

## **SECTION 09 21 16**

### **GYPSUM BOARD**

#### **PART 1: GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### **1.02 SUMMARY**

- A. Section includes:
1. Non load bearing interior metal stud framing for drywall.
  2. Gypsum wallboard and joint system.
- B. Related work specified in other sections:
1. Lath and plaster - Section 09 24 00.
  2. Insulation - Section 07 21 00.
  3. Spray Polyurethane Foam Insulation Section 07 21 29.

##### **1.03 SUBMITTALS**

- A. Submit in accordance with Section 01 33 00.
1. UL listings for gypsum board partitions for proposed products.
  2. UL listings for shaft wall assemblies proposed.

##### **1.05 QUALITY ASSURANCE**

- A. Referenced Specifications: Current Gypsum Associates publications ([www.gypsum.org](http://www.gypsum.org)).

##### **1.06 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Delivery and Handling
1. Deliver materials to the project site with manufacturer's labels intact and legible.
  2. Handle materials with care to prevent damage.
  3. Deliver fire-rated materials bearing testing agency label and required fire classification numbers.
  4. The plastic packaging used to wrap gypsum panel products for shipment is intended to provide temporary protection from moisture exposure during transit only and is not intended to provide protection during storage after delivery. Such plastic packaging shall be removed immediately upon receipt of the shipment.
    - a. Failure to remove protective plastic shipping covers can result in condensation which can lead to damage, including mold.

## B. Storage

1. Store materials inside under cover, stack flat, properly supported on a level surface, all in same direction, off of floor. Gypsum panel products to be fully protected from weather, direct sunlight exposure and condensation.
2. Avoid overloading floor system
3. Store adhesives in dry area; provide protection against freezing at all times.

## 1.07 JOB CONDITIONS

### A. Environmental Conditions

1. Do not install gypsum board products at temperatures below 40°F for mechanical installation and 50°F for adhesive installation, unless approved by manufacturer.
2. Measure temperature and humidity on a daily basis during taping operations. Re-application of taping compound shall not occur sooner than shown on the table in Gypsum Association Brochure GA-236.
3. Temperature: During cold weather, in areas receiving wallboard installation, maintain temperature range between 55°0 F to 90° F for 48 hours before, and during gypsum board and joint treatment application. Maintain specified temperature range until joint treatment is completely dry.
4. Ventilation
  - a. Provide ventilation during and following adhesives and joint treatment applications.
  - b. Use temporary air circulators in enclosed areas lacking natural ventilation.
  - c. Under slow drying conditions, allow additional drying time between coats of joint treatment.
  - d. Protect installed materials from drafts during hot, dry weather.

### B. Protect adjacent surfaces against damage and stains.

## 1.08 JOB COORDINATION

- A. Coordinate Work with installation of metal framing and electrical work.
- B. Coordinate framing and blocking for wall mounted accessories with Section 06 10 53.

## PART 2: PRODUCTS

### 2.01 PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
- B. General: Complying with ASTM C 36/C 36 M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

## 2.02 GYPSUM BOARD

### A. Standard

1. Panel Physical Characteristics.
  - a. Core: Regular
  - b. Surface Paper: 100% recycled content paper on front, back and long edges.
  - c. Long Edges: Tapered; square edge acceptable at areas with Level 1 finish.
  - d. Thickness: As noted on drawings.
  - e. Panel shall comply with requirements of ASTM C 1396 Standard Specification for Gypsum Board.

### B. Fire-Resistance Rated.

1. Type X, Panel Physical Characteristics
  - a. Core: Fire-resistant rated gypsum core.
  - b. Surface Paper: 100% recycled content paper on front, back and long edges.
  - c. Long Edges: Tapered; square edge acceptable at areas with Level 1 finish.
  - d. Thickness: 5/8"
  - e. Panel shall comply with Type X requirements of ASTM C 1396 Standard Specification for Gypsum Board.
2. Type C, Panel Physical Characteristics
  - a. Core: Fire-resistant rated gypsum core.
  - b. Surface Paper: 100% recycled content paper on front, back and long edges.
  - c. Long Edges: Tapered; square edge acceptable at areas with Level 1 finish.
  - d. Thickness: 1/2"
  - e. Panel shall comply with Type C requirements of ASTM C 1396 Standard Specification for Gypsum Board.

### C. Mold and Moisture Resistant

1. Panel Physical Characteristics
  - a. Core: Moisture resistant (moisture and fire-resistant rated at Type X).
  - b. Surface Paper: Coated fiberglass mat on face, back and long edges.
  - c. Long Edges: Tapered; square edge acceptable at areas with Level 1 finish.
  - d. Thickness: As noted on drawings. (5/8" at fire-resistant applications)
  - e. Humidified Deflection: Not more than 1/4" when tested in accordance with ASTM C473 and C1658.
  - f. Water Absorption: Less than 5% of weight when tested in accordance with ASTM C630, C1396 and C1658.
  - g. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273

### D. Gypsum Tile Backer Board:

1. Panel Physical Characteristics
  - a. Core: Moisture resistant (moisture and fire-resistant rated at Type X).
  - b. Surface Paper: Coated fiberglass mat on face, back and long edges.
  - c. Long Edges: Tapered; square edge acceptable at areas with Level 1 finish.
  - d. Thickness: As noted on drawings. (5/8" at fire-resistant applications)
  - e. Humidified Deflection: Not more than 1/4" when tested in accordance with ASTM C473 and C1658.
  - f. Water Absorption: Less than 5% of weight when tested in accordance with ASTM C630, C1396 and C1658.

- g. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D 3273
- h. Permeance: Not more than 1.0 perms when tested in accordance with ASTM E96.

E. Metal Framing:

1. Protective Coating: ASTM C 645/C, 645M G40 (Z120) or equivalent corrosion resistance.
  - a. Metal studs and runners.
    - 1) Metal Thickness
      - a) 20 gauge or UltraSTEEL 20 gauge equivalent.
      - b) 25 gauge or UltraSTEEL 25 gauge equivalent.
    - 2) Size: 1 5/8", 2 1/2", 3 5/8", 4" or 6" deep as noted on drawings.
  - b. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.
  - c. Fire Stop Track: Top runner designed to allow partition head to move while maintaining integrity of assembly fire-resistance rating. Thickness not less than indicated for studs, and of width to accommodate depth of studs.
  - d. Hat-Shaped, Rigid Furring Channels
    - 1) Base Metal Thickness: 0.0179 inch.
    - 2) Depth: 7/8" or 1 1/2" as noted on drawings.
  - e. Resilient Furring Channels: 1/2" deep, steel members designed to reduce sound transmission.
  - f. Z-Shaped Furring: With slotted or non-slotted web, face flange of 1 1/4", wall attachment flange of 7/8", minimum bare metal thickness of 0.0179 inch and depth required to fit insulation thickness.
  - g. Radius Framing: Steel sheet runner for non-structural curves, bends, variable radii and arches. Design to provide higher strength capacity than conventional lighter gauge material by using a work-hardened steel base strip.
    - 1) Base Metal Thickness and Size: Match studs.
  - h. Flat Strap and Backing Plate Sheet: For blocking or bracing.
    - 1) Base Metal Thickness: 20 gauge.
    - 2) Width: 6 inch.
  - i. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power and other properties required to fasten steel framing and furring member securely to substrates involved; comply with recommendations of gypsum board manufacturers for application indicated.
  - j. Ceiling Suspension Systems. Use one of the following systems:
    - 1) Metal studs with depth required to handle span.
    - 2) 1 1/2" cold rolled steel channels, 8 gauge annealed hanger wire and furring channels.
    - 3) Direct-hung system composed of 8 gauge hanger wire, main beams and interlocking cross furring members as manufactured by:
      - a) Armstrong World Industries, "Furring Systems/Drywall".
      - b) Chicago Metallic Corp. "Drywall Furring 640/Drywall Furring 660".
      - c) USG Interiors, Inc. "Drywall Suspension Systems".

## F. Accessories:

1. Trim: ASTM C 1047.
  - a. Material: Galvanized or aluminum-coated steel sheet, rolled zinc.
  - b. Shapes:
    - 1) Cornerbead.
    - 2) L-C Bead: J-shaped; exposed long flange receives joint compound.
    - 3) L-Bead: L-shaped; exposed long flange receives joint compound.
    - 4) Off-angle or splayed cornerbead.
    - 5) V-shaped Control Joint protected with plastic tape.
2. Acoustical sealant conforming to ASTM C 919.
3. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - a. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
  - b. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
4. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
  - a. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR, 59, Subpart D (EPA Method 24).
5. Joint Treatment Materials:
  - a. General: Comply with ASTM C 475/C 475M.
  - b. Joint Tape:
    - 1) Interior Gypsum Wallboard: 2 1/16" wide paper reinforcing tape.
    - 2) Glass-Mat Gypsum Wallboard: 2" wide self adhering fiberglass tape.
    - 3) Tile Backing Panels: As recommended by panel manufacturer.
  - c. Joint Compound for Interior Gypsum Wallboard: Drying type pre-mixed vinyl base compound and/or drying type pre-mixed vinyl base topping compound.
  - d. Joint compound for glass-mat gypsum wallboard: As recommended by wallboard manufacturer.

## **PART 3: EXECUTION**

### **3.01 EXAMINATION**

A. Examine substrates to which gypsum board construction attaches or abuts, installed hollow metal frames, cast-in anchors and structural framing with installer present for compliance with requirements for installation tolerances and other conditions affecting performance of gypsum board assemblies specified in this section.

1. Do not proceed with installation until satisfactory conditions have been corrected.

### **3.02 INSTALLATION OF STEEL FRAMING, GENERAL**

A. Steel framing installation standard: Comply with ASTM C 754.

## B. Metal Stud Schedule

1. Use 25 gauge metal studs on partitions up to 12'-0" high and soffits.
  2. Use 20 gauge metal studs on:
    - a. Metal stud partitions over 12'-0" high.
    - b. Metal stud ceilings.
    - c. Double studs at each door and borrowed light jamb and head.
- C. Install supplementary framing, blocking and bracing at terminations in work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, door bumpers, furnishings and similar construction to comply with details indicated and with recommendations of gypsum board manufacturer.
- D. Isolate steel framing from building structure to prevent transfer of loading imposed by structural movement, at location indicated below to comply with details shown on drawings.
1. Where suspended ceiling assemblies abut building structure horizontally at ceiling perimeters or penetrations of ceiling.
  2. Where partitions and wall framing abut overhead structure.
    - a. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
- E. Do not bridge building expansion and control joints with steel framing or furring members, independently frame both sides of joints with framing or furring members or as indicated.

### 3.03 INSTALLATION OF STEEL FRAMING FOR CEILINGS AND SOFFITS

#### A. Suspend ceiling hangers from building structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum not part of supporting structural or ceiling suspension system.
    - a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, counter splaying or other equally effective means.
  2. Where widths of ducts and other construction within ceiling plenum produce hanger spacing that interfere with the location of hangers at spacing required to support standard suspension system members, install supplemental suspension system members and hangers in form of trapezes or equivalent devices.
    - a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
  3. Secure wire hangers to structure, by looping or wire tying, directly to supporting structure, including intermediate framing members. Attach to inserts, eye screws, or other devices appropriate for structure to which hangers are attached as well as for type of hanger involved in manner that will not cause deterioration or failure, due to age, corrosion or elevated temperatures.
  4. Do not attach hangers to metal roof deck or metal deck tabs.
  5. Do not connect or suspend steel framing from ducts, pipes or conduits.
- B. Keep hangers and braces 2 inches clear of ducts, pipes and conduits.
- C. Wire-tie or clip furring members to main runners and to other structural supports.
- D. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension system abuts vertical surfaces. Mechanically join main beam and cross furring members to each other and butt cut to fit wall track.

### **3.04 INSTALLATION OF STEEL FRAMING FOR WALLS AND PARTITIONS**

- A. Install runners (tracks) at floors, ceilings and structural walls and columns where gypsum board stud system abuts other construction.
  - 1. Use proprietary tracks for non-rated and fire rated walls and partitions.
  - 2. Install studs full height for all partitions unless noted otherwise.
  - 3. Where studs are installed directly against masonry or concrete walls, set studs in acoustical sealant.
- B. Installation Tolerances: Install each steel framing and furring member so that fastening surface does not vary more than 1/8" from plane of faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at or just above suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
  - 1. Cut studs ½ inch short of full height to provide perimeter relief.
  - 2. For STC-rated or fire-resistance rated partitions that extend full height, install framing around structural members, as required to support gypsum board closures needed to make partitions continuous from floor to underside of structure above.
  - 3. Install bridging/spacing bar.
- D. Brace partition framing, not extending full height to structure above, with studs same size and thickness as partition framing. Provide bracing at:
  - 1. 6'-0" o.c. intervals along length of partitions.
  - 2. Not less than 6'-0" from partition ends and corners.
  - 3. Door and window openings.
- E. Terminate partition framing at suspended ceiling where indicated.
- F. Install metal studs and furring in sizes and at spacings indicated.
  - 1. Single and Multi Layer Construction: Space studs 16 inches o.c., unless otherwise indicated.
- G. Install metal studs with flanges in same direction and leading edge or end of gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- H. Frame door openings to comply with details indicated, with GA-219 and with applicable published recommendations of gypsum board manufacturer. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
- I. Frame openings other than door openings to comply with details indicated, or if none indicated, in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
  - 1. Extend vertical jamb studs through suspended ceilings and attach to underside of floor or roof structure above.

### **3.06 APPLICATION OF GYPSUM BOARD**

- A. Install the following gypsum board types as follows:
  - 1. Regular type: All non-rated areas unless noted differently below.
  - 2. Type X or C: As required to meet fire-resistant rated assemblies.
  - 3. Mold and Moisture Resistant: All gypsum board on the interior face of an insulated stud exterior wall. (Note: Gypsum Board on furred masonry walls can be regular type.)

- B. Gypsum Board Application and Finishing Standards: Comply with ASTM C 480 and GA-216.
- C. Install sound attenuation insulation blankets where indicated, prior to gypsum board, unless readily installed after board has been installed on one side.
- D. Single-Layer Application: Install gypsum wallboard as follows:
1. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 24 inches in alternate courses of board.
  2. On partitions/walls apply gypsum board vertically (parallel to framing), unless otherwise indicated or required by fire resistance rated assembly, and provide sheet lengths which will minimize end joints.
    - a. On partitions/walls 8'-1" or less in height, apply gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
    - b. At stairwells and other high walls, install gypsum board horizontal, unless otherwise indicated or required for fire resistance rating.
    - c. On Z-furring, apply gypsum panels vertically (parallel to framing). Locate edge joints over furring member.
- E. Double-Layer Application: Install gypsum backing board for base layer and exposed gypsum board for face layer.
1. On ceilings apply base layer prior to application of base layer on walls/partitions; apply face layer in same sequence. Offset joints between layers minimum one stud space. Apply base layers at right angles to supports, unless otherwise indicated.
  2. On partitions/walls apply base layer and face layer vertically (parallel to framing) with joints of base layer over supports and face layer joints offset minimum one stud space with base layer joints.
- F. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for light at edges and ends with not more than 1/16 inch open space between boards. Do not force into place.
- G. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints.
1. Position boards so like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field-cut ends.
  2. Do not place tapered edges against cut edges or ends.
  3. Gypsum panel product joints shall be located so that no joint will align with the edge of an opening unless control joints are to be installed at these locations.
  4. Joints on opposite sides of a partition shall not occur on the same stud.
  5. In single layer gypsum panel products systems, end joints parallel to and on the same side of framing members shall be staggered between alternate courses of gypsum panel products and from joints on the opposite side of the framing members.
  6. In multi-layer gypsum panel product systems, end joints parallel to and on the same side of framing members shall be staggered between alternate courses of gypsum panel products.
  7. Base layer end joints parallel to and on one side of framing shall be staggered from base layer end joints on the opposite side of the framing members.
  8. Install ceiling boards across framing in manner to minimize end-butt joints, and avoid end joints in central area of each ceiling. Stagger end joints at least 24 inches.
- H. Spot grout hollow metal door frames for solid core wood doors, hollow metal doors and doors over 32 inches wide except where full grout is shown. Apply spot grout at each jamb anchor clip just before inserting board into frame.



- I. Form control joints and expansion joints at locations indicated or as recommended, with space between edges of boards, prepared to receive trim accessories.
  - 1. Where a control joints occurs in an acoustical or fire-rated system, blocking shall be provide behind the control joint by using a backing material such as 5/8" type X gypsum panel product, or other tested equivalent.
- J. Cover both faces of metal stud partition framing with gypsum board in concealed spaces (above ceiling, etc.), except in chase walls which are braced internally.
  - 1. Except where concealed application is indicated or required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq.ft. area, and may be limited to not less than 75 percent of full coverage.
  - 2. Fit gypsum board around ducts, pipes and conduits.
- K. Isolate perimeters of non-load-bearing drywall partitions at structural abutments. Provide ¼ to ½ inch space to accept trim edge.
- L. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and other penetrations with a continuous bead of acoustical sealant. Include a bead of sealant at both faces of partitions.
  - 1. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound flanking paths around or through gypsum board assemblies, including partitions extending above ceilings.
  - 2. Where resilient furring channels are used over steel framing, the screws used to attach the gypsum panel product to the furring channels shall not contact the framing.
- M. Gypsum panel products applied to walls shall be applied with the bottom edge spaced a minimum of 1/8 inch and maximum of ¼ inch above the floor.
- N. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.
- O. Wall Tile Substrates: For substrates scheduled to receive ceramic or porcelain tile, comply with the following:
  - 1. Install gypsum tile backer board panels to comply with manufacturer's installation instructions at locations scheduled to receive wall tile. Install with ¼" open space where panels abut other construction.

### **3.07 METHODS OF GYPSUM BOARD FASTENING**

- A. Fastener lengths shall be at least 1 1/8" long for ½" gypsum panels and 1 ¼" long for 5/8" gypsum panels used for metal framing.
- B. Screws shall be spaced not more than 12 in. o.c. for ceilings and 16 in. o.c. for walls where the framing members are 16 in. o.c. Screws shall be spaced not more than 12 in. o.c. for both ceilings and walls where framing members are 24 in. o.c.
- C. Fasteners at gypsum panel product edges or ends shall be located not less than 3/8" from the edge or end. Fasteners at edges or ends in a perpendicular application shall be located not more than 1 in. from the edge or end. Perimeter attachment into partition top and bottom plates is neither required nor recommended except where fire ratings, structural performance requirements, or other special conditions require such attachment.
- D. While diving fasteners, gypsum panel products shall be held in firm contact with framing members or underlying support. Application of fasteners shall proceed from the center or field of the gypsum panel product toward the ends and edges, or shall begin along one edge and proceed toward the other edge.

- E. To provide a more flat surface at joints, attach gypsum board to steel studs so leading edge or end of each board is attached to open (unsupported) edge of stud flanges first.
- F. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- G. Screws shall be driven so that screw heads are slightly below the gypsum panel product surface without breaking the face paper, fracturing the core, or stripping the framing member around the screw shank.
- H. Double-Layer Fastening Methods: Apply base layer of gypsum board and face layer to base layer as follows:
  - 1. Fasten base layer with screws and face layer with adhesive and supplementary fasteners, except where otherwise required for fire-resistance rated assemblies.

### **3.08 INSTALLATION OF DRYWALL TRIM ACCESSORIES**

- A. General: Where feasible, use same fasteners to anchor trim accessory flanges as required to fasten gypsum board to supports. Otherwise, fasten flanges to comply with manufacturer's recommendations.
- B. Install corner beads at external corners.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed. Provide type with face flange to receive joint compound except where "U" bead (semi-finishing type) is indicated.
  - 1. Install "J" bead where drywall construction is tightly butted to other construction and back flange can be attached to framing or supporting substrate.
  - 2. Install "L" bead where edge trim can only be installed after gypsum board is installed.
- D. Install control joints at locations as follows:
  - 1. At ceilings, 50'-0" o.c. each way maximum and/or where shown on drawings. At corners and at tee intersections of soffits that change directions.
  - 2. At walls, 30'-0" o.c. maximum, and/or where shown on drawings.
  - 3. Full height door frames shall be considered equivalent to a control joint.

### **3.09 FINISHING OF GYPSUM WALL BOARD**

- A. General: Apply joint treatment at gypsum board joints (both directions); flanges of corner bead, edge trim and control joints; penetrations; fastener heads, surface defects and elsewhere as required to prepare work for decoration.
- B. Prefill open joints using setting-type joint compound.
- C. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
- D. Glass-Mat Water Resistant Backer Board: Comply with glass mat backer board manufacturer's recommendations.
- E. Water or additive shall not be added to joint compound unless recommended by manufacturer. See quality assurance for application temperature and drying times.
- F. Levels of Gypsum Board Finishing per Gypsum Association GA-214 and as note herein:
  - 1. Level 1/Fire Taping: All joints and interior angles shall have tape set in joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Tape and fasteners need not be covered.
    - a. For use in plenum areas above ceilings, gypsum board not scheduled for paint or wallcovering, gypsum board concealed from view in the finished work, except as noted in level 2.

2. Level 2: All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.
  - a. For use on areas that are a substrate for tile or wood paneling.
3. Level 3: All joints and interior angles shall have tape embedded in joint compound and one additional coat of joint compound applied over all joints and interior angles. Fastener heads and accessories shall be covered with two separate coats of joint compound. All joint compound shall be smooth and free to tool marks and ridges.
  - a. For use on surfaces of mechanical and electrical spaces scheduled to receive paint.
4. Level 4: All joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. All joint compound shall be smooth and free of tool marks and ridges. When necessary, sand between coats and following final coat to provide smooth surface ready for decoration.
  - a. For use on all walls scheduled for paint or wallcovering except those areas noted under Level 3 and 5.
5. Level 5: All joints and interior angles shall have tape embedded in joint compound and two separate coats for joint compound applied over all flat joints and one separate coat of joint compound applied over interior angles. Fastener heads and accessories shall be covered with three separate coats of joint compound. A thin skim coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, shall be applied to the entire surface. The surface shall be smooth and free of tool marks and ridges. When necessary, sand between coats and following final coat to provide smooth surface ready for decoration.
  - a. For use on all ceilings; walls and/or soffits under skylights and clerestories, and as noted on drawings.  
Note: when Level 5 finish is used, it shall extend to nearest inside or outside corner.

### **3.10 PARTITION IDENTIFICATION**

- A. Place identification on all partitions indicated on Code Drawings as having a required fire or smoke rating.
- B. Identification shall be as follows:
  1. Rating (i.e. 2 HR Fire Wall; Smoketight; 2 HR Fire Barrier): Same as indicated on Code Drawing Legend.
  2. Location: 10 feet on center, both sides of partitions, above ceiling line.
    - a. Place above access panels in hard ceilings.
  3. Style of Lettering: 2 inches high, Helvetica style, painted with aid of stencils.
  4. Color: Red

### **3.11 FINISHING ADJUSTMENT**

- A. Screw Pop
  1. Repair nail pop by driving new screw approximately 1-1/2 inches away and reseal screw.
  2. When face paper is punctured drive new screw approximately 1-1/2 inches from defective fastening and remove defective fastening.
  3. Fill damaged surface with compound in coats specified by required finish level.

**B. Ridging**

1. Sand ridges to reinforcing tape without cutting through tape.
2. Fill concave areas on both sides of ridge with topping compound.
3. After fill is dry, blend in topping compound over repaired area.

C. Fill cracks with compound and finish smooth and flush.

**3.12 CLEANING AND PROTECTION**

A. Promptly remove any residual joint compound from adjacent surfaces.

B. Protect installed products from damage from weather, condensation, construction, and other causes during remainder of the construction period.

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

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

**END OF SECTION 09 21 16**

## SECTION 09 24 00

### PORTLAND CEMENT PLASTER

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

- A. Related work specified in other sections:
  - 1. Joint Sealants - Section 07 92 00.

##### 1.03 QUALITY ASSURANCE

- A. Reference Specifications
  - 1. Metal Lathing and Furring: ASTM C841 interior and C1063 exterior .
  - 2. Cement Plaster: ASTM C926-94.
- B. Use applicators with experience on at least three projects equal in Scope to this work.

##### 1.04 MOCK-UPS

- A. Job Mock-up
  - 1. Make a 4' x 4' sample panel of plaster system showing color, texture, joints and workmanship proposed.
  - 2. Proceed with work after receiving acceptance by Architect.
  - 3. Use accepted sample as standard of quality for all stuccowork.

##### 1.05 SUBMITTALS

- A. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.
- B. Finish coat texture and color samples.
- C. Submit per Section 01 33 00.

##### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver manufactured materials in original unopened packages or containers, with manufacturer's label intact and legible.
- B. Keep plaster materials dry, store off the ground, covered, and away from damp surfaces.
- C. Remove wet and deteriorated materials from site.

## **1.07 JOB CONDITIONS**

### **A. Environmental Requirements**

1. Cold weather requirements
  - a. Do not use frozen materials in plaster mixes.
  - b. Do not apply plaster to frozen surfaces or surfaces containing frost.
  - c. Do not apply plaster unless minimum ambient temperature of 40°F. has been and continues to be maintained for a minimum of 48 hours prior to application and until plaster is cured.
2. Hot weather requirements: Protect plaster from uneven and excessive evaporation during hot, dry weather.
3. Ventilation: Remove water vapor from plastered rooms that is in excess of amount needed for hydration of plaster.
4. Acrylic Finish:
  - a. Protect cement plaster from all forms of precipitation during the application and the setting/curing period of finish coat. Ensure that the finish is fully set prior to removing protective covering.
  - b. Do not use frozen materials or materials that have been frozen.
  - c. Do not apply acrylic finish when ambient temperature is less than 40° F. (4.4°C.)
  - d. Do not apply acrylic finish unless the temperature has been 40°F. (4.4°C.) for at least 24 hours before the application.
  - e. Do not apply acrylic finish when there is any form of precipitation.
  - f. Do not apply acrylic finish to "brown" coat of cement plaster if sun is directly on the wall surface and temperature is 75°F. (24°C.). Work in shade whenever possible.

### **B. Protection**

1. Cover openings with plastic film when building is subject to hot, dry winds or temperature differentials of more than 20° F.
2. Protect finished surfaces installed prior to plastering by covering with plastic film.
3. Maintain protection in place until completion of work.

## **PART 2: PRODUCTS**

### **2.01 LATHING, FURRING AND ACCESSORIES**

#### **A. Lath**

1. Self-furring metal lath: 3.4 lb./sq.yd. galvanized steel diamond self-furring expanded metal conforming to ASTM C847.
2. Paper-backed metal lath for stucco: 3.4 lb. galvanized steel diamond flat expanded metal, with asphalt impregnated paper adhered to the backside.

**B. Framing and Suspension System**

1. Hanger wire: 9 W and M gauge (Class I) galvanized wire.
2. Carrying channels: 1-1/2" cold-rolled steel.
3. Furring channels: 3/4" cold rolled furring channel, attached with #18 tie wire.

**C. Accessories**

1. Shapes used as grounds shall be sized and dimensioned to provide required plaster thicknesses.
2. Weather-exposed accessories shall be fabricated from zinc alloy materials.
3. Provide standard trim items including control joints, casing beads, exterior corner beads and base screeds.
  - a. Casing beads and control joints as manufactured by USG or Keene's.
    - 1) Profile shall be lip flange and/or embedment section; #75 or equal.
  - b. Corner reinforcing shall be Stockton "Corneraid" or equal.
    - 1) Fabricated from galvanized welded wire for full embedment in the brown coat.
  - c. Expansion joints shall be #40 as manufactured by Keene's.
  - d. Corner beads shall be #800 as manufactured by USG.
4. Screeds as manufactured by Fry Reglet, aluminum with clear anodized finish.
  - a. Vent screed # TRM-75-V-150.
  - b. Drip screed #DS-875.
5. Flashings: Conform to requirements of Section 07 65 00. Color: See Material Finish/Color Schedule, on Architectural Drawings.

**2.02 STUCCO - PORTLAND CEMENT PLASTER**

- A. Portland cement: ASTM C150, Type 1.
- B. White cement: ASTM C150 White.
- C. Masonry cement: ASTM C91.
- D. Hydrated lime: C6 Type N.
- E. Silica sand: Graded as follows:

| <u>Sieve</u> | <u>% Passing</u> |
|--------------|------------------|
| No. 16       | 100              |
| No. 30       | 50-80            |
| No. 50       | 30-50            |
| No. 100      | 0-20             |

- F. Water: Potable, free from quantities of mineral or organic substances that would retard or accelerate setting of stucco.

- G. Admixture: Acryl 60 as produced by Standard Dry Wall Products.
- H. Fiber: Alkaline-resistant glass strands, ½ inch long, free of contaminants, manufactured for use in portland cement plaster.
- I. Stucco finish coat: Finish coat by Insulcrete, Dryvit, Senergy, STO, Tech Products, USG, H.B. Fuller/Tech, Sonneborn acceptable. Color and Texture: See Material Finish/Color Schedule, on Architectural Drawings.

### **PART 3: EXECUTION**

#### **3.01 MIX PROPORTIONS FOR CEMENT PLASTER/STUCCO**

- A. Scratch Coat: 1 part portland cement  
1 part masonry cement  
1 ½ to 2 ½ pounds fiber  
4 parts aggregate
- B. Brown Coats: 1 part portland cement  
1 part masonry cement  
1 ½ to 2 ½ pounds fiber  
5 parts aggregate
- C. Finish Coat: 1 part white cement OR stucco finish coat  
1/4 part lime (see schedule or details)  
3 parts silica sand
- D. For all liquid use 3 parts water and 1 part admixture.

#### **3.02 SUSPENSION SYSTEM/LATH FOR CEILINGS/SOFFITS**

- A. Install 1-1/2" furring channels, at 36" o.c. with 8 gauge hangar wire hung 4' x 3' on center. Tie 3/4" cross furring channels at 16" o.c. Tie on lath.
- B. Isolate ceiling/soffit assemblies where they abut or are penetrated by building structure. Do not bridge building control and expansion joints with framing. Frame both sides of joints independently.
  - 1. Suspend ceiling hangers from building structure as follows:
    - a. Install hangers plumb and free of contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
    - b. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to limit deflection to 1/360 of span while supporting ceiling loads.
    - c. Wire Hangers: Secure by looping and tying, either directly to structure or directly to fasteners that are secure and appropriate for substrate, in a manner that will not cause them to deteriorate or otherwise fail.

#### **3.03 LATH FOR WALLS**

- A. On exterior walls, install stucco wrap (over weather barrier by others) horizontally and plumb with grooved surface pattern in vertical position. Attach to studs with fasteners at 12"-18" on center (at masonry, temporarily attach with adhesives). Install shingle style with minimum 6" overlap and all seams taped. Seal to base screed with caulk or tape.



- B. Attach lath to framing or substrate according to ASTM C1063, lapping sides not less than ½ inch and ends not less than one inch.

### 3.04 ACCESSORIES

- A. Install metal plaster accessories per ASTM C1063. Attach to lath with wire ties 6 inches o.c.
  - 1. Install control joints (whether or not shown on drawings) to create panels relatively square, not larger than 144 square feet (on vertical surfaces) or 100 square feet (on horizontal surfaces), and with no dimension exceeding 18 feet or a length to width ratio of 2:1.
    - a. Locate vertical control joints at surface penetrations (windows, doors, louvers, etc.) and at areas of structural stress.
    - b. Locate horizontal control at all penetrations (light fixtures, diffusers, columns, etc.) and at areas of potential cracking.

### 3.05 CEMENT PLASTER APPLICATION

#### A. General

- 1. Apply cement plaster by hand.
- 2. Interrupt cement plaster only at junctions of plaster planes, at openings, or at control joints.
- 3. Tool through second and finish coats to produce "V" joint at intersection of frames or other items of metal or wood which act as plaster grounds.
- 4. Apply second coat to first coat, bringing out to grounds, flat to true surface, and free of imperfections which would reflect in finish coat.
- 5. Reconsolidate second coat by floating, and roughen to assure bond with finish coat.
- 6. Thickness:
  - a. Nominal stucco: 7/8" unless noted differently on drawings. Apply 3/8" scratch coat, 3/8" brown coat and 1/8" final coat of plaster or stucco finish coat as noted on drawings.
  - b. Nominal cement plaster: 3/4" unless noted differently on drawings. Apply 3/8" scratch coat, 1/4" brown coat and 1/8" minimum finish coat of cement plaster.

#### B. Base Coats

- 1. Over metal base
  - a. Apply with sufficient material to form keys through metal lath.
  - b. Embed and fill all spaces of lath and scratch vertical surfaces horizontally.
  - c. Scratch horizontal surfaces in one direction only.

#### C. Finish Coat

- 1. Apply plaster in number of coats and consistency to achieve required sand finish. When using acrylic-based finish coat, comply with manufacturer's written instructions.

### **3.06 CUTTING, FITTING AND PATCHING**

- A. After finishing last coat, point up and patch plastering, rake out surfaces where necessary, point up around trim and other adjoining work and leave surfaces complete and uniform at final completion.
- B. Unacceptable defects: Cracks, blisters, pits, discoloration or checks.
- C. Patch existing plaster surfaces where indicated on drawings and where affected by new construction as necessary to match existing plaster surfaces.

### **3.07 CLEAN-UP**

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from doorframes, windows, and other surfaces which are not to be plastered.

### **3.08 FIELD QUALITY CONTROL**

- A. Conform to applicable requirements of ASTM C926-94 cement plaster.

**END OF SECTION 09 24 00**

## **SECTION 09 51 00**

### **ACOUSTICAL CEILINGS**

#### **PART 1: GENERAL**

##### **1.01 RELATED DOCUMENTS**

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### **1.02 SUMMARY**

- A. Section includes:
  - 1. Lay-in acoustic ceilings.
- B. Related work specified in other sections:
  - 1. Mechanical penetration of ceilings - Divisions 21-25.
  - 2. Electrical penetration of ceilings - Divisions 26-28.

##### **1.03 SUBMITTALS**

- A. Submit Shop Drawings indicating installation layouts in accordance with Section 01 33 00.
- B. Submit samples of all acoustical and suspension materials to Architect for approval.

##### **1.04 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in original, unopened, protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness and fire rating as applicable, legible and intact.
- B. Store materials in original protective packaging to prevent soiling, physical damage or wetting.
- C. Store cartons open at each end to stabilize moisture content and temperature.
- D. Do not begin installation until sufficient materials to complete a room are received.

##### **1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Complete installation of dampening materials before beginning work.
- B. Maintain humidity of 65% - 75% in area where acoustical materials are to be installed, 25 hours before, during, and after installation.
- C. Maintain a uniform temperature in the range of 55 F. to 70 F. prior to, during, and after installation of materials.

## **PART 2: PRODUCTS**

### **2.01 ACOUSTICAL MATERIALS**

- A. Products specified are as follows:
1. Armstrong, [www.armstrong.com](http://www.armstrong.com)
  2. USG, [www.usg.com](http://www.usg.com)
- B. ACT 1: Square edge, 5/8" thick, sag and abuse resistant, anti-microbial, low VOC, lay-in tile. Provide 24" x 24" or 24" x 48" tile as shown on drawings.
1. Minimum NRC: 0.50
  2. Minimum CAC: 30
  3. Minimum LR: 0.86
  4. Minimum Recycled Content: 33%
  5. Armstrong "Tundra Humigard" #301 or #302.
  6. USG "Touchstone ClimaPlus" #5893 or #5894
- C. Furnish extra materials equal to 1% of each type of acoustical material supplied. Provide materials in new, unopened cartons labeled as to contents.

### **2.02 SUSPENSION SYSTEMS**

- A. Systems specified are by Chicago Metallic. Equivalent systems by USG or Armstrong are acceptable.
- B. Suspension System for Non-Rated Lay-In Panels (except locations listed below): 200 Intermediate Duty Snap-Grid System, standard white finish.
- C. Systems for use in kitchens, kitchen serving areas, toilets and locker rooms to be 1830 intermediate duty hot dipped galvanized capped with white aluminum capping.
- D. Perimeter treatment components for all systems to be 0.020 inch thick hot dipped galvanized steel, 15/16" wide x 3/4" high. Edges to be hemmed. Finished identical to main runners and cross tees.

## **PART 3: EXECUTION**

### **3.01 CONDITION OF SURFACES**

- A. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work.
- B. Mark access provisions as to size and location before beginning installation.

### **3.02 REQUIREMENTS FOR ALL MECHANICAL SUSPENSION SYSTEMS**

- A. Grid layout in each space, area located symmetrically in room, space. Coordinate work with other trades so that lighting fixtures, grilles, other ceiling fixtures work to grid layout.
- B. Do not use universal splices or other types whose use would obstruct passage of recessed lighting fixtures through grid openings, or make untenable their reposition upon flanges of beams.
- C. Support suspension system from structure above, not from ductwork, equipment or piping.
- D. Space hangers not more than 6" from ends, not more than 4'-0" o.c. Between ends of main runners, provide extra hangers as required to support other work resting in or on ceiling.

- E. Provide additional tee supports, hangers and cut tiles to support and fit to all sides of light fixtures, linear diffusers and other ceiling penetrations. Coordinate with mechanical and electrical drawings.

### **3.03 ACOUSTICAL MATERIALS**

- A. Install ceiling panels and tiles using clean gloves, to avoid soiling materials.
- B. Install lay-in panels snugly against support system without damaging panels.
- C. Field rabbit edges of panels where field-cut to match shadow-line profile.
- D. Adjust any sags or twists which develop in the ceiling systems and replace any part which is damaged or faulty.
- E. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings and suspension members; comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- F. Replace any sagging tile just prior to substantial completion.

**END OF SECTION 09 51 00**



## SECTION 09 91 00

### PAINTING

#### PART 1: GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings, Details of Construction and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work specified in this section.

##### 1.02 SUMMARY

- A. Section includes:

1. Field finish all materials scheduled and/or specified for paint, trim, stain or seal. Including but not limited to:
  - a. Concrete walls and floors
  - b. Concrete block
  - c. Steel
  - d. Galvanized metal
  - e. Gypsum Board
  - f. Plaster
  - g. Cotton or canvas insulation covering
  - h. Rated partition identification.

- B. Related work specified in other sections:

1. Colored sealants – Section 07 92 00
2. Finishing of wood doors - Section 08 14 00.
3. Shop finishing - Applicable Sections.

##### 1.03 SUBMITTALS

- A. Provide three (3) copies of a schedule detailing each substrate in the same order as the schedules used in Part 2 of this section. Include the following:
1. The specific products to be used for each coat.
  2. Documentation that the manufacturer has reviewed and approved each painting system.
  3. Data pages for all products listed, highlight the following:
    - a. Type of resin.
    - b. Dry Film Thickness.
    - c. Volume Solids.
    - d. Units of Sheen.
    - e. VOC content and chemical components.
    - f. Other performance or descriptive data required by Part 2 of this section.
    - g. If this information is not on the data page provide the information in a letter of certification from the manufacturer. Attach the letter to the appropriate data page.

- B. Submit three (3) drawdowns of each product and color combination. Drawdowns shall be applied using a 4 mil WFT drawdown bar on Leneta form WD plain white coated cards size 3-7/8" x 6".
1. Label each card with the following:
    - a. Job name.
    - b. Date.
    - c. Product name.
    - d. Product number.
    - e. Color number as stated in the material finish/color schedule.
    - f. Name, address, and phone number of the supplying facility.
    - g. Surface material product is to be applied onto.
- C. Do not deliver material to site until having received written approval of submitted information and samples.
- D. Complete sample area on project as selected by Architect on each type surface and with each type of paint system specified. Do not proceed further with application until receiving acceptance of each sample area by Architect. Accepted areas will serve as standard of quality for entire project.

#### **1.04 EXAMINATION OF DOCUMENTS**

- A. Examine the specifications for the work of other trade contractors and to become familiar with their work. All surfaces that are left unfinished by the requirements of other specifications to be finished by this section.

#### **1.05 EXISTING CONDITIONS**

- A. The existing building may contain lead-containing materials, including paint. It is the Contractor's responsibility to meet all governmental regulations when dealing with and disposing of lead containing materials.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store materials not in use, in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg. F.
1. Maintain containers in clean condition, free for foreign materials and residue.
  2. Remove rags and waste from storage areas daily.

#### **1.07 PROJECT CONDITIONS**

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.
- C. Do not apply coatings during cold, rainy or frosty weather.
- D. Do not apply to surfaces, which are exposed to hot sun.

#### **1.08 QUALITY ASSURANCE**

- A. MPI Standards:
1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."



2. Preparation and Workmanship: Comply with requirements in “MPI Architectural Painting Specification Manual” for products and paint systems indicated.
3. Previously Painted Surface Preparation and Workmanship: Comply with requirements in “MPI Maintenance and Repainting Manual” for products and paint system indicated.

## **PART 2: PRODUCTS**

### **2.01 PAINTING SYSTEMS**

- A. Painting systems for normal applications are specified using the products of Sherwin-Williams Co. (S-W), Akzo Nobel Paints (Glidden Professional: GP; DEVOE COATINGS) and Pittsburgh Paints (PPG) to establish standards of quality, except as noted.
  1. Other manufacturers can submit for approval through the pre-bid process defined in Section 01 25 00 Substitutions and Product options.
    - a. For approval, submit data sheets for each paint type with volume solids and VOC’s highlighted to indicate they meet or exceed products specified in Part 2.
- C. Use the materials of the same manufacturer for each system.
- D. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  1. Flat Paints and Coatings, VOC content of not more than 50 g/L.
  2. Non-flat Paints, Coatings and Primers: VOC content of not more than 150 g/L.
  3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
  4. Floor Coatings: VOC not more than 100 g/L.
  5. Shellacs, Clear: VOC not more than 730 g/L.
  6. Shellacs, Pigmented: VOC not more than 550 g/L.
- E. For color selection see Material Finish/Color Schedule, on Architectural Drawings.
- F. Chemical Components of Field-Applied Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
  1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
  2. Restricted Components: Paints and coatings shall not contain any of the following:
    - a. Acrolein
    - b. Acrylonitrile
    - c. Antimony
    - d. Benzene
    - e. Butyl benzyl phthalate
    - f. Cadmium
    - g. Di (2-ethylhexyl) phthalate
    - h. Di-n-butyl phthalate
    - i. Di-n-octyl phthalate
    - j. 1,2-dichlorobenzene

- k. Diethyl phthalate
- l. Dimethyl phthalate
- m. Ethylbenzene
- n. Formaldehyde
- o. Hexavalent chromium
- p. Isophorone
- q. Lead
- r. Mercury
- s. Methyl ethyl ketone
- t. Methyl isobutyl ketone
- u. Methylene chloride
- v. Naphthalene
- w. Toluene (methylbenzene)
- x. 1,1,1-trichloroethane
- y. Vinyl chloride

## 2.02 PRIMERS (INTERIOR AND EXTERIOR)

### A. 100% Acrylic Exterior Masonry Primer:

- 1. Minimum Volume Solids: 34%.
- 2. Maximum VOC: 100 g/L
- 3. Alkali Resistance: Passes ASTM D1308
  - a. S-W Loxon Exterior Acrylic Masonry Primer A24W300.
  - b. GP Hydrosealer Exterior Primer/Sealer 6001-1200.
  - c. PPG Perma-Crete Acrylic Alkali Resistant Primer 4-603.

### B. 100% Acrylic, Interior Alkali Resistant Primer:

- 1. Minimum Volume Solids: 35%.
- 2. Maximum VOC: 150 g/L
- 3. Alkali Resistance: Tolerance of PH levels up to 13.
  - a. S-W PrepRite Masonry Primer B28W300.
  - b. GP Gripper Interior/Exterior Primer Sealer 3210-1200.
  - c. PPG Perma-Crete Int/Ext Alkali Resistant Primer, 4-603.

### C. 100% Acrylic Interior Primer:

- 1. Shall be certifiable for use on gypsum drywall or wood, and paint.
- 2. Minimum Volume Solids: 37%.
- 3. Maximum VOC: 150 g/L
  - a. S-W ProGreen 200 Low VOC Interior Latex Primer B28W600
  - b. GP Gripper Interior/Exterior Primer Sealer 3210-1200.
  - c. PPG Seal Grip Int/Ext. Acrylic Universal Primer/Sealer, 17-921.

### D. Rust-inhibitive Waterborne Acrylic Primer:

- 1. Minimum Volume Solids: 37%.
- 2. Maximum VOC: 250 g/L
  - a. S-W DTM Acrylic Primer/Finish B66W1.
  - b. DC Devflex 4020PF Direct to Metal Primer and Flat Finish.
  - c. PPG Pitt-Tech Int/Ext Primer DTM, 90-712.

## **2.03 BLOCKFILLERS (INTERIOR AND EXTERIOR)**

### **A. Vinyl Acrylic Blockfiller:**

1. Minimum Volume Solids: 44%.
2. Maximum VOC: 150 g/L
  - a. S-W PrepRite Block Filler B25W25.
  - b. GP Concrete Coatings Block Filler Interior/Exterior Primer 3010-1200.
  - c. PPG Speedhide Int/Ext Masonry Block Filler, 6-7.

## **2.04 EXTERIOR FINISH PAINTS**

### **A. 100% Acrylic Exterior Satin Coating:**

1. Minimum Volume Solids: 29%.
2. Maximum VOC: 150 g/L
3. Sheen: 10-20 units at 60 degrees.
  - a. S-W A-100 Exterior Latex Satin A82 series.
  - b. GP Ultra-Hide 150 Exterior Satin Paint 2412V series.
  - c. PPG Sun-Proof Exterior 100% Acrylic Satin Finish, 76-45.

### **B. Non-blocking, 100% Acrylic Exterior Gloss Coating:**

1. Minimum Volume Solids: 34%.
2. Maximum VOC: 150 g/L
3. Sheen: 70-90 units at 60 degrees.
  - a. S-W Super Paint Exterior High Gloss Latex Enamel A85 Series.
  - b. GP Ultra-Hide Interior/Exterior Gloss Paint 3028N.
  - c. PPG Manor Hall Interior/Exterior Gloss Acrylic Latex, 52-110.

## **2.05 INTERIOR FINISH PAINTS**

### **A. Vinyl Acrylic Interior Eggshell Finish:**

1. Minimum Volume Solids: 35%.
2. Maximum VOC: 150 g/L
  - a. S-W ProGreen 200 Low VOC Eg-Shel B20W651.
  - b. GP Ultra-Hide 250 Interior Eggshell Paint 1402N.
  - c. PPG Speedhide Interior Enamel Eggshell, 6-411.

### **B. Vinyl Acrylic Interior Flat Finish:**

1. Minimum Volume Solids: 32%.
2. Maximum VOC: 50 g/L
3. Sheen: 0-8 units at 85 degrees.
  - a. S-W ProGreen 200 Low VOC Flat B30-600 Series.
  - d. GP Ultra-Hide 250 Interior Flat Paint 1200N.
  - b. PPG Wall Supreme Interior Flat High Build Wall Paint, 2-110.

C. 100%, Acrylic, Interior Gloss Coating:

1. Minimum Volume Solids: 34%.
2. Maximum VOC: 150 g/L
3. Sheen: 60-80 units at 60 degrees.
  - a. S-W Pro Industrial 0 VOC Acrylic Gloss, B66-600 Series.
  - b. GP Ultra-Hide 250 Interior/Exterior Acrylic Gloss Finish 3028N or GP Lifemaster Oil Interior/Exterior Gloss Paint 1508.
  - c. PPG Manor Hall Interior/Exterior Gloss Acrylic Latex, 52-110.

D. 100% Acrylic, Waterborne Eg-Shel Dryfall:

1. Minimum Volume Solids: 30%.
2. Maximum VOC: 150 g/L
3. Sheen: 0-8 units at 85 degrees.
  - a. S-W Waterborne Acrylic Dryfall B42W2.
  - b. GP Waterbased Interior Eggshell Dry Fall 1482-1200.
  - c. PPG Speedhide Super Tech Flat-Eggshell 0-5 @60&85 Dry Fall, 6-725.

E. Paint for Concrete Floors:

1. Floor Crack Filler
  - a. Minimum Volume Solids: 100%, mixed.
  - b. Maximum VOC: 10 g/L, mixed
    - 1) S-W Armorseal Crack Filler B58AQ2/B60VQ2
    - 2) DC Devfloor 576 Epoxy Crack Filler Additive used in conjunction with DEVFLOOR 525.
    - 3) PPG Megaseal CF Epoxy Crack Filler, 99-114.
2. Water Based Epoxy Floor Primer:
  - a. Minimum Volume Solids: 32%, mixed.
  - b. Maximum VOC: 100 g/L, mixed.
    - 1) S-W Armorseal 33 Epoxy Primer/Sealer/ B58/B60 Series.
    - 2) DC Devfloor 525 100% Solids Epoxy Resurfacer.
    - 3) PPG Megaseal WBPC Waterborne epoxy primer/sealer, 99-128.
3. Slip Resistant:
  - a. S-W H&C Shark Grip-Slip Resistant Additive.
  - b. DC Devfloor 577 White Aluminum Oxide Medium Grit Aggregate.
  - c. PPG Megaseal AS Anti-Slip Non-Sparking Natural Pumice Additive.
4. Water Based Epoxy Floor Coating:
  - a. Minimum Volume Solids: 94%, mixed.
  - b. Maximum VOC: 100 g/L, mixed.
    - 1) S-W Armorseal 700 HS-High Solids Water Based Epoxy Floor Coating.
    - 2) DC Devfloor 525 UVR Clear 100% Solids Epoxy (with Devfloor 571 Epoxy Color Additive).
    - 3) PPG Megaseal SL Self-leveling Epoxy Floor Coating, 99-126.
    - 4) Color(s): Gray

F. Alkyd Gloss Enamel:

1. Minimum Volume Solids: 41%.
2. Maximum VOC: 430 g/L
  - a. S-W Industrial Enamel
  - b. DC Devguard 4308 Alkyd Industrial Gloss Enamel.
  - c. PPG Alkyd Gloss Enamel, 7-282.

## **2.06 EXTRA STOCK**

- A. Provide left over paint with Owner for touch-up purposes. At completion of project, provide one complete set of drawdowns in each maintenance manual with a schedule noting the locations each paint color was used. Refer to Section 01 78 39.

## **PART 3: EXECUTION**

### **3.01 PREPARATION OF SURFACES**

#### **A. General**

1. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
2. Do not start work until preparation specified in surface Section is completed.
3. Ensure surfaces are dry and adequately protected from dampness.
4. Thoroughly clean surfaces free of loose, rough and foreign substances which will affect adhesion or appearance of applied coats.
5. Remove mildew and neutralize surface.
6. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface applied protection before surface preparation and painting.
  - a. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
  - b. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
7. Complete repainting or refinishing will be required if coats are applied over improperly prepared surfaces.

#### **B. Gypsum Board:**

1. Fill minor irregularities with patching material and sand to smooth level surfaces taking care not to raise nap of paper.
2. Previously painted gypsum wallboards must be completely dry, smooth-sanded, clean and free of dust, dirt, powdery residue, grease, oil, wax or any other contaminants such as flaking or peeling paint before paint application is started. Treat or remove all contaminants and correct defects. Dull glossy old paint by light sanding or with a commercial deglosser/cleaner to assure maximum adhesion of the new coating. Patch holes and cracks with a latex patching compound, sand smooth and spot prime with the paint or enamel to be used as the final coat.

#### **C. Plaster**

1. Fill cracks, holes or imperfections with patching plaster and smooth off to match adjoining surfaces. Do not sandpaper.
2. In case of high alkali or lime conditions, neutralize with solution recommended by paint manufacturer.

3. Do not paint until moisture content of surface is 12% or below, except as may be required by paint manufacturer.
4. Previously painted plaster surfaces must be dry, clean, and free of dust, dirt, powder residue, grease, oil, wax or any other contaminants; free of flaking, crumbling or chalking conditions before paint application is started. Contaminants must be treated or removed. Defects corrected as necessary. Dull glossy old paints by light sanding or with deglosser/cleaner to assure maximum adhesion of the new coating. Remove any loose, chipped, peeling or blistered old paint by scraping and smooth sanding. If highly porous old paint needs reconditioning before receiving the new application, prime the entire surface with undercoater oil primer. Patch holes and cracks with latex patching compound per manufacturer's instructions after removing plaster as far back as necessary to reach firm areas. Spot prime patched areas with sealer-primer.

#### D. Formed Concrete

1. Remove all traces of form oil.
2. Do not paint until moisture content of surface is 15% or below except as may be required by paint manufacturer.
3. Previously painted surfaces must be free of grease, oil, wax or any other contaminants and loose or flaking paint. Clean concrete of oil and grease with detergent, hot water and vigorous scrubbing. All loose and peeling paint must be scraped or sand blasted back to sound adhesion.

#### E. Masonry

1. Do not paint until moisture content of surface is 15% or below except as may be required by paint manufacturer.
2. After prime coat is dry, fill remaining small holes, cracks and other defects with Swedish putty made by mixing dry spackle with prime paint.
3. Previously painted masonry surfaces must be dry, clean and free of dust, dirt and any other contaminants. Hard glossy surfaces are to be lightly sanded or dulled with deglosser/cleaner. Surfaces in poor condition must be prepared for repainting by removing loose paint and blisters by scraping, sanding or burning. Paint in these areas are to be removed at least 12 inches beyond the failing area. Patch all holes left after removal of nails, screws, and anchors. Prime before applying finish coats.

#### F. Ferrous or Galvanized Metal

1. Remove dirt and grease with mineral spirits or solvent recommended by paint manufacturer and clean cloths.
2. If prime coat is not smooth, sand to bare metal, reprime. Touch up scratched or abraided primer.
3. Previously painted metal must be dry, clean and free of contaminants. Hard and glossy surfaces are to be sanded lightly or dulled with deglosser/cleaner. Remove peeling, loose, chipped, and blistered paint and rust by scraping and sanding. Prime all sanded areas and areas devoid of paint with an all-purpose metal primer.

#### G. Concrete Floors:

1. To receive paint or non-slip paint: Shotblast floor to resemble 100 grit sandpaper. Fill cracks, voids, bug holes, gouges or divots with Crack Filler.

### 3.02 EXAMINATION

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

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent
  - 2. Masonry: 12 percent
  - 3. Wood: 15 percent
  - 4. Gypsum Board: 12 percent
  - 5. Plaster: 12 percent
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
  - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
- E. Conditions
  - 1. Do no work when surface, coating product, air temperature, humidity or dewpoint does not meet requirements of PROJECT CONDITIONS in Part 1 of this specification.
  - 2. Do no interior work until building is properly enclosed.
  - 3. Do work under adequate illumination and dust-free conditions.

### **3.03 APPLICATION**

- A. Methods: Paint may be applied by brush, roller or spray methods except where particular method will produce unsatisfactory results. Where spray method is used on concrete block, follow with roller to work paint into voids.
- B. Materials: Do not open containers until required for use. Stir materials thoroughly and keep at uniform consistency during application.
- C. Coats
  - 1. Number specified is minimum. Provide sufficient number of coats to provide even, consistent, opaque coverage of substrate.
  - 2. Touch up suction spots between coats.
  - 3. Refinish surfaces affected by refitting work.
  - 4. Tint prime and under coats of paint approximately 1/2 to 3/4 depth of final color.
  - 5. Touch up suction and "hot" spots in plaster and concrete after application of first coat and before second coat.
  - 6. Do not apply next coat until previous is thoroughly dry.
  - 7. Provide final coat which is solid and even in color; free from runs, laps, sags, brush marks, air bubbles and excessive roller stipple and worked into crevices, joint and similar areas.
  - 8. Do not paint sealant / sealant joints.

### 3.04 SCHEDULE OF EXTERIOR WORK

- A. General: Do not paint brick, stucco, precast concrete, prefinished aluminum, sealant (unless scheduled to receive paint).
  - 1. New Work: Paint or finish all other new, unfinished, primed and factory painted surfaces, including all rooftop mechanical equipment, screen louvers, wall louvers (not factory-finished), miscellaneous metals, steel lintels and prefinished metal copings (color to match brick) occurring in brick as detailed.
  - 2. Existing Work: Prepare and paint all surfaces as noted on the drawings.
- B. Concrete, Stucco, Concrete Masonry Units, Fluted Block and Restored Masonry (except soffits):
  - 1. 1st Coat: 100% Acrylic Exterior Masonry Primer.
    - a. Minimum DFT: 8 mils.
  - 2. 2nd and 3<sup>rd</sup> Coat: 100% Acrylic Exterior Satin Coating.
    - a. Minimum DFT: 1.1 mils per coat.
- C. Zinc-coated Metal – Flashing, Decking, and Exposed Mechanical Including Rooftop Mechanical:
  - 1. Touch-up: Rust-inhibitive Waterborne Acrylic Primer.
    - a. DFT: 2.5-5.0 mils.
  - 2. 2nd and 3<sup>rd</sup> Coat: 100% Acrylic Exterior Satin Coating.
    - a. Minimum DFT: 1.3 mils per coat.
- D. Zinc-coated Metal – Doors, Frames and Handrails:
  - 1. Touch-up: Rust-inhibitive Waterborne Acrylic Primer.
    - a. DFT: 2.5-5.0 mils.
  - 2. 2nd and 3<sup>rd</sup> Coat: Non-blocking, 100% Acrylic Exterior Gloss Coating.
    - a. Minimum DFT: 1.3 mils per coat.

### 3.05 SCHEDULE OF INTERIOR WORK

- A. General
  - 1. Paint complete all surfaces noted with a "PT" on Room Finish Schedule.
    - a. New Work: In rooms with surfaces not scheduled for paint on Room Finish Schedule, paint hollow metal doors and frames, metal stairs and railings as occur.
    - b. Existing Areas:
      - 1. Remodeling work: In rooms with surfaces not scheduled for paint on Room Finish Schedule, paint hollow metal doors and frames, metal stairs and railings as occur.
      - 2. In unscheduled areas where patching has occurred, paint all walls corner to corner and floor to ceiling. Match adjacent wall color. Paint both sides of doors and frames at locations where replacement or modifications have been made.
  - 3. Provide specified finish on exposed surfaces including, but not limited to the following:
    - a. Prime coated mechanical units, piping, pipe covering, sprinkler piping, interior duct surfaces visible behind grilles, tanks without factory finish, radiation covers, cabinet unit heaters, exposed ductwork, louvers and grilles.



- b. Electrical panel box covers and surface raceways (over factory finish), conduits and boxes and all factory primed electrical equipment.
  - c. Hollow metal doors and frames, steel stairs, ladders and railings, catwalks and safety mesh grilles, access panels, prime painted hardware, painted astragals and vision lite kits on doors, coiling grilles and doors (unless factory finished), metal supports for counters and exposed miscellaneous metals.
- 4. Do not paint sealant.
  - 5. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
  - 6. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  - 7. Partition Identification
    - a. Place identification on all partitions indicated on Code Drawings as having a required fire or smoke rating.
    - b. Identification shall be as follows:
      - 1) Rating (i.e. 2 HR Fire Wall; Smoketight; 2 HR Fire Barrier): Same as indicated on Code Drawing Legend.
      - 2) Location: 10 feet on center, both sides of partitions, above ceiling line.
        - a) Place above panels in hard ceilings.
      - 3) Style of Lettering: 2 inches high, Helvetica style, painted with aid of stencils.
      - 4) Color: Red.
- B. Concrete, Cement Plaster – Ceilings Without Exposed Mechanical:
- 1. 1st Coat: 100% Acrylic, Interior Alkali Resistant Primer.
    - a. Minimum DFT: 3.0 mils.
  - 2. 2nd and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Flat Finish.
    - a. Minimum DFT: 1.4 per coat.
- C. Concrete Masonry Units and Restored Masonry (not scheduled for epoxy):
- 1. 1st Coat: Vinyl Acrylic Blockfiller.  
(1<sup>st</sup> Coat Option due to schedule constraints: 100% Acrylic Exterior Masonry Primer).
    - a. Minimum DFT: 8.0 mils (75-125 sq. ft./gal).
  - 2. 2nd and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Eggshell Finish.
    - a. Minimum DFT: 1.5 per coat.
- D. Gypsum Drywall – Wall (not scheduled for epoxy):
- 1. 1st Coat: 100% Acrylic Interior Primer.
    - a. Minimum DFT: 1.5 mils.
  - 2. 2nd and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Eggshell Finish.
    - a. Minimum DFT: 1.5 per coat.

- E. Gypsum Drywall – Ceilings (not scheduled for epoxy):
  - 1. 1st Coat: 100% Acrylic Interior Primer.
    - a. Minimum DFT: 1.5 mils.
  - 2. 2<sup>nd</sup> and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Flat Finish.
    - a. Minimum DFT: 1.4 per coat.
- F. Plaster – Walls (not scheduled for epoxy):
  - 1. 1st Coat: 100% Acrylic, Interior Alkali Resistant Primer.
    - a. Minimum DFT: 3.0 mils.
  - 2. 2<sup>nd</sup> and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Eggshell Finish.
    - a. Minimum DFT: 1.5 per coat
- G. Plaster – Ceilings (not scheduled for epoxy):
  - 1. 1st Coat: 100% Acrylic, Interior Alkali Resistant Primer.
    - a. Minimum DFT: 3.0 mils.
  - 2. 2<sup>nd</sup> and 3<sup>rd</sup> Coat: Vinyl Acrylic Interior Flat Finish.
    - a. Minimum DFT: 1.4 per coat.
- H. Ferrous Metal (not scheduled for epoxy):
  - 1. Touch-up: Rust-inhibitive Waterborne Acrylic Primer
    - a. DFT: 2.0-5.0 mils.
  - 2. 2<sup>nd</sup> and 3<sup>rd</sup> Coat: 100% Acrylic Interior Gloss Coating.
    - a. Minimum DFT: 1.3 mils per coat.
- I. Zinc-coated Metal:
  - 1. Touch-up: Rust-inhibitive Waterborne Acrylic Primer
    - a. DFT: 2.0-5.0 mils.
  - 2. 2<sup>nd</sup> and 3<sup>rd</sup> Coat: 100% Acrylic Interior Gloss Coating.
    - a. Minimum DFT: 1.6 mils per coat.
- J. Cotton or Canvas Covering Over Insulation (except exposed overhead work):
  - 1. 1st Coat: 100% Acrylic Interior Primer.
    - a. Minimum DFT: 1.5 mils.
  - 2. 2<sup>nd</sup> Coat: Vinyl Acrylic Interior Flat Finish.
    - a. Minimum DFT: 1.4 mils per coat.
- K. Exposed Overhead Work:
  - 1. Touch-up: Rust-inhibitive Waterborne Acrylic Primer.
    - a. DFT: 2.0-5.0 mils.
  - 2. 2<sup>nd</sup> Coat: 100% Acrylic, Waterborne Eg-Shel Dryfall.
    - a. DFT: 2.1-4.5 mils.
- L. Concrete Floors (scheduled to receive paint)
  - 1. Apply Floor Crack Filler as needed.
  - 2. First Coat: Water Based Epoxy Floor Primer.
    - a. Minimum DFT: 2.0-3.0 mils.
  - 3. Second Coat: Water Based Epoxy Floor Coating with color additive.
    - a. Minimum DFT: 6.5-7.5 mils.

4. Third Coat: Water Based Epoxy Floor Coating.
  - a. Minimum DFT: 6.5-7.5 mils.
  - b. Slip Resistant: 3.2 oz per gallon.

### **3.06 CLEANING AND PROTECTION**

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### **3.07 FIELD QUALITY CONTROL**

- A. Testing and Painting Application: Owner reserves the right to test DFT of painted surfaces.
  1. If testing discovers that DFT of installed paint does not meet specification, the Contractor will pay for initial and final testing and recoat surfaces until testing agency confirms specification is met.

**END OF SECTION 09 91 00**

