REGLETS**

- A. Install reglets in a manner to provide a watertight installation.
- B. Locate reglets not less than 225 mm (9 inch) nor more than 400 mm (16 inch) above roofing, and not less than 125 mm (5 inch) nor more than 325 mm (13 inch) above cant strip.
- C. Butt and align end joints or each section of reglet and securely hold in position until concrete or mortar are hardened:
  1. Coordinate reglets for anchorage into concrete with formwork construction.

2. Coordinate reglets for masonry to locate horizontally into mortar joints.

### **3.6 GRAVEL STOPS - NOT USED**

### **3.7 COPINGS**

#### **A. General:**

1. On walls topped with a wood plank, install a continuous edge strip on the front edge of the plank. Lock the coping to the edge strip with a 19 mm (3/4 inch) loose lock seam.
2. Where shown turn down roof side of coping and extend down over base flashing as specified for counter-flashing. Secure counter-flashing to lock strip in coping at continuous cleat.
3. Install ends adjoining existing construction so as to form space for installation of sealants. Sealant is specified in Section 07 92 00, JOINT SEALANTS.

#### **B. Aluminum Coping:**

1. Install with 6 mm (1/4 inch) joint between ends of coping sections.
2. Install joint covers, centered at each joint, and securely lock in place.

### **3.8 EXPANSION JOINT COVERS**

- A. Install expansion joint covers at locations shown on curbs not less than 200 mm (8 inch) high above roof surface.
- B. Install continuous edge strips of same metal as expansion joint flange, nailed at not less than 75 mm (3 inch) centers.
- C. Install insulated expansion joint covers in accordance with manufacturer's directions locking edges to edge strips.

### **3.9 ENGINE EXHAUST PIPE OR STACK FLASHING - NOT USED**

### **3.10 HANGING GUTTERS**

- A. Hang gutters with high points equidistant from downspouts. Slope at not less than 1:200 (1/16 inch per foot).
- B. Lap joints, except for expansion joints, at least 25 mm (one inch) in the direction of flow. Rivet and seal or solder lapped joints.
- C. Support gutters in brackets spaced not more than 600 mm (24 inch) on centers, brackets attached to facial or wood nailer by at least two screws or nails.
  1. For copper or copper clad stainless steel gutters use brass or bronze brackets.



2. For stainless steel gutters use stainless steel brackets.
3. For aluminum gutters use aluminum brackets or stainless steel brackets.
4. Use brass or stainless steel screws.
- D. Secure brackets to gutters in such a manner as to allow free movement of gutter due to expansion and contraction.
- E. Gutter Expansion Joint:
  1. Locate expansion joints midway between outlet tubes.
  2. Provide at least a 25 mm (one inch) expansion joint space between end baffles of gutters.
  3. Install a cover plate over the space at expansion joint.
  4. Fasten cover plates to gutter section on one side of expansion joint only.
  5. Secure loose end of cover plate to gutter section on other side of expansion joint by a loose-locked slip joint.
- F. Outlet Tubes: Set bracket strainers loosely into gutter outlet tubes.

### **3.11 CONDUCTORS (DOWNSPOUTS)**

- A. Where scuppers discharge into downspouts install conductor head to receive discharge with back edge up behind drip edge of scupper. Fasten and seal joint. Sleeve conductors to gutter outlet tubes and fasten joint and joints between sections.
- B. Set conductors plumb and clear of wall, and anchor to wall with two anchor straps, located near top and bottom of each section of conductor. Strap at top shall be fixed to downspout, intermediate straps and strap at bottom shall be slotted to allow not less than 13 mm (1/2 inch) movement for each 3000 mm (10 feet) of downspout.
- C. Install elbows, offsets and shoes where shown and required. Slope not less than 45 degrees.

### **3.12 SPLASH PANS**

- A. Install where downspouts discharge on low slope roofs unless shown otherwise.
- B. Set in roof cement prior to pour coat installation or sealant compatible with single ply roofing membrane.

### **3.13 GOOSENECK ROOF VENTILATORS - NOT USED**

- - - E N D - - -



**SECTION 07 81 00**  
**APPLIED FIREPROOFING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies mineral fiber and cementitious coverings to provide fire resistance to interior structural steel members shown.

**1.2 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Manufacturer's complete and detailed application instructions and specifications.
  2. Manufacturer's repair and patching instructions.
- C. Certificates:
1. Certificate from testing laboratory attesting fireproofing material and application method meet the specified fire ratings.
    - a. List thickness and density of material required to meet fire ratings.
    - b. Accompanied by complete test report and test record.
  2. Manufacturer's certificate indicating sprayed-on fireproofing material supplied under the Contract is same within manufacturing tolerance as fireproofing material tested.
- D. Miscellaneous:
1. Manufacturer's written approval of surfaces to receive sprayed-on fireproofing.
  2. Manufacturer's written approval of completed installation.
  3. Manufacturer's written approval of the applicators of fireproofing material.

**1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver to job-site in sealed containers marked and labeled to show manufacturer's name and brand and certification of compliance with the specified requirements.
- B. Remove damaged containers from the site.
- C. Store the materials off the ground, under cover, away from damp surfaces.
- D. Keep dry until ready for use.

- E. Remove materials that have been exposed to water before installation from the site.

#### **1.4 QUALITY CONTROL**

- A. Test for fire endurance in accordance with ASTM E119, for fire rating specified, in a nationally recognized laboratory.
- B. Manufacturer's inspection and approval of surfaces to receive fireproofing as specified under paragraph Examination.
- C. Manufacturer's approval of fireproofing applications.
- D. Manufacturer's approval of completed installation.
- E. Manufacturer's representative shall observe and advise at the commencement of application, and shall visit the site as required thereafter for the purpose of ascertaining proper application.
- F. Pre-Application Test Area.
  - 1. Apply a test area consisting of a typical overhead fireproofing installation, including not less than 4.5 m (15 feet) of beam and deck.
    - a. Apply to one column.
    - b. Apply for the hourly ratings used.
  - 2. Install in location selected by the COR, for approval by the representative of the fireproofing material manufacturer and by the Government.
  - 3. Perform Bond test on painted steel in accordance with ASTM E736.
  - 4. Do not proceed in other areas until installation of test area has been completed and approved.
  - 5. Keep approved installation area open for observation as criteria for sprayed-on fireproofing.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - C841-03(R2008).....Installation of Interior Lathing and Furring
  - C847-10.....Metal Lath
  - E84-10.....Surface Burning Characteristics of Building Materials
  - E119-10.....Fire Tests of Building Construction and Materials

- E605-93(R2006).....Thickness and Density of Sprayed Fire-Resistive  
Materials Applied to Structural Members
- E736-00(R2006).....Cohesion/Adhesion of Sprayed Fire-Resistive  
Materials Applied to Structural Members
- E759-92(R2005).....The Effect of Deflection on Sprayed Fire-  
Resistive Material Applied to Structural  
Members
- E760-92(R2005).....Impact on Bonding of Sprayed Fire-Resistive  
Material Applied to Structural Members
- E761-92(R2005).....Compressive Strength of Fire-Resistive Material  
Applied to Structural Members
- E859-93(R2006).....Air Erosion of Sprayed Fire-Resistive Materials  
Applied to Structural Members
- E937-93(R2005).....Corrosion of Steel by Sprayed Fire-Resistive  
Material Applied to Structural Members
- E1042-02(R2008).....Acoustically, Absorptive Materials Applied by  
Trowel or Spray.
- G21-09.....Determining Resistance of Synthetic Polymeric  
Materials to Fungi

- C. Underwriters Laboratories, Inc. (UL):  
Fire Resistance Directory...Latest Edition including Supplements
- D. Warnock Hersey (WH):  
Certification Listings..Latest Edition
- E. Factory Mutual System (FM):  
Approval Guide.....Latest Edition including Supplements

## **PART 2 - PRODUCTS**

### **2.1 SPRAYED-ON FIREPROOFING**

- A. ASTM E1042, Class (a), Category A.
  - 1. Type I, factory mixed cementitious materials with approved aggregate.
  - 2. Type II, factory mixed mineral fiber with integral inorganic binders minimum 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>) density per ASTM E605 test unless specified otherwise. Use in areas that are completely encased.
- B. Materials containing asbestos are not permitted.
- C. Fireproofing characteristics when applied in the thickness and density required to achieve the fire-rating specified.

	Characteristic	Test	Results
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1.	Deflection	ASTM E759	No cracking, spalling, or delamination when backing to which it is applied has a deflection up to 1/120 in 3m (10 ft.)
2.	Corrosion-Resistance	ASTM E937	No promotion of corrosion of steel.
3.	Bond Impact	ASTM E760	No cracking, spalling, or delamination.
4.	Cohesion/Adhesion (Bond Strength)	ASTM E736	Minimum cohesive/adhesive strength of 9.57 kPa (200 lbf/ft <sup>2</sup> ) for protected areas. 19.15 kPa (400 lbf/ft <sup>2</sup> ) for exposed areas.
5.	Air Erosion	ASTM E859	Maximum gain weight of the collecting filter 0.27gm/m <sup>2</sup> (0.025 gm/ft <sup>2</sup> ).
6.	Compressive Strength	ASTM E761	Minimum compressive strength 48 kPa (1000psf).
7.	Surface Burning Characteristics with adhesive and sealer to be used	ASTM E84	Flame spread 25 or less smoke developed 50 or less
8.	Fungi Resistance	ASTM G21	Resistance to mold growth when inoculated with aspergillus niger (28 days for general application)

## 2.2 ADHESIVE

- A. Bonding adhesive for Type II (fibrous) materials as recommended and supplied by the fireproofing material manufacturer.
- B. Adhesive may be an integral part of the material or applied separately to surface receiving fireproofing material.

## 2.3 SEALER

- A. Sealer for Type II (fibrous) material as recommended and supplied by the fireproofing material manufacturer.
- B. Surface burning characteristics as specified for fireproofing material.
- C. Fungus resistant.
- D. Sealer may be an integral part of the material or applied separately to the exposed surface. When applied separately use contrasting color pigmented sealer, white preferred.

## 2.4 WATER

- A. Clean, fresh, and free from organic and mineral impurities.
- B. pH of 6.9 to 7.1.

## **2.5 MECHANICAL BOND MATERIAL**

- A. Expanded Metal Lath: ASTM C847, minimum weight of 0.92 kg/m<sup>2</sup> (1.7 pounds per square yard).
- B. Fasteners: ASTM C841.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Verify surfaces to receive fireproofing are clean and free of dust, soot, oil, grease, water soluble materials or any foreign substance which would prevent adhesion of the fireproofing material.
- B. Verify hangers, inserts and clips are installed before the application of fireproofing material.
- C. Verify ductwork, piping, and other obstructing material and equipment is not installed that will interfere with fireproofing installation.
- D. Verify concrete work on steel decking and concrete encased steel is completed.
- E. Verify temperature and enclosure conditions are required by fireproofing material manufacturer.

### **3.2 APPLICATION**

- A. Do not start application until written approval has been obtained from manufacturer of fireproofing materials that surfaces have been inspected by the manufacturer or his representative, and are suitable to receive sprayed-on fireproofing.
- B. Coordinate application of fireproofing material with other trades.
- C. Application of Metal Lath:
  - 1. Apply to beam and columns having painted surfaces which fail ASTM E736 Bond Test requirements in pre-application test area.
  - 2. Apply to beam flanges 300 mm (12-inches) or more in width.
  - 3. Apply to column flanges 400 mm (16-inches) or more in width.
  - 4. Apply to beam or column web 400 mm (16-inches) or more in depth.
  - 5. Tack weld or mechanically fasten on maximum of 300 mm (12-inch) center.
  - 6. Lap and tie lath member in accordance with ASTM C841.
- D. Mix and apply in accordance with manufacturer's instructions.
  - 1. Mechanically control material and water ratios.
  - 2. Apply adhesive and sealer, when not an integral part of the materials, in accordance with the manufacturer's instructions.

3. Apply to density and thickness indicated in UL Fire Resistance Directory, FM Approval Guide, or WH Certification Listings unless specified otherwise. Test in accordance with ASTM E119.
4. Minimum applied dry density per cubic meter (cubic foot) for beam and steel deck, columns in interstitial spaces and mechanical equipment rooms shall be as follows:
  - a. Type I - 240 kg/m<sup>3</sup> (15 lb/ft<sup>3</sup>).
  - b. Type II - 350 kg/m<sup>3</sup> (22 lb/ft<sup>3</sup>).
  - c. Materials with higher density of 640kg/m<sup>3</sup> (40pcf) maybe used in some mechanical rooms or parking garages.
- E. Application shall be completed in one area, inspected and approved by COR before removal of application equipment and proceeding with further work.

### **3.3 FIELD TESTS**

- A. Tests of applied material will be performed by VA retained Testing Laboratory. See Section 01 45 29, TESTING LABORATORY SERVICES.
- B. COR will select area to be tested in specific bays on each floor using a geometric grid pattern.
- C. Test for thickness and density in accordance with ASTM E605. Areas showing thickness less than that required as a result of fire endurance test will be rejected.
- D. Areas showing less than required fireproofing characteristics will be rejected on the following field tests.
  1. Test for cohesion/adhesion: ASTM E736.
  2. Test for bond impact strength: ASTM E760.

### **3.3 PATCHING AND REPAIRING**

- A. Inspect after mechanical, electrical and other trades have completed work in contact with fireproofing material, but before sprayed material is covered by subsequent construction.
- B. Perform corrective measures in accordance with fireproofing material Manufacturer's recommendations.
  1. Respray areas requiring additional fireproofing material to provide the required thickness, and replace dislodged or removed material.
  2. Spray material for patching by machine directly on point to be patched, or into a container and then hand apply.
  3. Hand mixing of material is not permitted.
- C. Repair:



1. Respray all test and rejected areas.
  2. Patch fireproofing material which is removed or disturbed after approval.
- D. Perform final inspection of sprayed areas after patching and repair.

### **3.5 SCHEDULE**

- A. Apply fireproofing material on interior structural steel members and on underside of interior steel floor and roof decks, except on following surfaces:
1. Structural steel and underside of steel decks in elevator or dumbwaiter machine rooms.
  2. Steel members in elevator hoist ways.
  3. Areas used as air handling plenums.
  4. Steel to be encased in concrete or designated to receive other type of fireproofing.
- B. Type I:
1. One hour fire rating.
  2. Two hour fire rating.
- C. Type II:
1. One hour fire rating.
  2. Two hour fire rating.

- - - E N D - - -



**SECTION 07 84 00**  
**FIRESTOPPING**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. Closures of openings in walls, floors, and roof decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.
- B. Closure of openings in walls against penetration of gases or smoke in smoke partitions.

**1.2 RELATED WORK**

- A. Expansion and seismic joint firestopping: Section 07 95 13, EXPANSION JOINT COVER ASSEMBLIES.
- B. Spray applied fireproofing: Section 07 81 00, APPLIED FIREPROOFING
- C. Sealants and application: Section 07 92 00, JOINT SEALANTS.
- D. Fire and smoke damper assemblies in ductwork: Section 23 31 00, HVAC DUCTS AND CASINGS.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.
- C. Cutsheets and drawings of FM, UL, or WH systems to be installed and locations.
- D. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials in their original unopened containers with manufacturer's name and product identification.
- B. Store in a location providing protection from damage and exposure to the elements.

**1.5 WARRANTY**

- A. Firestopping work subject to the terms of the Article "Warranty of Construction", FAR clause 52.246-21, except extend the warranty period to five years.

**1.6 QUALITY ASSURANCE**

- A. FM, UL, or WH or other approved laboratory tested products will be acceptable.

## **1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - E84-10.....Surface Burning Characteristics of Building Materials
  - E814-11.....Fire Tests of Through-Penetration Fire Stops
- C. Factory Mutual Engineering and Research Corporation (FM):
  - Annual Issue Approval Guide Building Materials
- D. Underwriters Laboratories, Inc. (UL):
  - Annual Issue Building Materials Directory
  - Annual Issue Fire Resistance Directory
  - 1479-10.....Fire Tests of Through-Penetration Firestops
- E. Warnock Hersey (WH):
  - Annual Issue Certification Listings

## **PART 2 - PRODUCTS**

### **2.1 FIRESTOP SYSTEMS**

- A. Use either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke.
- B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 100 mm (4 in) nominal pipe or 0.01 m<sup>2</sup> (16 sq. in.) in overall cross sectional area.
- C. Products requiring heat activation to seal an opening by its intumescence shall exhibit a demonstrated ability to function as designed to maintain the fire barrier.
- D. Firestop sealants used for firestopping or smoke sealing shall have following properties:
  - 1. Contain no flammable or toxic solvents.
  - 2. Have no dangerous or flammable out gassing during the drying or curing of products.

3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.
  4. When used in exposed areas, shall be capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.
- E. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials shall have following properties:
1. Classified for use with the particular type of penetrating material used.
  2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.
  3. Intumescent products which would expand to seal the opening and act as fire, smoke, toxic fumes, and, water sealant.
- F. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84.
- G. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.
- H. Materials to be asbestos free.

## **2.2 SMOKE STOPPING IN SMOKE PARTITIONS**

- A. Use silicone sealant in smoke partitions as specified in Section 07 92 00, JOINT SEALANTS.
- B. Use mineral fiber filler and bond breaker behind sealant.
- C. Sealants shall have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with E84.
- D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Submit product data and installation instructions, as required by article, submittals, after an on site examination of areas to receive firestopping.

### **3.2 PREPARATION**

- A. Remove dirt, grease, oil, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.
- B. Remove insulation on insulated pipe for a distance of 150 mm (six inches) on either side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.

### **3.3 INSTALLATION**

- A. Do not begin work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.
- B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.
- C. Install smoke stopping seals in smoke partitions.

### **3.4 CLEAN-UP AND ACCEPTANCE OF WORK**

- A. As work on each floor is completed, remove materials, litter, and debris.
- B. Do not move materials and equipment to the next-scheduled work area until completed work is inspected and accepted by the COR.
- C. Clean up spills of liquid type materials.

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**SECTION 07 92 00**  
**JOINT SEALANTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

**1.2 RELATED WORK:**

- A. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.
- B. Glazing: Section 08 80 00, GLAZING.
- C. Sound rated gypsum partitions/sound sealants: Section 09 29 00, GYPSUM BOARD.
- D. Mechanical Work: Section 21 05 11, COMMON WORK RESULTS FOR FIRE SUPPRESSION. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.

**1.3 QUALITY CONTROL:**

- A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.
  - 2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.
  - 3. Test elastomeric joint sealants according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.
  - 4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

- D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer's recommendations:
  - 1. Locate test joints where indicated or, if not indicated, as directed by COR.
  - 2. Conduct field tests for each application indicated below:
    - a. Each type of elastomeric sealant and joint substrate indicated.
    - b. Each type of non-elastomeric sealant and joint substrate indicated.
  - 3. Notify COR seven days in advance of dates and times when test joints will be erected.
  - 4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
- E. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.
- F. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:
  - 1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

**1.4 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's installation instructions for each product used.
- C. Cured samples of exposed sealants for each color where required to match adjacent material.
- D. Manufacturer's Literature and Data:
  - 1. Caulking compound
  - 2. Primers
  - 3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

**1.5 PROJECT CONDITIONS:**

- A. Environmental Limitations:
  - 1. Do not proceed with installation of joint sealants under following conditions:



- a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).
- b. When joint substrates are wet.
- B. Joint-Width Conditions:
  - 1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- C. Joint-Substrate Conditions:
  - 1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

**1.6 DELIVERY, HANDLING, AND STORAGE:**

- A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.
- B. Carefully handle and store to prevent inclusion of foreign materials.
- C. Do not subject to sustained temperatures exceeding 32° C (90° F) or less than 5° C (40° F).

**1.7 DEFINITIONS:**

- A. Definitions of terms in accordance with ASTM C717 and as specified.
- B. Back-up Rod: A type of sealant backing.
- C. Bond Breakers: A type of sealant backing.
- D. Filler: A sealant backing used behind a back-up rod.

**1.8 WARRANTY:**

- A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be extended to two years.
- B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

**1.9 APPLICABLE PUBLICATIONS:**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

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

- C509-06.....Elastomeric Cellular Preformed Gasket and  
Sealing Material.
- C612-10.....Mineral Fiber Block and Board Thermal  
Insulation.
- C717-10.....Standard Terminology of Building Seals and  
Sealants.
- C834-10.....Latex Sealants.
- C919-08.....Use of Sealants in Acoustical Applications.
- C920-10.....Elastomeric Joint Sealants.
- C1021-08.....Laboratories Engaged in Testing of Building  
Sealants.
- C1193-09.....Standard Guide for Use of Joint Sealants.
- C1330-02 (R2007).....Cylindrical Sealant Backing for Use with Cold  
Liquid Applied Sealants.
- D1056-07.....Specification for Flexible Cellular Materials—  
Sponge or Expanded Rubber.
- E84-09.....Surface Burning Characteristics of Building  
Materials.

C. Sealant, Waterproofing and Restoration Institute (SWRI).  
The Professionals' Guide

**PART 2 - PRODUCTS**

**2.1 SEALANTS:**

A. S-1:

1. ASTM C920, polyurethane or polysulfide.
2. Type M.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 20-40

B. S-2:

1. ASTM C920, polyurethane or polysulfide.
2. Type M.
3. Class 25.
4. Grade P.
5. Shore A hardness of 25-40.

C. S-3:

1. ASTM C920, polyurethane or polysulfide.

2. Type S.
3. Class 25, joint movement range of plus or minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-25.
6. Minimum elongation of 700 percent.

D. S-4:

1. ASTM C920 polyurethane or polysulfide.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-40.

E. S-6:

1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class: Joint movement range of plus 100 percent to minus 50 percent.
4. Grade NS.
5. Shore A hardness of 15-20.
6. Minimum elongation of 1200 percent.

F. S-7:

1. ASTM C920, silicone, neutral cure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

G. S-8:

1. ASTM C920, silicone, acetoxycure.
2. Type S.
3. Class 25.
4. Grade NS.
5. Shore A hardness of 25-30.
6. Structural glazing application.

H. S-9:

1. ASTM C920 silicone.
2. Type S.
3. Class 25.
4. Grade NS.

5. Shore A hardness of 25-30.

6. Non-yellowing, mildew resistant.

## **2.2 CAULKING COMPOUND:**

A. C-1: ASTM C834, acrylic latex.

B. C-2: One component acoustical caulking, non drying, non hardening, synthetic rubber.

## **2.3 COLOR:**

A. Sealants used with exposed masonry shall match color of mortar joints.

B. Sealants used with unpainted concrete shall match color of adjacent concrete.

C. Color of sealants for other locations shall be light gray or aluminum, unless specified otherwise.

D. Caulking shall be light gray or white, unless specified otherwise.

## **2.4 JOINT SEALANT BACKING:**

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

## **2.5 FILLER:**

A. Mineral fiber board: ASTM C612, Class 1.

B. Thickness same as joint width.

C. Depth to fill void completely behind back-up rod.

**2.6 PRIMER:**

- A. As recommended by manufacturer of caulking or sealant material.
- B. Stain free type.

**2.7 CLEANERS-NON POUROUS SURFACES:**

- A. Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

**PART 3 - EXECUTION**

**3.1 INSPECTION:**

- A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.
- B. Coordinate for repair and resolution of unsound substrate materials.
- C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

**3.2 PREPARATIONS:**

- A. Prepare joints in accordance with manufacturer's instructions and SWRI.
- B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.
  - 1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.
  - 2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
    - a. Metal.
    - b. Glass.

- c. Porcelain enamel.
  - d. Glazed surfaces of ceramic tile.
- C. Do not cut or damage joint edges.
- D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.
  - 1. Do not leave gaps between ends of sealant backings.
  - 2. Do not stretch, twist, puncture, or tear sealant backings.
  - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.
  - 1. Apply primer prior to installation of back-up rod or bond breaker tape.
  - 2. Use brush or other approved means that will reach all parts of joints.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

### **3.3 BACKING INSTALLATION:**

- A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.
- B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.
- C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.
- D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.
- E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.
- F. Take all necessary steps to prevent three sided adhesion of sealants.

### **3.4 SEALANT DEPTHS AND GEOMETRY:**

- A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.
- B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

### **3.5 INSTALLATION:**

- A. General:

1. Apply sealants and caulking only when ambient temperature is between 5° C and 38° C (40° and 100° F).
  2. Do not use polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.
  3. Do not use sealant type listed by manufacture as not suitable for use in locations specified.
  4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.
  5. Avoid dropping or smearing compound on adjacent surfaces.
  6. Fill joints solidly with compound and finish compound smooth.
  7. Tool joints to concave surface unless shown or specified otherwise.
  8. Finish paving or floor joints flush unless joint is otherwise detailed.
  9. Apply compounds with nozzle size to fit joint width.
  10. Test sealants for compatibility with each other and substrate. Use only compatible sealant.
- B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.
- C. Where gypsum board partitions are of sound rated, fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.
1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.
  2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.
  3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.
  4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. To seal electrical boxes, seal sides and backs.
  5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for sound through control joint.

### **3.6 FIELD QUALITY CONTROL:**

- A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer:
  - 1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    - a. Perform 10 tests for first 300 m (1000 feet) of joint length for each type of elastomeric sealant and joint substrate.
    - b. Perform one test for each 300 m (1000 feet) of joint length thereafter or one test per each floor per elevation.
- B. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.
- C. Inspect tested joints and report on following:
  - 1. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
  - 2. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
  - 3. Whether sealants filled joint cavities and are free from voids.
  - 4. Whether sealant dimensions and configurations comply with specified requirements.
- D. Record test results in a field adhesion test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
- E. Repair sealants pulled from test area by applying new sealants following same procedures used to originally seal joints. Ensure that original sealant surfaces are clean and new sealant contacts original sealant.
- F. Evaluation of Field-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements, will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.



### 3.7 CLEANING:

- A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.
- B. After filling and finishing joints, remove masking tape.
- C. Leave adjacent surfaces in a clean and unstained condition.

### 3.8 LOCATIONS:

- A. Exterior Building Joints, Horizontal and Vertical:
  - 1. Metal to Metal: Type S-1, S-2
  - 2. Metal to Concrete: Type S-1
  - 3. Threshold Setting Bed: Type S-1, S-3, S-4
  - 4. Concrete Expansion and Control Joints: Type S-6
- B. Metal Reglets and Flashings:
  - 1. Flashings to Wall: Type S-6
  - 2. Metal to Metal: Type S-6
- C. Sanitary Joints:
  - 1. Walls to Plumbing Fixtures: Type S-9
  - 2. Counter Tops to Walls: Type S-9
  - 3. Pipe Penetrations: Type S-9
- D. High Temperature Joints over 204 degrees C (400 degrees F):
  - 1. Exhaust Pipes, Flues, Breech Stacks: Type S-7 or S-8
- E. Interior Caulking:
  - 1. Typical Narrow Joint 6 mm, (1/4 inch) or less at Walls and Adjacent Components: Types C-1, C-2.
  - 2. Perimeter of Doors, Windows, Access Panels which Adjoin Concrete or Masonry Surfaces: Types C-1, C-2.
  - 3. Joints at Masonry Walls and Columns, Piers, Concrete Walls or Exterior Walls: Types C-1, C-2.
  - 4. Perimeter of Gypsum Wallboard Walls: Types C-1, C-2.
  - 5. Exposed Isolation Joints at Top of Full Height Walls: Types C-1, C-2.
  - 6. Exposed Acoustical Joint at Sound Rated Partitions Type C-2.
  - 7. Concealed Acoustic Sealant Type S-4, C-1, C-2.

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**SECTION 07 95 13  
EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies floor, wall and ceiling seismic and building expansion joint assemblies.
- B. Types of assemblies:
  - 1. Metal Plate Cover
  - 2. Elastomeric Joint Covers
  - 3. Preformed Elastomeric Sealant Joint

**1.2 RELATED WORK**

- A. Sheet Metal Expansion Joint Seals: Section 07 60 00, FLASHING AND SHEET METAL.
- B. Roof Expansion Joint Cover Assemblies: Section 07 72 00, ROOF ACCESSORIES.
- C. Color of Elastomer Inserts, Filler Strips, Exterior Wall Seals and Metal Finishes: Section 09 06 00, SCHEDULE FOR FINISHES
- D. Steel Plate Expansion Joint Covers: Section 05 50 00, METAL FABRICATIONS.

**1.3 QUALITY ASSURANCE**

- A. Project Conditions:
  - 1. Check actual locations of walls and other construction, to which work must fit, by accurate field measurements before fabrication.
  - 2. Show recorded measurements on final shop drawings.
- B. Fire tests performed by Factory Mutual, Underwriters Laboratories, Inc., Warnock Hersey or other approved independent testing laboratory.

**1.4 DELIVERY STORAGE AND HANDLING**

- A. Take care in handling of materials so as not to injure finished surface and components.
- B. Store materials under cover in a dry and clean location off the ground.
- C. Remove materials which are damaged or otherwise not suitable for installation from job site and replace with acceptable materials.

**1.5 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:

1. Submit copies of manufacturer's current literature and data for each item specified.
2. Clearly indicate movement capability of cover assemblies.
- C. Certificates: Material test reports from approved independent testing laboratory indicating and interpreting test results relative to compliance of fire-rated expansion joint assemblies with requirements specified.
- D. Shop Drawings:
  1. Showing full extent of expansion joint cover assemblies; include large-scale details indicating profiles of each type of expansion joint cover assembly, splice joints between sections, joiners with other type assemblies, special end conditions, anchorages, fasteners, and relationship to adjoining work and finishes.
  2. Include description of materials and finishes and installation instructions.
- E. Samples:
  1. Samples of each type and color of metal finish on metal of same thickness and alloy used in work.
  2. Samples of each type and color of flexible seal used in work.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed form part of this specification to extent referenced. Publications are referred to in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A36/A36M-08.....Structural Steel
  - A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip
  - A283/A283M-07.....Low and Intermediate Tensile Strength Carbon Steel Plates
  - A786/A786M-05(R2009)....Rolled Steel Floor Plates
  - B36/B36M-08.....Brass, Plate, Sheet, Strip, and Rolled Bar
  - B121-01(R2006).....Leaded Brass Plate, Sheet, Strip and Rolled Bar
  - B209M-07.....Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
  - B221M-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes (Metric)

- B455-10.....Copper-Zinc Lead Alloy (Leaded Brass) Extruded  
Shapes
- C864-05.....Dense Elastomeric Compression Seal Gaskets,  
Setting Blocks, and Spacers
- C920-11.....Elastomeric Joint Sealants
- D1187-97 (R2002).....Asphalt Base Emulsions for Use as Protective  
Coatings for Metal
- D2287-96 (R2010).....Non-rigid Vinyl Chloride Polymer and Copolymer  
Molding and Extrusion Compounds
- E119-10.....Fire Tests of Building Construction and  
Materials
- E814-11.....Fire Tests of Through-Penetration Fire Stops
- C. Federal Specifications (Fed. Spec):
- TT-P-645B.....Primer, Paint, Zinc-Molybdate, Alkyd Type
- D. The National Association of Architectural Metal Manufacturers (NAAMM):
- AMP 500 Series.....Metal Finishes Manual.
- E. National Fire Protection Association (NFPA):
- 251-06.....Tests of Fire Endurance of Building  
Construction and Materials
- F. Underwriters Laboratories Inc. (UL):
- 263-11.....Fire Tests of Building Construction and  
Materials

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Structural Steel Shapes: ASTM A36.
- B. Bronze Plate: CDA Alloy, Muntz Metal.
- C. Aluminum:
1. Extruded: ASTM B221, alloy 6063-T5.
  2. Plate and Sheet: ASTM B209, alloy 6061-T6.
- D. Fire Barrier:
1. Designed for indicated or required dynamic structural movement without material degradation or fatigue.
  2. Tested in maximum joint width condition as a component of an expansion joint cover assembly in accordance with UL 263 NFPA 251, or ASTM E119 and E814, including hose steam test at full-rated period.
- E. Zinc-Molybdate Primer: Fed. Spec. TT-P-645.

F. Accessories:

1. Manufacturer's standard anchors, fasteners, set screws, spaces, flexible secondary water stops or seals and filler materials, drain tubes, adhesive and other accessories as indicated or required for complete installations.
2. Compatible with materials in contact.
3. Water stops.

**2.2 FABRICATION**

A. General:

1. Use ceiling and wall expansion joint cover assemblies of same design as floor to wall and floor to floor expansion joint cover assemblies. Unless shown otherwise.
2. Provide expansion joint cover assemblies of design, basic profile, materials and operation indicated required to accommodate joint size variations in adjacent surfaces, and as required for anticipated structural movement.
3. Deliver to job site ready for use and fabricated in as large sections and assemblies as practical. Assemblies identical to submitted and reviewed shop drawings, samples and certificates.
4. Furnish units in longest practicable lengths to minimize number of end joints. Provide mitered corners where joint changes directions or abuts other materials.
5. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections and other assemblies.
6. Fire Performance Characteristics:
  - a. Provide expansion joint cover assemblies identical to those of assemblies whose fire resistance has been determined per ASTM E119 and E814, NFPA 251, or UL 263 including hose stream test at full-rated period.
  - b. Fire rating: Not less than rating of adjacent floor or wall construction.
7. Fire Barrier Systems:
  - a. Material to carry label of approved independent testing laboratory, and be subject to follow-up system for quality assurance.
  - b. Include thermal insulation where necessary, in accordance with above tests, with factory cut miters and transitions.

- c. For joint widths up to and including 150 mm (six inches), supply barrier in lengths up to 15000 mm (50 feet) to eliminate field splicing.
  - d. For joint widths of seven inches and wider, supply barrier 3000 mm (10-foot) modules with overlapping ends for field splicing.
  - e. For joints within enclosed spaces such as chase walls, include 1 mm (0.032-inch) thick galvanized steel cover where conventional expansion joint cover is not used.
- 8. Seal Strip factory - formed and bonded to metal frames and anchor members.
  - 9. Compression Seals: Prefabricate from thermoplastic rubber or dense neoprene to sizes and approximate profiles shown.
- B. Floor-to-Floor Metal Plate Joints:
- 1. Frames on each side of joint designed to support cover plate of design shown.
    - a. Continuous frame designed to finish flush with adjacent floor of profile indicated with seating surface and raised floor rim to accommodate flooring.
    - b. Provide concealed bolt and steel anchors for embedment in concrete.
    - c. Designed for filler materials between raised rim of frame and edge of cover plate where shown.
    - d. Frame and cover plates of some metal where exposed.
      - 1) Design cover plates to support 180 Kg (400 lbs) per 0.3 square meters (1-square foot).
      - 2) Cover plates free of rattle due to traffic.
      - 3) No gaps or budes occur on filler material during design movement of joint.
      - 4) Provide manufacturer's continuous standard flexible vinyl water stop under floor joint cover assemblies.
  - 2. Basis of Design : MM Systems LBSB 1"-6" Bronze.
- C. Floor-to-Wall Metal Plate Joints:
- 1. Provide one frame on floor side of joint only. Provide wall side frame where required by manufacturer's design.
  - 2. Angle Cover Plates: Provide angle cover plates for joints to wall with countersunk flat-head exposed fasteners for securing to wall unless shown otherwise.

3. Space fasteners as recommended by manufacturer.

4. Match cover of adjacent floor to floor cover.

5. Basis of Design: MM Systems LBSBE 1"-6" Bronze.

D. Interior Wall Joint Cover Assemblies:

1. Recess Mounted Metal Cover Plates:

a. Concealed frame for fastening to wall on both sides of joint.

b. Extend cover to lap each side of joint and to permit free movement on both sides.

c. Provide concealed attachment of cover to frame cover in close contact with adjacent finish wall surfaces.

d. Use angle cover plates at intersection of walls.

e. Use smooth surface cover plates matching floor plates.

f. Use expansion fire inserts in fire rated walls, rated same as hour rating of wall.

2. Basis of Design: MM Systems CRS Bronze.

E. Ceiling and Soffit Assemblies:

1. Use wall joint assembly at ceilings and soffits.

**2.3 METAL FINISHES**

A. General:

1. Apply finishes in factory after products are fabricated.

2. Protect finishes on exposed surfaces with protective covering before shipment.

B. Carbon Steel: NAAMM AMP 504, Galvanized 690.

**PART 3 EXECUTION**

**3.1 EXAMINATION**

A. Manufacturer's representative shall make a thorough examination of surfaces receiving work of this section.

B. Before starting installation, notify prime contractor of defects which would affect satisfactory completion of work.

**3.2 PREPARATION**

A. Verify measurements and dimensions at job site and cooperate in coordination and scheduling of work with work of related trades.

B. Give particular attention to installation of items embedded in concrete and masonry so as not to delay job progress.

C. Provide templates to related trade for location of support and anchorage items.



### 3.3 INSTALLATION

- A. Install in accordance with manufacturers installation instructions unless specified otherwise.
- B. Provide anchorage devices and fasteners for securing expansion joint assemblies to in-place construction including threaded fasteners with drilled-in fasteners for masonry and concrete where anchoring members are not embedded in concrete. Provide metal fasteners of type and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.
- C. Perform cutting, drilling and fitting required for installation of expansion joint cover assemblies.
- D. Install joint cover assemblies in true alignment and proper relationship to expansion joint opening and adjoining finished surfaces measured from established lines and levels.
- E. Allow for thermal expansion and contraction of metal to avoid buckling.
- F. Set floor covers at elevations flush with adjacent finished floor materials unless shown otherwise.
- G. Material and method of grouting floor frames set in prepared recesses in accordance with manufacturer's instructions.
- H. Locate wall, ceiling and soffit covers in continuous contact with adjacent surfaces. Securely attach in place with required accessories.
- I. Locate anchors at interval recommended by manufacturer, but not less than 75 mm (3-inches) from each ends, and, not more than 600 mm (24-inches) on centers.
- J. Maintain continuity of expansion joint cover assemblies with end joints held to a minimum and metal members aligned mechanically using splice joints.
- K. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames or plates.
- L. Flush Metal Cover Plates:
  - 1. Secure flexible filler between frames so that it will compress and expand.
  - 2. Adhere flexible filler materials to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- M. Waterstops:

1. Install in conjunction with floor joints and where shown, run continuously to prevent water damage to finish spaces.
2. Provide seal with frame to prevent water leakage.
3. Provide outlet tubes from waterstops to drain to prevent damage to finish spaces.

N. Fire Barriers:

1. Install in compliance with tested assembly.
2. Install in floors and in fire rated walls.
3. Use fire barrier sealant or caulk supplied with system.

O. Sealants:

Install to prevent water and air infiltration.

**3.4 PROTECTION**

- A. Take proper precautions to protect the expansion joint covers from damage after they are in place.
- B. Cover floor joints with plywood where wheel traffic occurs.

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**SECTION 08 11 13**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies steel doors, steel frames and related components.
- B. Terms relating to steel doors and frames as defined in ANSI A123.1 and as specified.

**1.2 RELATED WORK**

- A. Frames fabricated of structural steel: Section 05 50 00, METAL FABRICATIONS.
- B. Aluminum framed sliding doors: Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
- C. Door Hardware: Section 08 71 00, DOOR HARDWARE.
- D. Glazing: Section 08 80 00, GLAZING.
- E. Intrusion Alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM.
- F. Security Monitors: Section 28 51 00, SECURITY CONTROL CENTER.

**1.3 TESTING**

- A. An independent testing laboratory shall perform testing.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturers Literature and Data:
  - 1. Fire rated doors and frames, showing conformance with NFPA 80 and Underwriters Laboratory, Inc., or Intertek Testing Services or Factory Mutual fire rating requirements and temperature rise rating for stairwell doors. Submit proof of temperature rating.
  - 2. Sound rated doors, including test report from Testing Laboratory.
- C. Door and Frame Schedule.

**1.5 SHIPMENT**

- A. Prior to shipment label each door and frame to show location, size, door swing and other pertinent information.
- B. Fasten temporary steel spreaders across the bottom of each door frame.

**1.6 STORAGE AND HANDLING**

- A. Store doors and frames at the site under cover.
- B. Protect from rust and damage during storage and erection until completion.

## 1.7 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):  
L-S-125B.....Screening, Insect, Nonmetallic
- C. Door and Hardware Institute (DHI):  
A115 Series.....Steel Door and Frame Preparation for Hardware,  
Series A115.1 through A115.17 (Dates Vary)
- D. Steel Door Institute (SDI):  
113-01 (R2006).....Thermal Transmittance of Steel Door and Frame  
Assemblies  
128-09.....Acoustical Performance for Steel Door and Frame  
Assemblies
- E. American National Standard Institute:  
A250.8-2003 (R2008).....Specifications for Standard Steel Doors and  
Frames
- F. American Society for Testing and Materials (ASTM):  
A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet, and Strip  
A568/568-M-11.....Steel, Sheet, Carbon, and High-Strength, Low-  
alloy, Hot-Rolled and Cold-Rolled  
A1008-10.....Steel, sheet, Cold-Rolled, Carbon, Structural,  
High Strength Low Alloy and High Strength Low  
Alloy with Improved Formability  
B209/209M-10.....Aluminum and Aluminum-Alloy Sheet and Plate  
B221/221M-12.....Aluminum and Aluminum-Alloy Extruded Bars,  
Rods, Wire, Profiles and Tubes  
D1621-10.....Compressive Properties of Rigid Cellular  
Plastics  
D3656-07.....Insect Screening and Louver Cloth Woven from  
Vinyl Coated Glass Yarns  
E90-09.....Laboratory Measurement of Airborne Sound  
Transmission Loss of Building Partitions
- G. The National Association Architectural Metal Manufacturers (NAAMM):  
Metal Finishes Manual (AMP 500-06)
- H. National Fire Protection Association (NFPA):

80-13.....Fire Doors and Fire Windows

I. Underwriters Laboratories, Inc. (UL):

Fire Resistance Directory

J. Intertek Testing Services (ITS):

Certifications Listings...Latest Edition

K. Factory Mutual System (FM):

Approval Guide

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Stainless Steel: ASTM A167, Type 302 or 304; finish, NAAMM Number 4.
- B. Sheet Steel: ASTM A1008, cold-rolled for panels (face sheets) of doors.
- C. Anchors, Fastenings and Accessories: Fastenings anchors, clips connecting members and sleeves from zinc coated steel.
- D. Insect Screening: ASTM D3656, 18 by 18 regular mesh.
- E. Aluminum Sheet: ASTM B209/209M.
- F. Aluminum, Extruded: ASTM B221/221M.
- G. Prime Paint: Paint that meets or exceeds the requirements of A250.8.

### **2.2 FABRICATION GENERAL**

A. GENERAL:

- 1. Follow ANSI A250.8 for fabrication of standard steel doors, except as specified otherwise. Doors to receive hardware specified in Section 08 71 00, DOOR HARDWARE. Tolerances as per ANSI A250.8. Thickness, 44 mm (1-3/4 inches), unless otherwise shown.
- 2. Close top edge of exterior doors flush and seal to prevent water intrusion.
- 3. When vertical steel stiffeners are used for core construction, fill spaces between stiffeners with mineral fiber insulation.
- B. Standard Duty Doors: ANSI A250.8, Level 1, Full flush seamless design of size and design shown. Use for interior locations only. Do not use for stairwell doors, security doors and detention doors.
- C. Heavy Duty Doors: ANSI A250.8, Level 2, Full flush seamless design of size and design shown. Core construction types a, d, or f, for interior doors, and, types b, c, e, or f, for exterior doors.
- D. Extra Heavy Duty Doors: ANSI A250.8, Level 3, Full flush seamless design of size and design shown. Core construction Types d or f, for interior doors, and Types b, c, e, or f, for exterior doors. Use for detention doors, stairwell doors and security doors. See additional

requirements for detention doors, under paragraph "Custom Hollow Metal Doors.

Core Construction Type	Door Core Description
a	Kraft honeycomb
b	Polyurethane
c	Polystyrene
d	Unitized steel grid
e	Mineral fiberboard
f	Vertical steel stiffeners

E. Smoke Doors:

1. Close top and vertical edges flush.
2. Provide seamless vertical edges.
3. Apply Steel astragal to the meeting stile at the active leaf of pair of doors or double egress doors.
4. Provide clearance at head, jamb and sill as specified in NFPA 80.

F. Fire Rated Doors (Labeled):

1. Conform to NFPA 80 when tested by Underwriters Laboratories, Inc., Inchcape Testing Services, or Factory Mutual for the class of door or door opening shown.
2. Fire rated labels of metal, with raised or incised markings of approving laboratory shall be permanently attached to doors.
3. Close top and vertical edges of doors flush. Vertical edges shall be seamless. Apply steel astragal to the meeting stile of the active leaf of pairs of fire rated doors, except where vertical rod exit devices are specified for both leaves swinging in the same direction.
4. Construct fire rated doors in stairwell enclosures for maximum transmitted temperature rise of 230 °C (450 °F) above ambient temperature at end of 30 minutes of fire exposure when tested in accordance with ASTM E152.

## 2.3 METAL FRAMES

A. General:

1. ANSI A250.8, 1.3 mm (0.053 inch) thick sheet steel, types and styles as shown or scheduled.
  2. Frames for exterior doors: Fabricate from 1.7 mm (0.067 inch) thick galvanized steel conforming to ASTM A525.
  3. Frames for labeled fire rated doors and windows.
    - a. Comply with NFPA 80. Test by Underwriters Laboratories, Inc., Inchcape Testing Services, or Factory Mutual.
    - b. Fire rated labels of approving laboratory permanently attached to frames as evidence of conformance with these requirements.  
Provide labels of metal or engraved stamp, with raised or incised markings.
  4. Frames for doors specified to have automatic door operators; Security doors (Type 36); service window: minimum 1.7 mm (0.067 inch) thick.
  5. Knocked-down frames are not acceptable.
- B. Reinforcement and Covers:
1. ANSI A250.8 for, minimum thickness of steel reinforcement welded to back of frames.
  2. Provide mortar guards securely fastened to back of hardware reinforcements except on lead-lined frames.
- C. Terminated Stops: ANSI A250.8.
- D. Glazed Openings and Panel Opening:
- a. Integral stop on exterior, corridor, or secure side of door.
  - b. Design rabbet width and depth to receive glazing material or panel shown or specified.
- E. Frame Anchors:
1. Floor anchors:
    - a. Where floor fills occur, provide extension type floor anchors to compensate for depth of fill.
    - b. At bottom of jamb use 1.3 mm (0.053 inch) thick steel clip angles welded to jamb and drilled to receive two 6 mm (1/4 inch) floor bolts. Use 50 mm x 50 mm (2 inch by 2 inch) 9 mm by (3/8 inch) clip angle for lead lined frames, drilled for 9 mm (3/8 inch) floor bolts.
    - c. Where mullions occur, provide 2.3 mm (0.093 inch) thick steel channel anchors, drilled for two 6 mm (1/4 inch) floor bolts and frame anchor screws.

- d. Where sill sections occur, provide continuous 1 mm (0.042 inch) thick steel rough bucks drilled for 6 mm (1/4 inch) floor bolts and frame anchor screws. Space floor bolts at 50 mm (24 inches) on center.
- 2. Jamb anchors:
  - a. Locate anchors on jambs near top and bottom of each frame, and at intermediate points not over 600 mm (24 inches) apart, except for fire rated frames space anchors as required by labeling authority.
  - b. Form jamb anchors of not less than 1 mm (0.042 inch) thick steel unless otherwise specified.
  - c. Anchors set in masonry: Use adjustable anchors designed for friction fit against the frame and for extension into the masonry not less than 250 mm (10 inches). Use one of following type:
    - 1) Wire loop type of 5 mm (3/16 inch) diameter wire.
    - 2) T-shape or strap and stirrup type of corrugated or perforated sheet steel.
  - d. Anchors for stud partitions: Either weld to frame or use lock-in snap-in type. Provide tabs for securing anchor to the sides of the studs.
  - e. Anchors for frames set in prepared openings:
    - 1) Steel pipe spacers with 6 mm (1/4 inch) inside diameter welded to plate reinforcing at jamb stops or hat shaped formed strap spacers, 50 mm (2 inches) wide, welded to jamb near stop.
    - 2) Drill jamb stop and strap spacers for 6 mm (1/4 inch) flat head bolts to pass thru frame and spacers.
    - 3) Two piece frames: Subframe or rough buck drilled for 6 mm (1/4 inch) bolts.
  - f. Anchors for observation windows and other continuous frames set in stud partitions.
    - 1) In addition to jamb anchors, weld clip anchors to sills and heads of continuous frames over 1200 mm (4 feet) long.
    - 2) Anchors spaced 600 mm (24 inches) on centers maximum.
  - g. Modify frame anchors to fit special frame and wall construction and provide special anchors where shown or required.

## **2.4 TRANSOM PANELS**

- A. Fabricate panels as specified for flush doors.



- B. Fabricate bottom edge with rabbet stop to fit top of door where no transom bar occurs.

## **2.5 LOUVERS**

### **A. General:**

1. Sight proof type with stationary blades the full thickness of the door.
2. Design lightproof louvers to exclude passage of light but permit free ventilation.
3. Provide insect screen and wire guards at exterior doors, except where doors are located below completely enclosed areaways, the wire guard is not required.

### **B. Fabrication:**

1. Steel louvers 0.8 mm (0.032 inch) thick for interior doors, and 1.3 mm (0.053 inch) inch thick for exterior doors.
2. Fabricate louvers as complete units. Install in prepared cutouts in doors.
3. Weld stationary blades to frames. Weld louvers into door openings.

### **C. Screen frames:**

1. Frame of either extruded aluminum or tubular aluminum.
2. Fabricate frame to hold wire fabric in a channel with a retaining bar anchor and to mount on surface of door with screws.
3. Do not lap frame over louver opening.
4. Miter corners of frame members and join by concealed mechanical fastenings extending about 57 mm (2-1/4 inches) into ends of each member.
5. Drill frame and doors for screw attachment. Space screws 50 mm (2 inches) from end of each leg of frame and not over 300 mm (12 inches) on center between end screws.
6. Finish: Clear anodized finish, 0.4 mils thick.
7. Insect Screens: Fasten insect screens to interior side of doors with retaining bar against door and not exposed to view.
8. Wire Guards:
  - a. Wire fabric shall be wire guard screen as specified.
  - b. Fasten wire guard to exterior side of door with retaining bar against door and not exposed to view.

## **2.6 SHOP PAINTING**

### **A. ANSI A250.8.**

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Plumb, align and brace frames securely until permanent anchors are set.
  - 1. Use triangular bracing near each corner on both sides of frames with temporary wood spreaders at midpoint.
  - 2. Use wood spreaders at bottom of frame if the shipping spreader is removed.
  - 3. Protect frame from accidental abuse.
  - 4. Where construction will permit concealment, leave the shipping spreaders in place after installation, otherwise remove the spreaders after the frames are set and anchored.
  - 5. Remove wood spreaders and braces only after the walls are built and jamb anchors are secured.
- B. Floor Anchors:
  - 1. Anchor the bottom of door frames to floor with two 6 mm (1/4 inch) diameter expansion bolts. Use 9 mm (3/8 inch) bolts on lead lined frames.
  - 2. Power actuated drive pins may be used to secure frame anchors to concrete floors.
- C. Jamb Anchors:
  - 1. Anchors in masonry walls: Embed anchors in mortar. Fill space between frame and masonry wall with grout or mortar as walls are built.
  - 2. Coat frame back with a bituminous coating prior to lining of grout filling in masonry walls.
  - 3. Secure anchors to sides of studs with two fasteners through anchor tabs. Use steel drill screws to steel studs.
  - 4. Frames set in prepared openings of masonry or concrete: Expansion bolt to wall with 6 mm (1/4 inch) expansion bolts through spacers. Where subframes or rough bucks are used, 6 mm (1/4 inch) expansion bolts on 600 mm (24 inch) centers or power activated drive pins 600 mm (24 inches) on centers. Secure two piece frames to subframe or rough buck with machine screws on both faces.
- D. Install anchors for labeled fire rated doors to provide rating as required.
- E. Frames for Sound Rated Doors: Coordinate to line frames for sound rated doors with insulation.

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

F. Overhead Bracing (Lead Lined Frames): Where jamb extensions extend to structure above, anchor clip angles with not less than two, 9 mm (3/8 inch) expansion bolts or power actuated drive pins to concrete slab. Weld to steel overhead members.

### **3.2 INSTALLATION OF DOORS AND APPLICATION OF HARDWARE**

A. Install doors and hardware as specified in Sections Section 08 71 00, DOOR HARDWARE.

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**SECTION 08 14 00**  
**INTERIOR WOOD DOORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies interior flush doors with prefinish, prefit requirement.
- B. Section includes fire rated doors, sound retardant doors, and smoke doors.

**1.2 RELATED WORK**

- A. Metal door frames: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES.
- B. Door hardware including hardware location (height): Section 08 71 00, DOOR HARDWARE.
- C. Installation of doors and hardware: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, Section 08 14 00, WOOD DOORS, or Section 08 71 00, DOOR HARDWARE.
- D. Glazing: Section 08 80 00, GLAZING.
- E. Finish: Section 09 06 00, SCHEDULE FOR FINISHES.
- F. Metal louvers: Section 08 90 00, LOUVERS AND VENTS.
- G. Card readers and biometric devices: Section 28 13 00, ACCESS CONTROL
- H. Intrusion alarm: Section 28 16 11, INTRUSION DETECTION SYSTEM
- I. Security monitors: Section 28 51 00, SECURITY CONTROL CENTER

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Corner section of flush veneered door 300 mm (12 inches) square, showing details of construction, labeled to show grade and type number and conformance to specified standard.
  - 2. Veneer sample 200 mm (8 inch) by 275 mm (11 inch) by 6 mm (1/4 inch) showing specified wood species sanded to receive a transparent finish. Factory finish veneer sample where the prefinished option is accepted.
- C. Shop Drawings:
  - 1. Show every door in project and schedule location in building.
  - 2. Indicate type, grade, finish and size; include detail of glazing louvers, sound gasketing, and pertinent details.

3. Provide information concerning specific requirements not included in the manufacturer's literature and data submittal.

D. Manufacturer's Literature and Data:

1. Sound rated doors, including test report indicating STC rating per ASTM E90 from test laboratory.
2. Labeled fire rated doors showing conformance with NFPA 80.

E. Laboratory Test Reports:

1. Screw holding capacity test report in accordance with WDMA T.M.10.
2. Split resistance test report in accordance with WDMA T.M.5.
3. Cycle/Slam test report in accordance with WDMA T.M.7.
4. Hinge-Loading test report in accordance with WDMA T.M.8.

**1.4 WARRANTY**

- A. Doors are subject to terms of Article titled "Warranty of Construction", FAR clause 52.246-21, except that warranty shall be as follows:
1. For interior doors, manufacturer's warranty for lifetime of original installation.
  2. Specified STC RATING for sound retardant rated door assembly in place.

**1.5 DELIVERY AND STORAGE**

- A. Factory seal doors and accessories in minimum of 6 mill polyethylene bags or cardboard packages which shall remain unbroken during delivery and storage.
- B. Store in accordance with WDMA I.S.1-A, Job Site Information.
- C. Label package for door opening where used.

**1.6 APPLICABLE PUBLICATIONS**

Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. Window and Door Manufacturers Association (WDMA):

- I.S.1A-11.....Architectural Wood Flush Doors
- I.S.4-09.....Water-Repellent Preservative Non-Pressure  
Treatment for Millwork
- I.S.6A-11.....Architectural Wood Stile and Rail Doors
- T.M.6-08.....Adhesive (Glue Bond) Durability Test Method
- T.M.7-08.....Cycle-Slam Test Method
- T.M.8-08.....Hinge Loading Test Method

T.M.10-08.....Screwholding Test Method

C. National Fire Protection Association (NFPA):

80-10.....Protection of Buildings from Exterior Fire

252-08.....Fire Tests of Door Assemblies

D. ASTM International (ASTM):

E90-09.....Laboratory Measurements of Airborne Sound

Transmission Loss

**PART 2 - PRODUCTS**

**2.1 FLUSH DOORS**

A. General:

1. Meet requirements of WDMA I.S.1-A, Extra Heavy Duty.
2. Adhesive: Type II
3. Thickness: 45 mm (1-3/4 inches) unless otherwise shown or specified.

B. Face Veneer:

1. In accordance with WDMA I.S.1-A.
2. One species throughout the project unless scheduled or otherwise shown: Quarter sawn white oak.
3. For transparent finishes: Premium Grade.
  - a. A grade face veneer standard optional.
  - b. AA grade face veneer
  - c. Match face veneers for doors for uniform effect of color and grain at joints.
  - d. Door edges shall be same species as door face veneer except maple may be used for stile face veneer on birch doors.
4. Factory sand doors for finishing.

C. Wood for stops, louvers, muntins and moldings of flush doors required to have transparent finish:

1. Solid Wood of same species as face veneer, except maple may be used on birch doors.
2. Glazing:
  - a. On non-labeled doors use applied wood stops nailed tight on room side and attached on opposite side with flathead, countersunk wood screws, spaced approximately 125 mm (5 inches) on centers.
  - b. Use stainless steel or dull chrome plated brass screws for exterior doors.
3. Wood Louvers:

- a. Door manufacturer's standard product, fabricated of solid wood sections.
  - b. Wood Slats: Not less than 5 mm (3/16 inch) thick.
  - c. Stiles routed out to receive slats.
  - d. Secure louvers in prepared cutouts with wood stops.
- D. Fire rated wood doors:
- 1. Fire Performance Rating:
    - a. "B" label, 1-1/2 hours.
    - b. "C" label, 3/4 hour.
  - 2. Labels:
    - a. Doors shall conform to the requirements of ASTM E2074, or NFPA 252, and, carry an identifying label from a qualified testing and inspection agency for class of door or opening shown designating fire performance rating.
    - b. Metal labels with raised or incised markings.
  - 3. Performance Criteria for Stiles of doors utilizing standard mortise leaf hinges:
    - a. Hinge Loading: WDMA T.M.8. Average of 10 test samples for Extra Heavy Duty doors.
    - b. Direct screw withdrawal: WDMA T.M.10 for Extra Heavy Duty doors. Average of 10 test samples using a steel, fully threaded #12 wood screw.
    - c. Cycle Slam: 1,000,000 cycles with no loose hinge screws or other visible signs of failure when tested in accordance with WDMA T.M.7.
  - 4. Additional Hardware Reinforcement:
    - a. Provide fire rated doors with hardware reinforcement blocking.
    - b. Size of lock blocks as required to secure hardware specified.
    - c. Top, bottom and intermediate rail blocks shall measure not less than 125 mm (five inches) minimum by full core width.
    - d. Reinforcement blocking in compliance with manufacturer's labeling requirements.
    - e. Mineral material similar to core is not acceptable.
  - 5. Other Core Components: Manufacturer's standard as allowed by the labeling requirements.
  - 6. Provide steel frame approved for use in labeled doors for vision panels.



7. Provide steel astragal on pair of doors.

E. Smoke Barrier Doors:

1. For glazed openings use steel frames approved for use in labeled doors.
2. Provide a steel astragal on one leaf of pairs of doors, including double egress doors.

F. Sound Rated Doors:

1. Fabricated as specified for flush wood doors with additional construction requirements to meet specified sound transmission class (STC).
2. STC Rating of the door assembly in place when tested in accordance with ASTM E90 by an independent nationally recognized acoustical testing laboratory not less than 36.
3. Accessories:
  - a. Frame Gaskets: Continuous closed cell sponge neoprene with stop adjusters.
  - b. Automatic Door Bottom Seal:
    - 1) Steel spring operated, closed cell sponge neoprene metal mounted removable in extruded aluminum housing with a medium matte 0.1 mm (4.0 mil) thick clear Anodized finish.
    - 2) Concealed or Surface Mounted.

**2.2 STILE AND RAIL DOORS - NOT USED**

**2.3 PREFINISH, PREFIT OPTION**

- A. Flush doors shall be factory machined to receive hardware, bevels, undercuts, cutouts, accessories and fitting for frame.
- B. Factory fitting to conform to specification for shop and field fitting, including factory application of sealer to edge and routings.
- C. Flush doors to receive transparent finish (in addition to being prefit) shall be factory finished as follows:
  1. WDMA I.S.1-A Section F-3 specification for System TR-4, Conversion Varnish or System TR-5, Catalyzed Vinyl.
  2. Use stain when required to produce the finish specified on drawings.

**2.4 IDENTIFICATION MARK:**

- A. On top edge of door.
- B. Either a stamp, brand or other indelible mark, giving manufacturer's name, door's trade name, construction of door, code date of manufacture and quality.

C. Accompanied by either of the following additional requirements:

1. An identification mark or a separate certification including name of inspection organization.
2. Identification of standards for door, including glue type.
3. Identification of veneer and quality certification.
4. Identification of preservative treatment for stile and rail doors.

## **2.5 SEALING:**

- A. Give top and bottom edge of doors two coats of catalyzed polyurethane or water resistant sealer before sealing in shipping containers.

## **PART 3 - EXECUTION**

### **3.1 DOOR PREPARATION**

- A. Field, shop or factory preparation: Do not violate the qualified testing and inspection agency label requirements for fire rated doors.
- B. Clearances between Doors and Frames and Floors:
1. Maximum 3 mm (1/8 inch) clearance at the jambs, heads, and meeting stiles, and a 19 mm (3/4 inch) clearance at bottom, except as otherwise specified.
  2. Maximum clearance at bottom of sound rated doors, light-proofed doors, doors to operating rooms, and doors designated to be fitted with mechanical seal: 10 mm (3/8 inch).
- C. Provide cutouts for special details required and specified.
- D. Rout doors for hardware using templates and location heights specified in Section, 08 71 00 DOOR HARDWARE.
- E. Fit doors to frame, bevel lock edge of doors 3 mm (1/8 inch) for each 50 mm (two inches) of door thickness undercut where shown.
- F. Immediately after fitting and cutting of doors for hardware, seal cut edges of doors with two coats of water resistant sealer.
- G. Finish surfaces, including both faces, top and bottom and edges of the doors smooth to touch.
- H. Apply a steel astragal on the opposite side of active door on pairs of fire rated doors.
- I. Apply a steel astragal to meeting stile of active leaf of pair of doors or double egress smoke doors.

### **3.2 INSTALLATION OF DOORS APPLICATION OF HARDWARE**

- A. Install doors and hardware as specified in this Section.

### **3.3 DOOR PROTECTION**

- A. As door installation is completed, place polyethylene bag or cardboard shipping container over door and tape in place.
- B. Provide protective covering over knobs and handles in addition to covering door.
- C. Maintain covering in good condition until removal is approved by COR.

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Section specifies access doors or panels.

**1.2 RELATED WORK:**

- A. Lock Cylinders: Section 08 71 00, DOOR HARDWARE.
- B. Access doors in acoustical ceilings: Section 09 51 00, ACOUSTICAL CEILINGS.
- C. Locations of access doors for duct work cleanouts: Section 23 31 00, HVAC DUCTS AND CASINGS.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Access doors, each type, showing construction, location and installation details.
- C. Manufacturer's Literature and Data: Access doors, each type.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A167-99(R-2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
  - A1008-10.....Steel Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy
- C. American Welding Society (AWS):
  - D1.3-08.....Structural Welding Code Sheet Steel
- D. National Fire Protection Association (NFPA):
  - 80-10.....Fire Doors and Windows
- E. The National Association of Architectural Metal Manufacturers (NAAMM):
  - AMP 500 Series.....Metal Finishes Manual
- F. Underwriters Laboratories, Inc. (UL):
  - Fire Resistance Directory

## **PART 2 - PRODUCTS**

### **2.1 FABRICATION, GENERAL**

- A. Fabricate components to be straight, square, flat and in same plane where required.
  - 1. Slightly round exposed edges and without burrs, snags and sharp edges.
  - 2. Exposed welds continuous and ground smooth.
  - 3. Weld in accordance with AWS D1.3.
- B. Number of locks and non-continuous hinges as required to maintain alignment of panel with frame. For fire rated doors, use hinges and locks as required by fire test.
- C. Provide anchors or make provisions in frame for anchoring to adjacent construction. Provide size, number and location of anchors on four sides to secure access door in opening. Provide anchors as required by fire test.

### **2.2 ACCESS DOORS, FIRE RATED:**

- A. Shall meet requirements for "B" label 1-1/2 hours with maximum temperature rise of 120 degree C (250 degrees F).
- B. Comply with NFPA 80 and have Underwriters Laboratories Inc., or other nationally recognized laboratory label for Class B opening.
- C. Door Panel: Form of 0.9 mm (0.0359 inch) thick steel sheet, insulated sandwich type construction.
- D. Frame: Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit material and type of construction where installed. Provide frame flange at perimeter where installed in concrete masonry or gypsum board openings.
  - 1. Weld exposed joints in flange and grind smooth.
  - 2. Provide frame flange at perimeter where installed in concrete masonry or gypsum board.
- E. Automatic Closing Device: Provide automatic closing device for door.
- F. Hinge: Continuous steel hinge with stainless steel pin.
- G. Lock:
  - 1. Self-latching, with provision for fitting flush a standard screw-in type lock cylinder. Lock cylinder specified in Section 08 71 00, DOOR HARDWARE.
  - 2. Provide latch release device operable from inside of door. Mortise case in door.

### **2.3 ACCESS DOORS, FLUSH PANEL:**

#### **A. Door Panel:**

1. Form of 1.9 mm (0.0747 inch) thick steel sheet.
2. Reinforce to maintain flat surface.

#### **B. Frame:**

1. Form of 1.5 mm (0.0598 inch) thick steel sheet of depth and configuration to suit material and type of construction where installed.
2. Provide surface mounted units having frame flange at perimeter where installed in concrete, masonry, or gypsum board construction.
3. Weld exposed joints in flange and grind smooth.

#### **C. Hinge:**

1. Concealed spring hinge to allow panel to open 175 degrees.
2. Provide removable hinge pin to allow removal of panel from frame.

#### **D. Lock:**

1. Flush, screwdriver operated cam lock.
2. Provide tamper proof screws (spanner head locks) for access panels in Psychiatric Areas.

### **2.4 ACCESS DOOR, RECESSED PANEL - NOT USED**

### **2.5 FINISH:**

- A. Provide in accordance with NAAMM AMP 500 series on exposed surfaces.
- B. Steel Surfaces: Baked-on prime coat over a protective phosphate coating.
- C. Stainless Steel: No. 4 for exposed surfaces.

### **2.6 SIZE:**

- A. Minimum 600 mm (24 inches) square door unless otherwise shown or required to suit opening in suspension system of ceiling.

## **PART 3 - EXECUTION**

### **3.1 LOCATION:**

- A. Provide access panels or doors wherever any valves, traps, dampers, cleanouts, and other control items of mechanical, electrical and conveyor work are concealed in wall or partition, or are above ceiling of gypsum board or plaster.
- B. Use fire rated doors in fire rated partitions and ceilings.
- C. Use flush panels in partitions and gypsum board or plaster ceilings, except lay-in acoustical panel ceilings or upward access acoustical tile ceilings.

### **3.2 INSTALLATION, GENERAL:**

- A. Install access doors in openings to have sides vertical in wall installations, and parallel to ceiling suspension grid or side walls when installed in ceiling.
- B. Set frames so that edge of frames without flanges will finish flush with surrounding finish surfaces.
- C. Set frames with flanges to overlap opening and so that face will be uniformly spaced from the finish surface.
- D. Set recessed panel access doors recessed so that face of surrounding materials will finish on the same plane, when finish in door is installed.

### **3.3 ANCHORAGE:**

- A. Secure frames to adjacent construction using anchors attached to frames or by use of bolts or screws through the frame members.
- B. Type, size and number of anchoring device suitable for the material surrounding the opening, maintain alignment, and resist displacement during normal use of access door.
- C. Anchors for fire rated access doors shall meet requirements of applicable fire test.

### **3.4 ADJUSTMENT:**

- A. Adjust hardware so that door panel will open freely.
- B. Adjust door when closed so door panel is centered in the frame.

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**SECTION 08 41 13**  
**ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies aluminum entrance work including storefront construction, hung doors, interior ICU sliding doors, and other components to make a complete assembly.

**1.2 RELATED WORK:**

- A. Glass and Glazing: Section 08 80 00, GLAZING.
- B. Texture and color of finish: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 SUBMITTALS:**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: (1/2 full scale) showing construction, anchorage, reinforcement, and installation details.
- C. Manufacturer's Literature and Data:
  - 1. Doors, each type.
  - 2. Entrance and Storefront construction.
- D. Samples:
  - 1. Door corner section, 450 mm x 450 mm (18 x 18 inches), of each door type specified, showing vertical and top hinge edges.
  - 2. Two samples of anodized aluminum of each color showing finish and maximum shade range.
- E. Manufacturer's Certificates:
  - 1. Stating that aluminum has been given specified thickness of anodizing.
  - 2. Indicating manufacturer's qualifications specified.

**1.4 QUALITY ASSURANCE:**

- A. Approval by Contracting Officer is required of products of proposed manufacturer, or supplier, and will be based upon submission by Contractor certification.
- B. Certify manufacturer regularly and presently manufactures aluminum entrances and storefronts as one of their principal products.

**1.5 DELIVERY, STORAGE AND HANDLING:**

- A. Deliver aluminum entrance and storefront material to the site in packages or containers; labeled for identification with the manufacturer's name, brand and contents.

- B. Store aluminum entrance and storefront material in weather-tight and dry storage facility.
- C. Protect from damage from handling, weather and construction operations before, during and after installation.

#### **1.6 APPLICABLE PUBLICATIONS:**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
  - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
  - E283-04.....Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
  - E331-00(R2009).....Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
  - F468-10.....Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
  - F593-02(R2008).....Stainless Steel Bolts, Hex Cap Screws, and Studs
- C. National Association of Architectural Metal Manufacturers (NAAMM):
  - AMP 500 Series.....Metal Finishes Manual
- D. American Architectural Manufacturer's Association (AAMA):
  - 2604-10.....High Performance Organic Coatings on Architectural Aluminum Extrusions and Panels
- E. American Welding Society (AWS):
  - D1.2-08.....Structural Welding Code Aluminum

#### **1.7 PERFORMANCE REQUIREMENTS - NOT USED**

#### **PART 2 - PRODUCTS**

##### **2.1 MATERIALS:**

- A. Aluminum, ASTM B209 and B221:
  - 1. Alloy 6063 temper T5 for doors and door frames.
  - 2. Alloy 6061 temper T6 for guide tracks for sliding doors and other extruded structural members.

3. For color anodized finish, use aluminum alloy as required to produce specified color.

B. Fasteners:

1. Aluminum: ASTM F468, Alloy 2024.
2. Stainless Steel: ASTM F593, Alloy Groups 1, 2 and 3.

**2.2 FABRICATION:**

- A. Fabricate doors, of extruded aluminum sections not less than 3 mm (0.125 inch) thick. Fabricate glazing beads of aluminum not less than 1.0 mm (0.050 inch) thick.
- B. Accurately form metal parts and accurately fit and rigidly assemble joints, except those joints designed to accommodate movement. Seal joints to prevent leakage of both air and water.
- C. Make welds in aluminum in accordance with the recommended practice AWA D1.2. Use electrodes and methods recommended by the manufacturers of the metals and alloys being welded. Make welds behind finished surfaces so as to cause no distortion or discoloration of the exposed side. Clean welded joints of welding flux and dress exposed and contact surfaces.
- D. Fit and assemble the work at the manufacturer's plant. Mark work that cannot be permanently plant-assembled to assure proper assembly in the field.

**2.3 PROTECTION OF ALUMINUM:**

- A. Isolate aluminum from contact with dissimilar metals other than stainless steel, white bronze, or zinc by any of the following:
  1. Coat the dissimilar metal with two coats of heavy-bodied alkali resistant bituminous paint.
  2. Place caulking compound, or non-absorptive tape, or gasket between the aluminum and the dissimilar metal.
  3. Paint aluminum in contact with mortar, concrete and plaster, with a coat of aluminum paint primer.

**2.4 FRAMES:**

- A. Fabricate doors, frames, mullions, transoms, frames for fixed glass and similar members from extruded aluminum not less than 3 mm (0.125 inch) thick.
- B. Provide integral stops and glass rebates and applied snap-on type trim.
- C. Use concealed screws, bolts and other fasteners. Secure cover boxes to frames in back of all lock strike cutouts.

- D. Fabricate framework with thermal breaks in frames where insulating glass is scheduled and specified under Section 08 80 00, GLAZING.

## **2.5 STILE AND RAIL DOORS:**

- A. Nominal 45 mm (1-3/4 inch) thick, with stile and head rail 90 mm (3-1/2 inches) wide, and bottom rail 250 mm (10 inches) wide.
- B. Construct doors with a system of welded joints or interlocking dovetail joints between stiles and rails. Clamp door together through top and bottom rails with 9 mm (3/8 inch) primed steel rod extending into the stiles, and having a self-locking nut and washer at each end. Reinforce stiles and rails to prevent door distortion when tie rods are tightened. Provide a compensating spring-type washer under each nut to take up any stresses that may develop. Construct joints between rails and stiles to remain rigid and tight when door is operated.

## **2.6 FLUSH PANEL DOORS - NOT USED**

## **2.7 REINFORCEMENT FOR BUILDERS HARDWARE:**

- A. Fabricate from stainless steel plates.
- B. Reinforcing for lock face, flush bolts, concealed holders, concealed or surface mounted closers: 2.66 mm (0.1046 inch) thick.
- C. Reinforcing for all other surface mounted hardware: 1.5 mm (0.0598 inch) thick.

## **2.8 COLUMN COVERS AND TRIM - NOT USED**

## **2.9 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Anodized Aluminum:
  - 1. Clear Finish: Chemically etched medium matte, with clear anodic coating, Class I Architectural, 7 mils thick.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION:**

- A. Allowable Installation Tolerances: Install work plumb and true, in alignment and in relation to lines and grades shown. Variation of 3 mm (1/8 inch) in 2400 mm (eight feet), non-accumulative, is maximum permissible for plumb, level, warp, bow and alignment.
- B. Anchor aluminum frames to adjoining construction at heads, jambs and bottom and to steel supports, and bracing. Anchor frames with stainless steel or aluminum countersunk flathead, expansion bolts or machine screws, as applicable. Use aluminum clips for internal connections of adjoining frame sections.

- C. Where work is installed within masonry or concrete openings, place no parts other than built-in anchors and provision for operating devices located in the floor, until after the masonry or concrete work is completed.

**3.2 ADJUSTING:**

- A. After installation of entrance and storefront work is completed, adjust and lubricate operating mechanisms to insure proper performance.

**3.3 PROTECTION, CLEANING AND REPAIRING:**

- A. Remove all mastic smears and other unsightly marks, and repair any damaged or disfiguration of the work. Protect the installed work against damage or abuse.

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**SECTION 08 51 13**  
**ALUMINUM WINDOWS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Aluminum windows of type and size shown, complete with hardware, related components and accessories.
- B. Types:
  - 1. Fixed

**1.2 DEFINITIONS**

- A. Accessories: Mullions, staff beads, casings, closures, trim, moldings, panning systems, sub-sills, clips anchors, fasteners, weather-stripping, and other necessary components required for fabrication and installation of window units.
- B. Uncontrolled Water: Water not drained to the exterior, or water appearing on the room side of the window.

**1.3 RELATED WORK**

- A. Steel subframes: Section 05 50 00, METAL FABRICATIONS.
- B. Glazing: Section 08 80 00, GLAZING.
- C. Color of finish: Match color of wall panels.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Protect windows from damage during handling and construction operations before, during and after installation.
- B. Store windows under cover, setting upright.
- C. Do not stack windows flat.
- D. Do not lay building materials or equipment on windows.

**1.5 QUALITY ASSURANCE**

- A. Approval by contracting officer is required of products or service of proposed manufacturers and installers.
- B. Approval will be based on submission of certification by Contractor that:
  - 1. Manufacturer regularly and presently manufactures the specified windows as one of its principal products.
  - 2. Installer has technical qualifications, experience, trained personnel and facilities to install specified items.
- C. Provide each type of window produced from one source of manufacture.
- D. Quality Certified Labels or certificate:

1. Architectural Aluminum Manufacturers Association, "AAMA label" affixed to each window indicating compliance with specification.
2. Certificates in lieu of label with copy of recent test report (not more than 4 years old) from an independent testing laboratory and certificate signed by window manufacturer stating that windows provided comply with specified requirements and AAMA 101/I.S.2/A440 for type of window specified.

#### **1.6 SUBMITTAL**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  1. Minimum of 1/2 full scale for each types of windows on project.
  2. Identifying parts of window units by name and kind of metal or material, show construction, locking systems, mechanical operators, trim, installation and anchorages.
  3. Include glazing details and standards for factory glazed units.
- C. Manufacturer's Literature and Data:
  1. Window.
- D. Certificates:
  1. Certificates as specified in paragraph QUALITY ASSURANCE.
  2. Indicating manufacturers and installers qualifications.
  3. Manufacturer's Certification that windows delivered to project are identical to windows tested.
- E. Test Reports:
  1. Copies of test reports as specified in paragraph QUALITY ASSURANCE.
- F. Samples: Provide 150 mm (six-inch) length samples showing finishes, specified.

#### **1.7 WARRANTY**

Warrant windows against malfunctions due to defects in thermal breaks, hardware, materials and workmanship, subject to the terms of Article "WARRANTY OF CONSTRUCTION", FAR clause 52.246-21, except provide 10 year warranty period.

#### **1.8 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.



- B. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
  - 90.1-07.....Energy Standard of Buildings
- C. American Architectural Manufacturers Association (AAMA):
  - 101/I.S.2/A440-11.....Windows, Doors, and Unit Skylights
  - 505-09.....Dry Shrinkage and Composite Performance Thermal Cycling Test Procedures
  - 2605-05.....Superior Performing Organic Coatings on Architectural Aluminum Extrusions and Panels
  - TIR-A8-08.....Structural Performance of Poured and Debridged Framing Systems
- D. American Society for Testing and Materials (ASTM):
  - A653/A653M-09.....Steel Sheet, Zinc Coated (Galvanized), Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-dip Process
  - E 90-09.....Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions
- E. National Fenestration Rating Council (NFRC):
  - NFRC 100-10.....Determining Fenestration Product U-Factors
  - NFRC 200-10.....Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence
- F. National Association of Architectural Metal Manufacturers (NAAMM):
  - AMP 500-06.....Metal Finishes Manual

## **PART 2- PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum Extrusions; Sheet and Plate: AAMA 101/I.S.2/A440.
- B. Sheet Steel, Galvanized: ASTM A653; G90 galvanized coating.
- C. Weather-strips: AAMA 101/I.S.2/A440; except leaf type weather-stripping is not permitted.
- D. Fasteners: AAMA 101/I.S.2/A440. Screws, bolts, nuts, rivets and other fastening devices to be non-magnetic stainless steel.
  - 1. Fasteners to be concealed when window is closed. Where wall thickness is less than 3 mm (0.125 inch) thick, provide backup plates or similar reinforcements for fasteners.

2. Stainless steel self tapping screws may be used to secure Venetian blind hanger clips, vent guide blocks, friction adjuster, and limit opening device.

E. Weather-strips: AAMA 101/I.S.2/A440.

## **2.2 THERMAL AND CONDENSATION PERFORMANCE**

A. Condensation Resistance Factor (CRF): Minimum CRF of C 55.

B. Thermal Transmittance:

1. Maximum U value class for insulating glass windows: 50 ( $U=0.50$ ).
2. Maximum U value class for dual glazed windows: 70 ( $U=0.70$ ), or as required by ASHRAE 90.1.

C. Solar Heat Gain Coefficient (SHGC): SHGC shall comply with State or local energy code requirement.

## **2.3 FABRICATION**

A. Fabrication to exceed or meet requirements of Physical Load Tests, Air Infiltration Test, and Water Resistance Test of AAMA 101/I.S.2/A440.

B. Glazing:

1. Factory.
2. Glaze in accordance with Section 08 80 00, GLAZING.
3. Windows reglazable without dismantling sash framing.
4. Glaze from interior except where not accessible.
5. Provide removable fin type glazing beads.

C. Trim:

1. Trim includes casings, closures, and panning.
2. Fabricate to shapes shown of aluminum not less than 1.6 mm (0.062 inch) thick
3. Extruded or formed sections, straight, true, and smooth on exposed surfaces.
4. Exposed external corners mitered and internal corners coped; fitted with hairline joints.
5. Reinforce 1.6 mm (0.062 inch) thick members with not less than 3 mm (1/8-inch) thick aluminum.
6. Except for strap anchors, provide reinforcing for fastening near ends and at intervals not more than 305 mm (12 inches) between ends.
7. Design to allow unrestricted expansion and contraction of members and window frames.
8. Secure to window frames with machine screws or expansion rivets.

9. Exposed screws, fasteners or pop rivets are not acceptable on exterior of the casing or trim cover system.

D. Thermal-Break Construction:

1. Manufacturer's Standard.
2. Low conductance thermal barrier.
3. Capable of structurally holding sash in position and together.
4. All Thermal Break Assemblies (Pour & Debridge, Insulbar or others) shall be tested as per AAMA TIR A8 and AAMA 505 for Dry Shrinkage and Composite Performance.
5. Location of thermal barrier and design of window shall be such that, in closed position, outside air shall not come in direct contact with interior frame of the window.

E. Mullions: AAMA 101/I.S.2/A440.

F. Subsills and Stools:

1. Fabricate to shapes shown of not less than 2 mm (0.080 inch) thick extruded aluminum.
2. One piece full length of opening with concealed anchors.
3. Sills turned up back edge not less than 6 mm (1/4 inch). Front edge provide with drip.
4. Sill back edge behind face of window frame. Do not extend to interior surface or bridge thermal breaks.
5. Do not perforate for anchorage, clip screws, or other requirements.

**2.4 DOUBLE HUNG WINDOWS - NOT USED**

**2.5 CASEMENT WINDOWS - NOT USED**

**2.6 PROJECTED WINDOWS - NOT USED**

**2.7 DUAL HORIZONTAL SLIDING WINDOWS - NOT USED**

**2.8 SINGLE SASH HORIZONTAL SLIDING WINDOWS - NOT USED**

**2.9 FIXED WINDOWS**

- A. AAMA 101/I.S.2/A440; Type AW-PG100-FW.
- B. AAMA certified product to the AAMA 101/I.S.2/A440. - 11 standard.

**2.10 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Finish exposed aluminum surfaces as follows:
  1. Anodized Aluminum:
    - a. Finish in accordance with AMP 501 letters and numbers.
      - a) AMP 501 and 505.

- b) Fluorocarbon Finish: AAMA 2605, superior performing organic coating.

### **PART 3 - EXECUTION**

#### **3.1 PROTECTION (DISSIMILAR MATERIALS): AAMA 101/I.S.2/A440.**

#### **3.2 INSTALLATION, GENERAL**

- A. Install window units in accordance with manufacturer's specifications and recommendations for installation of window units, hardware, operators and other components of work.
- B. Where type, size or spacing of fastenings for securing window accessories or equipment to building construction is not shown or specified, use expansion or toggle bolts or screws, as best suited to construction material.
1. Provide bolts or screws minimum 6 mm (1/4-inch) in diameter.
  2. Sized and spaced to resist the tensile and shear loads imposed.
  3. Do not use exposed fasteners on exterior, except when unavoidable for application of hardware.
  4. Provide non-magnetic stainless steel Phillips flat-head machine screws for exposed fasteners, where required, or special tamper-proof fasteners.
  5. Locate fasteners to not disturb the thermal break construction of windows.
- C. Set windows plumb, level, true, and in alignment; without warp or rack of frames or sash.
- D. Anchor windows on four sides with anchor clips or fin trim.
1. Do not allow anchor clips to bridge thermal breaks.
  2. Use separate clips for each side of thermal breaks.
  3. Make connections to allow for thermal and other movements.
  4. Do not allow building load to bear on windows.
  5. Use manufacturer's standard clips at corners and not over 600 mm (24 inches) on center.
  6. Where fin trim anchorage is shown build into adjacent construction, anchoring at corners and not over 600 mm (24 inches) on center.
- E. Sills and Stools:
1. Set in bed of mortar or other compound to fully support, true to line shown.
  2. Do not extend sill to inside window surface or past thermal break.

3. Leave space for sealants at ends and to window frame unless shown otherwise.

### **3.3 MULLIONS CLOSURES, TRIM, AND PANNING**

- A. Cut mullion full height of opening and anchor directly to window frame on each side.
- B. Closures, Trim, and Panning: External corners mitered and internal corners coped, fitted with hairline, tightly closed joints.
- C. Secure to concrete or solid masonry with expansion bolts, expansion rivets, split shank drive bolts, or powder actuated drive pins.
- D. Toggle bolt to hollow masonry units. Screwed to wood or metal.
- E. Fasten except for strap anchors, near ends and corners and at intervals not more than 300 mm (12 inches) between.
- F. Seal units following installation to provide weathertight system.

### **3.4 ADJUST AND CLEAN**

- A. Adjust ventilating sash and hardware to provide tight fit at contact points, and at weather-stripping for smooth operation and weathertight closure.
- B. Clean aluminum surfaces promptly after installation of windows, exercising care to avoid damage to protective coatings and finishes.
- C. Remove excess glazing and sealant compounds, dirt, and other substances.
- D. Lubricate hardware and moving parts.
- E. Clean glass promptly after installation of windows. Remove glazing and sealant compound, dirt and other substances.
- F. Except when a window is being adjusted or tested, keep locked in the closed position during the progress of work on the project.

### **3.5 OPERATION DEVICES - NOT USED**

- - - E N D - - -



**SECTION 08 71 00**  
**DOOR HARDWARE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Door hardware and related items necessary for complete installation and operation of doors.

**1.2 RELATED WORK**

- A. Caulking: Section 07 92 00 JOINT SEALANTS.
- B. Application of Hardware: Section 08 14 00, WOOD DOORS, Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, Section 08 17 10, INTEGRATED DOOR ASSEMBLIES, Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS, Section 08 71 13, AUTOMATIC DOOR OPERATORS
- C. Finishes: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Painting: Section 09 91 00, PAINTING.
- E. Card Readers: Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
- F. Electrical: Division 26, ELECTRICAL.
- G. Fire Detection: Section 28 31 00, FIRE DETECTION AND ALARM.

**1.3 GENERAL**

- A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.
- B. Provide rated door hardware assemblies where required by most current version of the International Building Code (IBC).
- C. Hardware for Labeled Fire Doors and Exit Doors: Conform to requirements of NFPA 80 for labeled fire doors and to NFPA 101 for exit doors, as well as to other requirements specified. Provide hardware listed by UL, except where heavier materials, large size, or better grades are specified herein under paragraph HARDWARE SETS. In lieu of UL labeling and listing, test reports from a nationally recognized testing agency may be submitted showing that hardware has been tested in accordance with UL test methods and that it conforms to NFPA requirements.
- D. Hardware for application on metal and wood doors and frames shall be made to standard templates. Furnish templates to the fabricator of these items in sufficient time so as not to delay the construction.
- E. The following items shall be of the same manufacturer, except as otherwise specified:
  - 1. Mortise locksets.
  - 2. Hinges for hollow metal and wood doors.

3. Surface applied overhead door closers.
4. Exit devices.
5. Floor closers.

#### 1.4 WARRANTY

- A. Automatic door operators shall be subject to the terms of FAR Clause 52.246-21, except that the Warranty period shall be two years in lieu of one year for all items except as noted below:
1. Locks, latchsets, and panic hardware: 5 years.
  2. Door closers and continuous hinges: 10 years.

#### 1.5 MAINTENANCE MANUALS

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

#### 1.6 SUBMITTALS

- A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).
- B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

- C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.



2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

#### **1.7 DELIVERY AND MARKING**

A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to COR for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in COR's office until all other similar items have been installed in project, at which time the COR will deliver items on file to Contractor for installation in predetermined locations on the project.

#### **1.8 PREINSTALLATION MEETING**

A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Architect, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer's Representative. Review the following:

1. Inspection of door hardware.
2. Job and surface readiness.
3. Coordination with other work.
4. Protection of hardware surfaces.
5. Substrate surface protection.
6. Installation.
7. Adjusting.
8. Repair.
9. Field quality control.
10. Cleaning.

## 1.9 INSTRUCTIONS

- A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mates, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.
- B. Keying: All cylinders shall be keyed into existing Facility Key System. Provide removable core cylinders that are removable only with a special key or tool without disassembly of knob or lockset. Cylinders shall be 7 pin type. Keying information shall be furnished at a later date by the COR. Provide construction cores for project duration and final cores to be installed after project turn over. Final cylinder cores and keys are to be delivered to VA directly from manufacturer.
- C. Keying:
  - 1. Keying information will be furnished to the Contractor by the COR.
  - 2. Supply information regarding key control of cylinder locks to manufacturers of equipment having cylinder type locks. Notify COR immediately when and to whom keys or keying information is supplied. Return all such keys to the COR.

## 1.10 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.
- B. American Society for Testing and Materials (ASTM):
  - F883-04.....Padlocks
  - E2180-07.....Standard Test Method for Determining the  
Activity of Incorporated Antimicrobial Agent(s)  
In Polymeric or Hydrophobic Materials
- C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
  - A156.1-06.....Butts and Hinges
  - A156.2-03.....Bored and Pre-assembled Locks and Latches
  - A156.3-08.....Exit Devices, Coordinators, and Auto Flush  
Bolts

- A156.4-08.....Door Controls (Closers)
- A156.5-01.....Auxiliary Locks and Associated Products
- A156.6-05.....Architectural Door Trim
- A156.8-05.....Door Controls-Overhead Stops and Holders
- A156.12-05 .....Interconnected Locks and Latches
- A156.13-05.....Mortise Locks and Latches Series 1000
- A156.14-07 .....Sliding and Folding Door Hardware
- A156.15-06.....Release Devices-Closer Holder, Electromagnetic  
and Electromechanical
- A156.16-08.....Auxiliary Hardware
- A156.17-04 .....Self-Closing Hinges and Pivots
- A156.18-06.....Materials and Finishes
- A156.20-06 .....Strap and Tee Hinges, and Hasps
- A156.21-09.....Thresholds
- A156.22-05.....Door Gasketing and Edge Seal Systems
- A156.23-04.....Electromagnetic Locks
- A156.24-03.....Delayed Egress Locking Systems
- A156.25-07 .....Electrified Locking Devices
- A156.26-06.....Continuous Hinges
- A156.28-07 .....Master Keying Systems
- A156.29-07 .....Exit Locks and Alarms
- A156.30-03 .....High Security Cylinders
- A156.31-07 .....Electric Strikes and Frame Mounted Actuators
- A250.8-03.....Standard Steel Doors and Frames
- D. National Fire Protection Association (NFPA):
  - 80-10.....Fire Doors and Fire Windows
  - 101-09.....Life Safety Code
- E. Underwriters Laboratories, Inc. (UL):
  - Building Materials Directory (2008)

## **PART 2 - PRODUCTS**

### **2.1 BUTT HINGES**

- A. ANSI A156.1. Provide only three-knuckle hinges, except five-knuckle where the required hinge type is not available in a three-knuckle version (e.g., some types of swing-clear hinges). The following types of butt hinges shall be used for the types of doors listed, except where otherwise specified:
1. Exterior Doors: Type A2112/A5112 for doors 900 mm (3 feet) wide or less and Type A2111/A5111 for doors over 900 mm (3 feet) wide. Hinges for exterior outswing doors shall have non-removable pins. Hinges for exterior fire-rated doors shall be of stainless steel material.
  2. Interior Doors: Type A8112/A5112 for doors 900 mm (3 feet) wide or less and Type A8111/A5111 for doors over 900 mm (3 feet) wide. Hinges for doors exposed to high humidity areas (shower rooms, toilet rooms, kitchens, janitor rooms, etc. shall be of stainless steel material.
- B. Provide quantity and size of hinges per door leaf as follows:
1. Doors up to 1210 mm (4 feet) high: 2 hinges.
  2. Doors 1210 mm (4 feet) to 2260 mm (7 feet 5 inches) high: 3 hinges minimum.
  3. Doors greater than 2260 mm (7 feet 5 inches) high: 4 hinges.
  4. Doors up to 900 mm (3 feet) wide, standard weight: 114 mm x 114 mm (4-1/2 inches x 4-1/2 inches) hinges.
  5. Doors over 900 mm (3 feet) to 1065 mm (3 feet 6 inches) wide, standard weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
  6. Doors over 1065 mm (3 feet 6 inches) to 1210 mm (4 feet), heavy weight: 127 mm x 114 mm (5 inches x 4-1/2 inches).
  7. Provide heavy-weight hinges where specified.
    8. At doors weighing 330 kg (150 lbs.) or more, furnish 127 mm (5 inch) high hinges.
- C. See Articles "MISCELLANEOUS HARDWARE" and "HARDWARE SETS" for pivots and hinges other than butts specified above and continuous hinges specified below.

### **2.2 CONTINUOUS HINGES**

- A. ANSI/BHMA A156.26, Grade 1-600.
1. Listed under Category N in BHMA's "Certified Product Directory."

- B. General: Minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete
- C. Continuous, Barrel-Type Hinges: Hinge with knuckles formed around a Teflon-coated 6.35mm (0.25-inch) minimum diameter pin that extends entire length of hinge.
  - 1. Base Metal for Exterior Hinges: Stainless steel.
  - 2. Base Metal for Interior Hinges: Steel.
  - 3. Base Metal for Hinges for Fire-Rated Assemblies: Steel.
  - 4. Provide with non-removable pin (hospital tip option) at lockable outswing doors.
  - 5. Where required to clear adjacent casing, trim, and wall conditions and allow full door swing, provide wide throw hinges of minimum width required.
  - 6. Provide with manufacturer's cut-outs for separate mortised power transfers and/or mortised automatic door bottoms where they occur.
  - 7. Where thru-wire power transfers are integral to the hinge, provide hinge with easily removable portion to allow easy access to wiring connections.
  - 8. Where models are specified that provide an integral wrap-around edge guard for the hinge edge of the door, provide manufacturer's adjustable threaded stud and machine screw mechanism to allow the door to be adjusted within the wrap-around edge guard.

### **2.3 DOOR CLOSING DEVICES**

- A. Closing devices shall be products of one manufacturer.

### **2.4 OVERHEAD CLOSERS**

- A. Conform to ANSI A156.4, Grade 1.
- B. Closers shall conform to the following:
  - 1. The closer shall have minimum 50 percent adjustable closing force over minimum value for that closer and have adjustable hydraulic back check effective between 60 degrees and 85 degrees of door opening.
  - 2. Where specified, closer shall have hold-open feature.
  - 3. Size Requirements: Provide multi-size closers, sizes 1 through 6, except where multi-size closer is not available for the required application.

4. Material of closer body shall be forged or cast.
5. Arm and brackets for closers shall be steel, malleable iron or high strength ductile cast iron.
6. Where closers are exposed to the exterior or are mounted in rooms that experience high humidity, provide closer body and arm assembly of stainless steel material.
7. Closers shall have full size metal cover; plastic covers will not be accepted.
8. Closers shall have adjustable hydraulic back-check, separate valves for closing and latching speed, adjustable back-check positioning valve, and adjustable delayed action valve.
9. Provide closers with any accessories required for the mounting application, including (but not limited to) drop plates, special soffit plates, spacers for heavy-duty parallel arm fifth screws, bull-nose or other regular arm brackets, longer or shorter arm assemblies, and special factory templating. Provide special arms, drop plates, and templating as needed to allow mounting at doors with overhead stops and/or holders.
10. Closer arms or backcheck valve shall not be used to stop the door from overswing, except in applications where a separate wall, floor, or overhead stop cannot be used.
11. Provide parallel arm closers with heavy duty rigid arm.
12. Where closers are to be installed on the push side of the door, provide parallel arm type except where conditions require use of top jamb arm.
13. Provide all surface closers with the same body attachment screw pattern for ease of replacement and maintenance.
14. All closers shall have a 1 ½" (38mm) minimum piston diameter.

## **2.5 FLOOR CLOSERS AND FLOOR PIVOT SETS**

- A. Comply with ANSI A156.4. Provide stainless steel floor plates for floor closers and floor pivots, except where metal thresholds occur. Provide cement case for all floor closers. Floor closers specified for fire doors shall comply with Underwriters Laboratories, Inc., requirements for concealed type floor closers for classes of fire doors indicated on drawings. Hold-open mechanism, where required, shall engage when door is opened 105 degrees, except when door swing is limited by building construction or equipment, the hold-open feature shall engage when door

is opened approximately 90 degrees. The hold-open mechanism shall be selectable on/off by turning a screw through the floor plate. Floor closers shall have adjustable hydraulic back-check, adjustable close speed, and adjustable latch speed. Provide closers with delayed action where a hold-open mechanism is not required. Floor closers shall be multi-sized. Single acting floor closers shall also have built in dead stop. Where required, provide closers with special cement cases appropriate for shallow deck installation or where concrete joint lines run through the floor blockout. At offset-hung doors installed in deep reveals, provide special closer arm and spindle to allow for installation. Where stone or terrazzo is applied over the floor closer case, provide closer without floor plate and with extended spindle (length as required) and special cover pan (depth as required) to allow closer to be accessed without damaging the material applied over the closer. Pivots for non-labeled doors shall be cast, forged or extruded brass or bronze.

B. Where floor closer appears in hardware set provide the following as applicable.

1. Double Acting Floor Closers: Type C06012.
2. Single Acting Floor Closer: Type C06021 (center pivoted).  
(Intermediate pivot is not required).
3. Single Acting Floor Closers: Type C06041 (offset pivoted).
4. Single Acting Floor Closer for Labeled Fire Doors: Type C06051  
(offset pivoted).
5. Single Acting Floor Closers For Lead Lined Doors: Type C06071  
(offset pivoted).

## **2.6 DOOR STOPS**

- A. Conform to ANSI A156.16.
- B. Provide door stops wherever an opened door or any item of hardware thereon would strike a wall, column, equipment or other parts of building construction. For concrete, masonry or quarry tile construction, use lead expansion shields for mounting door stops.
- C. Where cylindrical locks with turn pieces or pushbuttons occur, equip wall bumpers Type L02251 (rubber pads having concave face) to receive turn piece or button.
- D. Provide floor stops (Type L02141 or L02161 in office areas; Type L02121 x 3 screws into floor elsewhere. Wall bumpers, where used, must be

installed to impact the trim or the door within the leading half of its width. Floor stops, where used, must be installed within 4-inches of the wall face and impact the door within the leading half of its width.

- E. Where drywall partitions occur, use floor stops, Type L02141 or L02161 in office areas, Type L02121 elsewhere.
- F. Provide stop Type L02011, as applicable for exterior doors. At outswing doors where stop can be installed in concrete, provide stop mated to concrete anchor set in 76mm (3-inch) core-drilled hole and filled with quick-setting cement.
- G. Omit stops where floor mounted door holders are required and where automatic operated doors occur.
- H. Provide appropriate roller bumper for each set of doors (except where closet doors occur) where two doors would interfere with each other in swinging.
- I. Provide appropriate door mounted stop on doors in individual toilets where floor or wall mounted stops cannot be used.
- J. Provide overhead surface applied stop Type C02541, ANSI A156.8 on patient toilet doors in bedrooms where toilet door could come in contact with the bedroom door.
- K. Provide door stops on doors where combination closer magnetic holders are specified, except where wall stops cannot be used or where floor stops cannot be installed within 4-inches of the wall.
- L. Where the specified wall or floor stop cannot be used, provide concealed overhead stops (surface-mounted where concealed cannot be used).

## **2.7 OVERHEAD DOOR STOPS AND HOLDERS**

- A. Conform to ANSI Standard A156.8. Overhead holders shall be of sizes recommended by holder manufacturer for each width of door. Set overhead holders for 110 degree opening, unless limited by building construction or equipment. Provide Grade 1 overhead concealed slide type: stop-only at rated doors and security doors, hold-open type with exposed hold-open on/off control at all other doors requiring overhead door stops.

## **2.8 FLOOR DOOR HOLDERS**

- A. Conform to ANSI Standard A156.16. Provide extension strikes for Types L01301 and L01311 holders where necessary.



## 2.9 LOCKS AND LATCHES

- A. Conform to ANSI A156.2. Locks and latches for doors 45 mm (1-3/4 inch) thick or over shall have beveled fronts. Lock cylinders shall have not less than seven pins. Cylinders for all locksets shall be removable core type. Cylinders shall be furnished with construction removable cores and construction master keys. Cylinder shall be removable by special key or tool. Construct all cores so that they will be interchangeable into the core housings of all mortise locks, rim locks, cylindrical locks, and any other type lock included in the Great Grand Master Key System. Disassembly of lever or lockset shall not be required to remove core from lockset. All locksets or latches on double doors with fire label shall have latch bolt with 19 mm (3/4 inch) throw, unless shorter throw allowed by the door manufacturer's fire label. Provide temporary keying device or construction core of allow opening and closing during construction and prior to the installation of final cores.
- B. In addition to above requirements, locks and latches shall comply with following requirements:
1. Mortise Lock and Latch Sets: Conform to ANSI/BHMA A156.13. Mortise locksets shall be series 1000, minimum Grade 2. All locksets and latchsets, except on designated doors in Psychiatric (Mental Health) areas, shall have lever handles fabricated from cast stainless steel. Provide sectional (lever x rose) lever design matching Facility Standard. No substitute lever material shall be accepted. All locks and latchsets shall be furnished with 122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Lock function F02 shall be furnished with emergency tools/keys for emergency entrance. All lock cases installed on lead lined doors shall be lead lined before applying final hardware finish. Furnish armored fronts for all mortise locks. Where mortise locks are installed in high-humidity locations or where exposed to the exterior on both sides of the opening, provide non-ferrous mortise lock case.
  2. Cylindrical Lock and Latch Sets: levers shall meet ADA (Americans with Disabilities Act) requirements. Cylindrical locksets shall be series 4000 Grade I. All locks and latchsets shall be furnished with

122.55 mm (4-7/8-inch) curved lip strike and wrought box. At outswing pairs with overlapping astragals, provide flat lip strip with 21mm (7/8-inch) lip-to-center dimension. Provide lever design to match design selected by Architect or to match existing lever design. Where two turn pieces are specified for lock F76, turn piece on inside knob shall lock and unlock inside knob, and turn piece on outside knob shall unlock outside knob when inside knob is in the locked position. (This function is intended to allow emergency entry into these rooms without an emergency key or any special tool.)

3. Auxiliary locks shall be as specified under hardware sets and conform to ANSI A156.5.
4. Locks on designated doors in Psychiatric (Mental Health) areas shall be paddle type with arrow projection covers and be UL Listed. Provide these locks with paddle in the down position on both sides of the door. Locks shall be fabricated of wrought stainless steel.
5. Privacy locks in non-mental-health patient rooms shall have an inside thumbturn for privacy and an outside thumbturn for emergency entrance. Single occupancy patient privacy doors shall typically swing out; where such doors cannot swing out, provide center-pivoted doors with rescue hardware (see HW-2B).

## **2.10 PUSH-BUTTON COMBINATION LOCKS**

- A. ANSI/BHMA A156.13, Grade 1. Battery operated pushbutton entry.
- B. Construction: Heavy duty mortise lock housing conforming to ANSI/BHMA A156.13, Grade 1. Lever handles and operating components in compliance with the UFAS and the ADA Accessibility Guidelines. Match lever handles of locks and latchsets on adjacent doors.
- C. Special Features: Key override to permit a master keyed security system and a pushbutton security code activated passage feature to allow access without using the entry code.

## **2.11 ELECTROMAGNETIC LOCKS**

- A. ANSI/BHMA A156.23; electrically powered, of strength and configuration indicated; with electromagnet attached to frame and armature plate attached to door. Listed under Category E in BHMA's "Certified Product Directory."
1. Type: Full exterior or full interior, as required by application indicated.

2. Strength Ranking: 1500 lbf (6672 N).
3. Inductive Kickback Peak Voltage: Not more than 53 V.
4. Residual Magnetism: Not more than 4 lbf (18 N) to separate door from magnet.

B. Delayed-Egress Locks: BHMA A156.24. Listed under Category G in BHMA's "Certified Product Directory".

1. Means of Egress Doors: Lock releases within 15 seconds after applying a force not more than 15 lbf (67 N) for not more than 3 seconds, as required by NFPA 101.
2. Security Grade: Activated from secure side of door by initiating device.
3. Movement Grade: Activated by door movement as initiating device.
4. The lock housing shall not project more than 4-inches (101mm) from the underside of the frame head stop.

## **2.12 ELECTRIC STRIKES**

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

## **2.13 KEYS**

A. Stamp all keys with change number and key set symbol. Furnish keys in quantities as follows:

<b>Locks/Keys</b>	<b>Quantity</b>
Cylinder locks	2 keys each
Cylinder lock change key blanks	100 each different key way
Master-keyed sets	6 keys each
Grand Master sets	6 keys each
Great Grand Master set	5 keys
Control key	2 keys

B. Psychiatric keys shall be cut so that first two bittings closest to the key shoulder are shallow to provide greater strength at point of greatest torque.

## **2.14 KEY CABINET**

A. ANSI Standard A156.5. Provide key cabinet made of cold rolled, 1.2 mm (0.0478 inch) thick furniture steel electro-welded. Doors shall have "no sag" continuous brass-pin piano type hinge and be equipped with chrome plated locking door handles, hook cam and mechanical pushbutton

door lock. Key Cabinet and Key Control System shall accommodate all keys for this project plus 25 percent. Provide minimum number of multiple cabinets where a single cabinet of largest size will not accommodate the required number of keys.

- B. Key tags shall consist of two sets: Permanent self-locking and loan key snaphook type with tag colors as follows: Red fiber marker of the permanent self-locking type approximately 32 mm (1-1/4 inch) in diameter engraved with the legend "FILE KEY MUST NOT BE LOANED." Also furnish for each hook a white cloverleaf key marker with snap-hooks engraved with the legend "LOAN KEY."
- C. The manufacturer of the lock cylinders and locks shall attach a key tag to keys of each lock cylinder and shall mark thereon the respective item number and key change number. Provide each group of keys in a key gathering envelope (supplied by Key Cabinet Manufacturer) in which the lock manufacturer shall include the following information: Item number, key change number and door number. The contractor shall furnish the Key Cabinet Manufacturer the hardware and keying schedules and change keys.
- D. The Key Cabinet Manufacturer shall set up a three-way cross index system, including master keys, listing the keys alphabetically, the hooks numerically and the key changes numerically on different colored index cards. Index cards shall be typewritten and inserted in a durable binder. Attach the keys to the two sets of numbered tags supplied with the cabinet. (The permanent tag and the loan key tag). Instruct the owner in proper use of the system. Install cabinet as directed by the COR.

## **2.15 ARMOR PLATES, KICK PLATES, MOP PLATES AND DOOR EDGING**

- A. Conform to ANSI Standard A156.6.
- B. Provide protective plates as specified below:
  - 1. Kick plates, mop plates and armor plates of metal, Type J100 series.
  - 2. Provide kick plates and mop plates where specified. Kick plates shall be 254 mm (10 inches) or 305 mm (12 inches) high. Mop plates shall be 152 mm (6 inches) high. Both kick and mop plates shall be minimum 1.27 mm (0.050 inches) thick. Provide kick and mop plates beveled on all 4 edges (B4E). On push side of doors where jamb stop extends to floor, make kick plates 38 mm (1-1/2 inches) less than width of door, except pairs of metal doors which shall have plates 25 mm (1 inch) less than width of each door. Extend all other kick

- and mop plates to within 6 mm (1/4 inch) of each edge of doors. Kick and mop plates shall butt astragals. For jamb stop requirements, see specification sections pertaining to door frames.
3. Kick plates and/or mop plates are not required on following door sides:
    - a. Armor plate side of doors;
    - b. Exterior side of exterior doors;
    - c. Closet side of closet doors;
    - d. Both sides of aluminum entrance doors.
  4. Armor plates for doors are listed under Article "Hardware Sets".

Armor plates shall be thickness as noted in the hardware set, 875 mm (35 inches) high and 38 mm (1-1/2 inches) less than width of doors, except on pairs of metal doors. Provide armor plates beveled on all 4 edges (B4E). Plates on pairs of metal doors shall be 25 mm (1 inch) less than width of each door. Where top of intermediate rail of door is less than 875 mm (35 inches) from door bottom, extend armor plates to within 13 mm (1/2 inch) of top of intermediate rail. On doors equipped with panic devices, extend armor plates to within 13 mm (1/2 inch) of panic bolt push bar.
  5. Where louver or grille occurs in lower portion of doors, substitute stretcher plate and kick plate in place of armor plate. Size of stretcher plate and kick plate shall be 254 mm (10 inches) high.
  6. Provide stainless steel edge guards where so specified at wood doors. Provide mortised type instead of surface type except where door construction and/or ratings will not allow. Provide edge guards of bevel and thickness to match wood door. Provide edge guards with factory cut-outs for door hardware that must be installed through or extend through the edge guard. Provide full-height edge guards except where door rating does not allow; in such cases, provide edge guards to height of bottom of typical lockset armor front. Forward edge guards to wood door manufacturer for factory installation on doors.

## **2.16 EXIT DEVICES**

- A. Conform to ANSI Standard A156.3. Exit devices shall be Grade 1; type and function are specified in hardware sets. Provide flush with finished floor strikes for vertical rod exit devices in interior of building. Trim shall have cast satin stainless steel lever handles of

design similar to locksets, unless otherwise specified. Provide key cylinders for keyed operating trim and, where specified, cylinder dogging.

- B. Surface vertical rod panics shall only be provided less bottom rod; provide fire pins as required by exit device and door fire labels. Do not provide surface vertical rod panics at exterior doors.
- C. Concealed vertical rod panics shall be provided less bottom rod at interior doors, unless lockable or otherwise specified; provide fire pins as required by exit device and door fire labels. Where concealed vertical rod panics are specified at exterior doors, provide with both top and bottom rods.
- D. Where removable mullions are specified at pairs with rim panic devices, provide mullion with key-removable feature.
- E. At non-rated openings with panic hardware, provide panic hardware with key cylinder dogging feature.
- F. Exit devices for fire doors shall comply with Underwriters Laboratories, Inc., requirements for Fire Exit Hardware. Submit proof of compliance.

#### **2.17 FLUSH BOLTS (LEVER EXTENSION)**

- A. Conform to ANSI A156.16. Flush bolts shall be Type L24081 unless otherwise specified. Furnish proper dustproof strikes conforming to ANSI A156.16, for flush bolts required on lower part of doors.
- B. Lever extension manual flush bolts shall only be used at non-fire-rated pairs for rooms only accessed by maintenance personnel.
- C. Face plates for cylindrical strikes shall be rectangular and not less than 25 mm by 63 mm (1 inch by 2-1/2 inches).
- D. Friction-fit cylindrical dustproof strikes with circular face plate may be used only where metal thresholds occur.
- E. Provide extension rods for top bolt where door height exceeds 2184 mm (7 feet 2 inches).

#### **2.18 FLUSH BOLTS (AUTOMATIC)**

- A. Conform to ANSI A156.3. Dimension of flush bolts shall conform to ANSI A115. Bolts shall conform to Underwriters Laboratories, Inc., requirements for fire door hardware. Flush bolts shall automatically latch and unlatch. Furnish dustproof strikes conforming to ANSI A156.16 for bottom flushbolt. Face plates for dustproof strike shall be rectangular and not less than 38 mm by 90 mm (1-1/2 by 3-1/2 inches).

- B. At interior doors, provide auto flush bolts less bottom bolt, unless otherwise specified, except at wood pairs with fire-rating greater than 20 minutes; provide fire pins as required by auto flush bolt and door fire labels.

#### **2.19 DOOR PULLS WITH PLATES**

- A. Conform to ANSI A156.6. Pull Type J401, 152 mm (6 inches) high by 19 mm (3/4 inches) diameter with plate Type J302, 90 mm by 350 mm (3-1/2 inches by 14 inches), unless otherwise specified. Provide pull with projection of 70 mm (2 3/4 inches) and a clearance of 51 mm (2 inches). Cut plates of door pull plate for cylinders, or turn pieces where required.

#### **2.20 PUSH PLATES**

- A. Conform to ANSI A156.6. Metal, Type J302, 200 mm (8 inches) wide by 350 mm (14 inches) high. Provide metal Type J302 plates 100 mm (4 inches wide by 350 mm (14 inches) high) where push plates are specified for doors with stiles less than 200 mm (8 inches) wide. Cut plates for cylinders, and turn pieces where required.

#### **2.21 COMBINATION PUSH AND PULL PLATES**

- A. Conform to ANSI 156.6. Type J303, stainless steel 3 mm (1/8 inch) thick, 80 mm (3-1/3 inches) wide by 800 mm (16 inches) high), top and bottom edges shall be rounded. Secure plates to wood doors with 38 mm (1-1/2 inch) long No. 12 wood screws. Cut plates for turn pieces, and cylinders where required. Pull shall be mounted down.

#### **2.22 COORDINATORS**

- A. Conform to ANSI A156.16. Coordinators, when specified for fire doors, shall comply with Underwriters Laboratories, Inc., requirements for fire door hardware. Coordinator may be omitted on exterior pairs of doors where either door will close independently regardless of the position of the other door. Coordinator may be omitted on interior pairs of non-labeled open where open back strike is used. Open back strike shall not be used on labeled doors. Paint coordinators to match door frames, unless coordinators are plated. Provide bar type coordinators, except where gravity coordinators are required at acoustic pairs. For bar type coordinators, provide filler bars for full width and, as required, brackets for push-side surface mounted closers, overhead stops, and vertical rod panic strikes.

## **2.23 THRESHOLDS**

- A. Conform to ANSI A156.21, mill finish extruded aluminum, except as otherwise specified. In existing construction, thresholds shall be installed in a bed of sealant with ¼-20 stainless steel machine screws and expansion shields. In new construction, embed aluminum anchors coated with epoxy in concrete to secure thresholds. Furnish thresholds for the full width of the openings.
- B. For thresholds at elevators entrances see other sections of specifications.
- C. At exterior doors and any interior doors exposed to moisture, provide threshold with non-slip abrasive finish.
- D. Provide with miter returns where threshold extends more than 12 mm (0.5 inch) from frame face.

## **2.24 AUTOMATIC DOOR BOTTOM SEAL AND RUBBER GASKET FOR LIGHT PROOF OR SOUND CONTROL DOORS**

- A. Conform to ANSI A156.22. Provide mortise or under-door type, except where not practical. For mortise automatic door bottoms, provide type specific for door construction (wood or metal).

## **2.25 WEATHERSTRIPS (FOR EXTERIOR DOORS)**

- A. Conform to ANSI A156.22. Air leakage shall not to exceed 0.50 CFM per foot of crack length (0.000774m<sup>3</sup>/s/m).

## **2.26 MISCELLANEOUS HARDWARE**

- A. Access Doors (including Sheet Metal, Screen and Woven Wire Mesh Types): Except for fire-rated doors and doors to Temperature Control Cabinets, equip each single or double metal access door with Lock Type E76213, conforming to ANSI A156.5. Key locks as directed. Ship lock prepaid to the door manufacturer. Hinges shall be provided by door manufacturer.
- B. Cylinders for Various Partitions and Doors: Key cylinders same as entrance doors of area in which partitions and door occur, except as otherwise specified. Provide cylinders to operate locking devices where specified for following partitions and doors:
  - 1. Folding doors and partitions.
  - 2. Wicket door (in roll-up door assemblies).
  - 3. Slide-up doors.
  - 4. Swing-up doors.
  - 5. Fire-rated access doors-Engineer's key set.
  - 6. Doors from corridor to electromagnetic shielded room.
  - 7. Day gate on vault door.



- C. Mutes: Conform to ANSI A156.16. Provide door mutes or door silencers Type L03011 or L03021, depending on frame material, of white or light gray color, on each steel or wood door frame, except at fire-rated frames, lead-lined frames and frames for sound-resistant, lightproof and electromagnetically shielded doors. Furnish 3 mutes for single doors and 2 mutes for each pair of doors, except double-acting doors. Provide 4 mutes or silencers for frames for each Dutch type door. Provide 2 mutes for each edge of sliding door which would contact door frame.

**2.27 PADLOCKS FOR VARIOUS DOORS, GATES AND HATCHES - NOT USED**

**2.28 THERMOSTATIC TEMPERATURE CONTROL VALVE CABINETS - NOT USED**

**2.29 HINGED WIRE GUARDS (FOR WINDOWS, DOORS AND TRANSOMS) AND WIRE PARTITION DOORS - NOT USED**

**2.30 FINISHES**

- A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.
- B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.
- C. Miscellaneous Finishes:
1. Hinges --exterior doors: 626 or 630.
  2. Hinges --interior doors: 652 or 630.
  3. Pivots: Match door trim.
  4. Door Closers: Factory applied paint finish. Dull or Satin Aluminum color.
  5. Thresholds: Mill finish aluminum.
  6. Cover plates for floor hinges and pivots: 630.
  7. Other primed steel hardware: 600.
- D. Hardware Finishes for Existing Buildings: U.S. Standard finishes shall match finishes of hardware in (similar) existing spaces except where otherwise specified.
- E. Special Finish: Exposed surfaces of hardware for dark bronze anodized aluminum doors shall have oxidized oil rubbed bronze finish (dark bronze) finish on door closers shall closely match doors.
- F. Anti-microbial Coating: All hand-operated hardware (levers, pulls, push bars, push plates, paddles, and panic bars) shall be provided with an

anti-microbial/anti-fungal coating that has passed ASTM E2180 tests. Coating to consist of ionic silver (Ag<sup>+</sup>). Silver ions surround bacterial cells, inhibiting growth of bacteria, mold, and mildew by blockading food and respiration supplies.

### 2.31 BASE METALS

- A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

## PART 3 - EXECUTION

### 3.1 HARDWARE HEIGHTS

- A. For existing buildings locate hardware on doors at heights to match existing hardware. The Contractor shall visit the site, verify location of existing hardware and submit locations to VA COR for approval.
- B. Hardware Heights from Finished Floor:
- Exit devices centerline of strike (where applicable) 1024 mm (40-5/16 inches).
  - Locksets and latch sets centerline of strike 1024 mm (40-5/16 inches).
  - Deadlocks centerline of strike 1219 mm (48 inches).
  - Hospital arm pull 1168 mm (46 inches) to centerline of bottom supporting bracket.
  - Centerline of door pulls to be 1016 mm (40 inches).
  - Push plates and push-pull shall be 1270 mm (50 inches) to top of plate.
  - Push-pull latch to be 1024 mm (40-5/16 inches) to centerline of strike.
  - Locate other hardware at standard commercial heights. Locate push and pull plates to prevent conflict with other hardware.

### 3.2 INSTALLATION

- A. Closer devices, including those with hold-open features, shall be equipped and mounted to provide maximum door opening permitted by building construction or equipment. Closers shall be mounted on side of door inside rooms, inside stairs, and away from corridors. At exterior doors, closers shall be mounted on interior side. Where closers are

mounted on doors they shall be mounted with sex nuts and bolts; foot shall be fastened to frame with machine screws.

B. Hinge Size Requirements:

Door Thickness	Door Width	Hinge Height
45 mm (1-3/4 inch)	900 mm (3 feet) and less	113 mm (4-1/2 inches)
45 mm (1-3/4 inch)	Over 900 mm (3 feet) but not more than 1200 mm (4 feet)	125 mm (5 inches)
35 mm (1-3/8 inch) (hollow core wood doors)	Not over 1200 mm (4 feet)	113 mm (4-1/2 inches)

C. Hinge leaves shall be sufficiently wide to allow doors to swing clear of door frame trim and surrounding conditions.

D. Where new hinges are specified for new doors in existing frames or existing doors in new frames, sizes of new hinges shall match sizes of existing hinges; or, contractor may reuse existing hinges provided hinges are restored to satisfactory operating condition as approved by COR. Existing hinges shall not be reused on door openings having new doors and new frames. Coordinate preparation for hinge cut-outs and screw-hole locations on doors and frames.

E. Hinges Required Per Door:

Doors 1500 mm (5 ft) or less in height	2 butts
Doors over 1500 mm (5 ft) high and not over 2280 mm (7 ft 6 in) high	3 butts
Doors over 2280 mm (7 feet 6 inches) high	4 butts
Dutch type doors	4 butts
Doors with spring hinges 1370 mm (4 feet 6 inches) high or less	2 butts
Doors with spring hinges over 1370 mm (4 feet 6 inches)	3 butts

F. Fastenings: Suitable size and type and shall harmonize with hardware as to material and finish. Provide machine screws and lead expansion shields to secure hardware to concrete, ceramic or quarry floor tile, or solid masonry. Fiber or rawl plugs and adhesives are not permitted. All fastenings exposed to weather shall be of nonferrous metal.

G. After locks have been installed; show in presence of COR that keys operate their respective locks in accordance with keying requirements.

(All keys, Master Key level and above shall be sent Registered Mail to the Medical Center Director along with the bitting list. Also a copy of the invoice shall be sent to the COR for his records.) Installation of locks which do not meet specified keying requirements shall be considered sufficient justification for rejection and replacement of all locks installed on project.

### **3.3 FINAL INSPECTION**

- A. Installer to provide letter to the COR that upon completion, installer has visited the Project and has accomplished the following:
  - 1. Re-adjust hardware.
  - 2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
  - 3. Identify items that have deteriorated or failed.
  - 4. Submit written report identifying problems.

### **3.4 DEMONSTRATION**

- A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of COR and VA Locksmith.

### **3.5 HARDWARE SETS**

- A. Following sets of hardware correspond to hardware symbols shown on drawings. Only those hardware sets that are shown on drawings will be required. Disregard hardware sets listed in specifications but not shown on drawings.
- B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets. The numbers shown in the following sets come from BHMA standards.

#### **ELECTRIC HARDWARE ABBREVIATIONS LEGEND:**

ADO = Automatic Door Operator

EMCH = Electro-Mechanical Closer-Holder

MHO = Magnetic Hold-Open (wall- or floor-mounted)

### **INTERIOR SINGLE DOORS**

HW-1

Each Door to Have:

NON-RATED

1	Continuous Hinge	
1	Door Pull w/ Plate	J401 x J302
1	Push Plate	J302
1	Kick Plate	J102
1	Mop Plate (@ Inswing Doors)	J103
1	Closer	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
3	Silencers	L03011

HW-1B

Each Door to Have:

NON-RATED/RATED

2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X SWING-CLEAR X ADJUSTA-SCREWS
1	Hospital Latch	F01 x PADDLES POINTING DOWN
2	Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Overhead Stop	C01541-ADJUSTABLE
1	Set Seals	R0Y164
1	Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT

NO CLOSER REQUIRED DUE TO EXEMPTION FOR PATIENT ROOM DOORS.

HW-1K

Each Door to Have:

NON-RATED

2	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL
		X ADJUSTA-SCREWS
1	Hospital Latch	F01 x PADDLES POINTING DOWN
1	Closer	C02011/C02021
2	Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Overhead Stop	C01541-ADJUSTABLE
2	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154
1	Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT

HW-2

Each Door to Have:

RATED/NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Keyed Privacy Indicator Lock	F13 x OCCUPANCY INDICATOR
1	Closer	C02011/C02021
1	Kick Plate	J102
1	Mop Plate (@ Inswing Doors)	J103
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

STONE THRESHOLD BY OTHER TRADES.

HW-2H

Each Door to Have:

NON-RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Hospital Privacy Latch	F02-MOD x TURNPIECE BOTH SIDES X OCCUPANCY INDICATOR
1 Kick Plate	J102
1 Mop Plate (@ Inswing Doors)	J103
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Overhead Stop	C01541-ADJUSTABLE
3 Silencers	L03011

STONE THRESHOLD BY OTHER TRADES.

HW-3E

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
1 Coat Hook	L03121

OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.

HW-3G

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Office Lock	F04
1 Floor Stop	L02121 x 3 FASTENERS
1 Coat Hook	L03121
1 Door Viewer (Mental Health Only)	L03221 - 190° (VIEW INTO CORRIDOR)
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154

OMIT VIEWER IF DOOR PROVIDED WITH VISION LITE.

OMIT COAT HOOK WHERE GLASS LITE PREVENTS INSTALLATION.

HW-4E

Each Door to Have:

NON-RATED/RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Utility Lock	F09
1 Closer (@ rated doors)	C02011/C02021
1 Closer (@ non-rated doors)	CO2051/CO2061
2 Kick Plate	J102
2 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
2 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
1 Set Auto Flush Bolts	TYPE 25 LESS BOTTOM BOLT



HW-4F

Each Door to Have:

RATED

1	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Utility Lock	F09
1	Closer	C02011/C02021
1	Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1	Floor Stop (@ Outswing Doors)	L02121 x 3 FASTENERS
1	Wall Stop (@ Inswing Doors)	L02101 CONVEX
1	Set Self-Adhesive Seals	R0Y154

HW-4G

Each Door to Have:

RATED/NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Utility Lock	F09
1	Closer (@ Rated Doors)	C02011/C02021
1	Kick Plate	J102
1	Floor Stop	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-4J

Each Door to Have:

RATED/NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Utility Lock	F09
1	Closer (@ Rated Doors)	C02011/C02021
1	Kick Plate	J102
1	Floor Stop	L02121 x 3 FASTENERS
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

HW-4K

Each Door to Have:

NON-RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Utility Lock	F09
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-5B

Each Door to Have:

RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Storeroom Lock	F07
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-5D

Each Door to Have:

NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Storeroom Lock	F07
1 Kick Plate	J102 (@ STORAGE, EVM, & HAC ROOMS ONLY)
1 Floor Stop (@ Inswing Doors)	L02121 x 3 FASTENERS
1 Wall Stop (@ Outswing Doors)	L02101 CONVEX
3 Silencers	L03011

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

HW-5G

Each Door to Have:

NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Storeroom Lock	F07
1	Kick Plate	J102
1	Floor Stop	L02121 x 3 FASTENERS
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

HW-6G

Each Door to Have:

NON-RATED

	Hinges	QUANTITY & TYPE AS REQUIRED
1	Exit Device	TYPE 1 F13 LEVER
1	Key Cylinder	TYPE AS REQUIRED
1	Closer	C02011/C02021
1	Floor Stop	L02121 x 3 FASTENERS
1	Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1	Auto Door Bottom	R0Y346 - HEAVY DUTY
2	Sets Self-Adhesive Seals	R0Y154

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

HW-11B

Each Pair to Have:

RATED

2	Continuous Hinges	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25
1	Storeroom Lock	F07
1	Coordinator	TYPE 21A
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2	Closers	C02011/C02021
2	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Floor Stops	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-12C

Each [MHO] Pair Integrated Double Egress Doors to Have: RATED

ALL HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

HW-13

Each ICU Entrance to Have:

NON-RATED

ALL HARDWARE BY ICU ENTRANCE MANUFACTURER.

HW-E8

Each Pair to Have:

NON-RATED

2	Continuous Hinge	
1	Set Auto Flush Bolts	TYPE 25
1	Dust Proof Strike	L04021
1	Storeroom Lock	F13-MOD x RIGID OUTSIDE LEVER x KEY RETRACTS DEADBOLT AND LATCHBOLT
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
1	Coordinator	TYPE 21A
2	Closer	C02011/C02021
2	Armor Plate	J101 x 3.125 MM (0.125 INCH) THICKNESS
2	Floor Stop	L02121 x 3 FASTNERS
1	Threshold (outswing door)	J32120 x SILICONE GASKET
1	Threshold (inswing door)	ALUMINUM, PER ARCHITECTURAL DETAIL
2	Door Sweep	R0Y416
1	Set Frame Seals	R0Y164
1	Drip	R0Y976

HW-SH-3

Each [AC, EL, REX, DPS] Door to Have:

RATED/NON-RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Transfer Hinge	4-WIRE TYPE AS REQUIRED
1 Electrified Lock	F07 (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 MM WIDTH (2-1/4 INCHES)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
1 Alarm Contact	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.  
CARD READER BY DIVISION 28.

HW-SH-3C

Each [PB] Door to Have:

NON-RATED/RATED

1 Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1 Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1 Closer	C02011/C02021
1 Armor Plate	J101 x 1.275 MM (0.050 INCH) THICKNESS
1 Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
1 Floor Stop	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154

HW-SH-3E

Each [AC, EL, REX, DPS] Door to Have:

RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Transfer Hinge	4-WIRE TYPE AS REQUIRED
1 Electrified Occupancy Indicator Lock	F13-MODIFIED (E01-REX, E06) 24VDC X OCCUPANCY INDICATOR X KEY RETRACTS LATCHBOLT AND DEADBOLT X INTERNAL DEADBOLT MONITOR SWITCH
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Closer	C02011/C02021
1 Floor Stop	L02121 x 3 FASTENERS
1 Threshold	J32300 x 57 mm width (2-1/4 inches)
1 Auto Door Bottom	R0Y346 - HEAVY DUTY
2 Sets Self-Adhesive Seals	R0Y154
1 Alarm Contact	

INTERNAL DEADBOLT MONITOR SWITCH SHUNTS ACCESS CONTROL DEVICE WHEN DEADBOLT IS THROWN.  
120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.  
CARD READER BY DIVISION 28.

HW-SH-4

Each [AC, EL, REX, DPS] Integrated Door to Have:

RATED

1 Key Cylinder	TYPE AS REQUIRED
----------------	------------------

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

HW-SH-9

Each [AC, EL, REX, DPS] Pair to Have:

RATED

Hinges	QUANTITY & TYPE AS REQUIRED
1 Transfer Hinge	4-WIRE TYPE AS REQUIRED
1 Set Auto Flush Bolts	TYPE 25
1 Dust Proof Strike	L04021
1 Electrified Lock	F07 (E01-REX, E06) 24VDC
1 Power Supply	REGULATED, FILTERED, 24VDC, AMPERAGE AS REQUIRED
1 Coordinator	TYPE 21A
1 Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2 Closers	C02011/C02021
2 Kick Plates	J102 (@ STORAGE ROOMS ONLY)
2 Floor Stops	L02121 x 3 FASTENERS
1 Set Self-Adhesive Seals	R0Y154
2 Alarm Contacts	

120VAC POWER, CONDUIT, AND WIRING BY DIVISION 26.  
CARD READER BY DIVISION 28.



HW-SH-9A

Each [PB] Pair to Have:

RATED

2	Continuous Hinge	x INTEGRAL HINGE GUARD CHANNEL X ADJUSTA-SCREWS
1	Set Auto Flush Bolts	TYPE 25
1	Dust Proof Strike	L04021
1	Push-button Combination Lock	N3 - A156.13 F07 G1 E06
1	Coordinator	TYPE 21A
1	Overlapping Astragal with Self-Adhesive Seal	R0Y634 x R0Y154 x THRU-BOLTS
2	Closers	C02011/C02021
2	Armor Plates	J101 x 1.275 MM (0.050 INCH) THICKNESS
2	Edge Guard (@ Wood Doors)	J208M / J211 (VERIFY), CUT: HARDWARE
2	Floor Stops	L02121 x 3 FASTENERS
1	Set Self-Adhesive Seals	R0Y154

HW-SH-10A

Each [AC, ADO, EL, REX, DPS] Pair Integrated Doors to Have:

RATED

1 Key Cylinder TYPE AS REQUIRED

BALANCE OF HARDWARE BY SECTION 08 17 10, INTEGRATED DOOR ASSEMBLIES.

AUTOMATIC DOOR OPERATORS AND CONTROLS BY SECTION 08 71 13, AUTOMATIC DOOR OPERATORS.

- - - E N D - - -



**SECTION 08 71 13**  
**AUTOMATIC DOOR OPERATORS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies equipment, controls and accessories for automatic operation of swing and sliding doors.

**1.2 RELATED WORK**

- A. Aluminum frames entrance work; Section 08 41 13, ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS.
- B. Door hardware; Section 08 71 00, DOOR HARDWARE.
- C. Section 28 13 00, ACCESS CONTROL.
- D. Glass and glazing of doors and frames; Section 08 80 00, GLAZING.
- E. Electric general wiring, connections and equipment requirements; Division 26, ELECTRICAL.
- F. Section 28 31 00, FIRE DETECTION AND ALARM.

**1.3 QUALITY ASSURANCE**

- A. Automatic door operators, controls and other equipment shall be products of a manufacturer regularly engaged in manufacturing such equipment for a minimum of three years.
- B. One type of automatic door equipment shall be used throughout the building.
- C. Equipment installer shall have specialized experience and shall be approved by the manufacturer.

**1.4 WARRANTY**

- A. Automatic door operators shall be subject to the terms of the "Warranty of Construction", FAR clause 52.246-21, except that the Warranty period shall be two years in lieu of one year.

**1.5 MAINTENANCE MANUALS**

- A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on automatic door operators.

**1.6 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's literature and data describing operators, power units, controls, door hardware and safety devices.

C. Shop Drawings:

1. Showing location of controls and safety devices in relationship to each automatically operated door.
2. Showing layout, profiles, product components, including anchorage, accessories, as applicable.
3. Submit templates, wiring diagrams, fabrication details and other information to coordinate the proper installation of the automatic door operators.

D. Submit in writing to COR that items listed in Article 1.3 are in compliance.

**1.7 DESIGN CRITERIA**

- A. As a minimum automatic door equipment shall comply with the requirements of BHMA 156.10. Except as otherwise noted on drawings, provide operators which will move the doors from the fully closed to fully opened position in five seconds maximum time interval, when speed adjustment is at maximum setting.
- B. Equipment: Conforming to UL 325. Provide key operated power disconnect wall switch for each door installation.
- C. Electrical Wiring, Connections and Equipment: Provide all motor, starter, controls, associated devices, and interconnecting wiring required for the installation. Equipment and wiring shall be as specified in Division 26, ELECTRICAL.

**1.8 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Builders Hardware Manufacturers Association, Inc. (BHMA):  
A156.10-05.....Power Operated Pedestrian Doors (BHMA 1601)
- C. National Fire Protection Association (NFPA):  
101-09.....Life Safety Code
- D. Underwriters Laboratory (UL):  
325-10.....Door, Drapery, Gate, Louver, and Window  
Operators and Systems

**1.9 DELIVERY AND STORAGE**

- A. Delivery shall be in factory's original, unopened, undamaged container with identification labels attached.

## **PART 2 - PRODUCTS**

### **2.1 SWING DOOR OPERATORS**

- A. General: Swing door operators shall be of institutional type, door panel size 600 mm to 1250 mm (2'-0" to 5'-0") width, weight not to exceed 300 kg (600 pounds), electric operated for overhead mounting within the header or transom. Furnish metal mounting supports, brackets and other accessories necessary for the installation of operators at the head of the door frames. The motor on automatic door operator shall be provided with an interlock so that the motor will not operate when doors are electrically locked from opening.
- B. Operators shall have checking mechanism providing cushioning action at last part of door travel, in both opening and closing cycle. Operators shall be capable of recycling doors instantaneously to full open position from any point in the closing cycle when control switch is activated. Operators shall, when automatic power is interrupted or shut-off, permit doors to easily open manually without damage to automatic operator system.
- C. Operator, enclosed in housing, shall open door by energizing motor and shall stop by electrically reducing voltage and stalling motor against mechanical stop. Door shall close by means of spring energy, and close force shall be controlled by gear system and motor being used as dynamic break without power, or controlled by hydraulic closer in electro-hydraulic operators. System shall operate as manual door control in event of power failure. Opening and closing speeds shall be adjustable:
  - 1. Operator Housing: Housing shall be a minimum of 112 mm (4-1/2 inches) wide by 140 mm (5.5 inches) high aluminum extrusions with enclosed end caps for application to 100 mm (4 inches) and larger frame systems. All structural sections shall have a minimum thickness of 3.2 mm (0.125 inch) and be fabricated of a minimum of 6063-T5 aluminum alloy.
  - 2. Power Operator: Completely assembled and sealed unit which shall include gear drive transmission, mechanical spring and bearings, all located in aluminum case and filled with special lubricant for extreme temperature conditions. Complete unit shall be rubber mounted with provisions for easy maintenance and replacement, without removing door from pivots or frame.

3. Connecting hardware shall have drive arm attached to door with a pin linkage rotating in a self-lubricating bearing. Door shall not pivot on shaft of operator.
4. Electrical Control: Operator shall have a self contained electrical control unit, including necessary transformers, relays, rectifiers, and other electronic components for proper operation and switching of power operator. All connecting harnesses shall have interlocking plugs.

## **2.2 MICROPROCESSOR CONTROLS**

- A. The system shall include a multi-function microprocessor control providing adjustable hold open time (1-30 seconds), LED indications for sensor input signals and operator status and power assist close options. Control shall be capable of receiving activation signals from any device with normally open dry contact output. All activation modes shall provide fully adjustable opening speed:
- B. The door shall be held open by low voltage applied to the continuous duty motor. The control shall include an adjustable safety circuit that monitors door operation and stops the opening direction of the door if an obstruction is sensed. The motor shall include a recycle feature that reopens the door if an obstruction is sensed at any point during the closing cycle. The control shall include a standard three position key switch with functions for ON, OFF, and HOLD OPEN, mounted on operator enclosure, door frame, or wall, as indicated in the architectural drawings.

## **2.3 SLIDING DOOR OPERATORS - NOT USED**

## **2.4 POWER UNITS**

Each power unit shall be self-contained, electric operated and independent of the door operator. Capacity and size of power circuits shall be in accordance with automatic door operator manufacturer's specifications and Division 26 - ELECTRICAL.

## **2.5 DOOR CONTROLS**

- A. Opening and closing actions of doors shall be actuated by controls and safety devices specified, and conform to ANSI 156.10. Controls shall cause doors to open instantly when control device is actuated; hold doors in open positions; then, cause doors to close, unless safety device or reactivated control interrupts operation.
- B. Manual Controls:

1. Push Plate Wall Switch: Recess type, stainless steel push plate minimum 100 mm by 100 mm (four-inch by four-inch), with 13 mm (1/2-inch) high letters "To Operate Door--Push" engraved on face of plate.

C. Motion Detector: The motion detector may be surface mounted or concealed, to provide a signal to actuate the door operator, and monitor the immediate zone, to detect intrusion by persons, carts or similar objects. The zone which the detector monitors shall be 1500 mm (five feet) deep and 1500 mm (five feet) across, plus or minus 150 mm (six inches) on all dimensions. The maximum response time shall be no less than 25 milliseconds. Unit shall be designed to operate on 24 volts AC. The control shall not be affected by cleaning material, solvents, dust, dirt and outdoor weather conditions.

## **2.6 SAFETY DEVICES**

- A. General: Area over which doors swing or slide shall be a safety section and anyone standing in path of door's movement shall be protected by a safety device.
- B. Each swing door shall have installed on the pull side a presence sensor to detect any person standing in the door swing path and prevent the door from opening.
- C. Time delay switches shall be adjustable between 3 to 60 seconds and shall control closing cycle of doors.
- D. Decals with sign "In" or "Do Not Enter" shall be installed on both faces of each door where shown.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Coordinate installation of equipment with other related work. Manual controls and power disconnect switches shall be recessed or semi-flush mounted in partitions. Secure operator components to adjacent construction with suitable fastenings. Conceal conduits, piping, and electric equipment, in finish work.
- B. Install power units in locations shown. Where units are to be mounted on walls, provide metal supports or shelves for the units. All equipment, including time delay switches, shall be accessible for maintenance and adjustment.
- C. Operators shall be adjusted and must function properly for the type of traffic (pedestrians, carts, stretchers and wheelchairs) expected to

pass through doors. Each door leaf of pairs of doors shall open and close in synchronization. On pairs of doors, operators shall allow either door to be opened manually without the other door opening.

- D. Install controls at positions shown and make them convenient for particular traffic expected to pass through openings. Maximum height of push plate wall switches from finished floors shall be 40 inches unless otherwise approved by the COR.

### **3.2 INSTRUCTIONS**

- A. Following the installation and final adjustments of the door operators, the installer shall fully instruct VA personnel for 2 hours on the operating, servicing and safety requirements for the swing and sliding automatic door operators.
- B. Coordinate instruction to VA personnel with COR.

- - - E N D - - -



**SECTION 08 80 00**  
**GLAZING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies glass, plastic, related glazing materials and accessories. Glazing products specified apply to factory or field glazed items.

**1.2 RELATED WORK**

- A. Factory glazed by manufacturer in following units:
1. Sound resistant doors: Section 08 11 13, HOLLOW METAL DOORS AND FRAMES, and Section 08 14 00, WOOD DOORS.
  2. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.
  3. Section 08 44 13, GLAZED ALUMINUM CURTAIN WALLS.
  4. Color of spandrel glass, tinted (heat absorbing or light reducing) glass, and reflective (metallic coated) glass: BLACK.
  5. Section 28 13 11, PHYSICAL ACCESS CONTROL SYSTEMS.
  6. Section 28 16 11, INTRUSION DETECTION SYSTEM.

**1.3 LABELS**

- A. Temporary labels:
1. Provide temporary label on each light of glass identifying manufacturer or brand and glass type, quality and nominal thickness.
  2. Label in accordance with NFRC (National Fenestration Rating Council) label requirements.
  3. Temporary labels shall remain intact until glass is approved by COR.
- B. Permanent labels:
1. Locate in corner for each pane.
  2. Label in accordance with ANSI Z97.1 and SGCC (Safety Glass Certification Council) label requirements.
    - a. Tempered glass.
    - b. Laminated glass or have certificate for panes without permanent label.
    - c. Organic coated glass.
  3. Bullet resistance glass or plastic assemblies:
    - a. Bullet resistance glass or plastic assemblies in accordance with UL 752 requirements for power rating specified.
    - b. Identify each security glazing permanently with glazing manufacturer's name, date of manufacture, product number, and DOS

Code number inconspicuously located in lower corner on protective side and visible after glazing is framed.

- c. The "attack (threat) side" shall be identified in bold lettering on each side of glazing with removable label.

#### **1.4 PERFORMANCE REQUIREMENTS**

A. Building Enclosure Vapor Retarder and Air Barrier:

1. Utilize the inner pane of multiple pane sealed units for the continuity of the air barrier and vapor retarder seal.
2. Maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

B. Glass Thickness:

1. Select thickness of exterior glass to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with ASCE 7 code.
2. Test in accordance with ASTM E 1300.
3. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

C. Bullet resistance glass or plastic assemblies:

1. Coordinate with Physical Security Design Manual requirements.

#### **1.5 SUBMITTALS**

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's Certificates:

1. Certificates stating that wire glass, meets requirements for safety glazing material as specified in ANSI Z97.1.
2. Certificate on shading coefficient.
3. Certificate on "R" value when value is specified.
4. Certificate test reports confirming compliance's with specified bullet resistive rating.
5. Certificate that blast resistant glass meets the requirements of UFC4-010-01.

C. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.

D. Manufacturer's Literature and Data:

1. Glass, each kind required.
2. Insulating glass units.

3. Glazing cushion.
4. Sealing compound.

E. Samples:

1. Size: 150 mm by 150 mm (6 inches by 6 inches).
2. Tinted glass.
3. Reflective glass.
4. Transparent (one-way vision glass) mirrors.

F. Preconstruction Adhesion and Compatibility Test Report: Submit glazing sealant manufacturer's test report indicating glazing sealants were tested for adhesion to glass and glazing channel substrates and for compatibility with glass and other glazing materials.

**1.6 DELIVERY, STORAGE AND HANDLING**

- A. Delivery: Schedule delivery to coincide with glazing schedules so minimum handling of crates is required. Do not open crates except as required for inspection for shipping damage.
- B. Storage: Store cases according to printed instructions on case, in areas least subject to traffic or falling objects. Keep storage area clean and dry.
- C. Handling: Unpack cases following printed instructions on case. Stack individual windows on edge leaned slightly against upright supports with separators between each.

**1.7 PROJECT CONDITIONS**

- A. Field Measurements: Field measure openings before ordering tempered glass products. Be responsible for proper fit of field measured products.

**1.8 WARRANTY**

- A. Warranty: Conform to terms of "Warranty of Construction", FAR clause 52.246-21, except extend warranty period for the following:
  1. Bullet resistive plastic material to remain visibly clear without discoloration for 10 years.
  2. Insulating glass units to remain sealed for 10 years.
  3. Laminated glass units to remain laminated for 5 years.
  4. Polycarbonate to remain clear and ultraviolet light stabilized for 5 years.
  5. Insulating plastic to not have more than 6 percent decrease in light transmission and be ultraviolet light stabilized for 10 years.

## 1.9 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
- Z97.1-09.....Safety Glazing Material Used in  
                                    Building - Safety Performance Specifications  
                                    and Methods of Test.
- C. American Society for Testing and Materials (ASTM):
- C542-05.....Lock-Strip Gaskets
- C716-06.....Installing Lock-Strip Gaskets and Infill  
                                    Glazing Materials.
- C794-10.....Adhesion-in-Peel of Elastomeric Joint Sealants
- C864-05.....Dense Elastomeric Compression Seal Gaskets,  
                                    Setting Blocks, and Spacers
- C920-11.....Elastomeric Joint Sealants
- C964-07.....Standard Guide for Lock-Strip Gasket Glazing
- C1036-06.....Flat Glass
- C1048-12.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated  
                                    and Uncoated Glass.
- C1376-10.....Pyrolytic and Vacuum Deposition Coatings on  
                                    Flat Glass
- D635-10.....Rate of Burning and/or Extent and Time of  
                                    Burning of Self-Supporting Plastic in a  
                                    Horizontal Position
- D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic  
                                    Sheet
- E84-10.....Surface Burning Characteristics of Building  
                                    Materials
- E119-10.....Standard Test Methods for Fire Test of Building  
                                    Construction and Material
- E2190-10.....Insulating Glass Unit
- D. Commercial Item Description (CID):
- A-A-59502.....Plastic Sheet, Polycarbonate
- E. Code of Federal Regulations (CFR):
- 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; 2010
- F. National Fire Protection Association (NFPA):

80-13.....Fire Doors and Windows.

252-12.....Standard Method of Fire Test of Door Assemblies

257-12.....Standard on Fire Test for Window and Glass

Block Assemblies

G. National Fenestration Rating Council (NFRC)

H. Safety Glazing Certification Council (SGCC) 2012:

Certified Products Directory (Issued Semi-Annually).

I. Underwriters Laboratories, Inc. (UL):

752-11.....Bullet-Resisting Equipment.

J. Unified Facilities Criteria (UFC):

4-010-01-2012.....DOD Minimum Antiterrorism Standards for

Buildings

K. Glass Association of North America (GANA):

Glazing Manual (Latest Edition)

Sealant Manual (2009)

L. American Society of Civil Engineers (ASCE):

ASCE 7-10.....Wind Load Provisions

**PART 2 - PRODUCT**

**2.1 GLASS**

A. Use thickness stated unless specified otherwise in assemblies.

B. Clear Glass:

1. ASTM C1036, Type I, Class 1, Quality q3.

2. Thickness, 6 mm (1/4 inch).

3. Coordinate color/tint/coating to accommodate required security monitoring.

C. Tinted Heat reflective and low emissivity coated glass:

1. ASTM C1036, Type I, Class 2, Quality q3.

2. Color: Section 09 06 00, SCHEDULE FOR FINISHES.

3. Thickness, 6 mm (1/4 inch).

**2.2 HEAT-TREATED GLASS**

A. Clear Heat Strengthened Glass:

1. ASTM C1048, Kind HS, Condition A, Type I, Class 1, Quality q3.

2. Thickness, 6 mm (1/4 inch).

B. Clear Tempered Glass:

1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.

2. Thickness, 6 mm (1/4 inch).

C. Tinted Tempered Glass.

1. ASTM C1048, Kind FT, Condition A, Type I, Class 2, Quality q3.

2. Color: Section 09 06 00, SCHEDULE FOR FINISHES.

3. Thickness, 6 mm (1/4 inch).

## **2.3 COATED GLASS - NOT USED**

## **2.4 PLASTIC - NOT USED**

## **2.5 LAMINATED GLASS**

- A. Two or more lites of glass bonded with an interlayer material for use in building glazing
- B. Use 1.5 mm (0.060 inch) thick interlayer for:
  1. Horizontal or Sloped glazing.
  2. Acoustical glazing.
  3. Heat strengthened or fully tempered glass assemblies.
- C. Use min. 0.75 mm (0.030 inch) thick interlayer for vertical glazing where 1.5 mm (0.060 inch) interlayer is not otherwise shown or required.

## **2.6 LAMINATED GLAZING ASSEMBLIES**

- A. Tinted Tempered Glazing:
  1. Exterior pane ASTM C1036, Type I, Class 3, Quality q3, 3 mm (1/8 inch) thick minimum.
  2. Interior pane ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3, 3 mm (1/8 inch) thick.

## **2.7 BULLET RESISTIVE ASSEMBLY - NOT USED**

## **2.8 GLASS CLAD POLYCARBONATE SECURITY GLAZING ASSEMBLY - NOT USED**

## **2.9 INSULATING GLASS UNITS**

- A. Provide factory fabricated, hermetically sealed glass unit consisting of two panes of glass separated by a dehydrated air space and comply with ASTM E2190.
- B. Assemble units using glass types specified:
- C. Sealed Edge Units (SEU):
  1. Insulating Laminated Glass Unit Makeup
    - a. Outboard Lite
      1. Glass type: Type I, Class 3 (Tempered)
      2. Glass Tint: Match facility standard.
      3. Nominal Thickness: 1/4"
      4. Glass Strength: (Tempered)
      5. Coating Orientation: (N/A)
    - b. Spacer
      1. Nominal Thickness: 1/2"
      2. Gas Fill: (Air)

- c. Inboard Lite
  - 1. Glass Type: Laminated Unit.
  - 2. Glass Tint: Clear.
  - 3. Nominal Thickness: 9/16"
  - 4. Glass Strength: (Annealed)
  - 5. Coating Orientation: (N/A)
- 2. Performance Characteristics (Center of Glass)
  - a. Visible Transmittance: 51%
  - b. Visible Reflectance: 5%
  - c. Winter U-factor (U-value): .29
  - d. Shading Coefficient (SC): .63
  - e. Solar heat Gain Coefficient (SHGC): .29
- 3. Glass shall be annealed, heat strengthened or tempered as required by codes, or as required to meet thermal stress and wind loads.
- 4. Glass heat-treated by horizontal (roller hearth) process with inherent roller wave distortion parallel to the bottom edge of the glass as installed when specified.

#### **2.10 FIRE RESISTANT GLASS WITHOUT WIRE MESH**

- A. Type 1 (Transparent float glass), Class 1 (Clear).
- B. Fire-protective glass products used to protect against smoke and flames only shall be rated for [20] [45] minutes as required by local building code and shall be tested in accordance with NFPA 252 (Standard Methods of Fire Tests of Door Assemblies) and NFPA 257 (Standard on Fire Test for Window and Glass Block Assemblies)
- C. Fire-resistive products used to protect against smoke, flame, and the transmission of radiant heat shall be rated as indicated on drawings and shall be tested in accordance with NFPA 252, NFPA 257, and ASTM E119 (Standard Test Methods for Fire Tests of Building Construction and Materials).
- D. Fire-rated glass or glass assembly shall be classified by Underwriters Laboratory (UL), Intertek Testing Services- Warnock Hersey (ITS-WHI) or any other OSHA certified testing laboratory. All glass shall bear a permanent mark of classification in accordance with local building code.
- E. Maximum size is per the manufacturer's test agency listing for doors, transoms, side lights, borrowed lights, and windows.

F. Where safety glazing is required by local building code, fire-rated glass shall be tested in accordance with CPSC 16 CFR 1201 Category I or II and bear a permanent mark of classification.

1. Category I products are limited to 0.84 m<sup>2</sup> - 9 ft<sup>2</sup> and tested to no less than 203 Nm-150 ft-lbs impact loading.
2. Category II products are greater than 0.84 m<sup>2</sup> - 9 ft<sup>2</sup> and tested to no less than 542 Nm-400 ft-lbs impact loading. Category II products can be used in lieu of Category I products.

## **2.11 INSULATING PLASTIC SHEETS - NOT USED**

## **2.12 GLAZING ACCESSORIES**

A. As required to supplement the accessories provided with the items to be glazed and to provide a complete installation. Ferrous metal accessories exposed in the finished work shall have a finish that will not corrode or stain while in service.

B. Setting Blocks: ASTM C864:

1. Channel shape; having 6 mm (1/4 inch) internal depth.
2. Shore a hardness of 80 to 90 Durometer.
3. Block lengths: 50 mm (two inches) except 100 to 150 mm (four to six inches) for insulating glass.
4. Block width: Approximately 1.6 mm (1/16 inch) less than the full width of the rabbet.
5. Block thickness: Minimum 4.8 mm (3/16 inch). Thickness sized for rabbet depth as required.

C. Spacers: ASTM C864:

1. Channel shape having a 6 mm (1/4 inch) internal depth.
2. Flanges not less 2.4 mm (3/32 inch) thick and web 3 mm (1/8 inch) thick.
3. Lengths: One to 25 to 76 mm (one to three inches).
4. Shore a hardness of 40 to 50 Durometer.

D. Sealing Tapes:

1. Semi-solid polymeric based material exhibiting pressure-sensitive adhesion and withstanding exposure to sunlight, moisture, heat, cold, and aging.
2. Shape, size and degree of softness and strength suitable for use in glazing application to prevent water infiltration.

E. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel or rabbeted sash with stops.



F. Glazing Gaskets: ASTM C864:

1. Firm dense wedge shape for locking in sash.
2. Soft, closed cell with locking key for sash key.
3. Flanges may terminate above the glazing-beads or terminate flush with top of beads.

G. Lock-Strip Glazing Gaskets: ASTM C542, shape, size, and mounting as indicated.

H. Glazing Sealants: ASTM C920, silicone neutral cure:

1. Type S.
2. Class 25
3. Grade NS.
4. Shore A hardness of 25 to 30 Durometer.

I. Structural Sealant: Not Used.

J. Neoprene, EPDM, or Vinyl Glazing Gasket: ASTM C864.

1. Channel shape; flanges may terminate above the glazing channel or flush with the top of the channel.
2. Designed for dry glazing.

K. Color:

1. Color of glazing compounds, gaskets, and sealants used for aluminum color frames shall match color of the finished aluminum and be nonstaining.
2. Color of other glazing compounds, gaskets, and sealants which will be exposed in the finished work and unpainted shall be black, gray, or neutral color.

L. Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units intended for removal for smoke control. Comply with requirements of local Fire Department.

**PART 3 - EXECUTION**

**3.1 EXAMINATION**

A. Verification of Conditions:

1. Examine openings for glass and glazing units; determine they are proper size; plumb; square; and level before installation is started.
2. Verify that glazing openings conform with details, dimensions and tolerances indicated on manufacturer's approved shop drawings.

B. Advise Contractor of conditions which may adversely affect glass and glazing unit installation, prior to commencement of installation: Do

not proceed with installation until unsatisfactory conditions have been corrected.

- C. Verify that wash down of adjacent masonry is completed prior to erection of glass and glazing units to prevent damage to glass and glazing units by cleaning materials.

### **3.2 PREPARATION**

- A. For sealant glazing, prepare glazing surfaces in accordance with GANA-02 Sealant Manual.
- B. Determine glazing unit size and edge clearances by measuring the actual unit to receive the glazing.
- C. Shop fabricate and cut glass with smooth, straight edges of full size required by openings to provide GANA recommended edge clearances.
- D. Verify that components used are compatible.
- E. Clean and dry glazing surfaces.
- F. Prime surfaces scheduled to receive sealants, as determined by preconstruction sealant-substrate testing.

### **3.3 INSTALLATION - GENERAL**

- A. Install in accordance with GANA-01 Glazing Manual and GANA-02 Sealant Manual unless specified otherwise.
- B. Glaze in accordance with recommendations of glazing and framing manufacturers, and as required to meet the Performance Test Requirements specified in other applicable sections of specifications.
- C. Set glazing without bending, twisting, or forcing of units.
- D. Do not allow glass to rest on or contact any framing member.
- E. Glaze doors and operable sash, in a securely fixed or closed and locked position, until sealant, glazing compound, or putty has thoroughly set.
- F. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.
- G. Laminated Glass:
  - 1. Tape edges to seal interlayer and protect from glazing sealants.
  - 2. Do not use putty or glazing compounds.
- H. Insulating Glass Units:
  - 1. Glaze in compliance with glass manufacturer's written instructions.
  - 2. When glazing gaskets are used, they shall be of sufficient size and depth to cover glass seal or metal channel frame completely.
  - 3. Do not use putty or glazing compounds.

4. Do not grind, nip, cut, or otherwise alter edges and corners of fused glass units after shipping from factory.

5. Install with tape or gunnable sealant in wood sash.

**3.4 INSTALLATION - DRY METHOD (TAPE AND GASKET SPLINE GLAZING) - NOT USED**

**3.5 INSTALLATION - WET/DRY METHOD (PREFORMED TAPE AND SEALANT) - NOT USED**

**3.6 INSTALLATION - WET METHOD (SEALANT AND SEALANT) - NOT USED**

**3.7 INSTALLATION - EXTERIOR BUTT GLAZED METHOD (SEALANT ONLY) - NOT USED**

**3.8 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)**

- A. Cut glazing tape to length and install against permanent stops, projecting 1.6 mm (1/16 inch) above sight line.
- B. Place setting blocks at 1/3 points with edge block no more than 150 mm (6 inches) from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 600 mm (24 inch) intervals, 6 mm (1/4 inch) below sight line.
- E. Fill gaps between pane and applied stop with sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

**3.9 INSTALLATION - INTERIOR WET METHOD (COMPOUND AND COMPOUND) - NOT USED**

**3.10 INSTALLATION - REGLAZING HISTORIC FRAMING - NOT USED**

**3.11 REPLACEMENT AND CLEANING**

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by COR.
- B. Replace cracked, broken, and imperfect glass, or glass which has been installed improperly.
- C. Leave glass, putty, and other setting material in clean, whole, and acceptable condition.

**3.12 PROTECTION**

- A. Protect finished surfaces from damage during erection, and after completion of work. Strippable plastic coatings on colored anodized finish are not acceptable.

**3.13 GLAZING SCHEDULE**

- A. Fire Resistant Glass:
  - 1. Use Fire Resistant Glass without wire mesh in the following:
    - a. All glazed openings in rated assemblies.

B. Tempered Glass:

1. Install in full and half glazed doors unless indicated otherwise.
2. Install in storefront, windows, and door sidelights adjacent to doors.
3. Use clear tempered glass on interior side lights and doors, and on exterior doors and sidelights unless otherwise indicated or specified.
4. Use tinted tempered glass in exterior pane and clear tempered glass in interior pane unless specified otherwise of insulating glass units adjacent to door.

D. Clear Glass:

1. Interior observation windows not specified otherwise.
2. Interior pane of dual glazed windows not receiving tempered, laminated or organic coated glass, or other special glass indicated or specified.

E. Tinted Glass: Exterior pane of dual glazed windows not receiving tinted tempered glass.

F. Insulating Glass:

1. Install SEU tinted tempered and clear tempered glass in storefronts, and windows adjacent to entrances or walks.

G. Laminated Glass: Install as specified in doors, observation windows and interior pane of dual glazed windows where indicated.

1. Provide laminated glass for all exterior windows. Laminated glass shall be 9/16-in thick.(min. 1.5 mm interlayer).
2. If laminated glass is required for double glazed windows, provide it for interior panes only.

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**SECTION 09 05 16**  
**SUBSURFACE PREPARATION FOR FLOOR FINISHES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies subsurface preparation requirements for areas to receive the installation of applied and resinous flooring. This section includes removal of existing floor coverings, testing concrete for moisture and pH, remedial floor coating for concrete floor slabs having unsatisfactory moisture or pH conditions, floor leveling and repair as required.

**1.2 RELATED WORK**

A. Section 09 65 16, RESILIENT SHEET FLOORING, Section 09 65 19, RESILIENT TILE FLOORING, Section 09 67 23.20, RESINOUS EPOXY BASE WITH VINYL CHIP BROADCAST (RES-2).

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA and TEST DATA.
- B. Written approval confirming product compatibility with subfloor material manufacturer and the flooring manufacturer
- C. Product Data:
  - 1. Moisture remediation system
  - 2. Underlayment Primer
  - 3. Cementitious Self-Leveling Underlayment
  - 4. Cementitious Trowel-Applied Underlayment (Not suitable for resinous floor finishes)
- D. Test Data:
  - 1. Moisture test and pH results performed by a qualified independent testing agency or warranty holding manufacturer's technical representative.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.

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

<b>D638-10</b> (2010)	Test Method for Tensile Properties of Plastics
<b>D4259-88</b> (2012)	Standard Practice for Abrading Concrete to alter the surface profile of the concrete and to remove foreign materials and weak surface laitance.
<b>C109M-12</b> (2012)	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens) Modified Air Cure Only
<b>D7234-12</b> (2012)	Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
<b>E96/E96M - 12</b> (2012)	Standard Test Methods for Water Vapor Transmission of Materials
<b>F710-11</b> (2011)	Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
<b>F1869-11</b> (2011)	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
<b>F2170-11</b> (2011)	Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

**PART 2 - PRODUCTS**

**2.1 MOISTURE REMEDIATION COATING**

A. System Descriptions:

1. High-solids, epoxy system designed to suppress excess moisture in concrete prior to an overlayment. For use under resinous products, VCT, tile and carpet where issues caused by moisture vapor are a concern.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and cleanup.

C. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:

1. Liquid applied coating:
  - a. Resin: epoxy.
  - b. Formulation Description: Multiple component high solids.
  - c. Application: Per manufacturer's written installation requirements.
  - d. Thickness: minimum 10 mils

D. Material Vapor Permeance: Must achieve <.1 perm in accordance with ASTM E96.

E. Maximum RH requirement: 100% testing in accordance with ASTM F2170.

Property	Test	Value
Tensile Strength	ASTM D638	4,400 psi
Volatile Organic Compound Limits (V.O.C.)	SCAMD Rule 1113	25 grams per liter
Permeance	ASTM E96	0.1 perms
Tensile Modulus	ASTM D638	1.9X10 <sup>5</sup> psi
Percent Elongation	ASTM D638	12%
Cure Rate	Per manufactures Data	4 hours Tack free with 24hr recoat window
Bond Strength	ASTM D7234	100% bond to concrete failure

## 2.2 CEMENTITIOUS SELF-LEVELING UNDERLAYMENT

### A. System Descriptions:

1. High performance self-leveling underlayment resurfacer. Single component, self-leveling, cementitious material designed for easy application as an underlayment for all types of flooring materials. It is used for substrate repair and leveling and filling of depressed slab areas.

B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up. Gypsum-based products are unacceptable.

### C. System Characteristics:

1. Wearing Surface: smooth
2. Thickness: Per architectural drawings, ranging from feathered edge to 1", per application. Applications greater than 1" require additional 3/8" aggregate to mix or as recommended by manufacturer.

D. Underlayment must be calcium aluminate cement-based, containing portland cement with a maximum weight of 120 pounds per cubic foot. Gypsum-based products are unacceptable.

E. Compressive Strength: Minimum 4100 psi in 28 days in accordance with ASTM C109M

F. Flexural Strength: Minimum 1000 psi in 28 days in accordance with ASTM 348

- G. Dry Time: Underlayment shall receive the application of moisture insensitive tile in 6 hours, floor coverings in 16 hours, and resinous flooring in 3-7 days.
- H. Primer: compatible and as recommended by manufacturer for use over intended substrate
- I. System Components: Manufacturer's standard components that are compatible with each other and as follows:
1. Primer:
    - a. Resin: copolymer
    - b. Formulation Description: single component ready to use.
    - c. Application Method: Squeegee and medium nap roller.  
All puddles must be removed, and material must be allowed to dry, 1-2 hours at 70F/21C.
    - d. Number of Coats: (1) one.
  2. Grout Resurfacing Base:
    - a. Formulation Description: Single component, cementitious self-leveling high early, high strength grout.
    - b. Application Method: colloidal mix pump, cam rake, spike roll.
      - 1) Thickness of Coats: Per architectural scope, 1" lifts.
      - 2) Number of Coats: More than one if needed.
    - c. Aggregates: for applications greater than linch, require additional 3/8" aggregate to mix.

Property	Test	Value
Compressive Strength	ASTM C109	2,200 psi @ 24 hrs 3,000 psi @ 7 days
Initial set time	ASTM C191	30-45 min.
Final Set time		1 to 1.5 hours
Bond Strength	ASTM D7234	100% bond to concrete failure

**2.3 CEMENTITIOUS TROWEL-APPLIED UNDERLAYMENT(NOT SUITABLE FOR RESINOUS FLOOR FINISHES)**

- A. Underlayment must be calcium aluminate cement-based, containing portland cement. Gypsum-based products are unacceptable.
- B. Compressive Strength: Minimum 4000 psi in 28 days
- C. Trowel-applied underlayment shall not contain silica quartz (sand).
- D. Dry Time: Underlayment shall receive the application of floor covering in 15-20 minutes.



### **PART 3 - EXECUTION**

#### **3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before testing and not less than three days after testing.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation.
- C. Do not install materials when the temperatures of the substrate or materials are not within 60-85 degrees F/ 16-30 degrees C.

#### **3.2 SURFACE PREPARATION**

- A. Existing concrete slabs with existing floor coverings:
  - 1. Conduct visual observation of existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
  - 2. Remove existing floor covering and adhesives. Comply with local, state and federal regulations and the RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, as applicable to the floor covering being removed.
- B. Concrete shall meet the requirements of ASTM F710 and be sound, solid, clean, and free of all oil, grease, dirt, curing compounds, and any substance that might act as a bond-breaker before application. As required prepare slab by mechanical methods. No chemicals or solvents should be used.
- C. General: Prepare and clean substrates according to flooring manufacturer's written instructions for substrate indicated.
- D. Prepare concrete substrates per ASTM D4259 by any of the following methods:
  - 1. Dry abrasive blasting.
  - 2. Wet abrasive blasting.
  - 3. Vacuum-assisted abrasive blasting.
  - 4. Centrifugal-shot abrasive blasting.
- E. Repair damaged and deteriorated concrete according to flooring manufacturer's written recommendations.
- F. Verify that concrete substrates are dry.
- G. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of per flooring manufactures formal and project specific written recommendation.

- H. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity per flooring manufactures formal and project specific written recommendation.
- I. Provide a written report showing test placement and results.
- J. Prepare joints in accordance with material manufacturer's instructions.
- K. Alkalinity: Measure surface pH in accordance with procedures provided in ASTM F710 or as outlined by qualified testing agency or flooring manufacturer's technical representative.
- L. Tolerances: Subsurface shall meet the flatness and levelness tolerance specified on drawings or recommended by the floor finish manufacturer. Tolerance shall also not to exceed 1/4" deviation in 10'. As required, install underlayment to achieve required tolerance.
- M. Other Subsurface: For all other subsurface conditions, such as wood or metal, contact the floor finish or underlayment manufacturer, as appropriate, for proper preparation practices.

### **3.3 MOISTURE REMEDIATION COATING:**

- A. Where results of relative humidity testing (ASTM F2170) exceed the requirements of the specified flooring manufacturer, apply remedial coating as specified to correct excessive moisture condition.
- B. Prior to remedial floor coating installation mechanically prepare the concrete surface to provide a concrete surface profile in accordance with ASTM 4259.
- C. Mix and apply moisture remediation coating in accordance with manufacturer's instructions.

### **3.4 CEMENTITIOUS UNDERLAYMENT:**

- A. Install cementitious self-leveling underlayment as required to correct surface defects, floor flatness or levelness corrections to meet the tolerance requirements as or detailed on drawings, address non-moving cracks or joints, provide a smooth surface for the installation of floor covering, or meet elevation requirements detailed on drawings.
- B. Mix and apply in accordance with manufacturer's instructions.

### **3.5 PROTECTION**

- A. Prior to the installation of the finish flooring, the surface of the underlayment should be protected from abuse by other trades by the use of plywood, Masonite, or other suitable protection course

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary      VA #534-325  
Ralph H. Johnson VA Medical Center  
Charleston, SC      HDG #13026

### **3.6 FIELD QUALITY CONTROL**

- A. Where specified, field sampling of products must be conducted by a qualified, independent testing facility.

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**SECTION 09 29 00**  
**GYPSUM BOARD**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies installation and finishing of gypsum board.

**1.2 RELATED WORK**

- A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings: Section 05 40 00, COLD-FORMED METAL FRAMING, and Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- B. Sound deadening board: Section 07 21 13, THERMAL INSULATION.
- C. Acoustical Sealants: Section 07 92 00, JOINT SEALANTS.
- D. Lay in gypsum board ceiling panels: Section 09 51 00, ACOUSTICAL CEILING.

**1.3 TERMINOLOGY**

- A. Definitions and description of terms shall be in accordance with ASTM C11, C840, and as specified.
- B. Underside of Structure Overhead: In spaces where steel trusses or bar joists are shown, the underside of structure overhead shall be the underside of the floor or roof construction supported by the trusses or bar joists.
- C. "Yoked": Gypsum board cut out for opening with no joint at the opening (along door jamb or above the door).

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Cornerbead and edge trim.
  2. Finishing materials.
  3. Laminating adhesive.
  4. Gypsum board, each type.
- C. Shop Drawings:
1. Typical gypsum board installation, showing corner details, edge trim details and the like.
  2. Typical sound rated assembly, showing treatment at perimeter of partitions and penetrations at gypsum board.
  3. Typical shaft wall assembly.
  4. Typical fire rated assembly and column fireproofing, indicating details of construction same as that used in fire rating test.
- D. Samples:
1. Cornerbead.

2. Edge trim.
3. Control joints.

E. Test Results:

1. Fire rating test, each fire rating required for each assembly.
2. Sound rating test.

**1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE**

In accordance with the requirements of ASTM C840.

**1.6 ENVIRONMENTAL CONDITIONS**

In accordance with the requirements of ASTM C840.

**1.7 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing And Materials (ASTM):
- C11-08.....Terminology Relating to Gypsum and Related Building Materials and Systems
  - C475-02.....Joint Compound and Joint Tape for Finishing Gypsum Board
  - C840-08.....Application and Finishing of Gypsum Board
  - C919-08.....Sealants in Acoustical Applications
  - C954-07.....Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Stud from 0.033 in. (0.84mm) to 0.112 in. (2.84mm) in thickness
  - C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
  - C1047-05.....Accessories for Gypsum Wallboard and Gypsum Veneer Base
  - C1177-06.....Glass Mat Gypsum Substrate for Use as Sheathing
  - C1658-06.....Glass Mat Gypsum Panels
  - C1396-06.....Gypsum Board
  - E84-08.....Surface Burning Characteristics of Building Materials
- C. Underwriters Laboratories Inc. (UL):
- Latest Edition.....Fire Resistance Directory
- D. Inchcape Testing Services (ITS):
- Latest Editions.....Certification Listings

## **PART 2 - PRODUCTS**

### **2.1 GYPSUM BOARD**

- A. Gypsum Board: ASTM C1396, Type X, 16 mm (5/8 inch) thick unless shown otherwise. Shall contain a minimum of 20 percent recycled gypsum.
- B. Coreboard or Shaft Wall Liner Panels.
  - 1. ASTM C1396, Type X.
  - 2. ASTM C1658: Glass Mat Gypsum Panels,
  - 3. Coreboard for shaft walls 300, 400, 600 mm (12, 16, or 24 inches) wide by required lengths 25 mm (one inch) thick with paper faces treated to resist moisture.
- C. Water Resistant Gypsum Backing Board: ASTM C620, Type X, 16 mm (5/8 inch) thick.
- D. Gypsum cores shall contain maximum percentage of post industrial recycled gypsum content available in the area (a minimum of 95 percent post industrial recycled gypsum content). Paper facings shall contain 100 percent post-consumer recycled paper content.

### **2.2 GYPSUM SHEATHING BOARD**

- A. ASTM C1396, Type X, water-resistant core, 16 mm (5/8 inch) thick.
- B. ASTM C1177, Type X.

### **2.3 ACCESSORIES**

- A. ASTM C1047, except form of 0.39 mm (0.015 inch) thick zinc coated steel sheet or rigid PVC plastic.
- B. Flanges not less than 22 mm (7/8 inch) wide with punchouts or deformations as required to provide compound bond.

### **2.4 FASTENERS**

- A. ASTM C1002 and ASTM C840, except as otherwise specified.
- B. ASTM C954, for steel studs thicker than 0.04 mm (0.33 inch).
- C. Select screws of size and type recommended by the manufacturer of the material being fastened.
- D. For fire rated construction, type and size same as used in fire rating test.
- E. Clips: Zinc-coated (galvanized) steel; gypsum board manufacturer's standard items.

### **2.5 FINISHING MATERIALS AND LAMINATING ADHESIVE**

- A. ASTM C475 and ASTM C840. Free of antifreeze, vinyl adhesives, preservatives, biocides and other VOC. Adhesive shall contain a maximum VOC content of 50 g/l.

## **PART 3 - EXECUTION**

### **3.1 GYPSUM BOARD HEIGHTS**

- A. Extend all layers of gypsum board from floor to underside of structure overhead on following partitions and furring:
  - 1. Two sides of partitions:
    - a. Fire rated partitions.
    - b. Smoke partitions.
    - c. Sound rated partitions.
    - d. Full height partitions shown (FHP).
    - e. Corridor partitions.
  - 2. One side of partitions or furring:
    - a. Inside of exterior wall furring or stud construction.
    - b. Room side of room without suspended ceilings.
    - c. Furring for pipes and duct shafts, except where fire rated shaft wall construction is shown.
  - 3. Extend all layers of gypsum board construction used for fireproofing of columns from floor to underside of structure overhead, unless shown otherwise.
- B. In locations other than those specified, extend gypsum board from floor to heights as follows:
  - 1. Not less than 100 mm (4 inches) above suspended acoustical ceilings.
  - 2. At ceiling of suspended gypsum board ceilings.
  - 3. At existing ceilings.

### **3.2 INSTALLING GYPSUM BOARD**

- A. Coordinate installation of gypsum board with other trades and related work.
- B. Install gypsum board in accordance with ASTM C840, except as otherwise specified.
- C. Moisture and Mold-Resistant Assemblies: Provide and install moisture and mold-resistant glass mat gypsum wallboard products with moisture-resistant surfaces complying with ASTM C1658 where shown and in locations which might be subject to moisture exposure during construction.
- D. Use gypsum boards in maximum practical lengths to minimize number of end joints.
- E. Bring gypsum board into contact, but do not force into place.
- F. Ceilings:
  - 1. For single-ply construction, use perpendicular application.
  - 2. For two-ply assemblies:
    - a. Use perpendicular application.

- b. Apply face ply of gypsum board so that joints of face ply do not occur at joints of base ply with joints over framing members.

G. Walls (Except Shaft Walls):

1. When gypsum board is installed parallel to framing members, space fasteners 300 mm (12 inches) on center in field of the board, and 200 mm (8 inches) on center along edges.
2. When gypsum board is installed perpendicular to framing members, space fasteners 300 mm (12 inches) on center in field and along edges.
3. Stagger screws on abutting edges or ends.
4. For single-ply construction, apply gypsum board with long dimension either parallel or perpendicular to framing members as required to minimize number of joints except gypsum board shall be applied vertically over "Z" furring channels.
5. For two-ply gypsum board assemblies, apply base ply of gypsum board to assure minimum number of joints in facelayer. Apply face ply of wallboard to base ply so that joints of face ply do not occur at joints of base ply with joints over framing members.
6. For three-ply gypsum board assemblies, apply plies in same manner as for two-ply assemblies, except that heads of fasteners need only be driven flush with surface for first and second plies. Apply third ply of wallboard in same manner as second ply of two-ply assembly, except use fasteners of sufficient length enough to have the same penetration into framing members as required for two-ply assemblies.
7. No offset in exposed face of walls and partitions will be permitted because of single-ply and two-ply or three-ply application requirements.
8. Installing Two Layer Assembly Over Sound Deadening Board:
  - a. Apply face layer of wallboard vertically with joints staggered from joints in sound deadening board over framing members.
  - b. Fasten face layer with screw, of sufficient length to secure to framing, spaced 300 mm (12 inches) on center around perimeter, and 400 mm (16 inches) on center in the field.
9. Control Joints ASTM C840 and as follows:
  - a. Locate at both side jambs of openings if gypsum board is not "yoked". Use one system throughout.
  - b. Not required for wall lengths less than 9000 mm (30 feet).
  - c. Extend control joints the full height of the wall or length of soffit/ceiling membrane.

H. Acoustical or Sound Rated Partitions, Fire and Smoke Partitions:



1. Cut gypsum board for a space approximately 3 mm to 6 mm (1/8 to 1/4 inch) wide around partition perimeter.
2. Coordinate for application of caulking or sealants to space prior to taping and finishing.
3. For sound rated partitions, use sealing compound (ASTM C919) to fill the annular spaces between all receptacle boxes and the partition finish material through which the boxes protrude to seal all holes and/or openings on the back and sides of the boxes. STC minimum values as shown.

I. Electrical and Telecommunications Boxes:

1. Seal annular spaces between electrical and telecommunications receptacle boxes and gypsum board partitions.

J. Accessories:

1. Set accessories plumb, level and true to line, neatly mitered at corners and intersections, and securely attach to supporting surfaces as specified.
2. Install in one piece, without the limits of the longest commercially available lengths.
3. Corner Beads:
  - a. Install at all vertical and horizontal external corners and where shown.
  - b. Use screws only. Do not use crimping tool.
4. Edge Trim (casings Beads):
  - a. At both sides of expansion and control joints unless shown otherwise.
  - b. Where gypsum board terminates against dissimilar materials and at perimeter of openings, except where covered by flanges, casings or permanently built-in equipment.
  - c. Where gypsum board surfaces of non-load bearing assemblies abut load bearing members.
  - d. Where shown.

### **3.3 INSTALLING GYPSUM SHEATHING**

- A. Install in accordance with ASTM C840, except as otherwise specified or shown.
- B. Use screws of sufficient length to secure sheathing to framing.
- C. Space screws 9 mm (3/8 inch) from ends and edges of sheathing and 200 mm (8 inches) on center. Space screws a maximum of 200 mm (8 inches) on center on intermediate framing members.
- D. Apply 600 mm by 2400 mm (2 foot by 8 foot) sheathing boards horizontally with tongue edge up.

- E. Apply 1200 mm by 2400 mm or 2700 mm (4 ft. by 8 ft. or 9 foot) gypsum sheathing boards vertically with edges over framing.

#### **3.4 CAVITY SHAFT WALL - NOT USED**

#### **3.5 FINISHING OF GYPSUM BOARD**

- A. Finish joints, edges, corners, and fastener heads in accordance with ASTM C840. Use Level 4 finish for all finished areas open to public view.
- B. Before proceeding with installation of finishing materials, assure the following:
  - 1. Gypsum board is fastened and held close to framing or furring.
  - 2. Fastening heads in gypsum board are slightly below surface in dimple formed by driving tool.
- C. Finish joints, fasteners, and all openings, including openings around penetrations, on that part of the gypsum board extending above suspended ceilings to seal surface of non decorated smoke barrier, fire rated and sound rated and gypsum board construction. After the installation of hanger rods, hanger wires, supports, equipment, conduits, piping and similar work, seal remaining openings and maintain the integrity of the smoke barrier, fire rated and sound rated construction. Sanding is not required of non decorated surfaces.

#### **3.6 REPAIRS**

- A. After taping and finishing has been completed, and before decoration, repair all damaged and defective work, including nondecorated surfaces.
- B. Patch holes or openings 13 mm (1/2 inch) or less in diameter, or equivalent size, with a setting type finishing compound or patching plaster.
- C. Repair holes or openings over 13 mm (1/2 inch) diameter, or equivalent size, with 16 mm (5/8 inch) thick gypsum board secured in such a manner as to provide solid substrate equivalent to undamaged surface.
- D. Tape and refinish scratched, abraded or damaged finish surfaces including cracks and joints in non decorated surface to provide smoke tight construction fire protection equivalent to the fire rated construction and STC equivalent to the sound rated construction.

#### **3.7 UNACCESSIBLE CEILINGS - NOT USED**

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**SECTION 09 30 13**  
**CERAMIC/PORCELAIN TILING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies ceramic, porcelain and quarry tile, waterproofing membranes for thin-set applications, crack isolation membranes, tile backer board.

**1.2 RELATED WORK**

- A. Preformed sealant joints in tile flooring: Section 07 95 13, EXPANSION JOINT COVER ASSEMBLIES.
- B. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
- C. Color, texture and pattern of field tile and trim shapes, size of field tile, trim shapes, and color of grout specified: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Metal and resilient edge strips at joints with new resilient flooring: Section 09 65 19, RESILIENT TILE FLOORING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. Base tile, each type, each color, each size.
  2. Porcelain tile, each type, color, patterns and size.
  3. Wall (or wainscot) tile, each color, size and pattern.
  4. Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, color, and size.
- C. Product Data:
1. Ceramic and porcelain tile, marked to show each type, size, and shape required.
  2. Chemical resistant mortar and grout (Epoxy).
  3. Cementitious backer unit.
  4. Dry-set Portland cement mortar and grout.
  5. Divider strip.
  6. Elastomeric membrane and bond coat.
  7. Reinforcing tape.
  8. Leveling compound.
  9. Commercial Portland cement grout.
  10. Organic adhesive.
  11. Waterproofing isolation membrane.
  12. Fasteners.

D. Certification:

1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
  - a. Chemical resistant mortar and grout (epoxy and furan).
  - b. Modified epoxy emulsion.
  - c. Commercial Portland cement grout.
  - d. Cementitious backer unit.
  - e. Dry-set Portland cement mortar and grout.
  - f. Elastomeric membrane and bond coat.
  - g. Reinforcing tape.
  - h. Latex-Portland cement mortar and grout.
  - i. Leveling compound.
  - j. Organic adhesive.
  - k. Waterproof isolation membrane.
  - l. Factory mounted tile suitability for application in wet area specified under 2.1, A, 3 with list of successful in-service performance locations.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- B. Store material to prevent damage or contamination.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):
  - A108.1A-11.....Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar
  - A108.1B-11.....Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with dry-Set or latex-Portland Cement Mortar
  - A108.1C-11.....Contractors Option; Installation of Ceramic Tile in the Wet-Set method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex-Portland Cement Mortar
  - A137.1-08.....Ceramic Tile

C. American Society For Testing And Materials (ASTM):

- A185-07.....Steel Welded Wire Fabric, Plain, for Concrete Reinforcing
- C109/C109M-11.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch. or [50-mm] Cube Specimens)
- C241-09.....Abrasion Resistance of Stone Subjected to Foot Traffic
- C348-08.....Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- C627-10.....Evaluating Ceramic Floor Tile Installation Systems Using the Robinson-Type Floor Tester
- C954-11.....Steel Drill Screws for the Application of Gypsum Board on Metal Plaster Base to Steel Studs from 0.033 in (0.84 mm) to 0.112 in (2.84 mm) in thickness
- C979-10.....Pigments for Integrally Colored Concrete
- C1002-07.....Steel Self-Piercing Tapping Screws for the Application of Panel Products
- C1027-09.....Determining "Visible Abrasion Resistance on Glazed Ceramic Tile"
- C1028-07.....Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method
- C1127-09.....Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane with an Integral Wearing Surface
- C1178/C1178M-11.....Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
- C1325-08.....Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
- D4397-10.....Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications
- D5109-99(R2004).....Standard Test Methods for Copper-Clad Thermosetting Laminates for Printed Wiring Boards

D. Marble Institute of America (MIA): Design Manual III-2007

E. Tile Council of America, Inc. (TCA):

- 2013.....Handbook for Ceramic Tile Installation

## **PART 2 - PRODUCTS**

### **2.1 TILE**

- A. Comply with ANSI A137.1, Standard Grade, except as modified:
  - 1. Inspection procedures listed under the Appendix of ANSI A137.1.
  - 2. Slip Resistant Tile for Floors:
    - a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
    - b. Porcelain Paver Tile: Matte and polished surface finish.
  - 3. Do not use back mounted tiles in showers unless certified by manufacturer as noted in paragraph 1.3.D.
  - 4. Factory Blending: For tile with color variations, within the ranges selected during sample submittals blend tile in the factory and package so tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
  - 5. Factory-Applied Temporary Protective Coating:
    - a. Protect exposed face surfaces (top surface) of tile against adherence of mortar and grout by pre-coating with a continuous film of petroleum paraffin wax, applied hot.
    - b. Do not coat unexposed tile surfaces.
    - c. Pre-wax tiles set or grouted with furan or epoxy.
- B. Porcelain Paver Tile: Nominal 9 mm (3/8 inch) thick, with rectified edges. Porcelain tile produced by the dust pressed method shall be made of approximately 50% feldspar; the remaining 50% shall be made up of various high-quality light firing ball clays yielding a tile with a water absorption rate of 0.5% or less and a breaking strength of between 390 to 400 pounds.
- C. Trim Shapes:
  - 1. Conform to applicable requirements of adjoining wall tile.
  - 2. Use trim shapes sizes conforming to size of adjoining field wall tile unless detailed or specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

### **2.2 CEMENTITIOUS BACKER UNITS**

- A. Use in showers or wet areas and as indicated on drawings.
- B. ASTM C1325.
- C. Use Cementitious backer units in maximum available lengths.

### **2.3 JOINT MATERIALS FOR CEMENTITIOUS BACKER UNITS**

- A. Reinforcing Tape: Vinyl coated woven glass fiber mesh tape, open weave, 50 mm (2 inches) wide. Tape with pressure sensitive adhesive backing will not be permitted.

- B. Tape Embedding Material: Latex-Portland cement mortar complying with ANSI A108.1.
- C. Joint material, including reinforcing tape, and tape embedding material, shall be as specifically recommended by the backer unit manufacturer.

#### **2.4 FASTENERS**

- A. Screws for Cementitious Backer Units.
  - 1. Standard screws for gypsum board are not acceptable.
  - 2. Minimum 11 mm (7/16 inch) diameter head, corrosion resistant coated, with washers.
  - 3. ASTM C954 for steel 1 mm (0.033 inch) thick.
  - 4. ASTM C1002 for steel framing less than 0.0329 inch thick.
- B. Washers: Galvanized steel, 13 mm (1/2 inch) minimum diameter.

#### **2.5 GLASS MAT WATER RESISTANT GYPSUM BACKER BOARD**

- A. Conform to ASTM C1178/C1178M, Optional System for Cementitious Backer Units.

#### **2.6 SETTING MATERIALS OR BOND COATS**

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Portland Cement Mortar: Not Used.
- C. Latex-Portland Cement Mortar: Not Used.
- D. Dry-Set Portland Cement Mortar: Not Used.
- E. Organic Adhesives Bond Coat: ANSI A136.1, Type 1. Use in all toilet rooms without showers.
- F. Chemical-Resistant Bond Coat: Epoxy Resin Type: ANSI A118.3. Use in all bathrooms with showers.
- G. Latex-Portland Cement Waterproofing Membrane:
  - 1. ANSI A118.4 or better.
  - 2. Coal tar modified urethanes are not acceptable.

#### **2.7 GROUTING MATERIALS**

- A. Coloring Pigments:
  - 1. Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
  - 2. Add coloring pigments to grout by the manufacturer.
  - 3. Job colored grout is not acceptable.
  - 4. Use is required in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
- E. Latex-Portland Cement Grout: ANSI A108.1 color as specified. Use in all toilet rooms without showers.
  - 1. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
  - 2. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.
- F. Chemical-Resistant Grout: Use in all bathrooms with showers.



1. Epoxy grout, ANSI A118.3.

## **2.8 PATCHING AND LEVELING COMPOUND**

- A. Portland cement base, polymer-modified, self-leveling compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Shall have minimum following physical properties:
  1. Compressive strength - 25 MPa (3500 psig) per ASTM C109/C109M.
  2. Flexural strength - 7 MPa (1000 psig) per ASTM C348 (28 day value).
  3. Tensile strength - 600 psi per ANSI 118.7.
  4. Density - 1.9.
- C. Capable of being applied in layers up to 38 mm (1-1/2 inches) thick without fillers and up to 100 mm (four inches) thick with fillers, being brought to a feather edge, and being trowelled to a smooth finish.
- D. Primers, fillers, and reinforcement as required by manufacturer for application and substrate condition.
- E. Ready for use in 48 hours after application.

## **2.9 MARBLE**

- A. Soundness Classification in accordance with MIA Design Manual III Groups.
- B. Thresholds:
  1. Group A, Minimum abrasive hardness (Ha) of 10.0 per ASTM C241.
  2. Honed finish on exposed faces.
  3. Thickness and contour as shown.
  4. Fabricate from one piece without holes, cracks, or open seams; full depth of wall or frame opening by full width of wall or frame opening; 19 mm (3/4-inch) minimum thickness and 6 mm (1/4-inch) minimum thickness at beveled edge.
  5. Set not more than 13 mm (1/2-inch) above adjoining finished floor surfaces, with transition edges beveled on a slope of no greater than 1:2. On existing floor slabs provide 13 mm (1/2-inch) above ceramic tile surface with bevel edge joint top flush with adjacent floor.
  6. One piece full width of door opening. Notch thresholds to match profile of door jambs.

## **2.10 METAL DIVIDER STRIPS**

- A. Terrazzo type divider strips and formed shapes as indicated on drawings.
- B. Heavy top type strip with 5 mm (3/16 inch) wide top and 38 mm (1-1/2 inch) long leg.
- C. Embedded leg perforated and deformed for keying to mortar.
- D. Aluminum or brass as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

## **2.11 WATER**

- A. Clean, potable and free from salts and other injurious elements to mortar and grout materials.

## **2.12 CLEANING COMPOUNDS**

- A. Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- B. Materials containing acid or caustic material not acceptable.

## **2.13 FLOOR MORTAR BED REINFORCING - NOT USED**

## **2.14 POLYETHYLENE SHEET**

- A. Polyethylene sheet conforming to ASTM D4397.
- B. Nominal thickness: 0.15 mm (six mils).
- C. Use sheet width to minimize joints.

# **PART 3 - EXECUTION**

## **3.1 ENVIRONMENTAL REQUIREMENTS**

- A. Maintain ambient temperature of work areas at not less than 16 degree C (60 degrees F), without interruption, for not less than 24 hours before installation and not less than three days after installation.
- B. Maintain higher temperatures for a longer period of time where required by manufacturer's recommendation and ANSI Specifications for installation.
- C. Do not install tile when the temperature is above 38 degrees C (100 degrees F).
- D. Do not install materials when the temperature of the substrate is below 16 degrees C (60 degrees F).
- E. Do not allow temperature to fall below 10 degrees C (50 degrees F) after fourth day of completion of tile work.

## **3.2 ALLOWABLE TOLERANCE**

- A. Variation in plane of sub-floor, including concrete fills leveling compounds and mortar beds:
  - 1. Not more than 1 in 500 (1/4 inch in 10 feet) from required elevation where Portland cement mortar setting bed is used.
  - 2. Not more than 1 in 1000 (1/8 inch in 10 feet) where dry-set Portland cement, and latex-Portland cement mortar setting beds and chemical-resistant bond coats are used.
- B. Variation in Plane of Wall Surfaces:
  - 1. Not more than 1 in 400 (1/4 inch in eight feet) from required plane where Portland cement mortar setting bed is used.

2. Not more than 1 in 800 (1/8 inch in eight feet) where dry-set or latex-Portland cement mortar or organic adhesive setting materials is used.

### 3.3 SURFACE PREPARATION

#### A. Walls:

1. In showers or other wet areas cover studs with polyethylene sheet.
2. Apply patching and leveling compound to concrete and masonry surfaces that are out of required plane.
3. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces, other than concrete and masonry that are out of required plane.
4. Apply metal lath to framing in accordance with ANSI A108.1:
  - a. Use fasteners specified in paragraph "Fasteners." Use washers when lath opening is larger than screw head.
  - b. Apply scratch and leveling coats to metal lath in accordance with ANSI A108.1.C.
  - c. Total thickness of scratch and leveling coats:
    - 1) Apply 9 mm to 16 mm (3/8 inch to 5/8 inch) thick over solid backing.
    - 2) 16 mm to 19 mm (5/8 to 3/4 inch) thick on metal lath over studs.
    - 3) Where wainscots are required to finish flush with wall surface above, adjust thickness required for flush finish.
  - d. Apply scratch and leveling coats more than 19 mm (3/4 inch) thick in two coats.

#### B. Existing Floors and Walls:

1. Remove existing composition floor finishes and adhesive. Prepare surface by grinding, chipping, self-contained power blast cleaning or other suitable mechanical methods to completely expose uncontaminated concrete or masonry surfaces. Follow safety requirements of ANSI A10.20.
2. Remove existing concrete fill or topping to structural slab. Clean and level the substrate for new setting bed and waterproof membrane or cleavage membrane.
3. Where new tile bases are required to finish flush with plaster above or where they are extensions of similar bases in conjunction with existing floor tiles cut channel in floor slab and expose rough wall construction sufficiently to accommodate new tile base and setting material.

### **3.4 CEMENTITIOUS BACKER UNITS**

- A. Install in accordance with manufacturer's instructions. TCA Systems W244C-13.
- B. Remove polyethylene wrapping from cementitious backer units and separate to allow for air circulation. Allow moisture content of backer units to dry down to a maximum of 35 percent before applying joint treatment and tile.
- C. Install in accordance with ANSI A108.1 except as specified otherwise.
- D. Install units horizontally or vertically to minimize joints with end joints over framing members. Units with rounded edges; face rounded edge away from studs to form a V joint for joint treatment.
- E. Secure cementitious backer units to each framing member with screws spaced not more than 200 mm (eight inches) on center and not closer than 13 mm (1/2 inch) from the edge of the backer unit or as recommended by backer unit manufacturer. Install screws so that the screw heads are flush with the surface of the backer unit.
- F. Where backer unit joins shower pans or waterproofing, lap backer unit over turned up waterproof system. Install fasteners only through top one-inch of turned up waterproof systems.
- G. Do not install joint treatment for seven days after installation of cementitious backer unit.
- H. Joint Treatment:
  - 1. Fill horizontal and vertical joints and corners with latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
  - 2. Leave 6 mm (1/4 inch) space for sealant at lips of tubs, sinks, or other plumbing receptors.

### **3.5 GLASS MAT WATER-RESISTANT GYPSUM BACKER BOARD**

- A. Install in accordance with manufacturer's instructions. TCA Systems W245-13.
- B. Treat joints with tape and latex-Portland cement mortar or adhesive.

### **3.6 MARBLE**

- A. Secure thresholds and stools in position with minimum of two stainless steel dowels.
- B. Set in dry-set Portland cement mortar or latex-Portland cement mortar bond coat.
- C. Set threshold to finish 12mm (1/2 inch) above ceramic tile floor unless shown otherwise, with bevel edge joint top flush with adjacent floor similar to TCA detail TR611-02.

### **3.7 METAL DIVIDER STRIPS - NOT USED**

### **3.8 CERAMIC TILE - GENERAL**

- A. Comply with ANSI A108 series of tile installation standards in "Specifications for Installation of Ceramic Tile" applicable to methods of installation.
- B. Comply with TCA Installation Guidelines:
- C. Setting Beds or Bond Coats:
  - 1. Set wall tile installed over concrete backer board in latex-Portland cement mortar, ANSI A108.1B.
  - 3. Set trim shapes in same material specified for setting adjoining tile.
- E. Workmanship:
  - 1. Lay out tile work so that no tile less than one-half full size is used. Make all cuts on the outer edge of the field.
  - 2. Set tile firmly in place with finish surfaces in true planes. Align tile flush with adjacent tile unless shown otherwise.
  - 3. Form intersections and returns accurately.
  - 4. Cut and drill tile neatly without marring surface.
  - 5. Cut edges of tile abutting penetrations, finish, or built-in items:
    - a. Fit tile closely around electrical outlets, piping, fixtures and fittings, so that plates, escutcheons, collars and flanges will overlap cut edge of tile.
    - b. Seal tile joints water tight as specified in Section 07 92 00, JOINT SEALANTS, around electrical outlets, piping fixtures and fittings before cover plates and escutcheons are set in place.
  - 6. Completed work shall be free from hollow sounding areas and loose, cracked or defective tile.
  - 7. Remove and reset tiles that are out of plane or misaligned.
  - 8. Floors:
    - a. Extend floor tile beneath casework and equipment, except those units mounted in wall recesses.
    - b. Align finish surface of new tile work flush with other and existing adjoining floor finish where shown.
    - c. In areas where floor drains occur, slope to drains where shown.
    - d. Shove and vibrate tiles over 200 mm (8 inches) square to achieve full support of bond coat.
  - 9. Walls:
    - a. Cover walls and partitions, including pilasters, furred areas, and freestanding columns from floor to ceiling, or from floor to nominal wainscot heights shown with tile.

- b. Finish reveals of openings with tile, except where other finish materials are shown or specified.
  - c. At window openings, provide tile stools and reveals, except where other finish materials are shown or specified.
  - d. Finish wall surfaces behind and at sides of casework and equipment, except those units mounted in wall recesses, with same tile as scheduled for room proper.
10. Joints:
- a. Keep all joints in line, straight, level, perpendicular and of even width unless shown otherwise.
  - b. Make joints 2 mm (1/16 inch) wide for glazed wall tile and mosaic tile work.
  - c. Make joints in quarry tile work not less than 6 mm (1/4 inch) nor more than 9 mm (3/8 inch) wide. Finish joints flush with surface of tile.
  - d. Make joints in Paver tile, porcelain type; maximum 3 mm (1/8 inch) wide.
11. Back Buttering: For installations indicated below, obtain 100 percent mortar coverage by complying with applicable special requirements for back buttering of tile in referenced ANSI A108 series of tile installation standards:
- a. Tile wall installations in wet areas, including showers, tub enclosures, laundries and swimming pools.
  - b. Tile installed with chemical-resistant mortars and grouts.
  - c. Tile wall installations composed of tiles 200 by 200 mm (8 by 8 inches or larger).
  - d. Exterior tile wall installations.

**3.9 CERAMIC TILE INSTALLED WITH PORTLAND CEMENT MORTAR - NOT USED**

**3.10 PORCELAIN TILE INSTALLED WITH LATEX PORTLAND CEMENT BONDING MORTAR - NOT USED**

**3.11 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH DRY-SET PORTLAND CEMENT AND LATEX-PORTLAND CEMENT MORTAR - NOT USED**

**3.12 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH ORGANIC ADHESIVE**

- A. Installation of Tile: ANSI A108.1.

**3.13 THIN SET CERAMIC AND PORCELAIN TILE INSTALLED WITH CHEMICAL-RESISTANT BOND COAT**

- A. Epoxy Resin Type: Install tile in accordance with Installation of Tile with Epoxy Mortar; ANSI A108.1.

**3.14 CERAMIC AND PORCELAIN TILE INSTALLED WITH ELASTOMERIC BOND COAT - NOT USED**

**3.15 GROUTING**

- A. Grout Type and Location:
  - 1. Grout for tile of therapeutic pools: Portland cement epoxy grout.
- B. Workmanship:
  - 1. Install and cure grout in accordance with the applicable standard.
  - 2. Portland Cement grout: ANSI A108.1.
  - 3. Epoxy Grout: ANSI A108.1.
  - 4. Furan and Commercial Portland Cement Grout: ANSI A108.1 and in accordance with the manufacturer's printed instructions.
  - 5. Dry-set grout: ANSI A108.1.

**3.16 MOVEMENT JOINTS**

- A. Prepare tile expansion, isolation, construction and contraction joints for installation of sealant. Refer to Section 07 92 00, JOINT SEALANTS.
- B. TCA details EJ 171-02.
- C. At expansion joints, rake out joint full depth of tile and setting bed and mortar bed. Do not cut waterproof or isolation membrane.
- D. Rake out grout at joints between tile, not less than 6 mm (1/4 inch) deep.

**3.17 CLEANING**

- A. Thoroughly sponge and wash tile. Polish glazed surfaces with clean dry cloths.
- B. Methods and materials used shall not damage or impair appearance of tile surfaces.
- C. The use of acid or acid cleaners on glazed tile surfaces is prohibited.
- D. Clean tile grouted with epoxy, furan and commercial Portland cement grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

**3.18 PROTECTION**

- A. Keep traffic off tile floor, until grout and setting material is firmly set and cured.
- B. Where traffic occurs over tile floor, cover tile floor with not less than 9 mm (3/8 inch) thick plywood, wood particle board, or hardboard securely taped in place. Do not remove protective cover until time for final inspection. Clean tile of any tape, adhesive and stains.

**3.19 TESTING FINISH FLOOR**

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.
- B. Test kitchen and storage rooms.

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

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**SECTION 09 51 00**  
**ACOUSTICAL CEILINGS**

**PART 1- GENERAL**

**1.1 DESCRIPTION**

- A. Metal ceiling suspension system for acoustical ceilings.
- B. Acoustical units.
- C. Adhesive application.

**1.2 RELATED WORK**

- A. Color, pattern, and location of each type of acoustical unit:  
Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 SUBMITTAL**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
  - 1. Acoustical units, each type, with label indicating conformance to specification requirements.
  - 2. Colored markers for units providing access.
- C. Manufacturer's Literature and Data:
  - 1. Ceiling suspension system, each type, showing complete details of installation
  - 2. Acoustical units, each type
- D. Manufacturer's Certificates: Acoustical units, each type, in accordance with specification requirements.

**1.4 DEFINITIONS**

- A. Standard definitions as defined in ASTM C634.
- B. Terminology as defined in ASTM E1264.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in the text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A641/A641M-09.....Zinc-coated (Galvanized) Carbon Steel Wire
  - A653/A653M-11.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process
  - C423-09.....Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - C634-11.....Standard Terminology Relating to Environmental Acoustics

- C635-13.....Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- C636-13.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- E84-13.....Surface Burning Characteristics of Building Materials
- E119-12.....Fire Tests of Building Construction and Materials
- E413-10.....Classification for Rating Sound Insulation.
- E580-11.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Seismic Restraint
- E1264-08e1.....Classification for Acoustical Ceiling Products
- C. International Organization for Standardization (ISO)
- ISO 14644-1.....Classification of Air Cleanliness

## **PART 2- PRODUCTS**

### **2.1 METAL SUSPENSION SYSTEM**

- A. ASTM C635, heavy-duty system, except as otherwise specified.
1. Ceiling suspension system members may be fabricated from either of the following unless specified otherwise.
    - a. Galvanized cold-rolled steel, bonderized.
    - b. Extruded aluminum.
  2. Use same construction for cross runners as main runners. Use of lighter-duty sections for cross runners is not acceptable.
  3. Use aluminum suspension in kitchens and aluminum or fire resistant plastic in toilets adjacent to shower areas, hydrotherapy, and swimming pools.
- B. Exposed grid suspension system for support of lay-in panels:
1. Exposed grid width not less than 22 mm (7/8 inch) with not less than 8 mm (5/16 inch) panel bearing surface.
  2. Fabricate wall molding and other special molding from the same material with same exposed width and finish as the exposed grid members.
  3. On exposed metal surfaces apply baked-on enamel flat texture finish in color to match adjacent acoustical units unless specified otherwise on drawings.
  4. Provide gasketed grid system at AT(SP) ceilings.

## **2.2 PERIMETER SEAL**

- A. Vinyl, polyethylene or polyurethane open cell sponge material having density of 1.3 plus or minus 10 percent, compression set less than 10 percent with pressure sensitive adhesive coating on one side.
- B. Thickness as required to fill voids between back of wall molding and finish wall.
- C. Not less than 9 mm (3/8 inch) wide strip.

## **2.3 WIRE**

- A. ASTM A641.
- B. For wire hangers: Minimum diameter 2.68 mm (0.1055 inch).
- C. For bracing wires: Minimum diameter 3.43 mm (0.1350 inch).

## **2.4 ANCHORS AND INSERTS**

- A. Use anchors or inserts to support twice the loads imposed by hangers attached thereto.
- B. Hanger Inserts:
  - 1. Fabricate inserts from steel, zinc-coated (galvanized after fabrication).
  - 2. Nailing type option for wood forms:
    - a. Upper portion designed for anchorage in concrete and positioning lower portion below surface of concrete approximately 25 mm (one inch).
    - b. Lower portion provided with not less than 8 mm (5/16 inch) hole to permit attachment of hangers.
  - 3. Flush ceiling insert type:
    - a. Designed to provide a shell covered opening over a wire loop to permit attachment of hangers and keep concrete out of insert recess.
    - b. Insert opening inside shell approximately 16 mm (5/8 inch) wide by 9 mm (3/8 inch) high over top of wire.
    - c. Wire 5 mm (3/16 inch) diameter with length to provide positive hooked anchorage in concrete.
- C. Clips:
  - 1. Galvanized steel.
  - 2. Designed to clamp to steel beam or bar joists, or secure framing member together.
  - 3. Designed to rigidly secure framing members together.
  - 4. Designed to sustain twice the loads imposed by hangers or items supported.
- D. Tile Splines: ASTM C635.

## 2.5 CARRYING CHANNELS FOR SECONDARY FRAMING

- A. Fabricate from cold-rolled or hot-rolled steel, black asphaltic paint finish, free of rust.
- B. Weighing not less than the following, per 300 m (per thousand linear feet):

Size mm	Size Inches	Cold-rolled		Hot-rolled	
		Kg	Pound	Kg	Pound
38	1 1/2	215.4	475	508	1120
50	2	267.6	590	571.5	1260

## 2.6 ADHESIVE - NOT USED

## 2.7 ACOUSTICAL UNITS

- A. General:
1. Match facility standard finish(es).
  2. Ceiling Tile shall meet minimum 37% bio-based content in accordance with USDA Bio-Preferred Product requirements.
  3. ASTM E1264, weighing 3.6 kg/m<sup>2</sup> (3/4 psf) minimum for mineral fiber panels or tile.
  4. Class A Flame Spread: ASTM 84
  5. Minimum NRC (Noise Reduction Coefficient): 0.55 unless specified otherwise: ASTM C423.
  6. Minimum CAC (Ceiling Attenuation Class): 38-44 range unless specified otherwise: ASTM E413.
  7. Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.75 on the exposed surfaces, except as specified otherwise.
  8. Lay-in panels: Sizes as shown, with square edges, reveal edges.
- B. Special faced acoustical tile units AT(SP) shall be used for areas indicated on drawings, kitchens, SPD and wet areas as per referenced in PG-18-14, Room Finishes, Door, & Hardware Schedule. AT(SP) Special faced acoustical tile units shall provide anti-microbial coated surfaces suitable for use in Class 5 Clean Rooms per ISO 14644-1. Special faced acoustical tile units shall meet all general requirements stated in this specification.
- C. Type III Units - Mineral base with water-based painted finish less than 10 g/l VOC, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Mineral base to contain minimum 65 percent recycled content.

## 2.9 ACCESS IDENTIFICATION

- A. Markers:

1. Use colored markers with pressure sensitive adhesive on one side.
  2. Make colored markers of paper or plastic, 6 to 9 mm (1/4 to 3/8 inch) in diameter.
- B. Use markers of the same diameter throughout building.
- C. Color Code: Use following color markers for service identification:
- |             |                                          |
|-------------|------------------------------------------|
| Color.....  | Service                                  |
| Red.....    | Sprinkler System: Valves and Controls    |
| Green.....  | Domestic Water: Valves and Controls      |
| Yellow..... | Chilled Water and Heating Water          |
| Orange..... | Ductwork: Fire Dampers                   |
| Blue.....   | Ductwork: Dampers and Controls           |
| Black.....  | Gas: Laboratory, Medical, Air and Vacuum |

### **PART 3 EXECUTION**

#### **3.1 CEILING TREATMENT**

- A. Treatment of ceilings shall include sides and soffits of ceiling beams, furred work 600 mm (24 inches) wide and over, and vertical surfaces at changes in ceiling heights unless otherwise shown. Install acoustic tiles after wet finishes have been installed and solvents have cured.
- B. Lay out acoustical units symmetrically about center lines of each room or space unless shown otherwise on reflected ceiling plan.
- C. Moldings:
1. Install metal wall molding at perimeter of room, column, or edge at vertical surfaces.
  2. Install special shaped molding at changes in ceiling heights and at other breaks in ceiling construction to support acoustical units and to conceal their edges.
- D. Perimeter Seal:
1. Install perimeter seal between vertical leg of wall molding and finish wall, partition, and other vertical surfaces.
  2. Install perimeter seal to finish flush with exposed faces of horizontal legs of wall molding.
- E. Existing ceiling:
1. Where extension of existing ceilings occur, match existing.
  2. Where acoustical units are salvaged and reinstalled or joined, use salvaged units within a space. Do not mix new and salvaged units within a space which results in contrast between old and new acoustic units.
  3. Comply with specifications for new acoustical units for new units required to match appearance of existing units.

### 3.2 CEILING SUSPENSION SYSTEM INSTALLATION

#### A. General:

1. Install metal suspension system for acoustical tile and lay-in panels in accordance with ASTM C636, except as specified otherwise.
2. Use direct or indirect hung suspension system or combination thereof as defined in ASTM C635.
3. Support a maximum area of 1.48 m<sup>2</sup> (16 sf) of ceiling per hanger.
4. Prevent deflection in excess of 1/360 of span of cross runner and main runner.
5. Provide extra hangers, minimum of one hanger at each corner of each item of mechanical, electrical and miscellaneous equipment supported by ceiling suspension system not having separate support or hangers.
6. Provide not less than 100 mm (4 inch) clearance from the exposed face of the acoustical units to the underside of ducts, pipe, conduit, secondary suspension channels, concrete beams or joists; and steel beam or bar joist unless furred system is shown,
7. Use main runners not less than 1200 mm (48 inches) in length.
8. Install hanger wires vertically. Angled wires are not acceptable except for seismic restraint bracing wires.

#### B. Anchorage to Structure:

##### 1. Concrete:

- a. Install hanger inserts and wire loops required for support of hanger and bracing wire in concrete forms before concrete is placed. Install hanger wires with looped ends through steel deck if steel deck does not have attachment device.
- b. Use eye pins or threaded studs with screw-on eyes in existing or already placed concrete structures to support hanger and bracing wire. Install in sides of concrete beams or joists at mid height.

##### 2. Steel:

- a. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels for attachment of hanger wires.
  - (1) Size and space carrying channels to insure that the maximum deflection specified will not be exceeded.
  - (2) Attach hangers to steel carrying channels, spaced four feet on center, unless area supported or deflection exceeds the amount specified.
- b. Attach carrying channels to the bottom flange of steel beams spaced not 1200 mm (4 feet) on center before fire proofing is

installed. Weld or use steel clips to attach to beam to develop full strength of carrying channel.

- c. Attach hangers to bottom chord of bar joists or to carrying channels installed between the bar joists when hanger spacing prevents anchorage to joist. Rest carrying channels on top of the bottom chord of the bar joists, and securely wire tie or clip to joist.

B. Direct Hung Suspension System:

- 1. As illustrated in ASTM C635.
- 2. Support main runners by hanger wires attached directly to the structure overhead.
- 3. Maximum spacing of hangers, 1200 mm (4 feet) on centers unless interference occurs by mechanical systems. Use indirect hung suspension system where not possible to maintain hanger spacing.

C. Indirect Hung Suspension System:

- 1. As illustrated in ASTM C635.
- 2. Space carrying channels for indirect hung suspension system not more than 1200 mm (4 feet) on center. Space hangers for carrying channels not more than 2400 mm (8 feet) on center or for carrying channels less than 1200 mm (4 feet) on center so as to insure that specified requirements are not exceeded.
- 3. Support main runners by specially designed clips attached to carrying channels.

D. Seismic Ceiling Bracing System:

- 1. Construct system in accordance with ASTM E580.
- 2. Connect bracing wires to structure above as specified for anchorage to structure and to main runner or carrying channels of suspended ceiling at bottom.

**3.3 ACOUSTICAL UNIT INSTALLATION**

- A. Cut acoustic units for perimeter borders and penetrations to fit tight against penetration for joint not concealed by molding.
- B. Install lay-in acoustic panels in exposed grid with not less than 6 mm (1/4 inch) bearing at edges on supports.
  - 1. Install tile to lay level and in full contact with exposed grid.
  - 2. Replace cracked, broken, stained, dirty, or tile not cut for minimum bearing.
- C. Tile in concealed grid upward access suspension system:
  - 1. Install acoustical tile with joints close, straight and true to line, and with exposed surfaces level and flush at joints.
  - 2. Make corners and arises full, and without worn or broken places.



3. Locate acoustical units providing access as specified under Article, ACCESS.

D. Adhesive applied tile:

1. Condition of surface shall be in accordance with ASTM D1779, Note 1, Cleanliness of Surface, and Note 4, Rigidity of Base Surface.
2. Size or seal surface as recommended by manufacturer of adhesive and allow to dry before installing units.

E. Markers:

1. Install markers of color code specified to identify the various concealed piping, mechanical, and plumbing systems.
2. Attach colored markers to exposed grid on opposite sides of the units providing access.
3. Attach marker on exposed ceiling surface of upward access acoustical unit.

**3.5 CLEAN-UP AND COMPLETION**

- A. Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B. Leave finished work free from defects.

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**SECTION 09 65 13  
RESILIENT BASE AND ACCESSORIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the installation of vinyl or rubber base and resilient stair treads with sheet rubber flooring on landings.

**1.2 RELATED WORK**

- A. Color and texture: See drawings.
- B. Integral base with sheet flooring: Section 09 65 16, RESILIENT SHEET FLOORING.
- C. Section 09 65 19: RESILIENT TILE FLOORING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of each product.
  - 2. Base and stair material manufacturer's recommendations for adhesives.
  - 3. Application and installation instructions.
- C. Samples:
  - 1. Base: 150 mm (6 inches) long, each type and color.
  - 2. Resilient Stair Treads: 150 mm (6 inches) long.
  - 3. Adhesive: Literature indicating each type.

**1.4 DELIVERY**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

**1.5 STORAGE**

- A. Store materials in weather tight and dry storage facility.
- B. Protect material from damage by handling and construction operations before, during, and after installation.

**1.6 APPLICABLE PUBLICATIONS**

- A. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - F1344-10.....Rubber Floor Tile
  - F1859-10.....Rubber Sheet Floor Covering without Backing
  - F1860-10.....Rubber Sheet Floor Covering with Backing

F1861-08.....Resilient Wall Base

C. Federal Specifications (Fed. Spec.):

RR-T-650E.....Treads, Metallic and Non-Metallic, Nonskid

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

A. Use only products by the same manufacturer and from the same production run.

### **2.2 RESILIENT BASE**

A. ASTM F1861, 3 mm (1/8 inch) thick, 100 mm (4 inches) high, Thermoplastics, Group 1. Style B-cove.

B. Where carpet occurs, use Style A-straight.

C. Use only one type of base throughout.

### **2.3 RESILIENT TREADS**

A. Fed. Spec. RR-T-650, Composition A, Type 2, 5 mm (3/16 inch) thick on wear surface tapering to 3 mm (1/8 inch) thick at riser end.

B. Nosing shape to conform to sub-tread nosing shape.

### **2.4 SHEET RUBBER FLOORING - NOT USED**

### **2.5 PRIMER (FOR CONCRETE FLOORS)**

A. As recommended by the adhesive and tile manufacturer.

### **2.6 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

A. Provide products with latex or polyvinyl acetate resins in the mix.

### **2.7 ADHESIVES**

A. Use products recommended by the material manufacturer for the conditions of use.

B. Use low-VOC adhesive during installation. Water based adhesive with low VOC is preferred over solvent based adhesive.

## **PART 3 - EXECUTION**

### **3.1 PROJECT CONDITIONS**

A. Maintain temperature of materials above 21° C (70 °F), for 48 hours before installation.

B. Maintain temperature of rooms where work occurs, between 21° C and 27° C (70°F and 80°F) for at least 48 hours, before, during, and after installation.

C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.

### **3.2 INSTALLATION REQUIREMENTS**

A. The respective manufacturer's instructions for application and installation will be considered for use when approved by the COR.

- B. Submit proposed installation deviation from this specification to the COR indicating the differences in the method of installation.
- C. The COR reserves the right to have test portions of material installation removed to check for non-uniform adhesion and spotty adhesive coverage.

### **3.3 PREPARATION**

- A. Examine surfaces on which material is to be installed.
- B. Fill cracks, pits, and dents with leveling compound.
- C. Level to 3 mm (1/8 inch) maximum variations.
- D. Do not use adhesive for leveling or filling.
- E. Grind, sand, or cut away protrusions; grind high spots.
- F. Clean substrate area of oil, grease, dust, paint, and deleterious substances.
- G. Substrate area dry and cured. Perform manufacturer's recommended bond and moisture test.
- H. Preparation of existing installation:
  - 1. Remove existing base and stair treads including adhesive.
  - 2. Do not use solvents to remove adhesives.
  - 3. Prepare substrate as specified.

### **3.4 BASE INSTALLATION**

- A. Location:
  - 1. Unless otherwise specified or shown, where base is scheduled, install base over toe space of base of casework, lockers, laboratory, pharmacy furniture island cabinets and where other equipment occurs.
  - 2. Extend base scheduled for room into adjacent closet, alcoves, and around columns.
- B. Application:
  - 1. Apply adhesive uniformly with no bare spots.
  - 2. Set base with joints aligned and butted to touch for entire height.
  - 3. Before starting installation, layout base material to provide the minimum number of joints with no strip less than 600 mm (24 inches) length.
    - a. Short pieces to save material will not be permitted.
    - b. Locate joints as remote from corners as the material lengths or the wall configuration will permit.
- C. Form corners and end stops as follows:
  - 1. Score back of outside corner.
  - 2. Score face of inside corner and notch cove.
- D. Roll base for complete adhesion.

### **3.5 STAIR TREAD INSTALLATION**

- A. Prepare surfaces to receive the treads in accordance with applicable portions of paragraph, preparation.
- B. Layout of Treads.
  - 1. No joints will be accepted in treads.
  - 2. Set full treads on intermediate and floor landings.
- C. Application:
  - 1. Apply adhesive uniformly with no bare spots.
  - 2. Roll and pound treads to assure adhesion.

### **3.6 SHEET RUBBER INSTALLATION - NOT USED**

### **3.7 CLEANING AND PROTECTION**

- A. Clean all exposed surfaces of base and adjoining areas of adhesive spatter before it sets.
- B. Keep traffic off resilient material for at least 72 hours after installation.
- C. Clean and polish materials in the following order:
  - 1. After two weeks, scrub resilient base, sheet rubber and treads materials with a minimum amount of water and a mild detergent. Leave surfaces clean and free of detergent residue. Polish resilient base to a gloss finish.
  - 2. Do not polish tread and sheet rubber materials.
- D. When construction traffic is anticipated, cover tread materials with reinforced kraft paper and plywood or hardboard properly secured and maintained until removal is directed by the COR.
- E. Where protective materials are removed and immediately prior to acceptance, replace damaged materials and re-clean resilient materials. Damaged materials are defined as having cuts, gouges, scrapes or tears and not fully adhered.

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**SECTION 09 65 16**  
**RESILIENT SHEET FLOORING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This Section specifies the installation of sheet flooring with backing and integral cove base.
- B. Grades of resilient sheet vinyl floor covering without backing having vinyl plastic wearlayer with backing.
- C. Installation of sheet flooring including following:
  - 1. Heat welded seams.
  - 2. Integral cove base: Installed at intersection of floor and vertical surfaces.

**1.2 RELATED WORK**

- A. Concrete floors: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- B. Color, pattern and texture: Section 09 06 00, SCHEDULE FOR FINISHES.
- C. Resilient base required over metal base of casework: Section 12 31 00, MANUFACTURED METAL CASEWORK.
- D. Resilient base over base of lockers, equipment and casework: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 QUALITY CONTROL-QUALIFICATIONS:**

- A. The Contracting Officer shall approve products or service of proposed manufacturer, suppliers, and installers, and the Contractor shall submit certification that:
  - 1. Heat welded seaming is manufacturer's prescribed method of installation.
  - 2. Installer is approved by manufacturer of materials and has technical qualifications, experience, trained personnel, and facilities to install specified items.
  - 3. Manufacturer's product submitted has been in satisfactory operation, on three installations similar and equivalent in size to this project for three years. Submit list of installations.
- B. The sheet vinyl floor coverings shall meet fire performance characteristics as determined by testing products, per ASTM test method, indicated below by Underwriters Laboratories, Inc. (UL) or another recognized testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E648.
  - 2. Smoke Density: Less than 450 per ASTM E662.

- C. The floor covering manufacturer shall certify that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC's).

#### **1.4 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, submit following:
- B. Manufacturer's Literature and Data:
1. Description of resilient material and accessories to be provided.
  2. Resilient material manufacturer's recommendations for adhesives, weld rods, sealants, and underlayment.
  3. Application and installation instructions.
- C. Samples:
1. Sheet material, 38 mm by 300 mm (1-1/2 inch by 12 inch), of each color and pattern with a welded seam using proposed welding rod 300 mm (12 inches) square for each type, pattern and color.
  2. Cap strip and fillet strip, 300 mm (12 inches) for integral base.
  3. Shop Drawings and Certificates: Layout of joints showing patterns where joints are expressed, and type and location of obscure type joints. Indicate orientation of directional patterns.
  4. Certificates: Quality Control Certificate Submittals and lists specified in paragraph, QUALIFICATIONS.
  5. Edge strips: 150 mm (6 inches) long each type.
  6. Adhesive, underlayment and primer: Pint container, each type.

#### **1.5 PROJECT CONDITIONS**

- A. Maintain temperature of floor materials and room, where work occurs, above 18 ° C (65 °F) and below 38 ° C (100 °F) for 48 hours before, during and for 48 hours after installation. After above period, room temperature shall not fall below 13 °C (55 °F).
- B. Construction in or near areas to receive flooring work shall be complete, dry and cured. Do not install resilient flooring over slabs until they have been cured and are sufficiently dry to achieve a bond with adhesive. Follow flooring manufacturer's recommendations for bond and moisture testing.
- C. Building shall be permanently enclosed. Schedule construction so that floor receives no construction traffic when completed.

#### **1.6 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials to site in original sealed packages or containers; labeled for identification with manufacturer's name and brand.

- B. Deliver sheet flooring full width roll, completely enclosed in factory wrap, clearly marked with the manufacturer's number, type and color, production run number and manufacture date.
- C. Store materials in weathertight and dry storage facility. Protect from damage due to handling, weather, and construction operations before, during and after installation. Store sheet flooring on end with ambient temperatures maintained as recommended by manufacturer.
- D. Store sheet flooring on end.
- E. Move sheet vinyl floor coverings and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

#### **1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society For Testing Materials (ASTM):
  - E648-10.....Critical Radiant Flux of Floor-Covering Systems Using a Radiant Energy Source.
  - E662-12.....Specific Optical Density of Smoke Generated by Solid Materials.
  - F710-08.....Practice for Preparing Concrete Floors and Other Monolithic Floors to Receive Resilient Flooring.
  - F1303-04(2009).....Sheet Vinyl Floor Covering with Backing.
  - F1869-10.....Moisture Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride
  - F1913-04(2010).....Sheet Vinyl Flooring without Backing
  - F2170-09.....Determining Relative Humidity in Concrete Floor Slabs using In-situ Probes
- C. Resilient Floor Covering Institute (RFCI):
  - Recommended Work Practices for Removal of Resilient Floor Coverings.

#### **1.8 SCHEDULING**

- A. Interior finish work such as plastering, drywall finishing, concrete, terrazzo, ceiling work, and painting work shall be complete and dry before installation. Mechanical, electrical, and other work above ceiling line shall be completed. Heating, ventilating, and air conditioning systems shall be installed and operating in order to maintain temperature and humidity requirements.



**1.9 WARRANTY:**

- A. Submit written warranty, in accordance with FAR clause 52.246-21, Warranty of Construction requirements except that warranty period shall be extended to include two (2) years.

**PART 2 - PRODUCTS**

**2.1 SHEET VINYL FLOOR COVERINGS**

- A. Sheet Vinyl Floor Coverings: Smooth face, minimum thickness nominal 2 mm (0.08 inch). Sheet flooring shall conform to ASTM F1913 and material requirements specified in ASTM F1303, Type II, Grade 1, backing classification not applicable. Foam backed sheet flooring is not acceptable.
- B. Size: Provide maximum size sheet vinyl material produced by manufacturer to provide minimum number of joints. Minimum size width acceptable - 1800 mm (72 inches).
- C. Each color and pattern of sheet flooring shall be of same production run.

**2.2 WELDING ROD:**

- A. Product of floor covering manufacturer in color shall match field color of sheet vinyl covering.

**2.3 APPLICATION MATERIALS AND ACCESSORIES**

- A. Floor and Base Adhesive: Type recommended by sheet flooring material manufacturer for conditions of use.
- B. Mastic Underlayment (for concrete floors): Provide products with latex or polyvinyl acetate resins in mix. Condition to be corrected shall determine type of underlayment selected for use.
- C. Base Accessories:
  - 1. Fillet Strip: 19 mm (3/4 inch) radius fillet strip compatible with resilient sheet material.
  - 2. Cap Strip: Extruded flanged zero edge vinyl reducer strip approximately 25 mm (one inch) exposed height with 13 mm (1/2 inch) flange.

**2.4 SHEET FLOORING**

- A. ASTM F1303, Type II, Grade 1, except for backing requirements. Foam backed sheet flooring is not acceptable.
- B. Minimum nominal thickness 2 mm (0.08 inch); 1800 mm (6 ft) minimum width.
- C. Critical Radiant Flux: 0.45 watts per sq.cm or more, Class I, per ASTM E648.
- D. Smoke density: less than 450 per ASTM E662.
- E. Color and pattern of sheet flooring of the same production run.

## **2.5 ADHESIVES**

- A. Water resistant type recommended by the sheet flooring manufacturer for the conditions of use. VOC not to exceed 50g/L

## **2.6 BASE CAP STRIP AND COVE STRIP**

- A. Extruded vinyl compatible with the sheet flooring.
- B. Cap strip "J" shape with feathered edge flange approximately 25 mm (one inch) wide; top designed to receive sheet flooring with 13 mm (1/2 inch) flange lapping top of flooring
- C. Cove strip 70 mm (2-3/4 inch) radius.

## **2.7 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.

## **2.8 PRIMER (FOR CONCRETE SUBFLOORS)**

- A. As recommended by the adhesive or sheet flooring manufacturer.

## **2.9 EDGE STRIPS**

- A. Extruded aluminum, mill finish, mechanically cleaned.
- B. 28 mm (1-1/8 inch) wide, 6 mm (1/4 inch) thick, bevel one edge to 3 mm (1/8 inch) thick.
- C. Drill and counter sink edge strips for flat head screws. Space holes near ends and approximately 225 mm (9 inches) on center in between.

## **2.10 SEALANT**

- A. As specified in Section 07 92 00, JOINT SEALANTS.
- B. Compatible with sheet flooring.

# **PART 3 - EXECUTION**

## **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of sheet flooring above 36 °C (65 °F), for 48 hours before installation.
- B. Maintain temperature of rooms where sheet flooring work occurs above 36 °C (65 °F), for 48 hours, before installation and during installation.
- C. After installation, maintain temperature at or above 36 °C (65 °F.)
- D. Building is permanently enclosed.
- E. Wet construction in or near areas to receive sheet flooring is complete, dry and cured.

## **3.2 SUBFLOOR PREPARATION**

- A. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710.
  - 1. Installer shall examine surfaces on which resilient sheet flooring is to be installed, and shall advise Contractor, in writing, of areas which are unacceptable for installation of flooring material.

- Installer shall advise Contractor which methods are to be used to correct conditions that will impair proper installation. Installation shall not proceed until unsatisfactory conditions have been corrected.
2. Slab substrates dry, free of curing compounds, sealers, hardeners, and other materials which would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by Resilient Floor Covering Institute recommendations in manual RFCI-MRP.
- B. Broom or vacuum clean substrates to be covered by sheet vinyl floor coverings immediately before installation. Following cleaning, examine substrates to determine if there is visually any evidence of moisture, alkaline salts, carbonation, or dust.
- C. Primer: If recommended by flooring manufacturer, prior to application of adhesive, apply concrete slab primer in accordance with manufacturer's directions.
- D. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
- E. Fill cracks, joints, depressions, and other irregularities in concrete with leveling compound.
1. Do not use adhesive for filling or leveling purposes.
  2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
  3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.
- F. Clean floor of oil, paint, dust and deleterious substances. Leave floor dry and cured free of residue from existing curing or cleaning agents.
- G. Moisture Testing: Perform moisture and pH test as recommended by the flooring and adhesive manufacturers. Perform test locations starting on the deepest part of the concrete structure. Proceed with installation only after concrete substrates meet or exceed the manufacturer's requirements. In the absence of specific guidance from the flooring or adhesive manufacturer the following requirements are to be met:
1. Perform moisture vapor emission tests in accordance with ASTM F1869. Proceed with installation only after substrates have a maximum moisture-vapor-emission rate of 1.36 kg of water/92.9 sq. m (3lb of water/1000 sq. ft.) in 24 hours.
  2. Perform concrete internal relative humidity testing using situ probes in accordance with ASTM F2170. Proceed with installation only after

concrete reaches maximum 75 percent relative humidity level measurement.

- H. Preparation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives. Coordinate with Asbestos Abatement Section if asbestos abatement procedures will be involved.
- I. Remove existing resilient flooring and adhesive completely in accordance with Resilient Floor Covering Institute recommendations in manual RFCI-WP. Solvents shall not be used.

### **3.3 INSTALLATION OF FLOORING**

- A. Install work in strict compliance with manufacturer's instructions and approved layout drawings.
- B. Maintain uniformity of sheet vinyl floor covering direction and avoid cross seams.
- C. Arrange for a minimum number of seams and place them in inconspicuous and low traffic areas, but in no case less than 150 mm (6 inches) away from parallel joints in flooring substrates.
- D. Match edges of resilient floor coverings for color shading and pattern at seams.
- E. Where resilient sheet flooring abuts other flooring material floors shall finish level.
- F. Extend sheet vinyl floor coverings into toe spaces, door reveals, closets, and similar openings.
- G. Inform the COR of conflicts between this section and the manufacturer's instructions or recommendations for auxiliary materials, or installation methods, before proceeding.
- H. Install sheet in full coverage adhesives.
  - 1. Air pockets or loose edges will not be accepted.
  - 2. Trim sheet materials to touch in the length of intersection at pipes and vertical projections; seal joints at pipe with waterproof cement or sealant.
- I. Keep joints to a minimum; avoid small filler pieces or strips.
- J. Follow manufacturer's recommendations for seams at butt joints. Do not leave any open joints that would be readily visible from a standing position.
- K. Follow manufacturer's recommendations regarding pattern match, if applicable.
- L. Installation of Edge Strips:
  - 1. Locate edge strips under center lines of doors unless otherwise indicated.

2. Set aluminum strips in adhesive, anchor with lead anchors and stainless steel Phillips screws.

M. Integral Cove Base Installation:

1. Set preformed fillet strip to receive base.
2. Install the base with adhesive, terminate exposed edge with the cap strip.
3. Form internal and external corners to the geometric shape generated by the cove at either straight or radius corners.
4. Solvent weld joints as specified for the flooring. Seal cap strip to wall with an adhesive type sealant.
5. Unless otherwise specified or shown where sheet flooring is scheduled, provide integral base at intersection of floor and vertical surfaces. Provide sheet flooring and base scheduled for room on floors and walls under and behind areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.

**3.4 INSTALLATION OF INTEGRAL COVED BASE**

- A. Set preformed cove to receive base. Install base material with adhesive and terminate exposed edge with cap strip. Integral base shall be 100 mm (4 inches) high.
- B. Internal and external corners shall be formed to geometric shape generated by cove at either square or radius corners.

**3.5 WELDING**

- A. Heat weld all joints of flooring and base using equipment and procedures recommended by flooring manufacturer.
- B. Welding shall consist of routing joint, inserting a welding rod into routed space, and terminally fusing into a homogeneous joint.
- C. Upon completion of welding, surface across joint shall finish flush, free from voids, and recessed or raised areas.
- D. Fusion of Material: Joint shall be fused a minimum of 65 percent through thickness of material, and after welding shall meet specified characteristics for flooring.

**3.6 CLEANING**

- A. Clean small adhesive marks during application of sheet flooring and base before adhesive sets, excessive adhesive smearing will not be accepted.
- B. Remove visible adhesive and other surface blemishes using methods and cleaner recommended by floor covering manufacturers.
- C. Clean and polish materials per flooring manufacturer's written recommendations.
- D. Vacuum floor thoroughly.

- E. Do not wash floor until after period recommended by floor covering manufacturer and then prepare in accordance with manufacturer's recommendations.
- F. Upon completion, COR shall inspect floor and base to ascertain that work was done in accordance with manufacturer's printed instructions.
- G. Perform initial maintenance according to flooring manufacturer's written recommendations.

**3.7 PROTECTION:**

- A. Protect installed flooring as recommended by flooring manufacturer against damage from rolling loads, other trades, or placement of fixtures and furnishings.
- B. Keep traffic off sheet flooring for 24 hours after installation.
- C. Where construction traffic is anticipated, cover sheet flooring with reinforced kraft paper properly secured and maintained until removal is authorized by the COR.
- D. Where protective materials are removed and immediately prior to acceptance, repair any damage, re-clean sheet flooring, lightly re-apply polish and buff floor.

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**SECTION 09 65 19**  
**RESILIENT TILE FLOORING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the installation of rubber tile flooring, and accessories.

**1.2 RELATED WORK**

- A. Color and pattern and location in room finish schedule: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Resilient Base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of each product.
  - 2. Resilient material manufacturers recommendations for adhesives, underlayment, primers and polish.
  - 3. Application and installation instructions.
- C. Samples:
  - 1. Tile: 300 mm by 300 mm (12 inches by 12 inches) for each type, pattern and color.
  - 2. Edge Strips: 150 mm (6 inches) long, each type.
  - 3. Feature Strips: 150 mm (6 inches) long.
- D. Shop Drawings:
  - 1. Layout of patterns shown on the drawings and in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 2. Edge strip locations showing types and detail cross sections.
- E. Test Reports:
  - 1. Abrasion resistance: Depth of wear for each tile type and color and volume loss of tile, certified by independent laboratory.
  - 2. Tested per ASTM F510.

**1.4 DELIVERY**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Materials from containers which have been distorted, damaged or opened prior to installation will be rejected.

**1.5 STORAGE**

- A. Store materials in weathertight and dry storage facility.
- B. Protect from damage from handling, water, and temperature.



## **1.6 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - D4078-02 (2008).....Water Emulsion Floor Finish
  - E648-10.....Critical Radiant Flux of Floor Covering Systems  
Using a Radiant Energy Source
  - E662-09.....Specific Optical Density of Smoke Generated by  
Solid Materials
  - E1155-96 (R2008).....Determining Floor Flatness and Floor Levelness  
Numbers
  - F510-93 (R 2008).....Resistance to Abrasion of Resilient Floor  
Coverings Using an Abrader with a Grit Feed  
Method
  - F710-08.....Preparing Concrete Floors to Receive Resilient  
Flooring
  - F1066-04 (R2010).....Vinyl Composition Floor Tile
  - F1344-10.....Rubber Floor Tile
  - F1700-04 (R2010).....Solid Vinyl Floor Tile
- C. Resilient Floor Covering Institute (RFCI):
  - IP #2.....Installation Practice for Vinyl Composition Tile  
(VCT)
- D. Federal Specifications (Fed. Spec.):
  - SS-T-312.....Tile Floor: Asphalt, Rubber, Vinyl and Vinyl  
Composition

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. Furnish product type, materials of the same production run and meeting following criteria.
- B. Use adhesives, underlayment, primers and polish recommended by the floor resilient material manufacturer.
- C. Critical Radiant Flux: 0.45 watts per sq. cm or more, Class I, per ASTM E 648.
- D. Smoke density: Less than 450 per ASTM E662.

### **2.2 VINYL COMPOSITION TILE - NOT USED**

### **2.3 SOLID VINYL-TILE - NOT USED**

### **2.4 RUBBER TILE**

- A. ASTM F1344, Class 1, homogenous rubber tile, B, through mottled, 300 mm (12 inches) square, 3 mm (1/8 inch) thick.

- B. Color and pattern uniformly distributed throughout tile.
- C. Molded pattern wearing surface base thickness 3 mm (1/8 inch) thick.
- D. Where rubber tile is used provide tiles with a minimum of 90% post consumer rubber.

## **2.5 ADHESIVES**

- A. Comply with applicable regulations regarding toxic and hazardous materials Green Seal (GS-36) for commercial adhesive.
- B. Use low-VOC adhesive during installation. Water based is preferred over solvent based adhesives.

## **2.6 PRIMER (FOR CONCRETE SUBFLOORS)**

As recommended by the adhesive and tile manufacturer.

## **2.7 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide cementitious products with latex or polyvinyl acetate resins in the mix.
- B. Determine the type of underlayment selected for use by the condition to be corrected.

## **2.8 POLISH AND CLEANERS**

- A. Cleaners RFCI CL-1.
- B. Polish: ASTM D4078.

## **2.9 EDGE STRIPS**

- A. 28 mm (1-1/8 inch) wide unless shown otherwise.
- B. Bevel from maximum thickness to minimum thickness for flush joint unless shown otherwise.
- C. Extruded aluminum, mill finish, mechanically cleaned:
  - 1. Drill and counter sink edge strip for flat head screws.
  - 2. Space holes near ends and approximately 225 mm (9 inches) on center between.
- D. Resilient Edge Strip or Reducer Strip: Fed. Specs. SS-T-312, Solid vinyl.

## **2.10 SCREWS**

- A. Stainless steel flat head screw.

## **2.11 FEATURE STRIPS**

- A. Use stainless steel.
- B. Sizes and shapes as shown.

# **PART 3 - EXECUTION**

## **3.1 PROJECT CONDITIONS**

- A. Maintain temperature of materials a minimum of 22 °C (70 °F,) for 48 hours before installation.

- B. Maintain temperature of rooms where work occurs between 21 °C and 27 °C (70 °F and 80 °F), for at least 48 hours, before, during and after installation.
- C. Do not install flooring until building is permanently enclosed and wet construction in or near areas to receive tile materials is complete, dry and cured.

### **3.2 SUBFLOOR PREPARATION**

- A. Verify that concrete slabs comply with ASTM F710. At existing slabs, determine levelness by F-number method in accordance with ASTM E1155. Overall value shall not exceed as follows:  
FF30/FL20
- B. Correct conditions which will impair proper installation.
- C. Fill cracks, joints and other irregularities in concrete with leveling compound:
  - 1. Do not use adhesive for filling or leveling purposes.
  - 2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
  - 3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joints.
- D. Clean floor of oil, paint, dust, and deleterious substances: Leave floor dry and cured free of residue from existing curing or cleaning agents.
- E. Concrete Subfloor Testing:  
Determine Adhesion and dryness of the floor by bond and moisture tests as recommended by RFCI manual MRP.
- F. Perform additional subfloor preparation to obtain satisfactory adherence of flooring if subfloor test patches allows easy removal of tile.
- G. Prime the concrete subfloor if the primer will seal slab conditions that would inhibit bonding, or if priming is recommended by the tile or adhesive manufacturers.
- H. Preparation of existing installation shall include the removal of existing resilient floor and existing adhesive. Do not use solvents to remove adhesives.

### **3.3 INSTALLATION**

- A. Install in accordance with manufacturer's instructions for application and installation unless specified otherwise.
- B. Mix tile from at least two containers. An apparent line either of shades or pattern variance will not be accepted.
- C. Tile Layout:
  - 1. If layout is not shown on drawings, lay tile symmetrically about center of room or space with joints aligned.

2. No tile shall be less than 150 mm (6 inches) and of equal width at walls.
3. Place tile pattern in the same direction; do not alternate tiles.
- D. Trim tiles to touch for the length of intersections at pipes and vertical projections, seal joints at pipes with waterproof cement.
- E. Application:
  1. Apply adhesive uniformly with no bare spots.
    - a. Conform to RFC1-TM-6 for joint tightness and for corner intersection unless layout pattern shows random corner intersection.
    - b. More than 5 percent of the joints not touching will not be accepted.
  2. Roll tile floor with a minimum 45 kg (100 pound) roller. No exceptions.
  3. The COR may have test tiles removed to check for non-uniform adhesion, spotty adhesive coverage, and ease of removal. Install new tile for broken removed tile.
- F. Installation of Edge Strips:
  1. Locate edge strips under center line of doors unless otherwise shown.
  2. Set resilient edge strips in adhesive. Anchor metal edge strips with anchors and screws specified.
  3. Where tile edge is exposed, butt edge strip to touch along tile edge.
  4. Where thin set ceramic tile abuts resilient tile, set edge strip against floor file and against the ceramic tile edge.

### **3.4 CLEANING AND PROTECTION**

- A. Clean adhesive marks on exposed surfaces during the application of resilient materials before the adhesive sets. Exposed adhesive is not acceptable.
- B. Keep traffic off resilient material for a minimum 72 hours after installation.
- C. Clean and polish materials in the following order:
  1. For the first two weeks sweep and damp mopped only.
  2. After two weeks, scrub resilient materials with a minimum amount of water and a mild detergent. Leave surface clean and free of detergent residue.
  3. Apply polish to the floors in accordance with the polish manufacturer's instructions.
- D. When construction traffic occurs over tile, cover resilient materials with reinforced kraft paper properly secured and maintained until removal is directed by COR. At entrances and where wheeled vehicles or

carts are used, cover tile with plywood, hardboard, or particle board over paper, secured and maintained until removal is directed by COR.

- E. When protective materials are removed and immediately prior to acceptance, replace any damage tile, re-clean resilient materials, lightly re-apply polish and buff floors.

### **3.6 LOCATION**

- A. Unless otherwise specified or shown, install tile flooring, on floor under areas where casework, laboratory and pharmacy furniture and other equipment occurs, except where mounted in wall recesses.
- B. Extend tile flooring for room into adjacent closets and alcoves.

- - - E N D - - -

**SECTION 09 67 23.20**  
**RESINOUS (EPOXY BASE) WITH VINYL CHIP BROADCAST (RES-2)**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies Resinous (Resinous epoxy base with vinyl chip flake broadcast) flooring with integral cove base:
  - 1. Res-2 Resinous (epoxy) vinyl chip flake broadcast flooring system.

**1.2 RELATED WORK**

- A. Concrete and Moisture Vapor Barrier: Section 03 30 00, CAST-IN-PLACE CONCRETE.
- B. Color and location of each type of resinous flooring: As indicated on drawings.
- C. Floor Drains: Division 22, PLUMBING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Description of each product to be provided.
  - 2. Application and installation instructions.
  - 3. Maintenance Instructions: Submit manufacturer's written instructions for recommended maintenance practices.
- C. Qualification Data: For Installer.
- D. Sustainable Submittal:
  - 1. Product data for products having recycled content, submit documentation indicating percentages by weight of post-consumer and pre-consumer recycled content.
    - a. Include statements indicating costs for each product having recycled content.
  - 2. Product data for field applied, interior, paints, coatings, and primers, include printed statement of VOC content indicating compliance with environmental requirements.
- E. Samples:
  - 1. Each color and texture specified on drawings.
  - 2. Samples for verification: For each (color and texture) resinous flooring system required, 6 inches (152 mm) square, applied to a rigid backing by installer for this project.
  - 3. Sample showing construction from substrate to finish surface in thickness specified and color and texture of finished surfaces. Finished flooring must match the approved samples in color and texture.

F. Shop Drawings: Include plans, sections, component details, and attachment to other trades. Indicate layout of the following:

1. Patterns.
2. Edge configurations.

G. Certifications and Approvals:

1. Manufacturer's certification of material and substrate compliance with specification.
2. Manufacturer's approval of installers.
3. Contractor's certificate of compliance with Quality Assurance requirements.

H. Warranty: As specified in this section.

#### **1.4 QUALITY ASSURANCE**

A. Manufacture Certificate: Manufacture shall certify that a particular resinous flooring system has been manufactured and in use for a minimum of five (5) years.

B. Installer Qualifications: Engage an experienced installer (applicator) who is experienced in applying resinous flooring systems similar in material, design, and extent to those indicated for this project for a minimum period of five (5) years, whose work has resulted in applications with a record of successful in-service performance, and who is acceptable to resinous flooring manufacturer.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.
2. Contractor shall have completed at least ten (10) projects of similar size and complexity. Include list of at least five (5) projects. List must include owner (purchaser); address of installation, contact information at installation project site; and date of installation.
3. Installer's Personnel: Employ persons trained for application of specified product.

C. Source Limitations:

1. Obtain primary resinous flooring materials including primers, resins, hardening agents, grouting coats and finish or sealing coats from a single manufacturer.
2. Provide secondary materials, including patching and fill material, joint sealant, and repair material of type and from source recommended by manufacturer of primary materials.

D. Mockups: Apply mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and establish quality standards for materials and execution.

1. Apply full-thickness mockups on 48 inch (1200 mm) square floor area selected by VA COR.
    - a. If applicable include 48 inch (1200 mm) length of integral cove base.
  2. Approved mockups not damaged during the testing may become part of the completed work if undisturbed at time of Substantial Completion.
  3. Sign off from VA COR on texture for slip resistance and clean ability must be complete before installation of flooring system.
- E. Pre-Installation Conference:
1. Convene a meeting not less than thirty days prior to starting work.
  2. Attendance:
    - a. Contractor
    - b. VA COR
    - c. Manufacturer and Installer's Representative
  3. Review the following:
    - a. Environmental requirements
      - 1) Air and surface temperature
      - 2) Relative humidity
      - 3) Ventilation
      - 4) Dust and contaminants
    - b. Protection of surfaces not scheduled to be coated
    - c. Inspect and discuss condition of substrate and other preparatory work performed
    - d. Review and verify availability of material; installer's personnel, equipment needed
    - e. Design and edge conditions.
    - f. Performance of the coating with chemicals anticipated in the area receiving the resinous (urethane and epoxy mortar/cement) flooring system
    - g. Application and repair
    - h. Field quality control
    - i. Cleaning
    - j. Protection of coating systems
    - k. One-year inspection and maintenance
    - l. Coordination with other work
- F. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of resinous flooring systems.
- G. Contractor Job Site Log: Contractor shall document daily; the work accomplished environmental conditions and any other condition event



significant to the long term performance of the urethane and epoxy mortar/cement flooring materials installation. The Contractor shall maintain these records for one year after Substantial Completion.

#### **1.5 MATERIAL PACKAGING DELIVERY AND STORAGE**

- A. Deliver materials to the site in original sealed packages or containers, clearly marked with the manufacturer's name or brand, type and color, production run number and date of manufacture.
- B. Protect materials from damage and contamination in storage or delivery, including moisture, heat, cold, direct sunlight, etc.
- C. Maintain temperature of storage area between 60 and 80 degrees F (15 and 26 degrees C).
- D. Keep containers sealed until ready for use.
- E. Do not use materials beyond manufacturer's shelf life limits.
- F. Package materials in factory pre-weighed and in single, easy to manage batches sized for ease of handling and mixing proportions from entire package or packages. No On site weighing or volumetric measurements are allowed.

#### **1.6 PROJECT CONDITIONS**

- A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring applications.
  - 1. Maintain material and substrate temperature between 65 and 85 degrees F (18 and 30 degrees C) during resinous flooring application and for not less than 24 hours after application.
- B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- D. Concrete substrate shall be properly cured for a minimum of 30 days. A vapor barrier must be present for concrete subfloors on or below grade. Otherwise, an osmotic pressure resistant grout must be installed prior to the resinous flooring.

#### **1.7 WARRANTY**

- A. Work subject to the terms of the Article "Warranty of Construction" FAR clause 52.246-21.
- B. Warranty: Manufacture shall furnish a single, written warranty covering the full assembly (including substrata) for both material and

workmanship for a extended period of three (3) full years from date of installation, or provide a joint and several warranty signed on a single document by manufacturer and applicator jointly and severally warranting the materials and workmanship for a period of three (3) full years from date of installation. A sample warranty letter must be included with bid package or bid may be disqualified.

#### **1.8 APPLICABLE PUBLICATIONS**

- A. The publication listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. ACI (American Concrete Institute):  
Comm. 503.1-92.....Four Epoxy Specifications (Reapproved 2003).
- C. American Society for Testing and Materials (ASTM):  
C109.....Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2" or 50 mm Cube Specimens)  
C150.....Standard Specification for Portland Cement  
C219-07a.....Standard Terminology Relating to Hydraulic Cement  
C267-01(2006).....Standard Test Methods for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes  
C307-03 (2008).....Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing  
C413-01(2006).....Standard Test Method for Absorption of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing and Polymer Concretes  
C501-84(2002).....Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser  
C579-01(2006).....Standard Test Method for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes  
C580-02(2008).....Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes  
C722-04.....Standard Specification for Chemical-Resistant Monolithic Floor Surfacing

- C811-98(2008).....Standard Practice for Surface Preparation of  
                                          Concrete for Application of Chemical-Resistant  
                                          Resin Monolithic Surfacing
- C881/C881M-02.....Standard Specification for Epoxy-Resin-Base  
                                          Bonding Systems for Concrete
- D1308-02(2007).....Standard Test Method for Effect of Household  
                                          Chemicals on Clear and Pigmented Organic  
                                          Finishes
- D1652-04.....Standard Test Method for Epoxy Content of Epoxy  
                                          Resins
- D2240-05.....Standard Test Method for Rubber Property –  
                                          Durometer Hardness
- D4060-07.....Standard Test Method for Abrasion Resistance of  
                                          Organic Coatings by the Taber Abraser
- E162-09.....Standard Test Method for Surface Flammability of  
                                          Using a Radiant Heat Energy Source
- E648-09a.....Standard Test Method for Critical Radiant Flux  
                                          of Floor- Covering Systems Using a Radiant Heat  
                                          Energy Source
- F1869-09.....Standard Test Method for Measuring Moisture  
                                          Vapor Emission Rate of Concrete Subfloor Using  
                                          Anhydrous Calcium Chloride
- D. Military Specification (Mil Spec):  
     MIL-PRF-3134.....Para. 4.7.3, Indentation, No Cracking or Loss of  
                                          Bond Water Absorption
- MIL-PRF-23003A.....Para. 4.6.11, Resistance to Immersion
- E. National Association of Architectural Metal Manufacturers (NAAMM):  
     AMP 501.....Finishes for Aluminum
- F. National Fire Protection Association (NFPA):  
     56A.....Inhalation Aesthetics replaced by NFPA 99  
                                          Standard for Health Care Facilities
- G. The Society For Protective Coatings (SSPC):  
     SP6.....Commercial Blast Cleaning

## **PART 2 - PRODUCTS**

### **2.1 SYSTEM DESCRIPTION FOR RES-2 (BROADCAST VINYL CHIP FLAKE)**

- A. System Descriptions:
  - 1. Monolithic, multi-component epoxy chemistry resinous flooring system.  
     Primer with broadcast quartz aggregates, High performance multi-  
     component solvent free epoxy undercoat, Vinyl chip flake broadcast

- media in desired flake size (1/16"). High performance multi component epoxy and solvent free sealers.
- B. Products: Subject to compliance with applicable fire, health, environmental, and safety requirements for storage, handling, installation, and clean up.
- C. System Components: Verify specific requirements as systems vary by manufacturer. Verify build up layers of broadcast and installation method. Verify compatibility with substrate. Use manufacturer's standard components, compatible with each other and as follows:
1. Primer with Broadcast quartz (primer coat):
    - a. Resin: epoxy.
    - b. Formulation Description: Multiple component high solids.
    - c. Application Method: squeegee, back roll and broadcast.
    - d. Thickness of coat(s): 2-3mil.
    - e. Number of Coats: One.
    - f. Aggregates: Quartz broadcast into wet epoxy primer.
  2. Undercoat: (body coat)
    - a. Resin: Epoxy.
    - b. Formulation Description: Pigmented multi-component, high solids.
    - c. Application Method: Notched squeegee and Back roll
    - d. Number of Coats: One.
    - e. Aggregates: vinyl chip flake broadcast into wet Undercoat.
    - f. Thickness of coat(s): 20-30mil.
    - g. Number of Coats: One.
  3. Sealer coat:
    - a. Resin: Epoxy.
    - b. Formulation Description: Multiple component high solids, no solvent UV stable.
    - c. Type/Finsh: Clear Gloss.
    - d. Thickness of coat(s): 2-3mil.
    - e. Number of Coats: (2) two.
    - f. Application: Squeegee and finish roll.
- D. Physical Properties:
1. Physical Properties of flooring system when tested as follows:

Property	Test	Value
Tensile Strength	ASTM D638	5,200 psi
Volatile Organic Compound Limits (V.O.C.)	EPA & LEED	Below 100 g/l
Flexural Strength	ASTM D790	4,000 psi
Water Absorption	ASTM C413	0.056%
Coefficient of friction dry/slip index wet	ASTM D2047	>.79 dry >.65 wet
Impact Resistance	ASTM D4226	> 160 in. lbs
Abrasion Resistance	ASTM D4060 CS-17	0.03 gm maximum weight loss
Thermal Coefficient of Linear Expansion	ASTM C531	17 x 10 <sup>-6</sup> in/in °F
Hardness Shore D	ASTM D2240	85 to 90
Bond Strength	ASTM D7234	>300 psi 100% concrete failure
Chemical Resistance of the following:	ASTM D1380	No Effect
Acetic acid	5 percent	
Ammonium hydroxide	10 percent	
Citric Acid	50 percent	
Fatty acid Motor Oil, 20W		
Hydrochloric acid		
Salt water	10 percent	
Sodium Hydroxide	10 percent	
Sulfuric acid	10 percent	
Trisodium phosphate	10 percent	
	5 percent	
Urine		
Feces		
Hydrogen peroxide	28 percent	
Distilled Water		
Sodium Hypochloride	5.28 percent	

E. System Characteristics:

1. Color and Pattern: As selected by COR from manufacturer's standard colors.
2. Integral cove base: 1 inch (25.4 mm) radius epoxy mortar cove keyed into concrete substrate and or resinous flooring mortar system. No fillers integral cove base must be troweled in place with specified resinous mortar base.
3. Overall System Thickness: Nominal 3/16 to 1/4 inches (4.76 to 6.35 mm).

4. Finish: Anti-slip resistant.

5. Temperature Range: Systems vary by manufacturer; approximate range from a minimum of 45 to 150 degrees F.

F. Physical Properties:

1. Physical Properties of flooring system when tested as follows:

**2.2 SUPPLEMENTAL MATERIALS**

- A. Textured Top Coat: Type recommended or produced by manufacturer of seamless resinous flooring system, slip resistance for desired final finish.
- B. Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service or joint conditioned indicated.
- C. Waterproof Membrane: Type recommended or produced by manufacturer of resinous floor coatings for type of service and conditions as indicated in Drawings and/or specified.
- D. Provide a chemical resistant epoxy novolac top coat capable of resisting sustained temperatures up to 120°C (250°F).
- E. Crack Isolation Membrane: Type recommended or produced by manufacturer of resinous flooring for conditions as indicated in Drawings and/or specified.
- F. Anti-Microbial Additive: Incorporate anti-microbial chemical additive to prevent growth of most bacteria, algae, fungi, mold, mildew, yeast, etc.
- G. Patching and Fill Material: Resinous product of or approved by resinous coating manufacturer for application indicated. Resinous based materials only. Cementitious or single component product are not expectable.

**2.3 TROWELED COVE BASE**

- A. Same physical properties as specified resinous mortar system.

**2.4 BASE CAP STRIP**

- A. Aluminum, Extruded: ASTM B221, Alloy 6063-T6.
- B. Shape for 3/16 inch (4.76 mm) depth of base material, "J" configuration.
- C. Finish:
  - 1. Finish exposed surfaces in accordance with NAAMM Metal Finishes Manual.
  - 2. Aluminum: NAAMM Amp 501:
    - a. Clear anodic coating, AA-C22A41 chemically etched medium matte, with Architectural Class 1, 0.7 mils (0.018 mm) or thicker.

**PART 3 - EXECUTION**

**3.1 INSPECTION**

- A. Examine the areas and conditions where monolithic resinous system with integral base is to be installed with the VA COR.

- B. Moisture Vapor Emission Testing: Perform moisture vapor transmission testing in accordance with ASTM F1869 to determine the MVER of the substrate prior to commencement of the work. See section 3.4, 3.

### **3.2 PROJECT CONDITIONS**

- A. Maintain temperature of rooms (air and surface) where work occurs, between 70 and 90 degrees F (21 and 32 degrees C) for at least 48 hours, before, during, and 24 hours after installation. Maintain temperature at least 70 degrees F (21 degrees C) during cure period.
- B. Maintain relative humidity less than 75 percent.
- C. Do not install materials until building is permanently enclosed and wet construction is complete, dry, and cured.
- D. Maintain proper ventilation of the area during application and curing time period.
  - 1. Comply with infection control measures of the VA Medical Center.

### **3.3 INSTALLATION REQUIREMENTS**

- A. The manufacturer's instructions for application and installation shall be reviewed with the VA COR for the seamless resinous (urethane and epoxy mortar) flooring system with integral cove base.
- B. Substrate shall be approved by manufacture technical representative.

### **3.4 PREPARATION**

- A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry, and neutral Ph substrate for resinous flooring application.
- B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
  - 1. Prepare concrete substrates as follows:
    - a. Comply with ASTM C 811 requirements, unless manufacturer's written instructions are more stringent.
  - 2. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written recommendations.
  - 3. Verify that concrete substrates are dry.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with application only after substrates have maximum moisture-vapor-emission rate of [3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. MVT threshold for monolithic resinous flooring shall not exceed 3 lbs/1000 square feet (0.0001437 kPa) in a 24 hour period.
    - c. When MVT emission exceeds this limit, apply manufacturer's recommended vapor control primer or other corrective measures as

recommended by manufacturer prior to application of flooring or membrane systems.

- d. Perform in situ probe test, ASTM F2170. Proceed with application only after substrates do not exceed a maximum potential equilibrium relative humidity of 75-80 percent.
- e. Provide a written report showing test placement and results.
4. Verify that concrete substrates have neutral Ph and that resinous flooring will adhere to them. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.
- C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.
- D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written recommendations. Allowances should be included for flooring manufacturer recommended joint fill material, and concrete crack treatment.
- F. Prepare wall to receive integral cove base:
  1. Verify wall material is acceptable for resinous flooring application, if not, install material (e.g. cement board) to receive base.
  2. Fill voids in wall surface to receive base, install undercoats (e.g. water proofing membrane, and/or crack isolation membrane) as recommended by resinous flooring manufacturer.
  3. Install base prior to flooring if required by resinous flooring manufacturer.
  4. Grind, cut or sand protrusions to receive base application.

### **3.5 APPLICATION**

- A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.
  1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
  2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
- B. Apply Primer: over prepared substrate at manufacturer's recommended spreading rate for all areas to receive integrated cove base.



- C. Apply cove base: Trowel to wall surfaces at a 1 inch radius, before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, and troweling, sanding, and top coating of cove base. Round internal and external corners.
- D. Apply Primer: over prepared substrate at manufacturer's recommended spreading rate.
- E. Trowel mortar base: Mix mortar material according to manufacturer's recommended procedures. Climatic and non-climatic resinous flooring systems may vary slightly on mode of application. Application should be based upon the following: Uniformly spread mortar over substrate using a specially designed screed box adjusted to manufacturer's recommended height. Metal trowel (hand or power) single mortar coat in thickness indicated for flooring system, grout to fill substrate voids. When cured, sand to remove trowel marks and roughness.
- F. Broadcast: Immediately broadcast quartz silica aggregate into the primer using manufacturer's spray caster. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- G. Under Coat: Mix base material according to manufacturer's recommended procedures. Uniformly spread mixed material over previously primed substrate using manufacturer's installation tool. Roll material with strict adherence to manufacturer's installation procedures and coverage rates.
- H. Broadcast: Immediately broadcast vinyl flakes into the body coat. Strict adherence to manufacturer's installation procedures and coverage rates is imperative.
- I. First Sealer: Remove excess un-bonded flakes by lightly brushing and vacuuming the floor surface. Mix and apply sealer with strict adherence to manufacturer's installation procedures.
- J. Second Sealer: Lightly sand first sealer coat. Mix and apply second sealer coat with strict adherence to manufacturer's installation procedures.

### **3.6 TOLERANCE**

- A. From line of plane: Maximum 1/8 inch (3.18 mm) in total distance of flooring and base. Broadcast resinous flooring system will contour substrate. Deviation and tolerance are subject to concrete tolerance.
- B. From radius of cove: Maximum of 1/8 inch (3.18 mm) plus or 1/16-inch (1.59 mm) minus.

### **3.7 CURING, PROTECTION AND CLEANING**

- A. Cure resinous flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process.
- B. Close area of application for a minimum of 24 hours.
- C. Protect resinous flooring materials from damage and wear during construction operation.
  - 1. Cover flooring with kraft type paper.
  - 2. Optional 6 mm (1/4 inch) thick hardboard, plywood, or particle board where area is in foot or vehicle traffic pattern, rolling or fixed scaffolding and overhead work occurs.
- D. Remove temporary covering and clean resinous flooring just prior to final inspection. Use cleaning materials and procedures recommended by resinous flooring manufacturer.

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**SECTION 09 68 00**  
**CARPETING**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies carpet, edge strips, adhesives, and other items required for complete installation.

**1.2 RELATED WORK**

- A. Color and texture of carpet and edge strip: Section 09 06 00, SCHEDULE FOR FINISHES.
- B. Resilient wall base: Section 09 65 13, RESILIENT BASE AND ACCESSORIES.

**1.3 QUALITY ASSURANCE**

- A. Carpet installed by mechanics certified by the Floor Covering Installation Board.
- B. Certify and label the carpet that it has been tested and meets criteria of CRI IAQ Carpet Testing Program for indoor air quality.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Product Data:
  - 1. 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.
  - 2. Manufacturer's printed installation instructions for the carpet, including preparation of installation substrate, seaming techniques and recommended adhesives and tapes.
  - 3. Manufacturer's certificate verifying carpet containing recycled materials include percentage of recycled materials as specified.
- C. Samples:
  - 1. Carpet: "Production Quality" samples 300 x 300 mm (12 x 12 inches) of carpets, showing quality, pattern and color specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - 2. Floor Edge Strip (Molding): 150 mm (6 inches) long of each color and type specified.
  - 3. Base Edge Strip (Molding): 150 mm (6 inches) long of each color specified.
- D. Shop Drawings: Installers layout plan showing seams and cuts for sheet carpet and carpet module.

- E. Maintenance Data: Carpet manufacturer's maintenance instructions describing recommended type of cleaning equipment and material, spotting and cleaning methods and cleaning cycles.

#### **1.5 DELIVERY AND STORAGE**

- A. Deliver carpet in manufacturer's original wrappings and packages clearly labeled with manufacturer's name, brand, name, size, dye lot number and related information.
- B. Deliver adhesives in containers clearly labeled with manufacturer's name, brand name, number, installation instructions, safety instructions and flash points.
- C. Store in a clean, dry, well ventilated area, protected from damage and soiling. Maintain storage space at a temperature above 16 degrees C (60 degrees F) for 2 days prior to installation.

#### **1.6 ENVIRONMENTAL REQUIREMENTS**

- A. Areas in which carpeting is to be installed shall be maintained at a temperature above 16 degrees C (60 degrees F) for 2 days before installation, during installation and for 2 days after installation. A minimum temperature of 13 degrees C (55 degrees F) shall be maintained thereafter for the duration of the contract. Traffic or movement of furniture or equipment in carpeted area shall not be permitted for 24 hours after installation. Other work which would damage the carpet shall be completed prior to installation of carpet.

#### **1.7 WARRANTY**

- A. Carpet and installation subject to terms of "Warranty of Construction" FAR clause 52.246-21, except that warranty period is extended to two years.

#### **1.8 APPLICABLE PUBLICATIONS**

- A. Publication listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American National Standards Institute (ANSI):  
ANSI/NSF 140-10.....Sustainable Carpet Assessment Standard
- C. American Association of Textile Chemists and Colorists (AATCC):  
AATCC 16-04.....Colorfastness to Light  
AATCC 129-10.....Colorfastness to Ozone in the Atmosphere under High Humidities  
AATCC 134-11.....Electric Static Propensity of Carpets  
AATCC 165-08.....Colorfastness to Crocking: Textile Floor Conerings-AATCC Crockmeter Method
- D. American Society for Testing and Materials (ASTM):

ASTM D1335-05.....Tuft Bind of Pile Yarn Floor Coverings  
ASTM D3278-96 (R2004)...Flash Point of Liquids by Small Scale Closed-Cup  
Apparatus  
ASTM D5116-10.....Determinations of Organic Emissions from Indoor  
Materials/Products  
ASTM D5252-05.....Operation of the Hexapod Tumble Drum Tester  
ASTM D5417-05.....Operation of the Vettermann Drum Tester  
ASTM E648-10.....Critical Radiant Flux of Floor-Covering Systems  
Using a Radiant Heat Energy Source

E. The Carpet and Rug Institute (CRI):

CRI 104-11.....Installation of Commercial Carpet

**PART 2 - PRODUCTS**

**2.1 CARPET**

A. Physical Characteristics:

1. Carpet free of visual blemishes, streaks, poorly dyed areas, fuzzing of pile yarn, spots or stains and other physical and manufacturing defects.
2. Manufacturers standard construction commercial carpet:
  - a. Modular Tile: 660 mm (24 inches) square tile.
3. Provide static control to permanently control static build upto less than 2.0 kV when tested at 20 percent relative humidity and 21 degrees C (70 degrees F) in accordance with AATCC 134.
4. Pile Height: Maximum 5 mm (0.20 inch).
5. Pile Fiber: Nylon with recycled content 25 percent minimum branded (federally registered trademark).
6. Pile Type: Level Loop.
7. Backing materials: Manufacturer's unitary backing designed for glue-down installation using recovered materials.
8. Appearance Retention Rating (ARR): Carpet shall be tested and have the minimum 3.5-4.0 Severe ARR when tested in accordance with either the ASTM D 5252 (Hexapod) or ASTM D 5417 (Vettermann) test methods using the number of cycles for short and long term tests as specified.
9. Tuft Bind: Minimum force of 40 N (10 lb) required to pull a tuft or loop free from carpet backing. Test per ASTM D1335.
10. Colorfastness to Crocking: Dry and wet crocking and water bleed, comply with AATCC 165 Color Transference Chart for colors, minimum class 4 rating.
11. Colorfastness to Ozone: Comply with AATCC 129, minimum rating of 4 on the AATCC color transfer chart.

12. Delamination Strength: Minimum of 440 N/m (2.5 lb/inch) between secondary backing.
13. Flammability and Critical Radiant Flux Requirements:
  - a. Test Carpet in accordance with ASTM E 648.
  - b. Class I: Not less than 0.45 watts per square centimeter.
  - c. Class II: Not less than 0.22 watts per square centimeter.
  - d. Carpet in corridors, exits and Medical Facilities: Class I.
14. Density: Average Pile Yarn Density (APYD):
  - a. Corridors, lobbies, entrances, common areas or multipurpose rooms, open offices, waiting areas and dining areas: Minimum APYD 6000.
  - b. Other areas: Minimum APYD 4000.
15. VOC Limits: Use carpet and carpet adhesive that comply with the following limits for VOC content when tested according to ASTM D 5116:
  - a. Carpet, Total VOCs: 0.5 mg/sq.m x hr.
  - b. Carpet, 4-PC (4-Phenylcyclohexene): 0.05 mg/sq.m x hr.
  - c. Carpet, Formaldehyde: 0.05 mg/sq.m x hr.
  - d. Carpet, Styrene: 0.4 mg/sq.m x hr.
  - e. Adhesive, Total VOCs: 10.00 mg/sq.m x hr.
  - f. Adhesive, Formaldehyde: 0.05 mg/sq.m x hr.
  - g. Adhesive, 2-Ethyl-1-Hexanol: 3.00 mg/sq.m x hr.
- B. Shall meet platinum level of ANSI/NSF 140.
- C. Color, Texture, and Pattern: As specified on drawings.

## **2.2 ADHESIVE AND CONCRETE PRIMER**

- A. Waterproof, resistant to cleaning solutions, steam and water, nonflammable, complies with air-quality standards as specified.  
Adhesives flashpoint minimum 60 degrees C (140 degrees F), complies with ASTM D 3278.
- B. Seam Adhesives: Waterproof, non-flammable and non-staining.

## **2.3 SEAMING TAPE**

- A. Permanently resistant to carpet cleaning solutions, steam, and water.
- B. Recommended by carpet manufacturer.

## **2.4 EDGE STRIPS (MOLDING)**

- A. Metal:
  1. Hammered surface aluminum, pinless, clamp down type designed for the carpet being installed.
  2. Floor flange not less than 38 mm (1-1/2 inches) wide, face not less than 16 mm (5/8 inch) wide.
  3. Finish: Clear anodic coating unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

B. Vinyl Edge Strip:

1. Beveled floor flange minimum 50 mm (2 inches) wide.
2. Beveled surface to finish flush with carpet for tight joint and other side to floor finish.
3. Color as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

**2.5 LEVELING COMPOUND (FOR CONCRETE FLOORS)**

- A. Provide Portland cement bases polymer modifier with latex or polyvinyl acetate resin manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- B. Determine the type of underlayment selected for use by condition to be corrected.

**PART 3 - EXECUTION**

**3.1 SURFACE PREPARATION**

- A. Examine surfaces on which carpeting is to be installed.
- B. Clean floor of oil, waxy films, paint, dust and deleterious substances that prevent adhesion, leave floor dry and cured, free of residue from curing or cleaning agents.
- C. Correct conditions which will impair proper installation, including trowel marks, pits, dents, protrusions, cracks or joints.
- D. Fill cracks, joints depressions, and other irregularities in concrete with leveling compound.
  1. Do not use adhesive for filling or leveling purposes.
  2. Do not use leveling compound to correct imperfections which can be corrected by spot grinding.
  3. Trowel to smooth surface free of trowel marks, pits, dents, protrusions, cracks or joint lines.
- E. Test new concrete subfloor prior to adhesive application for moisture and surface alkalinity per CRI 104 Section 6.3.1 or per ASTM E1907.

**3.2 CARPET INSTALLTION**

- A. Do not install carpet until work of other trades including painting is complete and dry.
- B. Install in accordance with CRI 104 direct glue down installation.
  1. Relax carpet in accordance with Section 6.4.
  2. Comply with indoor air quality recommendations noted in Section 6.5.
  3. Maintain temperature in accordance with Section 15.3.
- C. Secure carpet to subfloor of spaces with adhesive applied as recommended by carpet manufacturer.
- D. Follow carpet manufacturer's recommendations for matching pattern and texture directions.



E. Cut openings in carpet where required for installing equipment, pipes, outlets, and penetrations.

1. Bind or seal cut edge of sheet carpet and replace flanges or plates.

2. Use additional adhesive to secure carpets around pipes and other vertical projections.

G. Broadloom Carpet:

1. Install per CRI 104, Section 8.

2. Lay broadloom carpet lengthwise in longest dimension of space, with minimum seams, uniformly spaced to provide a tight smooth finish, free from movement when subjected to traffic.

3. Use tape-seaming method to join sheet carpet edges. Do not leave visible seams.

H. Carpet Modules:

1. Install per CRI 104, Section 13, Adhesive Application.

2. Lay carpet modules with pile in same direction unless specified otherwise in Section 09 06 00, SCHEDULE FOR FINISHES.

3. Install carpet modules so that cleaning methods and solutions do not cause dislocation of modules.

4. Lay carpet modules uniformly to provide tight flush joints free from movement when subject to traffic.

### **3.3 EDGE STRIPS INSTALLATION**

A. Install edge strips over exposed carpet edges adjacent to uncarpeted finish flooring.

B. Anchor metal strips to floor with suitable fasteners. Apply adhesive to edge strips, insert carpet into lip and press it down over carpet.

C. Anchor vinyl edge strip to floor with adhesive apply adhesive to edge strip and insert carpet into lip and press lip down over carpet.

### **3.4 PROTECTION AND CLEANING**

A. Remove waste, fasteners and other cuttings from carpet floors.

B. Vacuum carpet and provide suitable protection. Do not use polyethylene film.

C. Do not permit traffic on carpeted surfaces for at least 48 hours after installation. Protect the carpet in accordance with CRI 104.

D. Do not move furniture or equipment on unprotected carpeted surfaces.

E. Just before final acceptance of work, remove protection and vacuum carpet clean.

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**SECTION 09 91 00**  
**PAINTING**

**PART 1-GENERAL**

**1.1 DESCRIPTION**

- A. Section specifies field painting.
- B. Section specifies prime coats which may be applied in shop under other sections.
- C. Painting includes shellacs, stains, varnishes, coatings specified, and striping or markers and identity markings.

**1.2 RELATED WORK**

- A. Shop prime painting of steel and ferrous metals: Division 05 - METALS, Division 08 - OPENINGS, Division 10 - SPECIALTIES, Division 11 - EQUIPMENT, Division 12 - FURNISHINGS, Division 13 - SPECIAL CONSTRUCTION, Division 14 - CONVEYING EQUIPMENT, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY sections.
- B. Contractor option: Prefinished flush doors with transparent finishes: Section 08 14 00, WOOD DOORS.
- C. Type of Finish, Color, and Gloss Level of Finish Coat: Section 09 06 00, SCHEDULE FOR FINISHES.
- D. Glazed wall surfacing or tile like coatings: Section 09 96 59, HIGH-BUILD GLAZED COATINGS.
- E. Multi-color Textured Wall Finish: Section 09 94 19, MULTICOLOR INTERIOR FINISHING.
- F. Asphalt and concrete pavement marking: Section 32 17 23, PAVEMENT MARKINGS.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:  
Before work is started, or sample panels are prepared, submit manufacturer's literature, the current Master Painters Institute (MPI) "Approved Product List" indicating 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 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 Product List" where applicable is acceptable.

C. Sample Panels:

1. After painters' materials have been approved and before work is started submit sample panels showing each type of finish and color specified.
2. Panels to show color: Composition board, 100 by 250 by 3 mm (4 inch by 10 inch by 1/8 inch).
3. Panel to show transparent finishes: Wood of same species and grain pattern as wood approved for use, 100 by 250 by 3 mm (4 inch by 10 inch face by 1/4 inch) thick minimum, and where both flat and edge grain will be exposed, 250 mm (10 inches) long by sufficient size, 50 by 50 mm (2 by 2 inch) minimum or actual wood member to show complete finish.
4. Attach labels to panel stating the following:
  - a. Federal Specification Number or manufacturers name and product number of paints used.
  - b. Specification code number specified in Section 09 06 00, SCHEDULE FOR FINISHES.
  - c. Product type and color.
  - d. Name of project.
5. Strips showing not less than 50 mm (2 inch) wide strips of undercoats and 100 mm (4 inch) wide strip of finish coat.

D. Sample of identity markers if used.

E. Manufacturers' Certificates indicating compliance with specified requirements:

1. Manufacturer's paint substituted for Federal Specification paints meets or exceeds performance of paint specified.
2. High temperature aluminum paint.
3. Epoxy coating.
4. Intumescent clear coating or fire retardant paint.
5. Plastic floor coating.

**1.4 DELIVERY AND STORAGE**

A. Deliver materials to site in manufacturer's sealed container marked to show following:

1. Name of manufacturer.
2. Product type.
3. Batch number.
4. Instructions for use.
5. Safety precautions.

B. In addition to manufacturer's label, provide a label legibly printed as following:

1. Federal Specification Number, where applicable, and name of material.
  2. Surface upon which material is to be applied.
  3. If paint or other coating, state coat types; prime, body or finish.
- C. Maintain space for storage, and handling of painting materials and equipment in a neat and orderly condition to prevent spontaneous combustion from occurring or igniting adjacent items.
- D. Store materials at site at least 24 hours before using, at a temperature between 18 and 30 degrees C (65 and 85 degrees F).

#### **1.5 MOCK-UP PANEL**

- A. Before starting application of water paint mixtures, cementitious paint, apply paint as specified to an area, not to exceed 9 m<sup>2</sup> (100 ft<sup>2</sup>), selected by COR.
- B. Finish and texture approved by COR will be used as a standard of quality for remainder of work.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by basic designation only.
- B. American Conference of Governmental Industrial Hygienists (ACGIH):  
ACGIH TLV-BKLT-2012.....Threshold Limit Values (TLV) for Chemical Substances and Physical Agents and Biological Exposure Indices (BEIs)  
ACGIH TLV-DOC-2012.....Documentation of Threshold Limit Values and Biological Exposure Indices, (Seventh Edition)
- C. American National Standards Institute (ANSI):  
A13.1-07.....Scheme for the Identification of Piping Systems
- D. American Society for Testing and Materials (ASTM):  
D260-86.....Boiled Linseed Oil
- E. Commercial Item Description (CID):  
A-A-1555.....Water Paint, Powder (Cementitious, White and Colors) (WPC) (cancelled)  
A-A-3120.....Paint, For Swimming Pools (RF) (cancelled)
- F. Federal Specifications (Fed Spec):  
TT-P-1411A.....Paint, Copolymer-Resin, Cementitious (For Waterproofing Concrete and Masonry Walls) (CEP)
- G. Master Painters Institute (MPI):  
No. 1-12.....Aluminum Paint (AP)  
No. 4-12.....Interior/ Exterior Latex Block Filler  
No. 5-12.....Exterior Alkyd Wood Primer  
No. 7-12.....Exterior Oil Wood Primer

- No. 8-12.....Exterior Alkyd, Flat MPI Gloss Level 1 (EO)
- No. 9-12.....Exterior Alkyd Enamel MPI Gloss Level 6 (EO)
- No. 10-12.....Exterior Latex, Flat (AE)
- No. 11-12.....Exterior Latex, Semi-Gloss (AE)
- No. 18-12.....Organic Zinc Rich Primer
- No. 22-12.....Aluminum Paint, High Heat (up to 590° - 1100F)  
(HR)
- No. 26-12.....Cementitious Galvanized Metal Primer
- No. 27-12.....Exterior / Interior Alkyd Floor Enamel, Gloss (FE)
- No. 31-12.....Polyurethane, Moisture Cured, Clear Gloss (PV)
- No. 36-12.....Knot Sealer
- No. 43-12.....Interior Satin Latex, MPI Gloss Level 4
- No. 44-12.....Interior Low Sheen Latex, MPI Gloss Level 2
- No. 45-12.....Interior Primer Sealer
- No. 46-12.....Interior Enamel Undercoat
- No. 47-12.....Interior Alkyd, Semi-Gloss, MPI Gloss Level 5 (AK)
- No. 48-12.....Interior Alkyd, Gloss, MPI Gloss Level 6 (AK)
- No. 49-12.....Interior Alkyd, Flat, MPI Gloss Level 1 (AK)
- No. 50-12.....Interior Latex Primer Sealer
- No. 51-12.....Interior Alkyd, Eggshell, MPI Gloss Level 3
- No. 52-12.....Interior Latex, MPI Gloss Level 3 (LE)
- No. 53-12.....Interior Latex, Flat, MPI Gloss Level 1 (LE)
- No. 54-12.....Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)
- No. 59-12.....Interior/Exterior Alkyd Porch & Floor Enamel, Low  
Gloss (FE)
- No. 60-12.....Interior/Exterior Latex Porch & Floor Paint, Low  
Gloss
- No. 66-12.....Interior Alkyd Fire Retardant, Clear Top-Coat (ULC  
Approved) (FC)
- No. 67-12.....Interior Latex Fire Retardant, Top-Coat (ULC  
Approved) (FR)
- No. 68-12.....Interior/ Exterior Latex Porch & Floor Paint,  
Gloss
- No. 71-12.....Polyurethane, Moisture Cured, Clear, Flat (PV)
- No. 74-12.....Interior Alkyd Varnish, Semi-Gloss
- No. 77-12.....Epoxy Cold Cured, Gloss (EC)
- No. 79-12.....Marine Alkyd Metal Primer
- No. 90-12.....Interior Wood Stain, Semi-Transparent (WS)
- No. 91-12.....Wood Filler Paste
- No. 94-12.....Exterior Alkyd, Semi-Gloss (EO)

- No. 95-12.....Fast Drying Metal Primer
- No. 98-12.....High Build Epoxy Coating
- No. 101-12.....Epoxy Anti-Corrosive Metal Primer
- No. 108-12.....High Build Epoxy Coating, Low Gloss (EC)
- No. 114-12.....Interior Latex, Gloss (LE) and (LG)
- No. 119-12.....Exterior Latex, High Gloss (acrylic) (AE)
- No. 135-12.....Non-Cementitious Galvanized Primer
- No. 138-12.....Interior High Performance Latex, MPI Gloss Level 2  
(LF)
- No. 139-12.....Interior High Performance Latex, MPI Gloss Level 3  
(LL)
- No. 140-12.....Interior High Performance Latex, MPI Gloss Level 4
- No. 141-12.....Interior High Performance Latex (SG) MPI Gloss  
Level 5

H. Steel Structures Painting Council (SSPC):

- SSPC SP 1-04 (R2004)....Solvent Cleaning
- SSPC SP 2-04 (R2004)....Hand Tool Cleaning
- SSPC SP 3-04 (R2004)....Power Tool Cleaning

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Cementitious Paint (CEP): TT-P-1411A [Paint, Copolymer-Resin, Cementitious (CEP)], Type 1 for exterior use, Type II for interior use.
- B. Wood Sealer: MPI 31 (gloss) or MPI 71 (flat) thinned with thinner recommended by manufacturer at rate of about one part of thinner to four parts of varnish.
- C. Identity markers options:
  - 1. Pressure sensitive vinyl markers.
  - 2. Snap-on coil plastic markers.
- D. Aluminum Paint (AP): MPI 1.
- E. Interior/Exterior Latex Block Filler: MPI 4.
- F. Exterior Alkyd Wood Primer: MPI 5.
- G. Exterior Oil Wood Primer: MPI 7.
- H. Exterior Alkyd, Flat (EO): MPI 8.
- I. Exterior Alkyd Enamel (EO): MPI 9.
- J. Exterior Latex, Flat (AE): MPI 10.
- K. Exterior Latex, Semi-Gloss (AE): MPI 11.
- L. Organic Zinc rich Coating (HR): MPI 22.
- M. High Heat Resistant Coating (HR): MPI 22.
- N. Cementitious Galvanized Metal Primer: MPI 26.
- O. Exterior/ interior Alkyd Floor Enamel, Gloss (FE): MPI 27.

- P. Knot Sealer: MPI 36.
- Q. Interior Satin Latex: MPI 43.
- R. Interior Low Sheen Latex: MPI 44.
- S. Interior Primer Sealer: MPI 45.
- T. Interior Enamel Undercoat: MPI 47.
- U. Interior Alkyd, Semi-Gloss (AK): MPI 47.
- V. Interior Alkyd, Gloss (AK): MPI 49.
- W. Interior Latex Primer Sealer: MPI 50.
- X. Interior Alkyd, Eggshell: MPI 51
- Y. Interior Latex, MPI Gloss Level 3 (LE): MPI 52.
- Z. Interior Latex, Flat, MPI Gloss Level 1 (LE): MPI 53.
- AA. Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE): MPI 54.
- BB. Interior / Exterior Alkyd Porch & Floor Enamel, Low Gloss (FE): MPI 59.
- CC. Interior/ Exterior Latex Porch & Floor Paint, Low Gloss: MPI 60.
- DD. Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC): MPI 66.
- EE. Interior Latex Fire Retardant, Top-Coat (ULC Approved) (FR): MPI 67.
- FF. Interior/ Exterior Latex Porch & Floor Paint, gloss: MPI 68.
- GG. Epoxy Cold Cured, Gloss (EC): MPI 77.
- HH. Marine Alkyd Metal primer: MPI 79.
- II. Interior Wood Stain, Semi-Transparent (WS): MPI 90.
- JJ. Wood Filler Paste: MPI 91.
- KK. Exterior Alkyd, Semi-Gloss (EO): MPI 94.
- LL. Fast Drying Metal Primer: MPI 95.
- MM. High Build Epoxy Coating: MPI 98.
- NN. Epoxy Anti-Corrosive Metal Primer: MPI 101.
- OO. High Build Epoxy Marine Coating (EC): MPI 108.
- PP. Interior latex, Gloss (LE) and (LG): MPI 114.
- QQ. Exterior Latex, High Gloss (acrylic) (AE): MPI 119.
- RR. Waterborne Galvanized Primer: MPI 134.
- SS. Non-Cementitious Galvanized Primer: MPI 135.
- TT. Interior High Performance Latex, MPI Gloss Level 2(LF): MPI 138.
- UU. Interior High Performance Latex, MPI Gloss Level 3 (LL): MPI 139.
- VV. Interior High Performance Latex, MPI Gloss Level 4: MPI 140.
- WW. Interior High Performance Latex (SG), MPI Gloss Level 5: MPI 141.

## 2.2 PAINT PROPERTIES

- A. Use ready-mixed (including colors), except two component epoxies, polyurethanes, polyesters, paints having metallic powders packaged separately and paints requiring specified additives.

- B. Where no requirements are given in the referenced specifications for primers, use primers with pigment and vehicle, compatible with substrate and finish coats specified.

### **2.3 REGULATORY REQUIREMENTS/QUALITY ASSURANCE**

- A. Paint materials shall conform to the restrictions of the local Environmental and Toxic Control jurisdiction.
1. Volatile Organic Compounds (VOC): VOC content of paint materials shall not exceed 10g/l for interior latex paints/primers and 50g/l for exterior latex paints and primers.
  2. Lead-Base Paint:
    - a. Comply with Section 410 of the Lead-Based Paint Poisoning Prevention Act, as amended, and with implementing regulations promulgated by Secretary of Housing and Urban Development.
    - b. Regulations concerning prohibition against use of lead-based paint in federal and federally assisted construction, or rehabilitation of residential structures are set forth in Subpart F, Title 24, Code of Federal Regulations, Department of Housing and Urban Development.
    - c. For lead-paint removal, see Section 02 83 33.13, LEAD-BASED PAINT REMOVAL AND DISPOSAL.
  3. Asbestos: Materials shall not contain asbestos.
  4. Chromate, Cadmium, Mercury, and Silica: Materials shall not contain zinc-chromate, strontium-chromate, Cadmium, mercury or mercury compounds or free crystalline silica.
  5. Human Carcinogens: Materials shall not contain any of the ACGIH-BKLT and ACGHI-DOC confirmed or suspected human carcinogens.
  6. Use high performance acrylic paints in place of alkyd paints, where possible.
  7. VOC content for solvent-based paints shall not exceed 250g/l and shall not be formulated with more than one percent aromatic hydro carbons by weight.

## **PART 3 - EXECUTION**

### **3.1 JOB CONDITIONS**

- A. Safety: Observe required safety regulations and manufacturer's warning and instructions for storage, handling and application of painting materials.
1. Take necessary precautions to protect personnel and property from hazards due to falls, injuries, toxic fumes, fire, explosion, or other harm.
  2. Deposit soiled cleaning rags and waste materials in metal containers approved for that purpose. Dispose of such items off the site at end of each days work.



B. Atmospheric and Surface Conditions:

1. Do not apply coating when air or substrate conditions are:
  - a. Less than 3 degrees C (5 degrees F) above dew point.
  - b. Below 10 degrees C (50 degrees F) or over 35 degrees C (95 degrees F), unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.
2. Maintain interior temperatures until paint dries hard.
3. Do no exterior painting when it is windy and dusty.
4. Do not paint in direct sunlight or on surfaces that the sun will soon warm.
5. Apply only on clean, dry and frost free surfaces except as follows:
  - a. Apply water thinned acrylic and cementitious paints to damp (not wet) surfaces where allowed by manufacturer's printed instructions.
  - b. Dampened with a fine mist of water on hot dry days concrete and masonry surfaces to which water thinned acrylic and cementitious paints are applied to prevent excessive suction and to cool surface.
6. Varnishing:
  - a. Apply in clean areas and in still air.
  - b. Before varnishing vacuum and dust area.
  - c. Immediately before varnishing wipe down surfaces with a tack rag.

**3.2 SURFACE PREPARATION**

- A. Method of surface preparation is optional, provided results of finish painting produce solid even color and texture specified with no overlays.
- B. General:
  1. Remove prefinished items not to be painted such as lighting fixtures, escutcheon plates, hardware, trim, and similar items for reinstallation after paint is dried.
  2. Remove items for reinstallation and complete painting of such items and adjacent areas when item or adjacent surface is not accessible or finish is different.
  3. See other sections of specifications for specified surface conditions and prime coat.
  4. Clean surfaces for painting with materials and methods compatible with substrate and specified finish. Remove any residue remaining from cleaning agents used. Do not use solvents, acid, or steam on concrete and masonry.
- C. Wood:
  1. Sand to a smooth even surface and then dust off.
  2. Sand surfaces showing raised grain smooth between each coat.

3. Wipe surface with a tack rag prior to applying finish.
4. Surface painted with an opaque finish:
  - a. Coat knots, sap and pitch streaks with MPI 36 (Knot Sealer) before applying paint.
  - b. Apply two coats of MPI 36 (Knot Sealer) over large knots.
5. After application of prime or first coat of stain, fill cracks, nail and screw holes, depressions and similar defects with wood filler paste. Sand the surface to make smooth and finish flush with adjacent surface.
6. Before applying finish coat, reapply wood filler paste if required, and sand surface to remove surface blemishes. Finish flush with adjacent surfaces.
7. Fill open grained wood such as oak, walnut, ash and mahogany with MPI 91 (Wood Filler Paste), colored to match wood color.
  - a. Thin filler in accordance with manufacturer's instructions for application.
  - b. Remove excess filler, wipe as clean as possible, dry, and sand as specified.

D. Ferrous Metals:

1. Remove oil, grease, soil, drawing and cutting compounds, flux and other detrimental foreign matter in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Remove loose mill scale, rust, and paint, by hand or power tool cleaning, as defined in SSPC-SP 2 (Hand Tool Cleaning) and SSPC-SP 3 (Power Tool Cleaning). Exception: where high temperature aluminum paint is used, prepare surface in accordance with paint manufacturer's instructions.
3. Fill dents, holes and similar voids and depressions in flat exposed surfaces of hollow steel doors and frames, access panels, roll-up steel doors and similar items specified to have semi-gloss or gloss finish with TT-F-322D (Filler, Two-Component Type, For Dents, Small Holes and Blow-Holes). Finish flush with adjacent surfaces.
  - a. This includes flat head countersunk screws used for permanent anchors.
  - b. Do not fill screws of item intended for removal such as glazing beads.
4. Spot prime abraded and damaged areas in shop prime coat which expose bare metal with same type of paint used for prime coat. Feather edge of spot prime to produce smooth finish coat.

5. Spot prime abraded and damaged areas which expose bare metal of factory finished items with paint as recommended by manufacturer of item.

E. Zinc-Coated (Galvanized) Metal Painted:

1. Clean surfaces to remove grease, oil and other deterrents to paint adhesion in accordance with SSPC-SP 1 (Solvent Cleaning).
2. Spot coat abraded and damaged areas of zinc-coating which expose base metal on hot-dip zinc-coated items with MPI 18 (Organic Zinc Rich Coating). Prime or spot prime with MPI 134 (Waterborne Galvanized Primer) or MPI 135 (Non- Cementitious Galvanized Primer) depending on finish coat compatibility.

F. Masonry, Concrete, Cement Board, Cement Plaster and Stucco:

1. Clean and remove dust, dirt, oil, grease efflorescence, form release agents, laitance, and other deterrents to paint adhesion.
2. Use emulsion type cleaning agents to remove oil, grease, paint and similar products. Use of solvents, acid, or steam is not permitted.
3. Remove loose mortar in masonry work.
4. Neutralize Concrete floors to be painted by washing with a solution of 1.4 Kg (3 pounds) of zinc sulfate crystals to 3.8 L (1 gallon) of water, allow to dry three days and brush thoroughly free of crystals.
5. Repair broken and spalled concrete edges with concrete patching compound to match adjacent surfaces as specified in CONCRETE Sections. Remove projections to level of adjacent surface by grinding or similar methods.

G. Gypsum Plaster and Gypsum Board:

1. Remove efflorescence, loose and chalking plaster or finishing materials.
2. Remove dust, dirt, and other deterrents to paint adhesion.
3. Fill holes, cracks, and other depressions with CID-A-A-1272A [Plaster, Gypsum (Spackling Compound) finished flush with adjacent surface, with texture to match texture of adjacent surface. Patch holes over 25 mm (1-inch) in diameter as specified in Section for plaster or gypsum board.

### 3.3 PAINT PREPARATION

- A. Thoroughly mix painting materials to ensure uniformity of color, complete dispersion of pigment and uniform composition.
- B. Do not thin unless necessary for application and when finish paint is used for body and prime coats. Use materials and quantities for thinning as specified in manufacturer's printed instructions.
- C. Remove paint skins, then strain paint through commercial paint strainer to remove lumps and other particles.

- D. Mix two component and two part paint and those requiring additives in such a manner as to uniformly blend as specified in manufacturer's printed instructions unless specified otherwise.
- E. For tinting required to produce exact shades specified, use color pigment recommended by the paint manufacturer.

### **3.4 APPLICATION**

- A. Start of surface preparation or painting will be construed as acceptance of the surface as satisfactory for the application of materials.
- B. Unless otherwise specified, apply paint in three coats; prime, body, and finish. When two coats applied to prime coat are the same, first coat applied over primer is body coat and second coat is finish coat.
- C. Apply each coat evenly and cover substrate completely.
- D. Allow not less than 48 hours between application of succeeding coats, except as allowed by manufacturer's printed instructions, and approved by COR.
- E. Finish surfaces to show solid even color, free from runs, lumps, brushmarks, laps, holidays, or other defects.
- F. Apply by brush, roller or spray, except as otherwise specified.
- G. Do not spray paint in existing occupied spaces unless approved by COR, except in spaces sealed from existing occupied spaces.
  - 1. Apply painting materials specifically required by manufacturer to be applied by spraying.
  - 2. In areas, where paint is applied by spray, mask or enclose with polyethylene, or similar air tight material with edges and seams continuously sealed including items specified in WORK NOT PAINTED, motors, controls, telephone, and electrical equipment, fronts of sterilizes and other recessed equipment and similar prefinished items.
- I. Do not paint in closed position operable items such as access doors and panels, window sashes, overhead doors, and similar items except overhead roll-up doors and shutters.

### **3.5 PRIME PAINTING**

- A. After surface preparation prime surfaces before application of body and finish coats, except as otherwise specified.
- B. Spot prime and apply body coat to damaged and abraded painted surfaces before applying succeeding coats.
- C. Additional field applied prime coats over shop or factory applied prime coats are not required except for exterior exposed steel apply an additional prime coat.
- D. Prime rebates for stop and face glazing of wood, and for face glazing of steel.

E. Wood:

1. Use same kind of primer specified for exposed face surface.
  - a. Interior wood except for transparent finish: MPI 45 (Interior Primer Sealer) or MPI 46 (Interior Enamel Undercoat), thinned if recommended by manufacturer.
  - b. Transparent finishes as specified under Transparent Finishes on Wood except Floors.

F. Metals except boilers, incinerator stacks, and engine exhaust pipes:

1. Steel and iron: MPI 95 (Fast Drying Metal Primer).
2. Zinc-coated steel and iron: MPI 134 (Waterborne Galvanized Primer).
3. Aluminum scheduled to be painted: MPI 95 (Fast Drying Metal Primer).
4. Machinery not factory finished: MPI 9 (Exterior Alkyd Enamel (EO)).
5. Metal over 94 degrees C. (200 degrees F), Boilers, Incinerator Stacks, and Engine Exhaust Pipes: MPI 22 (High Heat Resistant Coating (HR)).

G. Gypsum Board:

1. MPI 54 (Interior Latex, Semi-Gloss, MPI Gloss Level 5 (LE)), MPI 114 (Interior Latex, Gloss (LE) and (LG)) respectively.
2. Primer: MPI 50 (Interior Latex Primer Sealer) except use MPI 46 (Interior Enamel Undercoat) in shower and bathrooms.
4. Use MPI 101 (Cold Curing Epoxy Primer) for surfaces scheduled to receive MPI 77 (Epoxy Cold Cured, Gloss (EC)) finish.

H. Concrete Floors: MPI 60 (Interior/ Exterior Latex Porch & Floor Paint, Low Gloss).

**3.6 EXTERIOR FINISHES**

A. Apply following finish coats where specified on drawings.

C. Steel and Ferrous Metal:

1. Use two coats of TT-P-1411 (Paint, Co-polymer-Resin, Cementitious (CEP)), unless specified otherwise.
2. One coat of MPI 22 (High Heat Resistant Coating (HR)) on surfaces over 94 degrees K (200 degrees F) and on surfaces of boiler, incinerator, stacks, and engine exhaust pipes.

D. Machinery without factory finish except for primer: One coat MPI 94 (Exterior Alkyd, Semi-Gloss (EO)).

**3.7 INTERIOR FINISHES**

A. Apply following finish coats over prime coats in spaces or on surfaces specified in Section 09 06 00, SCHEDULE FOR FINISHES.

B. Metal Work:

1. Apply to exposed surfaces.
2. Omit body and finish coats on surfaces concealed after installation except electrical conduit containing conductors over 600 volts.

3. Ferrous Metal, Galvanized Metal, and Other Metals Scheduled:

- a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) unless specified otherwise.
- b. Ferrous Metal over 94 degrees K (200 degrees F): Boilers, Incinerator Stacks, and Engine Exhaust Pipes: One coat MPI 22 (High Heat Resistant Coating (HR)).

C. Gypsum Board:

1. One coat of MPI 50 (Interior Latex Primer Sealer).
2. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)).
3. One coat of MPI 77 (Epoxy Cold Cured, Gloss (EC)) in shower rooms.

E. Masonry and Concrete Walls:

1. Two coats of MPI 138 (Interior High Performance Latex, MPI Gloss Level 2 (LF)).

F. Wood:

1. Sanding:

- a. Use 220-grit sandpaper.
- b. Sand sealers and varnish between coats.
- c. Sand enough to scarify surface to assure good adhesion of subsequent coats, to level roughly applied sealer and varnish, and to knock off "whiskers" of any raised grain as well as dust particles.

2. Sealers:

- a. Apply sealers specified except sealer may be omitted where pigmented, penetrating, or wiping stains containing resins are used.
- b. Allow manufacturer's recommended drying time before sanding, but not less than 24 hours or 36 hours in damp or muggy weather.
- c. Sand as specified.

G. Concrete Floors:

1. Concrete Floors shown as SCONC on Finish Type: Two coats of MPI 68 (Interior/ Exterior Latex Porch & Floor Paint, Gloss (FE)).
2. Concrete Floors shown as XCONC on Finish Type: Two coats MPI 77 (Epoxy Cold Cured, Gloss (EC)).

H. Miscellaneous:

1. Apply where specified on drawings.
2. MPI 1 (Aluminum Paint): Two coats of aluminum paint.
4. Existing acoustical units scheduled to be repainted except acoustical units with a vinyl finish:
  - a. Clean units free of dust, dirt, grease, and other deterrents to paint adhesion.

b. Mineral fiber units: One coat of MPI 53 (Interior Latex, Flat, MPI Gloss Level 1 (LE)).

c. Units of organic fiber or other material not having a class A rating: One coat of MPI 66 (Interior Alkyd Fire Retardant, Clear Top-Coat (ULC Approved) (FC)).

### **3.8 REFINISHING EXISTING PAINTED SURFACES**

- A. Clean, patch and repair existing surfaces as specified under surface preparation.
- B. Remove and reinstall items as specified under surface preparation.
- C. Remove existing finishes or apply separation coats to prevent non compatible coatings from having contact.
- D. Patched or Replaced Areas in Surfaces and Components: Apply spot prime and body coats as specified for new work to repaired areas or replaced components.
- E. Except where scheduled for complete painting apply finish coat over plane surface to nearest break in plane, such as corner, reveal, or frame.
- F. In existing rooms and areas where alterations occur, clean existing stained and natural finished wood retouch abraded surfaces and then give entire surface one coat of MPI 71 (Polyurethane, Moisture Cured, Clear Flat (PV)).
- G. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- H. Coat knots and pitch streaks showing through old finish with MPI 36 (Knot Sealer) before refinishing.
- I. Sand or dull glossy surfaces prior to painting.
- J. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

### **3.9 PAINT COLOR**

- A. Color and gloss of finish coats is specified on drawings.
- B. For additional requirements regarding color see Articles, REFINISHING EXISTING PAINTED SURFACE and MECHANICAL AND ELECTRICAL FIELD PAINTING SCHEDULE.
- C. Coat Colors:
  - 1. Color of priming coat: Lighter than body coat.
  - 2. Color of body coat: Lighter than finish coat.
  - 3. Color prime and body coats to not show through the finish coat and to mask surface imperfections or contrasts.
- D. Painting, Caulking, Closures, and Fillers Adjacent to Casework:
  - 1. Paint to match color of casework where casework has a paint finish.

2. Paint to match color of wall where casework is stainless steel, plastic laminate, or varnished wood.

### **3.10 MECHANICAL AND ELECTRICAL WORK FIELD PAINTING SCHEDULE**

- A. Field painting of mechanical and electrical consists of cleaning, touching-up abraded shop prime coats, and applying prime, body and finish coats to materials and equipment if not factory finished in space scheduled to be finished.
- B. In spaces not scheduled to be finish painted on drawings.
- C. Paint various systems specified in Division 02 - EXISTING CONDITIONS, Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, Division 27 - COMMUNICATIONS, and Division 28 - ELECTRONIC SAFETY AND SECURITY.
- D. Paint after tests have been completed.
- E. Omit prime coat from factory prime-coated items.
- F. Finish painting of mechanical and electrical equipment is not required when located in interstitial spaces, above suspended ceilings, in concealed areas such as pipe and electric closets, pipe basements, pipe tunnels, trenches, attics, roof spaces, shafts and furred spaces except on electrical conduit containing feeders 600 volts or more.
- G. Omit field painting of items specified in paragraph, Building and Structural WORK NOT PAINTED.
- H. Color:
  1. Paint items having no color specified on drawings.
  2. Paint colors as specified in Section 09 06 00, SCHEDULE FOR FINISHES except for following:
    - a. White .....Exterior unfinished surfaces of enameled plumbing fixtures. Insulation coverings on breeching and uptake inside boiler house, drums and drum-heads, oil heaters, condensate tanks and condensate piping.
    - b. Gray: .....Heating, ventilating, air conditioning and refrigeration equipment (except as required to match surrounding surfaces), and water and sewage treatment equipment and sewage ejection equipment.
    - c. Aluminum Color: Ferrous metal on outside of boilers and in connection with boiler settings including supporting doors and door frames and fuel oil burning equipment, and steam generation system (bare piping, fittings, hangers, supports, valves, traps and miscellaneous iron work in contact with pipe).



- d. Federal Safety Red: Exposed fire protection piping hydrants, post indicators, electrical conducts containing fire alarm control wiring, and fire alarm equipment.
  - e. Federal Safety Orange: .Entire lengths of electrical conduits containing feeders 600 volts or more.
  - f. Color to match brickwork sheet metal covering on breeching outside of exterior wall of boiler house.
- I. Apply paint systems on properly prepared and primed surface as follows:
- 1. Exterior Locations:
    - a. Apply two coats of MPI 94 (Exterior Alkyd, Semi-gloss (EO)) to the following ferrous metal items:  
Vent and exhaust pipes with temperatures under 94 degrees C (200 degrees F), roof drains, fire hydrants, post indicators, yard hydrants, exposed piping and similar items.
    - b. Apply two coats of MPI 11 (Exterior Latex, Semi Gloss (AE)) to the following metal items:  
Galvanized and zinc-copper alloy metal.
    - c. Apply one coat of MPI 22 (High Heat Resistant Coating (HR)), 650 degrees C (1200 degrees F) to incinerator stacks, boiler stacks, and engine generator exhaust.
  - 2. Interior Locations:
    - a. Apply two coats of MPI 47 (Interior Alkyd, Semi-Gloss (AK)) to following items:
      - 1) Metal under 94 degrees C (200 degrees F) of items such as bare piping, fittings, hangers and supports.
      - 2) Equipment and systems such as hinged covers and frames for control cabinets and boxes, cast-iron radiators, electric conduits and panel boards.
      - 3) Heating, ventilating, air conditioning, plumbing equipment, and machinery having shop prime coat and not factory finished.
    - b. Paint electrical conduits containing cables rated 600 volts or more using two coats of MPI 94 (Exterior Alkyd, Semi-gloss (EO)) in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.
  - 3. Other exposed locations:
    - a. Metal surfaces, except aluminum, of cooling towers exposed to view, including connected pipes, rails, and ladders: Two coats of MPI 1 (Aluminum Paint (AP)).
    - b. Cloth jackets of insulation of ducts and pipes in connection with plumbing, air conditioning, ventilating refrigeration and heating

systems: One coat of MPI 50 (Interior Latex Primer Sealer) and one coat of MPI 10 (Exterior Latex, Flat (AE)).

### **3.11 BUILDING AND STRUCTURAL WORK FIELD PAINTING**

- A. Painting and finishing of interior and exterior work except as specified under paragraph 3.11 B.
  - 1. Painting and finishing of new and existing work including colors and gloss of finish selected is specified on drawings.
  - 2. Painting of disturbed, damaged and repaired or patched surfaces when entire space is not scheduled for complete repainting or refinishing.
  - 3. Painting of ferrous metal and galvanized metal.
  - 4. Painting of wood with fire retardant paint exposed in attics, when used as mechanical equipment space except shingles.
  - 5. Identity painting and safety painting.
- B. Building and Structural Work not Painted:
  - 1. Prefinished items:
    - a. Casework, doors, elevator entrances and cabs, metal panels, wall covering, and similar items specified factory finished under other sections.
    - b. Factory finished equipment and pre-engineered metal building components such as metal roof and wall panels.
  - 2. Finished surfaces:
    - a. Hardware except ferrous metal.
    - b. Anodized aluminum, stainless steel, chromium plating, copper, and brass, except as otherwise specified.
    - c. Signs, fixtures, and other similar items integrally finished.
  - 3. Concealed surfaces:
    - a. Inside dumbwaiter, elevator and duct shafts, interstitial spaces, pipe basements, crawl spaces, pipe tunnels, above ceilings, attics, except as otherwise specified.
    - b. Inside walls or other spaces behind access doors or panels.
    - c. Surfaces concealed behind permanently installed casework and equipment.
  - 4. Moving and operating parts:
    - a. Shafts, chains, gears, mechanical and electrical operators, linkages, and sprinkler heads, and sensing devices.
    - b. Tracks for overhead or coiling doors, shutters, and grilles.
  - 5. Labels:
    - a. Code required label, such as Underwriters Laboratories Inc., Inchcape Testing Services, Inc., or Factory Mutual Research Corporation.

- b. Identification plates, instruction plates, performance rating, and nomenclature.
- 6. Galvanized metal:
  - a. Exterior chain link fence and gates, corrugated metal areaways, and gratings.
  - b. Gas Storage Racks.
  - c. Except where specifically specified to be painted.
- 7. Metal safety treads and nosings.
- 8. Gaskets.
- 9. Concrete curbs, gutters, pavements, retaining walls, exterior exposed foundations walls and interior walls in pipe basements.
- 10. Face brick.
- 11. Structural steel encased in concrete, masonry, or other enclosure.
- 12. Structural steel to receive sprayed-on fire proofing.
- 13. Ceilings, walls, columns in interstitial spaces.
- 14. Ceilings, walls, and columns in pipe basements.
- 15. Wood Shingles.

### **3.12 IDENTITY PAINTING SCHEDULE**

- A. Identify designated service in accordance with ANSI A13.1, unless specified otherwise, on exposed piping, piping above removable ceilings, piping in accessible pipe spaces, interstitial spaces, and piping behind access panels.
  - 1. Legend may be identified using 2.1 G options or by stencil applications.
  - 2. Apply legends adjacent to changes in direction, on branches, where pipes pass through walls or floors, adjacent to operating accessories such as valves, regulators, strainers and cleanouts a minimum of 12 000 mm (40 feet) apart on straight runs of piping. Identification next to plumbing fixtures is not required.
  - 3. Locate Legends clearly visible from operating position.
  - 4. Use arrow to indicate direction of flow.
  - 5. Identify pipe contents with sufficient additional details such as temperature, pressure, and contents to identify possible hazard. Insert working pressure shown on drawings where asterisk appears for High, Medium, and Low Pressure designations as follows:
    - a. High Pressure - 414 kPa (60 psig) and above.
    - b. Medium Pressure - 104 to 413 kPa (15 to 59 psig).
    - c. Low Pressure - 103 kPa (14 psig) and below.
    - d. Add Fuel oil grade numbers.
  - 6. Legend name in full or in abbreviated form as follows:

PIPING	COLOR OF EXPOSED PIPING	COLOR OF BACKGROUND	COLOR OF LETTERS	LEGEND BBREVIATIONS
Blow-off		Yellow	Black	Blow-off
Boiler Feedwater		Yellow	Black	Blr Feed
A/C Condenser Water Supply		Green	White	A/C Cond Wtr Sup
A/C Condenser Water Return		Green	White	A/C Cond Wtr Ret
Chilled Water Supply		Green	White	Ch. Wtr Sup
Chilled Water Return		Green	White	Ch. Wtr Ret
Shop Compressed Air		Yellow	Black	Shop Air
Air-Instrument Controls		Green	White	Air-Inst Cont
Drain Line		Green	White	Drain
Emergency Shower		Green	White	Emg Shower
High Pressure Steam		Yellow	Black	H.P. _____*
High Pressure Condensate Return		Yellow	Black	H.P. Ret _____*
Medium Pressure Steam		Yellow	Black	M. P. Stm _____*
Medium Pressure Condensate Return		Yellow	Black	M.P. Ret _____*
Low Pressure Steam		Yellow	Black	L.P. Stm _____*
Low Pressure Condensate Return		Yellow	Black	L.P. Ret _____*
High Temperature Water Supply		Yellow	Black	H. Temp Wtr Sup
High Temperature Water Return		Yellow	Black	H. Temp Wtr Ret
Hot Water Heating Supply		Yellow	Black	H. W. Htg Sup
Hot Water Heating Return		Yellow	Black	H. W. Htg Ret
Gravity Condensate Return		Yellow	Black	Gravity Cond Ret
Pumped Condensate Return		Yellow	Black	Pumped Cond Ret
Vacuum Condensate Return		Yellow	Black	Vac Cond Ret
Fuel Oil - Grade		Brown	White	Fuel Oil-Grade ____*
(Diesel Fuel included under Fuel Oil)				
Boiler Water Sampling		Yellow	Black	Sample
Chemical Feed		Yellow	Black	Chem Feed
Continuous Blow-Down		Yellow	Black	Cont. B D
Pumped Condensate		Black		Pump Cond
Pump Recirculating		Yellow	Black	Pump-Recirc.
Vent Line		Yellow	Black	Vent
Alkali		Yellow	Black	Alk
Bleach		Yellow	Black	Bleach
Detergent		Yellow	Black	Det

Liquid Supply		Yellow	Black	Liq Sup
Reuse Water		Yellow	Black	Reuse Wtr
Cold Water (Domestic)	White	Green	White	C.W. Dom
Hot Water (Domestic)				
Supply	White	Yellow	Black	H.W. Dom
Return	White	Yellow	Black	H.W. Dom Ret
Tempered Water	White	Yellow	Black	Temp. Wtr
Ice Water				
Supply	White	Green	White	Ice Wtr
Return	White	Green	White	Ice Wtr Ret
Reagent Grade Water		Green	White	RG
Reverse Osmosis		Green	White	RO
Sanitary Waste		Green	White	San Waste
Sanitary Vent		Green	White	San Vent
Storm Drainage		Green	White	St Drain
Pump Drainage		Green	White	Pump Disch
Chemical Resistant Pipe				
Waste		Yellow	Black	Acid Waste
Vent		Yellow	Black	Acid Vent
Atmospheric Vent		Green	White	ATV
Silver Recovery		Green	White	Silver Rec
Oral Evacuation		Green	White	Oral Evac
Fuel Gas		Yellow	Black	Gas
Fire Protection Water				
Sprinkler		Red	White	Auto Spr
Standpipe		Red	White	Stand
Sprinkler		Red	White	Drain
Hot Water Supply Domestic/Solar Water				H.W. Sup Dom/SW
Hot Water Return Domestic/Solar Water				H.W. Ret Dom/SW

7. Electrical Conduits containing feeders over 600 volts, paint legends using 50 mm (2 inch) high black numbers and letters, showing the voltage class rating. Provide legends where conduits pass through walls and floors and at maximum 6100 mm (20 foot) intervals in between. Use labels with yellow background with black border and words Danger High Voltage Class, 5000 or 15000 or 25000.
8. See Sections for methods of identification, legends, and abbreviations of the following:
  - a. Regular compressed air lines: Section 22 15 00, GENERAL SERVICE COMPRESSED-AIR SYSTEMS.

- b. Dental compressed air lines: Section 22 61 13.74, DENTAL COMPRESSED-AIR PIPING / Section 22 61 19.74, DENTAL COMPRESSED-AIR EQUIPMENT.
  - c. Laboratory gas and vacuum lines: Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
  - d. Oral evacuation lines: Section 22 62 19.74, DENTAL VACUUM AND EVACUATION EQUIPMENT.
  - e. Medical Gases and vacuum lines: Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES / Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
  - f. Conduits containing high voltage feeders over 600 volts: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS / Section 27 05 33, RACEWAYS AND BOXES FOR COMMUNICATIONS SYSTEMS / Section 28 05 33, RACEWAYS AND BOXES FOR ELECTRONIC SAFETY AND SECURITY.
- B. Fire and Smoke Partitions:
- 1. Identify partitions above ceilings on both sides of partitions except within shafts in letters not less than 64 mm (2 1/2 inches) high.
  - 2. Stenciled message: "SMOKE BARRIER" or, "FIRE BARRIER" as applicable.
  - 3. Locate not more than 6100 mm (20 feet) on center on corridor sides of partitions, and with a least one message per room on room side of partition.
  - 4. Use semigloss paint of color that contrasts with color of substrate.
- C. Identify columns in pipe basements and interstitial space:
- 1. Apply stenciled number and letters to correspond with grid numbering and lettering shown.
  - 2. Paint numbers and letters 100 mm (4 inches) high, locate 450 mm (18 inches) below overhead structural slab.
  - 3. Apply on four sides of interior columns and on inside face only of exterior wall columns.
  - 4. Color:
    - a. Use black on concrete columns.
    - b. Use white or contrasting color on steel columns.

### **3.14 PROTECTION CLEAN UP, AND TOUCH-UP**

- A. Protect work from paint droppings and spattering by use of masking, drop cloths, removal of items or by other approved methods.
- B. Upon completion, clean paint from hardware, glass and other surfaces and items not required to be painted of paint drops or smears.
- C. Before final inspection, touch-up or refinished in a manner to produce solid even color and finish texture, free from defects in work which was damaged or discolored.

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

- - - E N D - - -

**SECTION 10 14 00**  
**SIGNAGE**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies interior signage for room numbers, directional signs, code required signs, telephone identification signs and temporary interior signs.
- B. This section also specifies exterior medical center identification signs, building identification signs, parking and traffic signs.
- C. Installation of Government furnished dedication plaque and VA seal.

**1.2 RELATED WORK**

- A. Electrical: Related Electrical Specification Sections.
- B. Lighted EXIT signs for egress purposes are specified under Division 26, ELECTRICAL.
- C. Section 10 13 00, DIRECTORIES and Section 10 14 00, SIGNAGE.
- D. Color Finish: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 MANUFACTURER'S QUALIFICATIONS**

Sign manufacturer shall provide evidence that they regularly and presently manufactures signs similar to those specified in this section as one of their principal products.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Samples: Sign panels and frames, with letters and symbols, each type. Submit 2 sets. One set of samples will be retained by COR, other returned to Contractor.
  - 1. Sign Panel, 200 mm x 250 mm (8 inches x 10 inches), with letters.
  - 2. Color samples of each color, 150 mm x 150 mm (6 inches x 6 inches. Show anticipated range of color and texture.
  - 3. Sample of typeface, arrow and symbols in a typical full size layout.
- C. Manufacturer's Literature:
  - 1. Showing the methods and procedures proposed for the concealed anchorage of the signage system to each surface type.
  - 2. Manufacturer's printed specifications, anchorage details, installation and maintenance instructions.
- D. Signage Plan: Sign location plan, showing location, type and total number of signs required.
- E. Shop Drawings: Scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.



F. Full size layout patterns for dimensional letters.

#### **1.5 DELIVERY AND STORAGE**

- A. Deliver materials to job in manufacturer's original sealed containers with brand name marked thereon. Protect materials from damage.
- B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- C. Deliver signs only when the site and mounting services are ready for installation work to proceed.
- D. Store products in dry condition inside enclosed facilities.

#### **1.6 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - B209-07.....Aluminum and Aluminum-Alloy Sheet and Plate
  - B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and tubes.
- C. Federal Specifications (Fed Spec):
  - MIL-PRF-8184F.....Plastic Sheet, Acrylic, Modified.
  - MIL-P-46144C.....Plastic Sheet, Polycarbonate

#### **1.7 MINIMUM SIGN REQUIREMENTS**

- A. Permanent Rooms and Spaces:
  - 1. Tactile and Braille Characters, raised minimum 0.793 mm (1/32 in). Characters shall be accompanied by Grade 2 Braille.
  - 2. Type Styles: Characters shall be uppercase, Helvetica Medium, Helvetica Medium Condensed and Helvetica Regular.
  - 3. Character Height: Minimum 16 mm (5/8 in) high, Maximum 50 mm (2 in).
  - 4. Symbols (Pictograms): Equivalent written description shall be placed directly below symbol, outside of symbol's background field. Border dimensions of symbol background shall be minimum 150 mm (6 in) high.
  - 5. Finish and Contrast: Characters and background shall be eggshell, matte or other non-glare finish with adequate contrast with background.
  - 6. Mounting Location and Height: As shown. Mounted on wall adjacent to the latch side of the door and to avoid door swing and protruding objects.
- B. Overhead Signs:

1. Type Styles: As shown. Characters shall have a width-to-height ratio between 3:5 and 1:1. Characters shall have a stroke width-to-height ratio of between 1:5 and 1:10.
2. Character Height: minimum 75 mm (3 in) high for overhead signs. As shown, for directional signs.
3. Finish and Contrast: Same as for signs of permanent rooms and spaces.
4. Mounting Location and Height: As shown.

#### **1.8 COLORS AND FINISHES:**

- A. Match facility standards.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Signs of type, size and design shown on the drawings and as specified.
- B. Signs complete with lettering, framing and related components for a complete installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.
- D. Do not scale drawings for dimensions. Contractor to verify and be responsible for all dimensions and conditions shown by these drawings. COR to be notified of any discrepancy in drawing, in field directions or conditions, and/or of any changes required for all such construction details.
- E. The Sign Contractor, by commencing work of this section, assumes overall responsibility, as part of his warranty of work, to assure that assemblies, components and parts shown or required within the work of the section, comply with the Contract Documents. The Contractor shall further warrant: That all components, specified or required to satisfactorily complete the installation are compatible with each other and with conditions of installations.

#### **2.2 PRODUCTS**

- A. Aluminum:
  1. Sheet and Plate: ASTM B209.
  2. Extrusions and Tubing: ASTM B221.
- B. Cast Acrylic Sheet: MIL-PRF-8184F; Type II, class 1, Water white non-glare optically clear. Matt finish water white clear acrylic shall not be acceptable.
- C. Polycarbonate: MIL-P-46144C; Type I, class 1.
- D. Vinyl: 0.1 mm thick machine cut, having a pressure sensitive adhesive and integral colors.
- E. Electrical Signs:

1. General: Furnish and install all lighting, electrical components, fixtures and lamps ready for use in accordance with the sign type drawings, details and specifications.
  2. Refer to Electrical Specifications Section, Division 26, ELECTRICAL, to verify line voltages for sign locations that require electrical signs.
  3. Quality Control: Installed electrical components and sign installations are to bear the label and certification of Underwriter's Laboratories, Inc., and are to comply with National Electrical Code as well as applicable federal, state and local codes for installation techniques, fabrication methods and general product safety.
  4. Ballast and Lighting Fixtures: See Electrical Specifications.
- F. Concrete Post Footings: See Section 03 30 53, MISCELLANEOUS CAST-IN-PLACE CONCRETE, Cast-in-place Concrete.
- G. Steel: See Section 05 12 00, STRUCTURAL STEEL FRAMING.

## **2.3 SIGN STANDARDS**

- A. Topography:
1. Type Style: Helvetica Medium and Helvetica Medium Condensed. Initial caps or all caps as indicated in Sign Message Schedule.
  2. Arrow: See graphic standards in drawings.
  3. Letter spacing: See graphic standards on drawings.
  4. Letter spacing: See graphic standards on drawings.
  5. All text, arrows, and symbols to be provided in size, colors, typefaces and letter spacing shown. Text shall be a true, clean, accurate reproduction of typeface(s) shown. Text shown in drawings are for layout purposes only; final text for signs is listed in Sign Message Schedule.
- B. Project Colors and Finishes: See Section 09 06 00, SCHEDULE FOR FINISHES.

## **2.4 SIGN TYPES**

- A. General:
1. The interior sign system is comprised of sign types families that are identified by a letter and number which identify a particular group of signs. An additional number identifies a specific type of sign within that family.
  2. IN indicates a component construction based sign.
  3. The exterior sign system shall be comprised of sign types families that are identified by a letter and number which identify a particular group of signs. An additional number identifies a specific type of sign within that family.

4. EI designation indicates exterior internally illuminated sign.
5. EN designation indicates exterior non-illuminated sign.

B. Interchangeable Component System:

1. Sign Type Families: 03, 04, 05, 07, 09, and 13.
2. Interior sign system capable of being arranged in a variety of configurations with a minimum of attachments, devices and connectors.
  - a. Interchangeable nature of the system shall allow for changes of graphic components of the installed sign, without changing sign in its entirety.
  - b. Component Sign System is comprised of the following primary components:
    - 1) Rail Back utilizing horizontal rails, spaced to allow for uniform, modular sizing of sign types.
    - 2) Rail Insert mounted to back of Copy Panels to allow for attachment to Rail Back.
    - 3) Copy Panels, made of a variety of materials to allow for different graphic needs.
    - 4) End Caps which interlock to Rail Back to enclose and secure changeable Copy Panels.
    - 5) Joiners and Accent Joiners connect separate Rail Backs together.
    - 6) Top Accent Bars which provide decorative trim cap that encloses the top of sign or can connect the sign to a Type 03 Room Number Sign.
  - c. Rail Back, Rail Insert and End Caps in anodized extruded aluminum to allow for tight tolerances and consistent quality of fit and finish.
  - d. Signs in system shall be convertible in the field to allow for enlargement from one size to another in height and width through use of Joiners or Accent Joiners, which connect Rail Back panels together blindly, providing a butt joint between Copy Panels. Accent Joiners shall connect Rail Backs together with a visible 3 mm (1/8") horizontal rib, flush to the adjacent copy insert surfaces.
  - e. Sign configurations shall vary in width from 225 mm (9 inches) to 2050 mm (80 inches), and have height dimensions of 50 mm (2 inches), 75 mm (3 inches), 150 mm (6 inches), 225 mm (9 inches) and 300 mm (12 inches). Height shall be increased beyond 300 mm (12 inches), by repeating height module in full or in part.

3. Rail Back functions as internal structural member of sign using 6063T5 extruded aluminum and anodized black.
  - a. Shall accept an extruded aluminum or plastic insert on one sign or on both sides, depending upon sign type.
  - b. Shall be convertible in field to allow for connection to other Rail Back panels, so that additive changes can be made to sign unit.
  - c. Rail shall allow for a variety of mounting devices including wall mounting for screw-on applications, using pressure sensitive tape, freestanding mount, ceiling mount and other mounting devices as needed.
4. Rail Insert functions as a mounting device for Copy Panels on to the Rail Back. The Rail Insert mounts to the back of the Copy Panel with adhesive suitable for use with the particular copy insert material.
  - a. Shall allow Copy Panels to slide or snap into the horizontal Rail Back for ease of changeability.
  - b. Shall mount to the back of the Copy Panel with adhesive suitable for use with particular Copy Panel material.
5. Copy Panels shall accept various forms of copy and graphics, and attaches to the Rail Back with the Rail Insert. Copy Panels shall be either ABS plastic with integral color or an acrylic lacquer finish; photo polymer; or, acrylic.
  - a. Interchangeable by sliding horizontally from either side of sign, and to other signs in system of equal or greater width or height.
  - b. Cleanable without use of special chemicals or cleaning solutions.
  - c. Copy Insert Materials.
    - 1) ABS Inserts - 2.3 mm (.090 inches) extruded ABS plastic core with .07 mm (.003 inches) acrylic cap bonded during extrusion/texturing process. Pressure bonded to extruded Rail Insert using adhesive. Background color is either integral or painted in acrylic lacquer. ABS inserts finished in a chromium industries #HM335RA texture pattern to prevent glare.
    - 2) Photo polymer Inserts - 3 mm (.125 inches) phenolic photo polymer with raised copy etched to 2.3 mm (.0937 inches), bonded to an ABS plastic or extruded aluminum insert with adhesive. Background color is painted in acrylic enamel.
    - 3) Changeable Paper/ Insert Holder - Extruded insert holder with integral Rail Insert for connection with structural back panel in 6063T5 aluminum with a black anodized finish. Inserts into

- holder are paper with a clear 0.7 mm (.030 inches) textured cover. Background color is painted in acrylic lacquer.
- 4) Acrylic - 2 mm (.080 inches) non-glare acrylic. Pressure bonded to extruded Rail Insert using adhesive. Background color is painted in acrylic lacquer or acrylic enamel.
  - 5) Extruded 6063T5 aluminum with a black anodized finish Insert Holder with integral Rail Insert for connection with Structural Back Panel to hold a 0.7 mm (.030 inches) textured polycarbonate insert and a Sliding Tile which mounts in the Inset Holder and slides horizontally.
  - 6) End Caps - Extruded using 6063T5 aluminum with a black anodized. End Caps interlock with Rail Back with clips to form an integral unit, enclosing and securing the changeable Copy Panels, without requiring tools for assembly.
    - a) Shall be interchangeable to either end of sign and to other signs in the system of equal height.
    - b) Mechanical fasteners can be added to the End Caps that will secure it to Rail Back to make sign tamper resistant.
  - 7) Joiners - Extruded using 6063T5 aluminum with a black anodized finish. Rail Joiners connect Rail Backs together blindly, providing a butt joint between Copy Inserts.
  - 8) Accent Joiners - Extruded using 6063T5 aluminum with a mirror polished finish. Joiner shall connect Rail Backs together with a visible 3 mm (.125 inches) horizontal rib, flush to the adjacent Copy Panel surfaces.
  - 9) Top Accent Rail - Extruded using 6063T5 aluminum with a mirror polished finish. Rail shall provide 3 mm (.125 inches) high decorative trim cap, which butts flush to adjacent Copy Panel and encloses top of Rail Back and Copy Panel.
  - 10) Typography
    - a) Vinyl First Surface Copy (non-tactile) - Applied Vinyl copy.
    - b) Subsurface Copy Inserts - Textured 1 mm (.030 inches) clear polycarbonate face with subsurface applied Vinyl copy. Face shall be back sprayed with paint and laminated to an extruded aluminum carrier insert.
    - c) Integral Tactile Copy Inserts - phenolic photo polymer etched with 2.3 mm (.0937 inches) raised copy.
    - d) Silk-screened First Surface Copy (non-tactile) - Injection molded or extruded ABS plastic or aluminum insert with first surface applied enamel silk-screened copy.

C. Sign Type Family 09:

1. All text and graphics are to be first surface silk-screened.
2. IN-01.12 & IN-01.13: Refer to Sign Type 03 specification for tactile and Braille portion of sign.
3. IN-02.4: All text and graphics are to be first surface vinyl letters.
4. IN-01.1: Preparation of artwork for reproduction of "fire and emergency evacuation maps" is by manufacturer.

D. Sign Type Families 03:

1. Tactile sign is to be made from a material that provides for letters, numbers and Braille to be integral with sign plaque material such as: photosensitive polyamide resin, etched metal, sandblasted phenolic or embossed material. Do not apply letters, numbers and Braille with adhesive.
2. Numbers, letters and Braille to be raised 0.793 mm (.0312 inches) from the background surface. The draft of the letters, numbers and Braille to be tapered, vertical and clean.
3. Braille dots are to conform with standard dimensions for literary Braille; (a) Dot base diameter: 1.5 mm (.059 inches) (b) Inter-dot spacing: 2.3 mm (.090 inches) (c) Horizontal separation between cells: 6.0 mm (.241 inches) (d) Vertical separation between cells: 10.0 mm (.395 inches)
4. Entire assembly is painted in specified color. After painting, apply white or other specified color to surface of the numbers and letters. Entire sign is to have a protective clear coat sealant applied.
5. Complete sign is to have an eggshell finish (11 to 19 degree on a 60 degree glossmeter).

E. Sign Type Family 04:

1. All text and graphics are to be first surface applied vinyl letters.
2. IN-04: When a Type IN-04 is to be mounted under a Type IN03, a connecting Accent Joiner is to be used to create a singular integrated sign.

F. Sign Type 05:

1. Text if added to Copy Insert module to be first surface applied vinyl letters.

G. Sign Type Family 07:

1. All text and graphics are to be first surface applied vinyl letters except for under sliding tile.
2. Protect text, which is covered by sliding tile, so tile does not wear away letters.

H. Sign Type Family 13:

1. All text and graphics are to be first surface applied vinyl letters.

I. Temporary Interior Signs:

1. Fabricated from 50 kg (110 pound) matte finished white paper cut to 100 mm (4 inch) wide by 300 mm (12 inch) long. Punched 3 mm (.125 inch) hole with edge of hole spaced 13 mm (.5 inch) in from edge and centered on 100 mm (4 inch) side. Reinforce hole on both sides with suitable material that prevents tie from pulling through hole. Ties are steel wire 0.3 mm (0.120 inch) thick attached to tag with twist leaving 150 mm (6 inch) long free ends.
2. Mark architectural room number on sign, with broad felt marker in clearly legible numbers or letters that identify room, corridor or space as shown on floor plans.
3. Install temporary signs to all rooms that have a room, corridor or space number. Attach to door frame, door knob or door pull.
  - a. Doors that do not require signs are: corridor doors in corridor with same number, folding doors or partitions, toilet doors, bathroom doors within and between rooms, closet doors within rooms, communicating doors in partitions between rooms with corridor entrance doors.
  - b. Replace and missing damaged or illegible signs.

**2.5 FABRICATION**

- A. Design components to allow for expansion and contraction for a minimum material temperature range of 56 °C (100 °F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Use concealed fasteners whenever and wherever possible.
- C. Shop fabricate so far as practicable. Joints fastened flush to conceal reinforcement, or welded where thickness or section permits.
- D. Contact surfaces of connected members be true. Assembled so joints will be tight and practically unnoticeable, without use of filling compound.
- E. Signs shall have fine, even texture and be flat and sound. Lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern. Plane surfaces be smooth flat and without oil-canning, free of rack and twist. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). Restore texture to filed or cut areas.
- F. Level or straighten wrought work. Members shall have sharp lines and angles and smooth surfaces.



- G. Extruded members to be free from extrusion marks. Square turns and corners sharp, curves true.
- H. Drill holes for bolts and screws. Conceal fastenings where possible. Exposed ends and edges mill smooth, with corners slightly rounded. Form joints exposed to weather to exclude water.
- I. Finish hollow signs with matching material on all faces, tops, bottoms and ends. Edge joints tightly mitered to give appearance of solid material.
- J. All painted surfaces properly primed. Finish coating of paint to have complete coverage with no light or thin applications allowing substrate or primer to show. Finished surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.
- K. Movable parts, including hardware, are to be cleaned and adjusted to operate as designed without binding or deformation of members. Doors and covers centered in opening or frame. All contact surfaces fit tight and even without forcing or warping components.
- L. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- M. No signs are to be manufactured until final sign message schedule and location review has been completed by the COR & forwarded to contractor.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Protect products against damage during field handling and installation. Protect adjacent existing and newly placed construction, landscaping and finishes as necessary to prevent damage during installation. Paint and touch up any exposed fasteners and connecting hardware to match color and finish of surrounding surface.
- B. Mount signs in proper alignment, level and plumb according to the sign location plan and the dimensions given on elevation and sign location drawings. Where otherwise not dimensioned, signs shall be installed where best suited to provide a consistent appearance throughout the project. When exact position, angle, height or location is in doubt, contact COR for clarification.
- C. Contractor shall be responsible for all signs that are damaged, lost or stolen while materials are on the job site and up until the completion and final acceptance of the job.

- D. Remove or correct signs or installation work COR determines as unsafe or as an unsafe condition.
- E. At completion of sign installation, clean exposed sign surfaces. Clean and repair any adjoining surfaces and landscaping that became soiled or damaged as a result of installation of signs.
- F. Locate signs as shown on the Sign Location Plans.
- G. Certain signs may be installed on glass. A blank glass back up is required to be placed on opposite side of glass exactly behind sign being installed. This blank glass back up is to be the same size as sign being installed.
- H. Contractor will be responsible for verifying that behind each sign location there are no utility lines that will be affected by installation of signs. Any damage during installation of signs to utilities will be the sole responsibility of the Contractor to correct and repair.
- I. Furnish inserts and anchoring devices which must be set in concrete or other material for installation of signs. Provide setting drawings, templates, instructions and directions for installation of anchorage devices which may involve other trades.

- - - END - - -



**SECTION 10 21 23**  
**CUBICLE CURTAIN AND SHOWER TRACKS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies cubicle curtain track (C.C.T.).

**1.2 RELATED WORK**

- A. Steel shapes for suspending track assembly: Section 05 50 00, METAL FABRICATIONS and Section 09 51 00, ACOUSTICAL CEILINGS.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Samples:
1. One 300 mm (12 inch) long piece of cubicle curtain track with carrier access and end stop.
  2. One clip anchor for fastening track to grid system of acoustical ceilings. One curtain carrier.
- C. Shop Drawings: Showing layout of tracks and method of anchorage.
- D. Manufacturer's Literature and Data:
1. Cubicle curtain track.

**1.4 DELIVERY, STORAGE AND HANDLING**

- A. Deliver material in original package marked to identify the contents, brand name, and the name of the manufacturer or supplier.
- B. Store in dry and protected location. Store so as to not bend or warp the tracks.
- C. Do not open packages until contents are needed for installation, unless verification inspection is required.

**1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
- B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- B456-03(R2009).....Electrodeposited Coatings for Copper Plus Nickel Plus Chromium and Nickel Plus Chromium
- C. The National Association of Architectural Metal Manufacturers (NAAMM):
- AMP 500 Series.....Metal Finishes Manual

**PART 2 - PRODUCTS**

**2.1 CUBICLE AND SHOWER CURTAIN TRACKS**

- A. Surface mounted:

1. Channel Tracks (Surface Mounted Type): Extruded aluminum, ASTM B221, alloy 6063, temper T5 or T6, channel shaped, with smooth inside raceway for curtain carriers.
- B. Curtain Carriers: Nylon or delrin carriers, with either nylon or delrin wheels on metal, delrin, or nylon axles. Equip each carrier with either stainless steel, chromium plated brass or steel hooks with swivel, or nickel chromium plated brass or stainless steel bead chain and hook assembly, or delrin carriers may have moulded on delrin hooks. Hook for bead chain may be the same material and finish as the bead chain or may be chromium plated steel. Provide 2.2 carriers for every 300 mm (onefoot) of each section of each track length, plus one additional carrier.
- C. End Stop Connectors, Ceiling Flanges and Other Accessories: Fabricate from the same material with the same finish as the tracks or from nylon.
- D. Hangers and Fittings: Fabricate from the same material with the same finish as the tracks. Hangers may be round or square for channel tracks and round for tubular tracks. Design fittings to be compatible with design of tracks and to safely transmit the track load to the hangers.
- E. At end of each section of track, make provision for insertion and removal of carriers. Design to prevent accidental removal of carrier. Any operating mechanism shall be removable with common tools.

## **2.2 INTRAVENOUS SUPPORT ASSEMBLY - NOT USED**

## **2.3 FASTENERS**

- A. Exposed Fasteners, Screws and Bolts: Stainless steel or chromium/nickel plated brass.
- B. Concealed Fasteners, Screws and Bolts: Hot-dip galvanized (except in high moisture areas use stainless steel).
- C. Metal Clips: Anchor curtain tracks to exposed grid of lay-in acoustical tile ceilings, with concealed metal (butterfly) type or two piece snap locking type ceiling clip of high strength spring steel. When it is not possible to install the metal ceiling clip, the cubicle curtain track may be screwed to the ceiling grid.

## **2.4 FINISHES**

- A. Aluminum: Chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 mils thick.
- B. Chrome/Nickel Plating: Satin or polished finish as specified, ASTM B546, minimum thickness of chromium plate as follows:
  1. 0.2 mil on copper alloys.
  2. 0.4 mil on steel.
- C. Stainless Steel: No. 4 in accordance with NAAMM Metal Finishes Manual.

## **2.5 FABRICATION**

- A. Weld and grind smooth joints of fabricated components.
- B. Form tracks and bends of lengths that will produce the minimum number of joints. Make track sections up to 4800 mm (16 feet) without joints. Form corner bend on a 300 mm (12 inch) radius.
- C. Provide steel anchor plates, supports, and anchors for securing components to building construction.
- D. Form flat surface without distortion.
- E. Shop assemble components and package complete with anchors and fittings.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install tracks after finish painting and ceiling finishing operations are complete.
- B. Install track level and hangers plumb and securely anchor to the ceiling to form a rigid installation.
- C. Anchor surface mounted curtain tracks directly to exposed grid of lay-in acoustical tile ceilings with suitable fasteners, spaced approximately 600 mm (24 inches) on center.
- D. Anchor surface mounted curtain tracks to concrete, plaster and gypsum board ceilings with a minimum of 3 mm (1/8-inch) diameter fastenings or concealed clips spaced not more than 900 mm (three feet) on center.
- E. Securely fasten end stop caps to prevent their being forced out by the striking weight of carriers.
- F. Remove damaged or defective components and replace with new components or repair to the original condition.

### **3.2 ACCEPTANCE**

- A. Track shall be installed neat, rigid, plumb, level and true, and securely anchored to the overhead construction.
- B. Carrier units shall operate smoothly and easily over the full range of travel.

- - - E N D - - -



**SECTION 10 25 13**  
**PATIENT BED SERVICE WALLS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the furnishing, installation and connection of the patient wall systems both horizontal and vertical. Patient wall systems are also referred to as prefabricated bedside patient units or PBPUs.

**1.2 RELATED WORK**

- A. Color and finishes of the patient wall units on drawings.
- B. Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES AND Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES: Requirements for air, oxygen and vacuum outlets in the patient wall units.
- C. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one section of Division 26.
- D. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Raceways and outlet boxes for wiring.
- E. Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
- F. Section 26 27 26, WIRING DEVICES: Wiring devices to be installed in the patient wall units.
- G. Section 26 24 16, PANELBOARDS: Panelboard requirements for patient wall units with a panelboard.
- H. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground currents.
- I. Section 26 51 00, INTERIOR LIGHTING: Lighting fixture requirements when installed in or connected to the patient wall units.
- J. Section 27 52 23, NURSE CALL/CODE BLUE SYSTEMS: Nurse Call and Code One requirements for installation in the patient wall units.

**1.3 SUBMITTALS**

- A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:
- B. Shop Drawings:
1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.



2. Include electrical ratings, dimensions, mounting details, front view, side view, equipment and device arrangement, wiring diagrams, material, and connection diagrams.
  3. Determine final layout of each style of patient wall system at this stage. Provide configuration drawings showing all possible device (nurse call, medical gases, electrical receptacles and switches, etc.) locations to the COR. The COR will provide by return of submittal the desired configuration of each style of patient wall system. Limit the number and type of devices allowed for each style of unit to the number and type of devices specified for that style below.
- C. Manuals: Two weeks prior to the final inspection, deliver four copies of the following to the COR.
1. Complete maintenance and operating manuals including wiring diagrams, technical data sheets, and information for ordering replacement parts:
    - a. Include complete "As installed" diagrams which indicate all items of equipment, their interconnecting wiring and interconnecting piping.
    - b. Include complete diagrams of the internal wiring for each of the items of equipment, including "As installed" revisions of the diagrams.
    - c. Identify terminals on the wiring diagrams to facilitate installation, maintenance and operation.
- D. Certifications: Two weeks prior to the final inspection, deliver four copies of the following certifications to the COR:
1. Certification by the manufacturer that the equipment conforms to the requirements of the drawings and specifications.
  2. Certification by the Contractor that the equipment has been properly installed, adjusted, and tested in accordance with the manufacturer's recommendations.
- E. Samples: Samples of front panels and vinyl facing material; 12 inches x 12 inches minimum size.

#### **1.4 APPLICABLE PUBLICATIONS:**

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in text by the basic designation only.
- B. National Fire Protection Association (NFPA):  
70-11.....National Electrical Code (NEC)

99-12.....Health Care Facilities

C. Underwriters Laboratories, Inc. (UL):

UL listed in product category SECTIONS AND UNITS (QQXX). This standard used to investigate listed products in this category is NFPA 70 (NEC).

**PART 2 - PRODUCTS**

**2.1 PATIENT WALL SYSTEMS**

- A. Shall be UL listed.
- B. Shall consist of a structural framework, removable panels and removable equipment console units, factory assembled to house all permanent bedside services including but not necessarily limited to fixtures, grounding jacks, power outlets, telephone outlet, nurses call patient station, medical gas outlet(s) and other fittings or devices.
- C. Shall conform to the following:
  - 1. Applicable requirements in NFPA 70 (NEC) and NFPA 99.
  - 2. Assembly and all components shall be UL listed or labeled.
- D. Coordinate the mounting space provisions for the nurse call equipment with Section 27 52 23, NURSE CALL/CODE BLUE SYSTEMS.
- E. Compressed Air, Oxygen and Vacuum System Equipment: Furnish, install and test the equipment in accordance with the drawings and Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES and Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
  - 1. Fixed medical gas outlets are permanently installed in one location and may not be moved without special tools and shutting off the gas involved.
- F. Electrical receptacles and switches shall comply with the requirements in Section 26 27 26, WIRING DEVICES; grounding in Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS; and internal wiring in Section 26 05 21, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW).
- G. Styles:
  - 1. Style A1: A single bed patient wall unit consisting of a horizontal unit. Horizontal units shall consist of a minimum of three rails (two rails can be used if the bed light is independently mounted). Patient bed light power must be wired through the patient wall unit. Provide a middle rail for power, nurses call and medical gases as well as a bottom rail with bed bumper and for bed motor power. The horizontal unit shall have a vertical chase connecting the rails to the above ceiling junction boxes and gas connection points. All electrical devices shall be wired in accordance with the schematic diagram shown on the drawings.

- a. Refer to headwall elevation on sheet A-402 for required devices and services.
  - b. Basis of Design: Modular services company provider plus 6600-PC.
2. Style C: Single bed patient unit consisting of a vertical unit.  
Vertical units to be free standing. All electrical devices shall be wired in accordance with the schematic diagram shown on the drawings.
  - a. Refer to headwall elevation on drawing sheet A-402 for required devices and services.
  - b. Basis of Design: Modular Services Company; Form Series 7500 floor mounted high acuity.
- H. All styles of the units shall have the following features:
  1. Basic structural framework shall be constructed of heavy gage extruded aluminum or minimum 1.9 mm (14 gage) cold-rolled steel, designed to be a self-supporting unit for above-the-floor, for close wall mounting or a freestanding installation. For freestanding units, provide the framework with a base plate and overhead structural supports.
  2. Drill and tap the side frame members to permit the installation of front panel devices at modular intervals at any elevation between the top and bottom.
  3. Provide removable front panels:
    - a. Construct panel of the following materials:
      - 1) Vinyl material heat and pressure applied over a minimum of 1.6 mm (0.060 inch) sheet aluminum back braced for rigidity and sound control.
      - 2) Vinyl material heat and pressure applied over sheet steel minimum 1.6 mm (0.060 inch).
      - 3) Vinyl material heat and pressure applied over sheet aluminum minimum 2.0 mm (0.080 inch).
    - b. Color and texture shall be as specified on drawings.
    - c. Bond the panel edges with an aluminum extrusion or cold-rolled steel trim designed for mounting directly to the structural framework, thus allowing the panels to be easily removed for access to internal components and for servicing of utility connections or future modifications. Secure panels with hidden screws or other means to offer an overall finished appearance. All exposed metal surfaces or trims greater than 4 mm (1/8 inch) wide shall be of anodized aluminum or stainless steel finished to resist abrasion and affects from hospital cleaning compounds.

4. Style A1 need not have back panels, provided they are edge gasketed to the wall or totally and inconspicuously edge sealed to the wall with a resilient caulking material. Attach side and back panels [sheet steel, a minimum of 1.6 mm (0.060 inch)] or equivalent strength aluminum side and back panels, with flush screws to permit close wall mounting. Finish side panels to match or compliment the front panels. Match back panel for free-standing units with the finish of the front and side panels.
5. Mount patient service components in an equipment console made up of a backbox and finish fascia.
  - a. Use galvanized steel backbox with outlet gang openings on minimum 60 mm (2.4 inches) uniform centers to provide mounting supports of front panel devices. Provide removable metal barriers to separate voltage sources and to facilitate wiring between segregated devices within the same horizontal module.
  - b. Match finish, either anodized aluminum or stainless steel of all fascia and device face plates.
  - c. Fascia and/or face plates may be omitted for power and grounding receptacles in the consoles if the receptacles are mounted flush in the PBPU cover panel and facilities (support members, tapped holes, spacing, etc.) are provided behind the panel for future addition or relocation of receptacles.
  - d. Provide smooth external surfaces having a finished appearance. Maintain adequate spacing of device plates and similar items to eliminate crevices and facilitate cleaning.
6. Provide patient services as indicated in paragraphs Styles above, the schematic wiring diagram shown on drawings, and as follows:
  - a. Electrical components: Factory assembled and prewired to a sectionalized junction box at the top of the unit in accordance with circuiting and switching arrangements shown on the drawings. Factory assembled prewiring may be stranded in sizes AWG #10 and #12. Provide an equipotential ground bus with lugs suitable for connecting AWG #14 to AWG #6 conductors with a minimum of 48 screw-type terminals, unless otherwise shown.
  - b. Receptacles: Single Hospital Grade NEMA 5-20R, unless otherwise specified.
  - c. Provide medical gas components compatible with those installed elsewhere in the project that are factory assembled, manifolded and pre-piped, using medical grade copper pipe, to single point connections of each service at the top of the units.

- d. Provide nurse call services consisting of provisions for adequate space and matching face plates for the equipment and empty conduit to the sectionalized junction box at the top of the unit.
- e. Provide internal power and signal wiring in separate EMT, flexible metal conduits or approved raceway. Separate normal power circuits from emergency power circuits. Also, provide adequate supports for conduits and piping within the structural frame.
- f. Telephone outlets/jacks: Plug-in type as approved by the VAMC.
- g. Except for anodized aluminum and galvanized or stainless steel surfaces, clean and paint all other metal surfaces at the factory with primer and not less than two coats of baked enamel.

**PART 3 - EXECUTION**

**3.1 INSTALLATION:**

- A. Installation shall be in accordance with NFPA 70 (NEC), NFPA 99, and as shown on the drawings.
- B. Compressed Air, Oxygen and Vacuum System Equipment:
  - 1. Install and test the equipment and piping system in accordance with the drawings and Section 22 62 00, VACUUM SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES and Section 22 63 00, GAS SYSTEMS FOR LABORATORY AND HEALTHCARE FACILITIES.
  - 2. Install and make connections as required for a complete and operational patient wall system for each unit.

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

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies wall guards (crash rails or bumper guards), handrail/wall guard combinations, corner guards and door/door frame protectors and high impact wall covering.

**1.2 RELATED WORK**

- A. Structural steel corner guards: Section 05 50 00, METAL FABRICATIONS.
- B. Armor plates and kick plates not specified in this section: Section 08 71 00, DOOR HARDWARE.
- C. Color and texture of aluminum and resilient material: Section 09 06 00, SCHEDULE FOR FINISHES.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings: Show design and installation details.
- C. Manufacturer's Literature and Data:
  - 1. Handrail/Wall Guard Combinations.
  - 2. Wall Guards.
  - 3. Corner Guards.
  - 4. High Impact Wall covering.
- D. Test Report: Showing that resilient material complies with specified fire and safety code requirements.
- E. Samples: Samples of each product to be provided: 6 inches minimum length for railings; 12 inches by 12 inches for sheet products.

**1.4 DELIVERY AND STORAGE**

- A. Deliver materials to the site in original sealed packages or containers marked with the name and brand, or trademark of the manufacturer.
- B. Protect from damage from handling and construction operations before, during and after installation.
- C. Store in a dry environment of approximately 21° C (70 degrees F) for at least 48 hours prior to installation.

**1.5 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip

B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,  
Wire, Shapes, and Tubes

D256-06.....Impact Resistance of Plastics

D635-06.....Rate of Burning and/or Extent and Time of  
Burning of Self-Supporting Plastics in a  
Horizontal Position

E84-09.....Surface Burning Characteristics of Building  
Materials

C. The National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500-06.....Metal Finishes Manual

D. National Fire Protection Association (NFPA):  
80-10.....Standard for Fire Doors and Windows

E. Society of American Automotive Engineers (SAE):  
J 1545-05.....Instrumental Color Difference Measurement for  
Exterior Finishes.

F. Underwriters Laboratories Inc. (UL):  
Annual Issue.....Building Materials Directory

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

A. Stainless Steel: ASTM A167, Type 302B.

B. Aluminum Extruded: ASTM B221, Alloy 6063, Temper T5 or T6.

C. Resilient Material:

1. Extruded and injection molded acrylic vinyl or extruded polyvinyl chloride meeting following requirements:
  - a. Minimum impact resistance of 1197 ps (25 ft lbs per sq.ft) when tested in accordance with ASTM D256 (Izod impact, ft.lbs. per inch notch).
  - b. Class 1 fire rating when tested in accordance with ASTM E84, having a maximum flame spread of 25 and a smoke developed rating of 450 or less.
  - c. Rated self extinguishing when tested in accordance with ASTM D635.
  - d. Material shall be labeled and tested by Underwriters Laboratories or other approved independent testing laboratory.
  - e. Integral color with all colored components matched in accordance with SAE J 1545 to within plus or minus 1.0 on the CIE-LCH scales.
  - f. Same finish on exposed surfaces.

### **2.2 CORNER GUARDS**

A. Stainless Steel Corner Guards: Fabricate of 1.6 mm (0.0625-inch) thick stainless steel. Form guards of dimensions and to contour shown.

## **2.3 WALL GUARDS AND HANDRAILS**

### **A. Resilient Wall Guards and Metal Handrails:**

1. Handrail: Anti-microbial copper alloy tubing, 1.5 inch O.D., anchored to wall at maximum 760 mm (30 inches) on center.
2. Wall Guards (Crash Rails): Snap-on covers of resilient material, minimum 2.8 mm (0.110-inch) thick, shall be free-floated over 50 mm (two-inch) wide aluminum retainer clips, minimum 2.3 mm (0.090-inch) thick, anchored to wall at maximum 600 mm (24 inches) on center, supporting a continuous aluminum retainer, minimum 1.6 mm (0.062-inch) thick; or, shall be free-floated over a continuous extruded aluminum retainer, minimum 2.3 (0.090-inch) thick anchored to wall at maximum 600 mm (24 inches) on center.
3. Provide handrails and wall guards (crash rails) with prefabricated and closure caps, inside and outside corners, concealed splices, cushions, mounting hardware and other accessories as required. End caps and corners shall be field adjustable to assure close alignment with handrails and wall guards (crash rails). Screw or bolt closure caps to aluminum retainer.
  - a. Handrail Basis of Design: Wagner Companies Wagnerrail CuVerro with GB4382 brackets. Deductive alternate basis of design: C/S Group HRS-6C.

## **2.4 DOOR AND DOOR FRAME PROTECTION - NOT USED**

## **2.5 HIGH IMPACT WALL COVERING**

- A. Fabricate from vinyl acrylic or polyvinyl chloride resilient material minimum 6mm (0.06 inch) thick designed specially for interior use.
- B. Coordinate with guard rail protection material and supplier for proper fit, installation and color.
- C. Provide adhesive as recommended by the wall covering manufacturer.

## **2.6 FASTENERS AND ANCHORS**

- A. Provide fasteners and anchors as required for each specific type of installation.
- B. Where type, size, spacing or method of fastening is not shown or specified, submit shop drawings showing proposed installation details.

## **2.7 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Aluminum:
  1. Exposed aluminum: AAC22A31 chemically etched medium matte, with clear anodic coating, Class II Architectural, 0.4 mil thick.
  2. Concealed aluminum: Mill finish as fabricated, uniform in color and free from surface blemishes.



C. Stainless Steel: NAAMM finish Number 4.

D. Resilient Material: Embossed texture and color in accordance with SAE J 1545 and as specified in Section 09 06 00, SCHEDULE FOR FINISHES.

### **PART 3 - INSTALLATION**

#### **3.1 RESILIENT CORNER GUARDS - NOT USED**

#### **3.2 STAINLESS STEEL CORNER GUARDS**

A. Mount guards on external corners of interior walls, partitions and columns as shown.

1. Where corner guards are installed on gypsum board, clean surface and anchor guards with a neoprene solvent-type contact adhesive specifically manufactured for use on gypsum board construction. Remove excess adhesive from around edge of guard and allow to cure undisturbed for 24 hours.

#### **3.3 HANDRAIL AND RESILIENT WALL GUARDS (CRASH RAIL)**

A. Secure guards to walls with brackets and fasteners in accordance with manufacturer's details and instructions.

#### **3.4 ALUMINUM WALL GUARDS - NOT USED**

#### **3.5 STAINLESS STEEL WALL GUARDS - NOT USED**

#### **3.6 HIGH IMPACT WALL COVERING**

- A. Surfaces to receive protection shall be clean, smooth and free of obstructions.
- B. Install protectors after frames are in place but preceding installation of doors in accordance with approved shop drawings and manufacturers specific instructions.
- C. Apply with adhesive in controlled environment according to manufacture's recommendations.

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**SECTION 10 28 00**  
**TOILET, BATH, AND LAUNDRY ACCESSORIES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies manufactured items usually used in dressing rooms, toilets, baths, locker rooms and at sinks in related spaces.
- B. Items Specified:
  - 1. Grab Bars: (10800-1.DWG).
  - 2. Clothes hooks, robe or coat.
  - 3. Metal framed mirror: (10800-7.DWG).
  - 4. Soap dishes.
  - 5. Mop racks.
  - 6. Stainless steel shelves at wheelchair lavatory.
- B. This section also specifies custom fabricated items used in toilets and related spaces.

**1.2 RELATED WORK**

- A. Color of finishes: Section 09 06 00, SCHEDULE FOR FINISHES
- B. Custom fabricated accessories: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Shop Drawings:
  - 1. Each product specified.
  - 2. Paper towel dispenser and combination dispenser and disposal units.
  - 3. Metal framed mirrors, showing shelf where required, fillers, and design and installation of units when installed on ceramic tile wainscots and offset surfaces.
  - 4. Grab bars, showing design and each different type of anchorage.
  - 5. Show material and finish, size of members, and details of construction, installation and anchorage of mop racks.
- C. Samples:
  - 1. One of each type of accessory specified.
  - 2. After approval, samples may be used in the work.
- D. Manufacturer's Literature and Data:
  - 1. All accessories specified.
  - 2. Show type of material, gages or metal thickness in inches, finishes, and when required, capacity of accessories.
  - 3. Show working operations of spindle for toilet tissue dispensers.
  - 4. Mop racks.

E. Manufacturer's Certificates:

1. Attesting that soap dispensers are fabricated of material that will not be affected by liquid soap or aseptic detergents, PhisoHex and solutions containing hexachlorophene.
2. Anodized finish as specified.

**1.4 QUALITY ASSURANCE**

- A. Each product shall meet, as a minimum, the requirements specified, and shall be a standard commercial product of a manufacturer regularly presently manufacturing items of type specified.
- B. Each accessory type shall be the same and be made by the same manufacturer.
- C. Each accessory shall be assembled to the greatest extent possible before delivery to the site.
- D. Include additional features, which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product.

**1.5 PACKAGING AND DELIVERY**

- A. Pack accessories individually to protect finish.
- B. Deliver accessories to the project only when installation work in rooms is ready to receive them.
- C. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- D. Deliver products to site in sealed packages of containers; labeled for identification with manufacturer's name, brand, and contents.

**1.6 STORAGE**

- A. Store products in weathertight and dry storage facility.
- B. Protect from damage from handling, weather and construction operations before, during and after installation in accordance with manufacturer's instructions.

**1.7 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.
- B. American Society for Testing and Materials (ASTM):
  - A167-99(R2009).....Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
  - A176-99(R2009).....Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
  - A269-10.....Seamless and Welded Austenitic Stainless Steel Tubing for General Service

- A312/A312M-09.....Seamless and Welded Austenitic Stainless Steel  
Pipes
- A653/A653M-10.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-  
Iron Alloy-Coated (Galvannealed) by the Hot-Dip  
Process
- B221-08.....Aluminum and Aluminum-Alloy Extruded Bars, Rods,  
Wire, Shapes, and Tubes
- B456-03(R2009).....Electrodeposited Coatings of Copper Plus Nickel  
Plus Chromium and Nickel Plus Chromium
- C1036-06.....Flat Glass
- C1048-04.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated  
and Uncoated Glass
- D635-10.....Rate of Burning and/or Extent and Time of  
Burning of Self Supporting Plastics in a  
Horizontal Position
- F446-85(R2009).....Consumer Safety Specification for Grab Bars and  
Accessories Installed in the Bathing Area.
- D3453-07.....Flexible Cellular Materials - Urethane for  
Furniture and Automotive Cushioning, Bedding,  
and Similar Applications
- D3690-02(R2009).....Vinyl-Coated and Urethane-Coated Upholstery  
Fabrics
- C. The National Association of Architectural Metal Manufacturers (NAAMM):  
AMP 500 Series.....Metal Finishes Manual
- D. American Welding Society (AWS):  
D10.4-86 (R2000).....Welding Austenitic Chromium-Nickel Stainless  
Steel Piping and Tubing
- E. Federal Specifications (Fed. Specs.):  
A-A-3002.....Mirrors, Glass  
FF-S-107C (2).....Screw, Tapping and Drive  
FF-S-107C.....Screw, Tapping and Drive.  
WW-P-541E(1).....Plumbing Fixtures (Accessories, Land Use) Detail  
Specification

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Aluminum: ASTM B221, alloy 6063-T5 and alloy 6463-T5.
- B. Stainless Steel:
1. Plate or sheet: ASTM A167, Type 302, 304, or 304L, except ASTM A176 where Type 430 is specified, 0.0299-inch thick unless otherwise specified.

- 2. Tube: ASTM A269, Alloy Type 302, 304, or 304L.
- C. Stainless Steel Tubing: ASTM A269, Grade 304 or 304L, seamless or welded.
- D. Stainless Steel Pipe: ASTM A312; Grade TP 304 or TP 304L.
- E. Steel Sheet: ASTM A653, zinc-coated (galvanized) coating designation G90.
- F. Glass:
  - 1. ASTM C1036, Type 1, Class 1, Quality q2, for mirrors, and for mirror doors in medicine cabinets.
  - 2. ASTM C1036, Type 1 Class 1 Quality q3, for shelves in medicine cabinets.
  - 3. ASTM C1048, Kind FT, Condition A, Type 1, Class 1 (use in Mental Health and Behavior Nursing Unit Psychiatric Patient Areas and Security Examination Rooms where mirrors and glass are specified).
- G. Foam Rubber: ASTM D3453, Grade BD, Type 2.
- H. Vinyl Covering: ASTM D3690, Vinyl coated fabric, Class A.
- I. Plywood: PS1, Grade CD.

## **2.2 FASTENERS**

- A. Exposed Fasteners: Stainless steel or chromium plated brass, finish to match adjacent surface.
- B. Concealed Fasteners: Steel, hot-dip galvanized (except in high moisture areas such as showers or bath tubs use stainless steel).
- C. Toggle Bolts: For use in hollow masonry or frame construction.
- D. Hex bolts: For through bolting on thin panels.
- E. Expansion Shields: Lead or plastic as recommended by accessory manufacturer for component and substrate for use in solid masonry or concrete.
- F. Screws:
  - 1. ASME B18.6.4.
  - 2. Fed Spec. FF-S-107, Stainless steel Type A.
- G. Adhesive: As recommended by manufacturer for products to be joined.

## **2.3 FINISH**

- A. In accordance with NAAMM AMP 500 series.
- B. Anodized Aluminum:
  - 1. AA-C22A41 Chemically etched medium matte, with clear anodic coating, Class I Architectural, 0.7-mil thick.
- C. AA-M32 Mechanical finish, medium satin.
  - 1. Chromium Plating: ASTM B456, satin or bright as specified, Service Condition No. SC2.
  - 2. Stainless Steel: NAAMM AMP 503, finish number 4.

3. Ferrous Metal:

- a. Shop Prime: Clean, pretreat and apply one coat of primer and bake.
- b. Finish: Over primer apply two coats of alkyd or phenolic resin enamel, and bake.

**2.4 FABRICATION - GENERAL**

- A. Welding, AWS D10.4.
- B. Grind dress, and finish welded joints to match finish of adjacent surface.
- C. Form exposed surfaces from one sheet of stock, free of joints.
- D. Provide steel anchors and components required for secure installation.
- E. Form flat surfaces without distortion. Keep exposed surfaces free from scratches and dents. Reinforce doors to prevent warp or twist.
- F. Isolate aluminum from dissimilar metals and from contact with building materials as required to prevent electrolysis and corrosion.
- G. Hot-dip galvanized steel, except stainless steel, anchors and fastening devices.
- H. Shop assemble accessories and package with all components, anchors, fittings, fasteners and keys.
- I. Key items alike.
- J. Provide templates and rough-in measurements as required.
- K. Round and deburr edges of sheets to remove sharp edges.

**2.5 PAPER TOWEL DISPENSERS - NOT USED**

**2.6 COMBINATION PAPER TOWEL DISPENSER AND DISPOSAL UNITS - NOT USED**

**2.7 WASTE RECEPTACLES - NOT USED**

**2.8 TOILET TISSUE DISPENSERS - NOT USED**

**2.9 GRAB BARS**

- A. Fed. Spec WW-P-541/8B, Type IV, bars, surface mounted, Class 2, grab bars and ASTM F446.
- B. Fabricate of either stainless steel or nylon coated steel, except use only one type throughout the project:
  - 1. Stainless steel: Grab bars, flanges, mounting plates, supports, screws, bolts, and exposed nuts and washers.
- C. Concealed mount, except grab bars mounted at floor, swing up and on metal partitions.
- D. Bars:
  - 1. Fabricate from 38 mm (1-1/2 inch) outside diameter tubing.
    - a. Stainless steel, minimum 1.2 mm (0.0478 inch) thick.
  - 2. Fabricate in one continuous piece with ends turned toward walls, except swing up and where grab bars are shown continuous around three

- sides of showers, bars may be fabricated in two sections, with concealed slip joint between.
3. Continuous weld intermediate support to the grab bar.
  4. Swing up bars manually operated. Designed to prevent bar from falling when in raised position.
- E. Flange for Concealed Mounting:
1. Minimum of 2.65 mm (0.1046 inch) thick, approximately 75 mm (3 inch) diameter by 13 mm (1/2 inch) deep, with provisions for not less than three set screws for securing flange to back plate.
  2. Insert grab bar through center of the flange and continuously weld perimeter of grab bar flush to back side of flange.
- F. Flange for Exposed Mounting:
1. Minimum 5 mm (3/16 inch) thick, approximately 75 mm (3 inch) diameter.
  2. Insert grab bar through flange and continuously weld perimeter of grab bar flush to backside of flange.
  3. Where mounted on metal partitions, provide three equally spaced, countersunk holes, sized to accommodate 5 mm (3/16 inch) diameter bolts.
- G. In lieu of providing flange for concealed mounting, and back plate as specified, grab rail may be secured by being welded to a back plate and be covered with flange.
- H. Back Plates:
1. Minimum 2.65 mm (0.1046 inch) thick metal.
  2. Fabricate in one piece, approximately 6 mm (1/4 inch) deep, with diameter sized to fit flange. Provide slotted holes to accommodate anchor bolts.
  3. Furnish spreaders, through bolt fasteners, and cap nuts, where grab bars are mounted on partitions.

## **2.10 SHOWER CURTAIN TRACKS - NOT USED**

## **2.11 CLOTHES HOOKS-ROBE OR COAT**

- A. Fabricate hook units either of chromium plated brass with a satin finish, or stainless steel, using 6 mm (1/4 inch) minimum thick stock, with edges and corners rounded smooth to the thickness of the metal, or 3 mm (1/8 inch) minimum radius.
- B. Fabricate each unit as a double hook on a single shaft, integral with or permanently fastened to the wall flange, provided with concealed fastenings.

## **2.12 TOWEL BARS - NOT USED**

## **2.13 METAL FRAMED MIRRORS**

- A. Fed. Spec. A-A-3002 metal frame; stainless steel, type 302 or 304.
- B. Mirror Glass:
  - 1. Minimum 6 mm (1/4 inch) thick.
  - 2. Set mirror in a protective vinyl glazing tape.
  - 3. Use tempered glass for mirrors in Mental Health and Behavioral Nursing units.
- C. Frames:
  - 1. Channel shaped section with face of frame not less than 9 mm (3/8 inch) wide. Fabricate with square corners.
  - 2. Use either 0.9 mm (0.0359 inch) thick stainless steel.
  - 3. Filler:
    - a. Where mirrors are mounted on walls having ceramic tile wainscots not flush with wall above, provide fillers at void between back of mirror and wall surface.
    - b. Fabricate fillers from same material and finish as the mirror frame, contoured to conceal the void behind the mirror at sides and top.
- D. Back Plate:
  - 1. Fabricate backplate for concealed wall hanging of either zinc-coated, or cadmium plated 0.9 mm (0.036 inch) thick sheet steel, die cut to fit face of mirror frame, and furnish with theft resistant concealed wall fastenings.
  - 2. Use set screw type theft resistant concealed fastening system for mounting mirrors.
- E. Mounting Bracket:
  - 1. Designed to support mirror tight to wall.
  - 2. Designed to retain mirror with concealed set screw fastenings.

## **2.14 MEDICINE CABINETS - NOT USED**

## **2.15 FOOT OPERATED SOAP DISPENSER - NOT USED**

## **2.16 SOAP DISHES**

- A. Fed. Spec. WW-P-541/8B, Type VI, Holder.
- B. Class 1, Surface Mounted:
  - 1. One piece with provisions for exposed fasteners.
  - 2. Fabricate from chromium plated brass approximately 115 by 95 mm (4 1/2 by 3-3/4 inches) overall size with drainage openings at bottom.
- C. Class 2, Recessed:
  - 1. One piece seamless shell and flange with provisions for concealed fasteners.



2. Fabricate from either chromium plated brass, or 0.8 mm (0.0329 inch) thick stainless steel.
3. Form surface of soap tray with raised ridges or patterned dimples to provide gripping surface for soap bar, or provide flush soap tray with a retaining lip. Plastic soap trays or tray inserts are not acceptable.

**2.17 PAPER CUP DISPENSER - NOT USED**

**2.18 MOP RACKS**

- A. Minimum 1.0M (40 inches) long with five holders.
- B. Clamps:
  1. Minimum of 1.3 mm (0.050-inch) thick stainless steel bracket retaining channel with a hard rubber serrated cam; pivot mounted to channel.
  2. Clamps to hold handles from 13 mm (1/2-inch) minimum to 32 mm (1-1/4 inch) maximum diameter.
- C. Support:
  1. Minimum of 1 mm (0.0375 inch) thick stainless steel hat shape channel to hold clamps away from wall as shown.
  2. Drill wall flange for 3 mm (1/8 inch) fasteners above and below clamp locations.
- D. Secure clamps to support with oval head machine screws or rivets into continuous reinforcing back of clamps.
- E. Finish on stainless Steel: AMP 503-No. 4.

**2.19 STAINLESS STEEL SHELVES (TYPE 44)- NOT USED**

**2.20 STAINLESS STEEL SHELVES, TYPES 45, 45C. - NOT USED**

**2.21 STAINLESS STEEL SHELVES AT WHEELCHAIR LAVATORY**

- A. Side wall mounted:
  1. Fabricate to size and shape shown of 1.2 mm (0.0478 inch) thick sheet.
  2. Turn up edges and weld corners closed.
  3. Fabricate brackets and weld to shelf. Drill brackets for 6 mm (1/4 inch) anchor bolts.
- B. Back wall mounted:
  1. Fabricate to size and shape shown of plate and tube.
  2. Turn up edges and weld corners of shelf.
  3. Weld tube to back plate and shelf, weld back plate to shelf, filler plate to tube, and corners of shelf with continuous welds.
  4. Drill back plate for 6 mm (1/4 inch) anchor bolts.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- A. Before starting work notify COR in writing of any conflicts detrimental to installation or operation of units.
- B. Verify with the COR the exact location of accessories.

#### **3.2 INSTALLATION**

- A. Set work accurately, in alignment and where shown. Items shall be plumb, level, free of rack and twist, and set parallel or perpendicular as required to line and plane of surface.
- B. Toggle bolt to steel anchorage plates in frame partitions or hollow masonry. Expansion bolt to concrete or solid masonry.
- C. Install accessories in accordance with the manufacturer's printed instructions and ASTM F446.
- D. Install accessories plumb and level and securely anchor to substrate.
- E. Install accessories in a manner that will permit the accessory to function as designed and allow for servicing as required without hampering or hindering the performance of other devices.
- F. Position and install dispensers, and other devices in countertops, clear of drawers, permitting ample clearance below countertop between devices, and ready access for maintenance as needed.
- G. Align mirrors, dispensers and other accessories even and level, when installed in battery.
- H. Install accessories to prevent striking by other moving, items or interference with accessibility.

#### **3.3 SCHEDULE OF ACCESSORIES - NOT USED**

#### **3.4 CLEANING**

- A. After installation, clean as recommended by the manufacturer and protect from damage until completion of the project.

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**SECTION 10 44 13**  
**FIRE EXTINGUISHER CABINETS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section covers recessed fire extinguisher cabinets.

**1.2 RELATED WORK**

- A. Acrylic glazing: Section 08 80 00, GLAZING.  
B. Field Painting: Section 09 91 00, PAINTING.

**1.3 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.  
B. Manufacturer's Literature and Data: Fire extinguisher cabinet including installation instruction and rough opening required.

**1.4 APPLICATION PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.  
B. American Society of Testing and Materials (ASTM):  
D4802-10.....Poly (Methyl Methacrylate) Acrylic Plastic Sheet

**PART 2 - PRODUCTS**

**2.1 FIRE EXTINGUISHER CABINET**

- A. Recessed type with flat trim of size and design shown.

**2.2 FABRICATION**

- A. Form body of cabinet from 0.9 mm (0.0359 inch) thick sheet steel.  
B. Fabricate door and trim from 1.2 mm (0.0478 inch) thick sheet steel with all face joints fully welded and ground smooth.  
1. Glaze doors with 6 mm (1/4 inch) thick ASTM D4802, clear acrylic sheet, Category B-1, Finish 1.  
2. Design doors to open 180 degrees.  
3. Provide continuous hinge, pull handle, and adjustable roller catch.

**2.3 FINISH**

- A. Finish interior of cabinet body with baked-on semigloss white enamel.  
B. Finish door, frame with manufacturer's standard baked-on prime coat suitable for field painting.

**PART 3 - EXECUTION**

- A. Install fire extinguisher cabinets in prepared openings and secure in accordance with manufacturer's instructions.  
B. Install cabinet so that bottom of cabinet is 975 mm (39 inches) above finished floor.

Expand/Repair Intensive Care Unit, Step Down Unit and Pulmonary  
Ralph H. Johnson VA Medical Center  
Charleston, SC

VA #534-325

HDG #13026

- - - E N D - - -

**SECTION 11 05 12**  
**GENERAL MOTOR REQUIREMENTS FOR EQUIPMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. This section specifies the furnishing, installation and connection of motors.

**1.2 RELATED WORK:**

- A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements that are common to more than one Section of Division 26.
- B. Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS: Starters, control and protection for motors.
- C. Section 26 24 19, MOTOR-CONTROL CENTERS: Multiple motor control assemblies, which include motor starters.
- D. Other sections specifying motor driven equipment in Divisions 11 and 14.

**1.3 SUBMITTALS:**

- A. In accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, submit the following:
- B. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include electrical ratings, dimensions, mounting details, materials, horsepower, RPM, enclosure, starting characteristics, torque characteristics, code letter, full load and locked rotor current, service factor, and lubrication method.
- C. Manuals:
  - 1. Submit simultaneously with the shop drawings, companion copies of complete maintenance and operating manuals, including technical data sheets and application data.
- D. Certification: Two weeks prior to final inspection, unless otherwise noted, submit four copies of the following certification to the COR:
  - 1. Certification that the motors have been properly applied, installed, adjusted, lubricated, and tested.

**1.4 APPLICABLE PUBLICATIONS:**

- A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.
- B. National Electrical Manufacturers Association (NEMA):
  - MG 1-09(R2010).....Motors and Generators

MG 2-01(R2007).....Safety Standard and Guide for Selection,  
Installation and Use of Electric Motors and  
Generators

C. National Fire Protection Association (NFPA):

70-11.....National Electrical Code (NEC)

## **PART 2 - PRODUCTS**

### **2.1 MOTORS:**

A. For alternating current, fractional and integral horsepower motors, NEMA Publications MG 1 and MG 2 shall apply.

B. Voltage ratings shall be as follows:

1. Single phase:

- a. Motors connected to 120-volt systems: 115 volts.
- b. Motors connected to 208-volt systems: 200 volts.
- c. Motors connected to 240 volt or 480 volt systems: 230/460 volts, dual connection.

2. Three phase:

- a. Motors connected to 208-volt systems: 200 volts.
- b. Motors, less than 74.6 kW (100 HP), connected to 240 volt or 480 volt systems: 230/460 volts, dual connection.
- c. Motors, 74.6 kW (100 HP) or larger, connected to 240-volt systems: 230 volts.
- d. Motors, 74.6 kW (100 HP) or larger, connected to 480-volt systems: 460 volts.
- e. Motors connected to high voltage systems: Shall conform to NEMA Standards for connection to the nominal system voltage shown on the drawings.

C. Number of phases shall be as follows:

- 1. Motors, less than 373 W (1/2 HP): Single phase.
- 2. Motors, 373 W (1/2 HP) and larger: 3 phase.
- 3. Exceptions:
  - a. Hermetically sealed motors.
  - b. Motors for equipment assemblies, less than 746 W (one HP), may be single phase provided the manufacturer of the proposed assemblies cannot supply the assemblies with three phase motors.

D. Horsepower ratings shall be adequate for operating the connected loads continuously in the prevailing ambient temperatures in areas where the motors are installed, without exceeding the NEMA standard temperature rises for the motor insulation.

- E. Motor designs, as indicated by the NEMA code letters, shall be coordinated with the connected loads to assure adequate starting and running torque.
- F. Motor Enclosures:
1. Shall be the NEMA types shown on the drawings for the motors.
  2. Where the types of motor enclosures are not shown on the drawings, they shall be the NEMA types, which are most suitable for the environmental conditions where the motors are being installed.
  3. Enclosures shall be primed and finish coated at the factory with manufacturer's prime coat and standard finish.
- G. Additional requirements for specific motors, as indicated in other sections, shall also apply.
- H. Energy-Efficient Motors (Motor Efficiencies): All permanently wired polyphase motors of 746 Watts or more shall meet the minimum full-load efficiencies as indicated in the following table, and as specified in this specification. Motors of 746 Watts or more with open, drip-proof or totally enclosed fan-cooled enclosures shall be NEMA premium efficiency type, unless otherwise indicated. Motors provided as an integral part of motor driven equipment are excluded from this requirement if a minimum seasonal or overall efficiency requirement is indicated for that equipment by the provisions of another section.

Minimum Efficiencies Open Drip-Proof				Minimum Efficiencies Totally Enclosed Fan-Cooled			
Rating kW (HP)	1200 RPM	1800 RPM	3600 RPM	Rating kW (HP)	1200 RPM	1800 RPM	3600 RPM
0.746 (1)	82.5%	85.5%	77.0%	0.746 (1)	82.5%	85.5%	77.0%
1.12 (1.5)	86.5%	86.5%	84.0%	1.12 (1.5)	87.5%	86.5%	84.0%
1.49 (2)	87.5%	86.5%	85.5%	1.49 (2)	88.5%	86.5%	85.5%
2.24 (3)	88.5%	89.5%	85.5%	2.24 (3)	89.5%	89.5%	86.5%
3.73 (5)	89.5%	89.5%	86.5%	3.73 (5)	89.5%	89.5%	88.5%
5.60 (7.5)	90.2%	91.0%	88.5%	5.60 (7.5)	91.0%	91.7%	89.5%
7.46 (10)	91.7%	91.7%	89.5%	7.46 (10)	91.0%	91.7%	90.2%
11.2 (15)	91.7%	93.0%	90.2%	11.2 (15)	91.7%	92.4%	91.0%
14.9 (20)	92.4%	93.0%	91.0%	14.9 (20)	91.7%	93.0%	91.0%
18.7 (25)	93.0%	93.6%	91.7%	18.7 (25)	93.0%	93.6%	91.7%
22.4 (30)	93.6%	94.1%	91.7%	22.4 (30)	93.0%	93.6%	91.7%
29.8 (40)	94.1%	94.1%	92.4%	29.8 (40)	94.1%	94.1%	92.4%
37.3 (50)	94.1%	94.5%	93.0%	37.3 (50)	94.1%	94.5%	93.0%
44.8 (60)	94.5%	95.0%	93.6%	44.8 (60)	94.5%	95.0%	93.6%



56.9 (75)	94.5%	95.0%	93.6%	56.9 (75)	94.5%	95.4%	93.6%
74.6 (100)	95.0%	95.4%	93.6%	74.6 (100)	95.0%	95.4%	94.1%
93.3 (125)	95.0%	95.4%	94.1%	93.3 (125)	95.0%	95.4%	95.0%
112 (150)	95.4%	95.8%	94.1%	112 (150)	95.8%	95.8%	95.0%
149.2 (200)	95.4%	95.8%	95.0%	149.2 (200)	95.8%	96.2%	95.4%

I. Minimum Power Factor at Full Load and Rated Voltage: 90 percent at 1200 RPM, 1800 RPM and 3600 RPM.

J. Premium efficiency motors shall be used where energy cost/kW x (hours use/year) > 50.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION:**

A. Install motors in accordance with manufacturer's recommendations, the NEC, NEMA, as shown on the drawings and/or as required by other sections of these specifications.

#### **3.2 FIELD TESTS**

A. Megger all motors after installation, before start-up. All shall test free from grounds.

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**SECTION 11 73 00**  
**CEILING MOUNTED PATIENT LIFT SYSTEM**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Ceiling Mounted Patient Lift Systems for the transfer of physically challenged patients are specified in this section.

**1.2 RELATED WORK**

- A. Section 01 00 00, GENERAL REQUIREMENTS: Requirements for pre-test of equipment.
- B. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Seismic requirements for non-structural equipment.
- C. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General Electrical Requirements and items, which are common to sections of Division 26.

**1.3 QUALITY ASSURANCE**

- A. Certification for compliance is required for Ceiling Mounted Patient Lift Systems. Certifications shall be provided by an independent third party who will conduct testing to ensure that the ceiling lift and charging system are safe and in compliance with ISO 10535 & UL 60601-1.
- B. Contractor to engage a professional engineer licensed in the jurisdiction where project is located to design all supports and bracing for ceiling mounted patient lift systems.

**1.4 SUBMITTALS**

- A. Submit in accordance with specification Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Certificates of Compliance
- C. Manufacturer's Literature and Data:
  - 1. Lifting Capacity
  - 2. Lifting Speed
  - 3. Horizontal Displacement Speeds
  - 4. Horizontal Axis Motor
  - 5. Vertical Axis Motor
  - 6. Emergency Brake
  - 7. Emergency Lowering Device
  - 8. Emergency Stopping Device
  - 9. Electronic Soft-Start and Soft-Stop Motor Control
  - 10. Current Limiter for Circuit Protection
  - 11. Low Battery Disconnect System
  - 12. Strap Length

13. All equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, methods of connections to existing structure and new lift system, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion,) associated with equipment or piping so that the proposed installation can be properly reviewed.
- D. Individual Room layouts showing location of lift system installation shall be approved before proceeding with installation of lifts.

#### **1.5 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are listed in the text by the basic designation only.
- B. International Organization for Standardization (IOS):  
10535-06.....Hoist for the Transfer of Disabled Persons-  
Requirements and Test Methods
- C. Underwriters Laboratories (UL):  
60601-1(2003).....Medical Electrical Equipment: General  
Requirements for Safety  
94-2013.....UL Standards for Safety Test for Flammability of  
Plastic Materials for Parts in Devices and  
Appliances-Fifth Edition
- D. International Electromagnetic Commission (IEC):  
801-2(1991).....Electromagnetic Compatibility for Industrial-  
Process Measurement and Control Equipment-Part  
2: Electromagnetic Discharge Requirements

### **PART 2 - PRODUCTS**

#### **2.1 CEILING TRACK SYSTEM**

- A. The Ceiling Track shall be transverse type made from high strength extruded aluminum T66081-T5 at a thickness of 3/16" (4.8mm). Provide anchor supports to existing structure. The ceiling track shall be clear anodized finish.

#### **2.2 LIFT UNIT**

- A. The Lift Unit shall be constructed of a steel frame system (2205lbs / 1000kg tested) driven by a gear reduced high torque motor
- B. The Lift system shall have the following features.
  1. Lifting capacities:
    - a. Single motor with 550 lbs (250 kg) capacity for non-bariatric applications

- b. Twin 550 lbs (250 kg) capacity motors for a total 1,100 lbs (500kg) capacity for bariatric locations (MICU #8 A216, MICU #4 A220, SICU #8 A224, SICU #7 A225, STEP DOWN #1 A213).
- 2. Electronic soft-start and soft-stop motor control
- 3. Emergency lowering device
- 4. Emergency stopping device
- 5. Current limiter for circuit protection in case of overload.
- 6. Safety device that stops the motor to lift when batteries are low.
- 7. Lifting speed: 2.3in/s (6 cm/s), 1.6in/s (3.5cm) in full capacity
- 8. Horizontal displacement speed: 5.9in/s (150mm/s)
- 9. Horizontal axis motor: 24VDC at 62 watts and vertical axis motor at 110 watts
- 10. Emergency brake (in case of mechanical failure)
- 11. Strap length up to 90in (2.3m) tested for 2998lbs (1360kg)
- 12. Cab: VO plastic-fire retardant, UL 94
- 13. Wireless remote control (optional)

## **2.3 MOTORS**

### **A. Vertical Movement-DC Motor**

- 1. Type: Class A, fully enclosed, permanent magnet.
- 2. Rating: 24Vdc, 1.1A, 110W, 4000RPM, 0.3N-m.
- 3. Mounting: Secured to chassis.

### **B. Horizontal Movement-DC Motor**

- 1. Type: Fully enclosed, permanent magnet, integral reducer.
- 2. Rating: 24Vdc, 1.8A, 62W, 260RPM, 1.0N-m.
- 3. Mounting: Secured to chassis.

## **2.4 BATTERIES**

- A. The life cycle (number of charging cycles) for batteries shall be in compliance with IEC 801-2.
- B. Provide rechargeable batteries with up to 120 transfers with a load of 200lbs (74kg) and up to 70 transfers with its maximum load of 440lbs (200kg).

## **2.5 CHARGER**

- A. Charger Input: 100-240 Vac, 50/60 Hz.
- B. Charger Output: 27 Vdc, 1 A max.
- C. Supplemental to the charger provide a clip on charging station with indicator lights.
- D. Provide one charging station per motor.

## **2.6 STRAPS AND SLING**

- A. The straps shall be made of threaded nylon. The straps shall ensure the patient's safety by preventing the patient from falling out of the sling.
- B. The sling shall be made from a polyester/nylon net material that is pliable, breathable and easy to use. The sling shall cradle the body of the patient.
- C. Provide one strap and sling set per motor.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Install ceiling mounted patient lift system as per manufacturer's instruction and under the supervision of manufacturer's qualified representative and as shown on drawings.
- B. If the distance in between the suspended ceiling and anchors is more than 18" consult with manufacturer to determine if lateral braces will be required.

### **3.2 INSTRUCTION AND PERSONNEL TRAINING**

- A. Training shall be provided for the required personnel to educate them on proper operation and maintenance for the lift system equipment.

### **3.3 TEST**

- A. Conduct performance test, in the presence of the COR and a manufacturer's field representative, to show that the patient lift system equipment and control devices operate properly and in accordance with design and specification requirements.

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**SECTION 12 24 21**  
**DUAL LIGHTPROOF/TRANSLUCENT SHADES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. Provide dual lightproof/translucent shades where indicated.

**1.2 RELATED WORK - NOT USED**

**1.3 SUBMITTALS**

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Manufacturers' Literature and Data: Showing details of construction and hardware for Lightproof Shades.
- C. Samples: 12 inches x 12 inches of each fabric; minimum 6 inch length of each exposed metal.

**1.4 APPLICABLE PUBLICATIONS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):  
A-A-59517.....Cloth, Coated or Laminated, Polyvinylchloride  
(Artificial Leather)

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. Shade Cloth: Fabricate for a crackproof and fadeproof material that will remain soft and pliable at all times under temperature changes. Shade cloth shall conform to fire resistant requirement of Fed. Spec. A-A-59517, and shall be same color on both sides.
- B. Cords for Shades: No. 4 braided nylon, or No. 4 1/2 braided cotton having not less than 80 Kg (175 pounds) breaking strength.
- C. Fastenings: Zinc-coated or cadmium plated metal, aluminum or stainless steel fastenings of proper length and type. Except as otherwise specified, fastenings for use with various structural materials shall be as follows:

Type of Fastening	Structural Material
Wood screw	Wood
Tap Screw	Metal
Case-hardened, self-tapping screw	Solid masonry Sheet metal
Toggle bolts	Hollow blocks, wallboard plaster

## **2.2 NOT USED**

## **2.3 FABRICATION**

- A. Lightproof shades shall be metal head housing, deep side guides, sill light lock members, continuous metal jamb and head anchor section, operating bars, and shall be complete with two roller assemblies, one piece lightproof shade cloth, and one piece translucent shadecloth, and metal disappearing type horizontal braces (two each shade).
- B. Light traps shall be shop fabricated, and shall consist of a head box to house the shade roller, and steel channels U-shape in cross section to serve as guides for the shade along the sides, and to receive the bottom edge of the shade along the sill. Make light trap of sheet steel having a minimum thickness of 0.38 mm (0.015). Legs of the U-shaped channels shall be, not less than 45 mm (1-3/4 inches) long and separated by minimum distance that will permit free operation of the shade. Edges of light trap coming into contact with the shade cloth shall be rounded or beaded. Exposed face of the head box shall be hinged, or removable for access to the shade roller. Design entire assembly to prevent light from entering the room when the shade is drawn. Interior or unexposed surfaces of the light trap shall have a finish coat of flat black enamel. Exposed portions of the light trap shall have a factory applied pyroxylin lacquer, or baked on enamel finish in color to match adjoining wood or metal work.
- C. Rollers shall be of aluminum or stainless steel of sufficient diameter to support the shade, and provided with spindles, bearings and coil springs. Provide rollers with a groove and metal spline with aluminum, or stainless steel machine screws spaced not over nine inches on centers, for attaching the shade cloth.
- D. Shades not finished with a selvage shall have vertical edges bound or hemmed to prevent raveling. Sewing shall be double or triple stitched, using a high-grade thread. Make needle holes lightproof by applying a suitable filler.
- E. Stiffen the shade by transverse steel bars of size and weight to hold the shade in the channel guides. Space bars approximately 450 mm (18 inches) on centers and conceal in pockets in the shade. Fit bottom edge of the shade with a steel operating bar designed to engage the sill channel of the light trap. Paint bars with flat black enamel.
- F. Cords: Fit operating bar with pull cord.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

Install lightproof shades level at a height that will permit proper operation of the shades, and prevent outside light from infiltrating into the room. Light traps shall be closely fitted to the adjacent construction, and the connection shall be rigid and light-tight. Shades shall not be installed until after the room painting and finishing operations are complete.

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**SECTION 12 32 00**  
**MANUFACTURED WOOD CASEWORK**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies plastic laminate casework as detailed on the drawings, including related components and accessories required to form integral units. Wood casework items shown on the drawings, but not specified below shall be included as part of the work under this section, and applicable portions of the specification shall apply to these items. Each like item of casework shall be of the same design and by one manufacturer.

**1.2 RELATED WORK**

- A. Color and Finish of Plastic Laminate: DRAWINGS.
- B. Lavatories and Plumbing in Casework: Section 22 40 00, PLUMBING FIXTURES.
- C. Countertops: Section 12 36 00, COUNTERTOPS.

**1.3 MANUFACTURER'S QUALIFICATIONS**

- A. The fabrication of casework shall be by a manufacturer who produces casework similar to the casework specified and shown.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
1. Sinks, trim and fittings.
  2. Locks for doors and drawers
  3. Adhesive cements
- C. Samples:
1. Hardware: Two of each hardware component.
- D. Shop Drawings (1/2 full size):
1. All casework, showing details of construction, including materials, hardware and accessories.
  2. Cabinets and counters showing faucets in connection with sink bowls, and electrical fixtures and receptacles which are mounted on cabinets and counters.
  3. Fastenings and method of installation.

**1.5 APPLICABLE PUBLICATIONS**

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

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

A167-99 (R2009).....Stainless and Heat-Resisting chromium-Nickel  
Steel Plate, Sheet and Strip

A1008-10.....Steel, Sheet, Cold-Rolled, Carbon, Structural,  
High Strength Low Alloy

C1036-06.....Flat Glass

C. Composite Panel Association (CPA):

A208.1-09.....Particleboard

D. U.S. Department of Commerce Product Standards (Prod. Std):

PS1-95.....Construction and Industrial Plywood

E. Hardwood, Plywood and Veneer Association (HPVA):

HP-1-09.....Hardwood and Decorative Plywood

F. Architectural Woodwork Institute (AWI):

Architectural Woodwork Quality Standards, 2<sup>nd</sup> Edition - 2014

G. American Society of Mechanical Engineers (ASME):

A112.18.1-05.....Plumbing Fixture Fittings

H. National Electrical Manufacturers Association (NEMA):

LD3-05.....High Pressure Decorative Laminates

LD3.1-95.....Performance, Application Fabrication and  
Installations of High-Pressure Decorative  
Laminates

**PART 2 - PRODUCTS**

**2.1 PLYWOOD, HARDWOOD FACE VENEER - NOT USED**

**2.2 PLASTIC LAMINATE:**

A. NEMA LD-3.

B. Exposed decorative surfaces, both sides of cabinet doors, and for items  
having plastic laminate finish. General purpose Type HGL.

C. Cabinet Interiors Including Shelving: Both of following options to  
comply with NEMA, LD3.1 as a minimum.

1. Plastic laminate clad plywood or particle board.

D. Post Forming Fabrication, Decorative Surface: Post forming Type HGP.

**2.3 PLYWOOD, SOFTWOOD**

A. Prod. Std. PS1, five ply construction from 13 mm to 28 mm (1/2 inch to  
1-1/8 inch) thickness, and seven ply for 31 mm (1 1/4 inch) thickness.

**2.4 PARTICLEBOARD**

A. CPA A208.1, Type 1, Grade 1-M-3.

**2.5 RUBBER OR VINYL BASE - NOT USED**

**2.6 PLUMBING FIXTURES - NOT USED**

ASME A112.18.1, except die-cast zinc-alloy material is not acceptable.

## **2.7 GLASS: ASTM C1036**

For Doors: Type I, Class 1, Quality q4.

## **2.8 SOLID WOOD - NOT USED**

## **2.9 SHEET STEEL - NOT USED**

## **2.10 STAINLESS STEEL**

ASTM A167, with No. 4 finish.

## **2.11 HARDWARE**

- A. Where pin tumbler locks are specified, disc tumbler lock "Duo A", with brass working parts and case, as manufactured by the Illinois Lock Company will be an acceptable substitute. Locks for each type casework, shall be keyed differently and shall be master-keyed for each type service, such as Nurses, Psychiatric, and Administration. Provide two keys for each lock. Exposed hardware, except as otherwise specified, shall be satin finished chromium plated brass or nickel plated brass.
- B. Marking of Locks and Keys:
  - 1. The name of the manufacturer, or trademark by which manufacturer can readily be identified, legibly marked on each lock.
  - 2. The key change number marked on the exposed face of lock, and also stamped on each key.
  - 3. Key change numbers shall provide sufficient information for replacement of the key by the manufacturer.
- C. Hinged Doors:
  - 1. Doors 900 mm (36 inches) and more in height shall have three hinges and doors less than 900 mm (36 inches) in height shall have two hinges. Each door shall close against two rubber bumpers.
  - 2. Hinges: Fabricate hinges with minimum 2 mm (0.072 inch) thick chromium plated steel leaves, and with minimum 3.5 mm (0.139 inch) diameter stainless steel pin. Hinges shall be five knuckle design with 63 mm (2-1/2 inch) high leaves and hospital type tips.
  - 3. Fasteners: Provide full thread wood screws to fasten hinge leaves to door and cabinet frame. Finish screws to match finish of hinges.
- D. Door Catches:
  - 1. Friction or Magnetic type, fabricated with metal housing.
  - 2. Provide one catch for cabinet doors 1200 mm (48 inches) high and under, and two for doors over 1200 mm (48 inches) high.
- E. Locks:
  - 1. Cylinder type pin tumbler.
  - 2. Equip doors and drawers where shown with locks.

F. Drawer and Door Pulls:

Doors and drawers shall have flush pulls, fabricated of either chromium plated brass, chromium plated steel, stainless steel, or anodized aluminum.

G. Drawer Slides:

1. Full extension steel slides with nylon ball-bearing rollers.
2. Slides shall have positive stop.
3. Equip drawers with rubber bumpers.

H. Shelf Standards (Except For Fixed Shelves):

Bright zinc-plated steel for recessed mounting with screws, 16 mm (5/8 inch) wide by 5 mm (3/16 inch) high providing 13 mm (1/2 inch) adjustment, complete with shelf supports.

## 2.12 FABRICATION

A. Casework shall be of the flush overlay design and, except as otherwise specified, be of premium grade construction and of component thickness in conformance with AWI Quality Standards.

B. Fabricate casework of plastic laminated covered particleboard as follows:

1. All semi-concealed surfaces shall be plastic laminated.

C. Electrical fixtures, receptacles, wiring and junction boxes required for fixtures and receptacles:

1. Factory or field installed in casework.
2. For electrical lighting fixtures, see drawings.
3. For electric receptacles and lighting fixtures installed below or adjacent to wall cabinets or above counter tops, see electrical sections or specifications.
4. Install wiring in built-in raceways and terminate at junction box mounted on rear of cabinet and counter.
5. For final hook-up at junction box see electrical sections of specifications.

D. Provide plastic laminated covered particleboard soffits for all tall or wall hung casework.

E. Base:

1. Provide scheduled base.
2. Remove adhesive from exposed surfaces.
3. Install base at floor line after casework has been accurately leveled.

F. Support Members for Tops:

1. Construct as detailed.
2. Provide miscellaneous steel members and anchor as shown.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Set casework in place; level, plumb and accurately scribe and secure to walls, and/or floors.
- B. The installation shall be complete including all trim and hardware.  
Leave the casework clean and free from defects.

**3.2 FASTENINGS**

- A. Fastenings for securing casework to adjoining construction shall be as detailed on the drawings or approved shop drawings.
- B. See Section 05 50 00, METAL FABRICATIONS for reinforcement of walls and partitions for casework anchorage.

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**SECTION 12 36 00  
COUNTERTOPS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies casework countertops with integral accessories.

**1.2 RELATED WORK**

- A. Color and patterns of solid surface: SECTION 09 06 00, SCHEDULE FOR FINISHES.  
B. DIVISION 22, PLUMBING.  
C. DIVISION 26, ELECTRICAL.  
D. Equipment Reference Manual for SECTION 12 36 00, COUNTERTOPS.

**1.3 SUBMITTALS**

- A. Submit in accordance with SECTION 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.  
B. Shop Drawings  
1. Show dimensions of section and method of assembly.  
2. Show details of construction at 1/2 scale.  
C. Samples:  
1. 150 mm (6 inch) square samples each top.  
2. Front edge, back splash, end splash and core with surface material and booking.

**1.4 APPLICABLE PUBLICATIONS**

- A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.  
B. American Hardboard Association (AHA):  
A135.4-95.....Basic Hardboard  
C. Composite Panel Association (CPA):  
A208.1-09.....Particleboard  
D. Architectural Woodwork Institute (AWI):  
Architectural Woodwork Quality Standards, 2<sup>nd</sup> Edition - 2014  
E. American Society for Testing and Materials (ASTM):  
A167-99 (R2009).....Stainless and Heat-Resisting Chromium-Nickel  
Steel Plate, Sheet and Strip  
A1008-10.....Steel, Sheet, Cold-Rolled, Carbon, Structural,  
High Strength, Low Alloy  
D256-10.....Pendulum Impact Resistance of Plastic  
D570-98(R2005).....Water Absorption of Plastics  
D638-10.....Tensile Properties of Plastics



- D785-08.....Rockwell Hardness of Plastics and Electrical  
Insulating Materials
- D790-10.....Flexural Properties of Unreinforced and  
Reinforced Plastics and Electrical Insulating  
Materials
- D4690-99(2005).....Urea-Formaldehyde Resin Adhesives
- F. Federal Specifications (FS):
- A-A-1936.....Adhesive, Contact, Neoprene Rubber
- G. U.S. Department of Commerce, Product Standards (PS):
- PS 1-95.....Construction and Industrial Plywood
- H. National Electrical Manufacturers Association (NEMA):
- LD 3-05.....High Pressure Decorative Laminates

## PART 2 - PRODUCTS

### 2.1 MATERIALS

#### A. Fasteners:

1. Metals used for welding same metal as materials joined.
2. Use studs, bolts, spaces, threaded rods with nuts or screws suitable for materials being joined with metal splice plates, channels or other supporting shape.

#### B. Solid Polymer Material:

1. Filled Methyl Methacrylic Polymer.
2. Performance properties required:

Property	Result	Test
Elongation	0.3% min.	ASTM D638
Hardness	90 Rockwell M	ASTM D785
Gloss (60° Gordon)	5-20	NEMA LD3.1
Color stability	No change	NEMA LD3 except 200 hour
Abrasion resistance	No loss of pattern Max wear depth 0.0762 mm (0.003 in) - 10000 cycles	NEMA LD3
Water absorption weight (5 max)	24 hours 0.9	ASTM D-570
Izod impact	14 N·m/m (0.25 ft-lb/in)	ASTM D256 (Method A)
Impact resistance	No fracture	NEMA LD-3 900 mm (36") drop 1 kg (2 lb.) ball
Boiling water surface resistance	No visible change	NEMA LD3
High temperature resistance	Slight surface dulling	NEMA LD3

3. Cast into sheet form.
4. Color throughout with subtle veining through thickness.
5. Joint adhesive and sealer: Manufacturers silicone adhesive and sealant for joining methyl methacrylic polymer sheet.
6. Bio-based products will be preferred.

**2.2 SINKS - NOT USED**

**2.3 TRAPS AND FITTINGS - NOT USED**

**2.4 WATER FAUCETS - NOT USED**

**2.5 FUEL GAS, LABORATORY AIR AND LABORATORY VACUUM FIXTURES - NOT USED**

**2.6 FIXTURE IDENTIFICATION - NOT USED**

**2.7 ELECTRICAL RECEPTACLES - NOT USED**

**2.8 ELECTRIC DROP-IN HOTPLATE (RANGE) UNITS - NOT USED**

**2.9 FILM VIEWER - NOT USED**

**2.10 COUNTERTOPS**

- A. Fabricate to AWI Custom Grade construction and of component thickness in conformance with AWI Quality Standards.
- B. Fabricate in largest sections practicable.
- C. Fabricate with joints flush on top surface.
- D. Fabricate countertops to overhang front of cabinets and end of assemblies 25 mm (one inch) except where against walls or cabinets.
- E. Provide 1 mm (0.039 inch) thick metal plate connectors or fastening devices (except epoxy resin tops).
- F. Join edges in a chemical resistant waterproof cement or epoxy cement, except weld metal tops.
- G. Fabricate with end splashes where against walls or cabinets.
- H. Splash Backs and End Splashes:
  1. Not less than 19 mm (3/4 inch) thick.
  2. Height 100 mm (4 inches) unless noted otherwise.
  3. Laboratories and pharmacy heights or where fixtures or outlets occur: Not less than 150 mm (6 inches) unless noted otherwise.
  4. Fabricate epoxy splash back in maximum lengths practical of the same material.
- I. Methyl Methacrylic Polymer Tops:
  1. Fabricate countertop of methyl methacrylic polymer cast sheet, 12 mm (1/2 inch) thick.
  2. Fabricate back splash and end splash to height shown.
  3. Fabricate skirt to depth shown at base cabinets, fabricate thickened front edge 25 mm (1 inch) thick, to profile shown on drawings.
  4. Fabricate with marine edge where sinks occur.

5. Fabricate in one piece for full length from corner to corner up to 3600 mm (12 feet).
  6. Join pieces with adhesive sealant.
  7. Cut out countertop for lavatories, plumbing trim.
  8. Provide concealed fasteners and epoxy cement for anchorage of sinks to countertop.
- J. Counter Top Supports: Support tops on full coverage 3/4" plywood or plywood cross strips as recommended by manufacturer of top material. All wood supports to be Fire Retardant.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Before installing countertops verify that wall surfaces have been finished as specified and that mechanical and electrical service locations are as required.
- B. Secure countertops to supporting rails of cabinets with metal fastening devices, or screws through pierced slots in rails.
  1. Where type, size or spacing of fastenings is not shown or specified, submit shop drawings showing proposed fastenings and method of installation.
  2. Use round head bolts or screws.
  3. Use epoxy or silicone to fasten the epoxy resin countertops to the cabinets.
  4. Use wood or sheet metal screws for wood or plastic laminate tops; minimum penetration into top 16 mm (5/8 inch), screw size No 8, or 10.
- C. Rubber Moldings:
  1. Where shown install molding with butt joints in horizontal runs and mitered joints at corners where ceramic tile occurs omit molding.
  2. Fasten molding to wall and to splashbacks and splashends with adhesive.

#### **3.2 PROTECTION AND CLEANING**

- A. Tightly cover and protect against dirt, water, and chemical or mechanical injury.
- B. Clean at completion of work.

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**SECTION 13 05 41**  
**SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION:**

- A. Provide seismic restraint in accordance with the requirements of this section in order to maintain the integrity of nonstructural components of the building so that they remain safe and functional in case of seismic event.
- B. The design to resist seismic load shall be based on Seismic Design Categories per section 4.0 of the VA Seismic Design Requirements (H-18-8) dated August 2013, <http://www.cfm.va.gov/til/etc/seismic.pdf>.
- C. Definitions: Non-structural building components are components or systems that are not part of the building's structural system whether inside or outside, above or below grade. Non-structural components of buildings include:
  - 1. Architectural Elements: Facades that are not part of the structural system and its shear resistant elements; cornices and other architectural projections and parapets that do not function structurally; glazing; nonbearing partitions; suspended ceilings; stairs isolated from the basic structure; cabinets; bookshelves; medical equipment; and storage racks.
  - 2. Electrical Elements: Power and lighting systems; transfer switches; selector and controller panels; fire protection and alarm systems; special life support systems; and telephone and communication systems.
  - 3. Mechanical Elements: Heating, ventilating, and air-conditioning systems; medical gas systems; plumbing systems; sprinkler systems; pneumatic systems; and components.
  - 4. Transportation Elements: Mechanical, electrical and structural elements for transport systems, i.e., elevators and dumbwaiters, including hoisting equipment and counterweights.

**1.2 RELATED WORK:**

- A. Refer to individual sections for seismic requirements.

**1.3 QUALITY CONTROL:**

- A. Shop-Drawing Preparation:
  - 1. Have seismic-force-restraint shop drawings and calculations prepared by a professional structural engineer experienced in the area of seismic force restraints. The professional structural engineer shall be registered in the state where the project is located.

2. Submit design tables and information used for the design-force levels, stamped and signed by a professional structural engineer registered in the State where project is located.

B. Coordination:

1. Do not install seismic restraints until seismic restraint submittals are approved by the COR.
2. Coordinate and install trapezes or other multi-pipe hanger systems prior to pipe installation.

C. Seismic Certification:

In structures assigned to IBC Seismic Design Category C, D, E, or F, permanent equipments and components are to have Special Seismic Certification in accordance with requirements of section 13.2.2 of ASCE 7 except for equipment that are considered rugged as listed in section 2.2 OSHPD code application notice CAN No. 2-1708A.5, and shall comply with section 13.2.6 of ASCE 7.

**1.4 SUBMITTALS:**

A. Submit a coordinated set of equipment anchorage drawings prior to installation including:

1. Description, layout, and location of items to be anchored or braced with anchorage or brace points noted and dimensioned.
2. Details of anchorage or bracing at large scale with all members, parts brackets shown, together with all connections, bolts, welds etc. clearly identified and specified.
3. Numerical value of design seismic brace loads.
4. For expansion bolts, include design load and capacity if different from those specified.

B. Submit prior to installation, a coordinated set of bracing drawings for seismic protection of piping, with data identifying the various support-to-structure connections and seismic bracing structural connections, include:

1. Single-line piping diagrams on a floor-by-floor basis. Show all suspended piping for a given floor on the same plain.
2. Type of pipe (Copper, steel, cast iron, insulated, non-insulated, etc.).
3. Pipe contents.
4. Structural framing.
5. Location of all gravity load pipe supports and spacing requirements.
6. Numerical value of gravity load reactions.
7. Location of all seismic bracing.
8. Numerical value of applied seismic brace loads.

9. Type of connection (Vertical support, vertical support with seismic brace etc.).
  10. Seismic brace reaction type (tension or compression): Details illustrating all support and bracing components, methods of connections, and specific anchors to be used.
- C. Submit prior to installation, bracing drawings for seismic protection of suspended ductwork and suspended electrical and communication cables, include:
1. Details illustrating all support and bracing components, methods of connection, and specific anchors to be used.
  2. Numerical value of applied gravity and seismic loads and seismic loads acting on support and bracing components.
  3. Maximum spacing of hangers and bracing.
  4. Seal of registered structural engineer responsible for design.
- D. Submit design calculations prepared and sealed by the registered structural engineer specified above in paragraph 1.3A.
- E. Submit for concrete anchors, the appropriate ICBC evaluation reports, OSHPD pre-approvals, or lab test reports verifying compliance with OSHPD Interpretation of Regulations 28-6.

### 1.5 APPLICABLE PUBLICATIONS:

- A. The Publications listed below (including amendments, addenda revisions, supplements and errata) form a part of this specification to the extent referenced. The publications are referenced in text by basic designation only.
- B. American Concrete Institute (ACI):
- 355.2-07.....Qualification for Post-Installed Mechanical Anchors in Concrete and Commentary
- C. American Institute of Steel Construction (AISC):
- Load and Resistance Factor Design, Volume 1, Second Edition
- D. American Society for Testing and Materials (ASTM):
- A36/A36M-08.....Standard Specification for Carbon Structural Steel
- A53/A53M-10.....Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
- A307-10.....Standard Specification for Carbon Steel Bolts and Studs; 60,000 PSI Tensile Strength.
- A325-10.....Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

- A325M-09.....Standard Specification for High-Strength Bolts  
for Structural Steel Joints [Metric]
- A490-10.....Standard Specification for Heat-Treated Steel  
Structural Bolts, 150 ksi Minimum Tensile  
Strength
- A490M-10.....Standard Specification for High-Strength Steel  
Bolts, Classes 10.9 and 10.9.3, for Structural  
Steel Joints [Metric]
- A500/A500M-10.....Standard Specification for Cold-Formed Welded  
and Seamless Carbon Steel Structural Tubing in  
Rounds and Shapes
- A501-07.....Specification for Hot-Formed Welded and Seamless  
Carbon Steel Structural Tubing
- A615/A615M-09.....Standard Specification for Deformed and Plain  
Billet-Steel Bars for Concrete Reinforcement
- A992/A992M-06.....Standard Specification for Steel for Structural  
Shapes for Use in Building Framing
- A996/A996M-09.....Standard Specification for Rail-Steel and Axel-  
Steel Deformed Bars for Concrete  
Reinforcement
- E488-96(R2003).....Standard Test Method for Strength of Anchors in  
Concrete and Masonry Element
- E. American Society of Civil Engineers (ASCE 7) Latest Edition.
- F. International Building Code (IBC) Latest Edition
- G. VA Seismic Design Requirements, H-18-8, August 2013
- H. National Uniform Seismic Installation Guidelines (NUSIG)
- I. Sheet Metal and Air Conditioning Contractors National Association  
(SMACNA): Seismic Restraint Manual - Guidelines for Mechanical Systems,  
1998 Edition and Addendum

#### **1.6 REGULATORY REQUIREMENT:**

- A. IBC Latest Edition.
- B. Exceptions: The seismic restraint of the following items may be omitted:
  - 1. Equipment weighing less than 400 pounds, which is supported directly on the floor or roof.
  - 2. Equipment weighing less than 20 pounds, which is suspended from the roof or floor or hung from a wall.
  - 3. Gas and medical piping less than 2 ½ inches inside diameter.
  - 4. Piping in boiler plants and equipment rooms less than 1 ¼ inches inside diameter.

5. All other piping less than 2 ½ inches inside diameter, except for automatic fire suppression systems.
6. All piping suspended by individual hangers, 12 inches or less in length from the top of pipe to the bottom of the support for the hanger.
7. All electrical conduits, less than 2 ½ inches inside diameter.
8. All rectangular air handling ducts less than six square feet in cross sectional area.
9. All round air handling ducts less than 28 inches in diameter.
10. All ducts suspended by hangers 12 inches or less in length from the top of the duct to the bottom of support for the hanger.

## **PART 2 - PRODUCTS**

### **2.1 STEEL:**

- A. Structural Steel: ASTM A36 and A992.
- B. Structural Tubing: ASTM A500, Grade B.
- C. Structural Tubing: ASTM A501.
- D. Steel Pipe: ASTM A53/A53M, Grade B.
- E. Bolts & Nuts: ASTM A307, A325, and A490.

### **2.2 CAST-IN-PLACE CONCRETE:**

- A. Concrete: 28 day strength, f'c = 25 MPa (3,000 psi).
- B. Reinforcing Steel: ASTM A615/615M or ASTM A996/A996M deformed.

## **PART 3 - EXECUTION**

### **3.1 CONSTRUCTION, GENERAL:**

- A. Provide equipment supports and anchoring devices to withstand the seismic design forces, so that when seismic design forces are applied, the equipment cannot displace, overturn, or become inoperable.
- B. Provide anchorages in conformance with recommendations of the equipment manufacturer and as shown on approved shop drawings and calculations.
- C. Construct seismic restraints and anchorage to allow for thermal expansion.
- D. Testing Before Final Inspection:
  1. Test 10-percent of anchors in masonry and concrete per ASTM E488, and ACI 355.2 to determine that they meet the required load capacity. If any anchor fails to meet the required load, test the next 20 consecutive anchors, which are required to have zero failure, before resuming the 10-percent testing frequency.
  2. Before scheduling Final Inspection, submit a report on this testing indicating the number and location of testing, and what anchor-loads were obtained.



### **3.2 EQUIPMENT RESTRAINT AND BRACING:**

- A. See drawings for equipment to be restrained or braced.

### **3.3 MECHANICAL DUCTWORK AND PIPING; ELECTRICAL CONDUITS; AND TELECOMMUNICATION WIRES AND CABLE TRAYS**

- A. Support and brace mechanical ductwork and piping; electrical conduits; and telecommunication wires and cable trays.
- B. Brace duct and breeching branches with a minimum of 1 brace per branch.
- C. Provide supports and anchoring so that, upon application of seismic forces, piping remains fully connected as operable systems which will not displace sufficiently to damage adjacent or connecting equipment, or building members.
- E. Seismic Restraint of Piping:
  - 1. Design criteria:
    - a. Piping resiliently supported: Restrain to support 120-percent of the weight of the systems and components and contents.
    - b. Piping not resiliently supported: Restrain to support 60-percent of the weight of the system components and contents.
  - 2. Provide seismic restraints according to design.
- E. Piping Connections: Provide flexible connections where pipes connect to equipment. Make the connections capable of accommodating relative differential movements between the pipe and equipment under conditions of earthquake shaking.

### **3.4 PARTITIONS**

- A. In buildings with flexible structural frames, anchor partitions to only structural element, such as a floor slab, and separate such partition by a physical gap from all other structural elements.
- B. Properly anchor masonry walls to the structure for restraint, so as to carry lateral loads imposed due to earthquake along with their own weight and other lateral forces.

### **3.5 CEILINGS AND LIGHTING FIXTURES**

- A. At regular intervals, laterally brace suspended ceilings against lateral and vertical movements, and provide with a physical separation at the walls.
- B. Independently support and laterally brace all lighting fixtures. Refer to applicable portion of lighting specification, Section 26 51 00, INTERIOR LIGHTING.

### **3.6 FACADES AND GLAZING**

- A. Do not install concrete masonry unit filler walls in a manner that can restrain the lateral deflection of the building frame. Provide a gap

with adequately sized resilient filler to separate the structural frame from the non-structural filler wall.

- B. Tie brick veneers to a separate wall that is independent of the steel frame as shown on construction drawings to ensure strength against applicable seismic forces at the project location.
- C. Install attachments to structure for all façade materials as shown on construction drawings to ensure strength against applicable seismic forces at the project location.

### **3.7 STORAGE RACKS, CABINETS, AND BOOKCASES**

- A. Install storage racks to withstand earthquake forces and anchored to the floor or laterally braced from the top to the structural elements.
- B. Anchor medical supply cabinets to the floor or walls and equip them with properly engaged, lockable latches.
- C. Anchor filing cabinets that are more than 2 drawers high to the floor or walls, and equip all drawers with properly engaged, lockable latches.
- D. Anchor bookcases that are more than 30 inches high to the floor or walls, and equip any doors with properly engaged, lockable latches.

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**SECTION 14 92 00**  
**PNEUMATIC TUBE SYSTEMS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This specification specifies the requirements for the design and installation of modifications and expansion of a hospital pneumatic tube system.

**1.2 RELATED WORK**

- A. Section 01 91 00, GENERAL COMMISSIONING REQUIREMENTS: Requirements for commissioning of pneumatic tube systems.

**1.3 QUALITY ASSURANCE**

- A. The contractor shall retain the manufacturer and installer of the existing pneumatic tube system to perform the design and installation of all modifications and expansion of the system. Manufacturer: Pevco Systems International, Inc.
- B. All equipment provided by the manufacturer shall be listed with UL (Underwriter's Laboratory).
- C. The manufacturer shall participate in the preparation of coordination drawings.

**1.4 SUBMITTALS**

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
  - 1. Sending / Receiving Stations.
  - 2. Piping and supports.
  - 3. Shop drawings showing modifications to existing system components and configuration of new components.

**1.5 WARRANTY**

- A. The manufacturer shall provide the hospital with a warranty that covers mechanical equipment for 12 months and electronic equipment for 24 months. For the pneumatic tube system components modified or added as part of this project.
- B. The warranty period commences on the date of signed acceptance of the system.

**PART 2 - PRODUCTS**

**2.1 SYSTEM DESIGN, GENERAL**

- A. The system tubing shall be 6 inches to match existing system components (system size indicates the outside diameter of the tubing).

- B. The system shall include one (1) new station at Nurse Station A280 and the relocation of one (1) existing station at Nurse Station A256. New station at A280 to receive carriers for both step-down and MICU.
- C. The system shall include (2) new annunciators in the vicinity of the new MICU Nurse Station #A285. Annunciators are to provide notification that a carrier for MICU has been received at Nurse Station A280.
- D. The system design shall include the relocation of one (1) existing diverter station. The system shall include new diverters, tubing and other required components to link all stations.
- E. Provide four (4) carriers per station of a corresponding size.
- F. System components shall match existing components.

## **2.2 STATIONS**

- A. New stations shall be Compact Stations with pedestals to match existing.
  - 1. Provide integrated 2D barcode scanner with mounting provided near the dispatch arm.

## **2.3 ANNUNCIATORS**

- A. Annunciators are to be silent and non-seizer inducing type.

## **PART 3 - EXECUTION**

### **3.1 EXISTING SYSTEM MODIFICATION AND EXPANSION**

- A. System manufacturer shall remove, store and protect existing station and components during renovation activities and integrate into modified tube system in new location.
- B. Modify and extend existing tubing system on 2<sup>nd</sup> and 3<sup>rd</sup> floors to extend to new station locations on 2<sup>nd</sup> floor and to existing station(s) on other floors. Drawings indicate proposed routing of tubing. System manufacturer to design and coordinate final routing with other existing and new above-ceiling systems and elements.

### **3.2 CLOSE OUT**

- A. Commission completed system to ensure proper integration, functionality and performance of system.

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