

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. Mirrors: Section 10 28 00, TOILET, BATH, AND LAUNDRY ACCESSORIES.

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 Contracting Officer's Technical Representative.
- 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.

1.4 PERFORMANCE REQUIREMENTS

- A. Glass Thickness:
1. Test in accordance with ASTM E 1300.
 2. Thicknesses listed are minimum. Coordinate thicknesses with framing system manufacturers.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Warranty: Submit written guaranty, conforming to General Condition requirements, and to "Warranty of Construction" Article in this Section.
- C. Manufacturer's Literature and Data:
1. Glass, each kind required.

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:

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):
 - C794-10.....Adhesion-in-Peel of Elastomeric Joint Sealants
 - C864-05.....Dense Elastomeric Compression Seal Gaskets,
Setting Blocks, and Spacers
 - C1036-06.....Flat Glass
 - C1048-12.....Heat-Treated Flat Glass-Kind HS, Kind FT Coated
and Uncoated Glass.
 - E84-10.....Surface Burning Characteristics of Building
Materials
 - E119-10.....Standard Test Methods for Fire Test of Building
Construction and Material

- D. Code of Federal Regulations (CFR):
16 CFR 1201 - Safety Standard for Architectural Glazing Materials; 2010
- E. Safety Glazing Certification Council (SGCC) 2012:
Certified Products Directory (Issued Semi-Annually).
- F. Unified Facilities Criteria (UFC):
4-010-01-2012.....DOD Minimum Antiterrorism Standards for
Buildings
- G. Glass Association of North America (GANA):
Glazing Manual (Latest Edition)
Sealant Manual (2009)

PART 2 - PRODUCT

2.1 HEAT-TREATED GLASS

- A. Clear Tempered Glass:
 1. ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality q3.
 2. Thickness, 6 mm (1/4 inch).

2.2 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. 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.
- D. Spring Steel Spacer: Galvanized steel wire or strip designed to position glazing in channel with stops.

E. 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.

F. Color:

1. Color of sealants which will be exposed in the finished work and unpainted shall be black, gray, or neutral color.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine openings for glass; 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.

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. Tempered Glass: Install with roller distortions in horizontal position unless otherwise directed.

3.4 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 1/4 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.
- 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 S type sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.5 REPLACEMENT AND CLEANING

- A. Clean new glass surfaces removing temporary labels, paint spots, and defacement after approval by Contracting Officer's Technical Representative.
- 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.

3.6 PROTECTION

- A. Protect finished surfaces from damage during erection, and after completion of work.

3.7 GLAZING SCHEDULE

- A. Tempered Glass:
 - 1. Install in full and half glazed doors unless indicated otherwise.
 - 2. Install in door sidelights adjacent to doors.
 - 3. Use clear tempered glass on interior side lights and doors unless otherwise indicated or specified.

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SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies steel studs wall systems, shaft wall systems, ceiling or soffit suspended or furred framing, wall furring, fasteners, and accessories for the screw attachment of gypsum board, plaster bases or other building boards.

1.2 RELATED WORK

- A. Ceiling suspension systems for acoustical tile or panels and lay in gypsum board panels: Section 09 51 00, ACOUSTICAL CEILINGS// Section 09 29 00, GYPSUM BOARD.

1.3 TERMINOLOGY

- A. Description of terms shall be in accordance with ASTM C754, ASTM C11, ASTM C841 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 beams, trusses, or bar joists. In interstitial spaces with walk-on floors the underside of the walk-on floor is the underside of structure overhead.
- C. Thickness of steel specified is the minimum bare (uncoated) steel thickness.

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. Studs, runners and accessories.
 2. Hanger inserts.
 3. Channels (Rolled steel).
 4. Furring channels.
 5. Screws, clips and other fasteners.
- C. Shop Drawings:
1. Typical ceiling suspension system.
 2. Typical metal stud and furring construction system including details around openings and corner details.
 4. Typical fire rated assembly and column fireproofing showing details of construction same as that used in fire rating test.
- D. Test Results: Fire rating test designation, each fire rating required for each assembly.

1.5 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

- A. In accordance with the requirements of ASTM C754.

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)
- A641-09.....Zinc-Coated (Galvanized) Carbon Steel Wire
- C11-10.....Terminology Relating to Gypsum and Related Building Materials and Systems
- C635-07.....Manufacture, Performance, and Testing of Metal Suspension System for Acoustical Tile and Lay-in Panel Ceilings
- C636-08.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
- C645-09.....Non-Structural Steel Framing Members
- C754-11.....Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products
- C841-03(R2008).....Installation of Interior Lathing and Furring
- C954-10.....Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness
- E580-11.....Application of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Requiring Moderate Seismic Restraint.
- C. Ceilings and Interior Systems Construction Association (CISCA): Ceiling Systems Handbook for installation of gypsum board ceilings.
- D. Gypsum Association (GA):
- GA-201.....Using Gypsum Board for Walls and Ceilings, for installation of steel framing for gypsum board.

PART 2 - PRODUCTS**2.1 PROTECTIVE COATING**

- A. Galvanize steel studs, runners (track), rigid (hat section) furring channels, "Z" shaped furring channels, and resilient furring channels, with coating designation of G-60 minimum, per ASTM 123.

2.2 STEEL STUDS AND RUNNERS (TRACK)

- A. ASTM C645, modified for thickness specified and sizes as shown.
1. Use ASTM A525 steel, 0.8 mm (0.0329-inch) thick bare metal (33 mil).

2. Runners same thickness as studs.

- B. Provide not less than two cutouts in web of each stud, approximately 300 mm (12 inches) from each end, and intermediate cutouts on approximately 600 mm (24-inch) centers.
- C. Doubled studs for openings and studs for supporting concrete backer-board.
- D. Studs 3600 mm (12 feet) or less in length shall be in one piece.

2.3 FURRING CHANNELS

- A. Rigid furring channels (hat shape): ASTM C645.
- B. Rolled Steel Channels: ASTM C754, cold rolled; or, ASTM C841, cold rolled.

2.4 FASTENERS, CLIPS, AND OTHER METAL ACCESSORIES

- A. ASTM C754, except as otherwise specified.
- B. For fire rated construction: Type and size same as used in fire rating test.
- C. Fasteners for steel studs thicker than 0.84 mm (0.033-inch) thick. Use ASTM C954 steel drill screws of size and type recommended by the manufacturer of the material being fastened.
- D. Clips: ASTM C841 (paragraph 6.11), manufacturer's standard items. Clips used in lieu of tie wire shall have holding power equivalent to that provided by the tie wire for the specific application.
- E. Concrete ceiling hanger inserts (anchorage for hanger wire and hanger straps): Steel, zinc-coated (galvanized), manufacturers standard items, designed to support twice the hanger loads imposed and the type of hanger used.
- F. Tie Wire and Hanger Wire:
 - 1. ASTM A641, soft temper, Class 1 coating.
 - 2. Gage (diameter) as specified in ASTM C754 or ASTM C841.
- G. Attachments for Wall Furring:
 - 1. Manufacturers standard items fabricated from zinc-coated (galvanized) steel sheet.
 - 2. For concrete or masonry walls: Metal slots with adjustable inserts or adjustable wall furring brackets. Spacers may be fabricated from 1 mm (0.0396-inch) thick galvanized steel with corrugated edges.
- H. Power Actuated Fasteners: Type and size as recommended by the manufacturer of the material being fastened.

2.5 SUSPENDED CEILING SYSTEM FOR GYPSUM BOARD (OPTION)

- A. Conform to ASTM C635, heavy duty, with not less than 35 mm (1-3/8 inch) wide knurled capped flange face designed for screw attachment of gypsum board.

- B. Wall track channel with 35 mm (1-3/8 inch) wide flange.

PART 3 - EXECUTION

3.1 INSTALLATION CRITERIA

- A. Where fire rated construction is required for walls, partitions, columns, beams and floor-ceiling assemblies, the construction shall be same as that used in fire rating test.
- B. Construction requirements for fire rated assemblies and materials shall be as shown and specified, the provisions of the Scope paragraph (1.2) of ASTM C754 and ASTM C841 regarding details of construction shall not apply.

3.2 INSTALLING STUDS

- A. Install studs in accordance with ASTM C754, except as otherwise shown or specified.
- B. Space studs not more than 610 mm (24 inches) on center.
- C. Cut studs 6 mm to 9 mm (1/4 to 3/8-inch) less than floor to underside of structure overhead when extended to underside of structure overhead.
- D. Where studs are shown to terminate above suspended ceilings, provide bracing as shown or extend studs to underside of structure overhead.
- E. Extend studs to underside of structure overhead for fire, rated partitions, smoke partitions, shafts, and sound rated partitions // and insulated exterior wall furring. //
- F. Openings:
 - 1. Frame jambs of openings in stud partitions and furring with two studs placed back to back or as shown.
 - 2. Fasten back to back studs together with 9 mm (3/8-inch) long Type S pan head screws at not less than 600 mm (two feet) on center, staggered along webs.
 - 3. Studs fastened flange to flange shall have splice plates on both sides approximately 50 X 75 mm (2 by 3 inches) screwed to each stud with two screws in each stud. Locate splice plates at 600 mm (24 inches) on center between runner tracks.
- G. Fastening Studs:
 - 1. Fasten studs located adjacent to partition intersections, corners and studs at jambs of openings to flange of runner tracks with two screws through each end of each stud and flange of runner.
 - 2. Do not fasten studs to top runner track when studs extend to underside of structure overhead.
- H. Form expansion joints with double studs back to back spaced 75 mm (three inches) apart plus the width of the expansion joint.

- I. Form control joint, with double studs spaced 13 mm (1/2-inch) apart.

3.3 INSTALLING WALL FURRING FOR FINISH APPLIED TO ONE SIDE ONLY

- A. In accordance with ASTM C754, or ASTM C841 except as otherwise specified or shown.
- B. Wall furring-Stud System:
 - 1. Framed with 63 mm (2-1/2 inch) or narrower studs, 600 mm (24 inches) on center.
 - 2. Brace as specified in ASTM C754 for Wall Furring-Stud System or brace with sections or runners or studs placed horizontally at not less than three foot vertical intervals on side without finish.
 - 3. Securely fasten braces to each stud with two Type S pan head screws at each bearing.
- C. Installing Wall Furring-Bracket System: Space furring channels not more than 400 mm (16 inches) on center.

3.4 INSTALLING SUPPORTS REQUIRED BY OTHER TRADES

- A. Provide for attachment and support of electrical outlets, plumbing, laboratory or heating fixtures, recessed type plumbing fixture accessories, access panel frames, wall bumpers, wood seats, toilet stall partitions, dressing booth partitions, urinal screens, chalkboards, tackboards, wall-hung casework, handrail brackets, recessed fire extinguisher cabinets and other items like auto door buttons and auto door operators supported by stud construction.
- B. Provide additional studs where required. Install metal backing plates, or special metal shapes as required, securely fastened to metal studs.

3.5 INSTALLING FURRED AND SUSPENDED CEILINGS OR SOFFITS

- A. Install furred and suspended ceilings or soffits in accordance with ASTM C754 or ASTM C841 except as otherwise specified or shown for screw attached gypsum board ceilings and for plaster ceilings or soffits.
 - 1. Space framing at 400 mm (16-inch) centers for metal lath anchorage.
 - 2. Space framing at 600 mm (24-inch) centers for gypsum board anchorage.
- B. Existing concrete construction exposed or concrete on steel decking:
 - 1. Use power actuated fasteners either eye pin, threaded studs or drive pins for type of hanger attachment required.
 - 2. Install fasteners at approximate mid height of concrete beams or joists. Do not install in bottom of beams or joists. //
- C. Installing suspended ceiling system for gypsum board (ASTM C635 Option):
 - 1. Install only for ceilings to receive screw attached gypsum board.
 - 2. Install in accordance with ASTM C636.
 - a. Install main runners spaced 1200 mm (48 inches) on center.

- b. Install 1200 mm (four foot) tees not over 600 mm (24 inches) on center; locate for edge support of gypsum board.
 - c. Install wall track channel at perimeter.
- D. Installing Ceiling Bracing System:
- 1. Construct bracing of 38 mm (1-1/2 inch) channels for lengths up to 2400 mm (8 feet) and 50 mm (2 inch) channels for lengths over 2400 mm (8 feet) with ends bent to form surfaces for anchorage to carrying channels and over head construction. Lap channels not less than 600 mm (2 feet) at midpoint back to back. Screw or bolt lap together with two fasteners.
 - 2. Install bracing at an approximate 45 degree angle to carrying channels and structure overhead; secure as specified to structure overhead with two fasteners and to carrying channels with two fasteners or wire ties.
 - 3. Brace suspended ceiling or soffit framing in seismic areas in accordance with ASTM E580.

3.6 TOLERANCES

- A. Fastening surface for application of subsequent materials shall not vary more than 3 mm (1/8-inch) from the layout line.
- B. Plumb and align vertical members within 3 mm (1/8-inch.)
- C. Level or align ceilings within 3 mm (1/8-inch.)

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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 and tile backing panels.

1.2 RELATED WORK

- A. Installation of steel framing members for walls, partitions, furring, soffits, and ceilings: Section 09 22 16, NON-STRUCTURAL METAL FRAMING.
- B. Acoustical Sealants: Section 07 92 00, JOINT SEALANTS.
- C. Lay in gypsum board ceiling panels: Section 09 51 00, ACOUSTICAL CEILING.

1.3 PERFORMANCE REQUIREMENTS

- A. General: Work shall meet performance requirements indicated by Contract Documents, including requirements specified in this Paragraph and in other parts of this Section.
1. Loading: Provide gypsum board systems designed and tested by manufacturer to withstand a uniform lateral load perpendicular to surface and allowable deflection as follows:
- a. Indoor Stud Walls and Partitions - General: Uniform lateral load (air pressure) of 5 psf minimum and allowable deflection of L/240 maximum based on supported span of wall or partition and stud type, size and spacing, except as otherwise indicated by Contract Documents.
- b. Indoor Stud Walls and Partitions - With Applied Finish Materials: Uniform lateral load (air pressure) of 5 psf minimum and allowable deflection of L/360 maximum based on supported span of wall and framing type, size and spacing, except when to receive only paint or wallcovering.
- c. Indoor Ceilings: Uniform load of 5 psf minimum and allowable deflection of L/360 maximum based on supported span of ceiling and framing type, size and spacing.
2. Isolation: Isolate non-load bearing walls and partitions from transfer of structural loading from building structural components, such as decks, railing and vertical structural elements, both horizontally and vertically. Provide slip or cushion type joints of dimension and detail to obtain support meeting performance loading requirements and to prevent building structure load transfer.

- a. Isolate perimeter of board materials of non-load bearing walls and partitions at abutment with building structural components.
 - b. Provide 1/4 inch minimum to 1/2 inch minimum gap at ceiling runner between gypsum board and structure. Provide greater gap dimension as required to prevent transfer of loads from building structure to gypsum board.
 - c. Finish edges of face layer with J-type casing bead. Seal space between casing bead and surface with continuous uniform bead of acoustical sealant, except as otherwise required for fire rated assemblies.
 - d. Attach gypsum board to studs 1/2 inch minimum below bottom edge of ceiling running flange and to first stud adjacent to vertical runner. Do not attach board to runners or in any manner which creates structural transfer of load to wall.
- B. Fire Resistance Rating:
- 1. Where gypsum board assemblies are indicated for fire resistance ratings, including those required to meet regulations of public authorities having jurisdiction over the Work, provide materials and installation identical with applicable assemblies which have been evaluated meeting requirements of ASTM E119 and listed by recognized authorities, including UL and FM.
 - 2. Provide fire resistance rated assemblies identical to those indicated by reference to GA File Numbers in GA-600 - Fire Resistance Design Manual or to design designations in UL - Fire Resistance Directory.

1.4 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).

1.5 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. Gypsum board, each type.

C. Shop Drawings:

1. Typical gypsum board installation, showing corner details, edge trim details and the like.
2. 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.

1.6 DELIVERY, IDENTIFICATION, HANDLING AND STORAGE

- A. In accordance with the requirements of ASTM C840.

1.7 ENVIRONMENTAL CONDITIONS

- A. In accordance with the requirements of ASTM C840.

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. 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
C1658-06.....	Glass Mat Gypsum Panels
C1396-06.....	Gypsum Board
E84-08.....	Surface Burning Characteristics of Building Materials

- C. Ceilings and Interior Systems Construction Association (CISCA): Ceiling Systems Handbook, for installation of gypsum board ceilings.
- D. Gypsum Association (GA):
 - GA-216.....Application and Finishing of Gypsum Panel Products
 - GA-214.....Recommended Levels of Gypsum Board Finish
- E. Underwriters Laboratories Inc. (UL):
 - Latest Edition.....Fire Resistance Directory
- F. Inchcape Testing Services (ITS):
 - Latest Editions.....Certification Listings

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- A. General: Work shall meet performance requirements indicated by Contract Documents, including requirements specified in this Paragraph and in other parts of this Section.
 - 1. Loading: Provide gypsum board systems designed and tested by manufacturer to withstand a uniform lateral load perpendicular to surface and allowable deflection as follows:
 - a. Indoor Stud Walls and Partitions - General: Uniform lateral load (air pressure) of 5psf minimum and allowable deflection of L/240 maximum based on supported span of wall or partition and stud type, size and spacing, except as otherwise indicated by Contract Documents.
 - b. Indoor Ceilings: Uniform load of 5psf minimum and allowable deflection of L/360 maximum based on supported span of ceiling and framing type, size and spacing.
 - 2. Isolation: Isolate non-load bearing walls and partitions from transfer of structural loading from building structural components, such as decks, railing and vertical structural elements, both horizontally and vertically. Provide slip or cushion type joints of dimension and detail to obtain support meeting performance loading requirements and to prevent building structure load transfer.
 - a. Isolate perimeter of board materials of non-load bearing walls and partitions at abutment with building structural components.
 - b. Provide 1/4 inch minimum to 1/2 inch minimum gap at ceiling runner between gypsum board and structure. Provide greater gap dimension as required to prevent transfer of loads from building structure to gypsum board.

- c. Finish edges of face layer with J-type casing bead. Seal space between casing bead and surface with continuous uniform bead of acoustical sealant, except as otherwise required for fire rated assemblies.
 - d. Attach gypsum board to studs 1/2 inch minimum below bottom edge of ceiling running flange and to first stud adjacent to vertical runner. Do not attach board to runners or in any manner which creates structural transfer of load to wall.
- B. Fire Resistance Rating:
- 1. Where gypsum board assemblies are indicated for fire resistance ratings, including those required to meet regulations of public authorities having jurisdiction over the Work, provide materials and installation identical with applicable assemblies which have been evaluated meeting requirements of ASTM E119 and listed by recognized authorities, including UL and FM.
 - 2. Provide fire resistance rated assemblies identical to those indicated by reference to GA File Numbers in GA-600 - Fire Resistance Design Manual or to design designations in UL - Fire Resistance Directory.

2.2 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. Impact, Moisture and Mold Resistant Gypsum Board: ASTM C1396, Type X, 16 mm (5/8 inch) thick, noncombustible, moisture and mold resistant gypsum core with heavy duty, abrasion resistant paper surfacing on front face and heavy duty paper surfacing on back face with fiberglass mesh reinforcement close to back face of board, for indoor applications, including substrate for small format tile, paint finishes, wall coverings and like decoration, and unfinished work, requiring resistance to high energy or continual impact than standard gypsum board. Abuse resistance shall meet requirements of ASTM C1629, Classification Level 3 - Heavy Duty. Board shall be resistant to intermittent moisture and humidity exposure, and growth of mold when evaluated meeting requirements of ASTM D3273, Panel Score 8 average minimum.
- 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.

2.3 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.

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 Glass Mat 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. Tile and Paint Impact Resistant Gypsum Board: Provide and install tile and paint type impact resistant gypsum board for all gypsum board surfaces to receive rigid finish material such as ceramic/porcelain tile finish, and rigid applied wall base finishes.
- E. Impact, Moisture and Mold Resistant Gypsum Board: Provide and install impact, moisture and mold resistant gypsum board up to 1200 mm (4 feet) above finish floor at all indoor locations to receive painted gypsum board finish.
- F. Use gypsum boards in maximum practical lengths to minimize number of end joints.
- G. Bring gypsum board into contact, but do not force into place.
- H. 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.
- I. 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. 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.

J. Acoustical 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 acoustical 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.

K. Electrical and Telecommunications Boxes:

1. Seal annular spaces between electrical and telecommunications receptacle boxes and gypsum board partitions.

L. 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 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 fire rated and acoustical partition 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 fire rated and acoustical construction. Sanding is not required of non decorated surfaces.

3.4 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 fire protection equivalent to the fire rated construction.

3.5 UNACCESSIBLE CEILINGS

- A. At Mental Health and Behavioral Nursing Units, areas accessible to patients and not continuously observable by staff (e.g., patient bedrooms, day rooms), ceilings should be a solid material such as gypsum board. This will limit patient access. Access doors are needed to access electrical and mechanical equipment above the ceiling. These doors should be locked to prevent unauthorized access and secured to ceiling using tamper resistant fasteners.

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SECTION 09 30 13
CERAMIC/PORCELAIN TILING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies porcelain tile panels, and crack isolation membranes.

1.2 RELATED WORK

- A. Sealing of joints where specified: Section 07 92 00, JOINT SEALANTS.
B. Metal and resilient edge strips at joints with new resilient flooring: Section 09 65 19, RESILIENT TILE FLOORING.C. Gypsum Board Substrate to Receive Tile and Paint Type Ceramic and Porcelain Tiling: Section 09 29 00, GYPSUM BOARD.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
B. Samples:
1. Porcelain tile panel, each size, type, color and pattern.
C. Product Data:
1. Porcelain tile, marked to show each type, size, and shape required.
2. Epoxy grout.
3. Divider strip.
4. Reinforcing tape.
5. Leveling compound.
6. Latex-Portland cement mortar and grout.
7. Organic adhesive.
8. Crack isolation membrane.
9. Fasteners.
D. Certification:
1. Master grade, ANSI A137.1.
2. Manufacturer's certificates indicating that the following materials comply with specification requirements:
a. Modified epoxy emulsion.
b. Reinforcing tape.
c. Latex-Portland cement mortar and grout.
d. Leveling compound.
e. Crack isolation membrane.

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)

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

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

D. Tile Council of America, Inc. (TCA):

2007.....Handbook for CeramicTile 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. Abrasion Resistance Classification:

- a. Tested in accordance with values listed in Table 1, ASTM C 1027.
 - b. Class V, 12000 revolutions for floors in Corridors, Kitchens, Storage including Refrigerated Rooms
 - c. Class IV, 6000 revolutions for remaining areas.
3. Slip Resistant Tile for Floors:
- a. Coefficient of friction, when tested in accordance with ASTM C1028, required for level of performance:
 - 1) Not less than 0.7 (wet condition) for bathing areas.
 - 2) Not less than 0.8 on ramps for wet and dry conditions.
 - 3) Not less than 0.6, except 0.8 on ramps as stated above, for wet and dry conditions for other areas.
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 epoxy or latex modified mortars.//
- B. Porcelain Tile Panels: Nominal 3 mm or 5.6 mm thick, laminate porcelain produced by wet grinding clayish raw materials, granite and metamorphic, feldspar-containing rocks and ceramic pigments. The dust is compacted and sintered at 1200 degrees Celcius with hybrid firing. yielding a tile with a water absorption rate of 0.5% or less and a breaking strength of between 390 to 400 pounds. Structurally reinforced with a bonded fiberglass blanket.

2.2 SETTING MATERIALS OR BOND COATS

- A. Conform to TCA Handbook for Ceramic Tile Installation.
- B. Latex-Portland Cement Mortar: ANSI A108.1.
 - 1. For wall applications, provide non-sagging, latex-Portland cement mortar complying with ANSI A108.1.
 - 2. Prepackaged Dry-Mortar Mix: Factory-prepared mixture of Portland cement; dry, redispersible, ethylene vinyl acetate additive; and other ingredients to which only water needs to be added at Project site.

C. Crack Isolation Membrane:

1. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.
2. Acceptable Products:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. Laticrete International, Inc.; Laticrete Blue 92 Anti-Fracture Membrane.
 - c. MAPEI Corporation; Mapelastic L (PRP M19).

2.3 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 Latex-Portland Cement Grout.

B. Polymer-Modified Tile Grout: ANSI A118.7 color as specified.

1. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
2. Unsanded grout mixture for joints 3.2 mm (1/8 inch) and narrower.
3. Sanded grout mixture for joints 3.2 mm (1/8 inch) and wider.

2.4 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.

2.5 WATER

A. Clean, potable and free from salts and other injurious elements to mortar and grout materials.

2.6 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.

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. Patching and Leveling:
 - 1. Mix and apply patching and leveling compound in accordance with manufacturer's instructions.

2. Fill holes and cracks and align concrete floors that are out of required plane with patching and leveling compound.
 - a. Thickness of compound as required to bring finish tile system to elevation shown.
 - b. Float finish // except finish smooth for elastomeric waterproofing. //
 - c. At substrate expansion, isolation, and other moving joints, allow joint of same width to continue through underlayment.
3. Apply patching and leveling compound to concrete and masonry wall surfaces that are out of required plane.
4. 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.

B. Walls:

1. Apply leveling coats of material compatible with wall surface and tile setting material to wall surfaces that are out of required plane.

C. 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 METAL DIVIDER STRIPS

- A. Install metal divider strips in floor joints between ceramic and quarry tile floors and between tile floors and adjacent flooring of other materials where the finish floors are flush unless shown otherwise.
- B. Set divider strip in mortar bed to line and level centered under doors or in openings.

3.5 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:
 - 1. Floors: Set floor tile panels in latex portland cement mortar thin set over crack isolation membrane meeting requirements of ANSI 108.13, TNA System F113A-13.
 - 2. Walls: Set wall tile panels installed over gypsum board and gypsum plaster in latex Portland cement mortar, ANSI A108.1, TCA System W244-13.
- C. 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. 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 composed of tiles 200 by 200 mm (8 by 8 inches or larger).

3.6 THIN SET TILE INSTALLED WITH LATEX-PORTLAND CEMENT MORTAR AND CRACK ISOLATION MEMBRANE

- A. General: TCA System F113A and W244 modified, modified thin set system, and ANSI A108.5.
- B. Crack Isolation Membrane: Apply crack isolation membrane on substrate. Apply membrane with total coverage.
- C Bond Coat: Latex-portland cement mortar.

3.7 GROUTING

- A. Grout Type and Location:
 - 1. Grout for Wall Tile Panels: Polymer-Modified Tile Grout, sanded or unsanded as required for application.
 - 2. Grout for floor tile panels: Polymer-Modified Tile Grout, sanded..
- B. Workmanship:
 - 1. Install and cure grout in accordance with the applicable standard.
 - 2. Polymer-Modified Tile Grout: ANSI A118.7.

3.8 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, service sink, and where shown not less than 6 mm (1/4 inch) deep.

3.9 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 grout and tile set in elastomeric bond coat as recommended by the manufacturer of the grout and bond coat.

3.10 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.

3.11 TESTING FINISH FLOOR

- A. Test floors in accordance with ASTM C627 to show compliance with codes 1 through 10.

3.12 TILE SCHEDULE

A. Floors:

1. Tile CT-1:

- a. Type: Porcelain tile floor panels.
- b. Size: 12 inches by 24 inches.
- c. Manufacturer: Crossville, Inc.
- d. Product: Contract/Commercial, Shades by Crossville series.
- e. Color: AV243-UPS Fog.

B. Walls CT-2:

1. Tile:

- a. Type: Porcelain tile wall panels.
- b. Size: 6 inches by 12 inches.
- c. Manufacturer: Crossville, Inc.
- d. Product: Contract/Commercial, Retro Active series.
- e. Color: A215 Empress White.

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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. Schedule: Required types and applications of acoustical ceilings include, but are not limited to, materials and application locations specified in Article - Acoustical Ceiling Schedule at the end of this Section.

1.2 RELATED WORK

- A. Linear Metal Ceilings: Section 09 54 23, LINEAR METAL CEILINGS.//

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.
- E1264-08e1.....Classification for Acoustical Ceiling Products
- C. International Organization for Standardization (ISO)
 - ISO 14644-1.....Classification of Air Cleanliness
- D. Ceilings and Interior Systems Construction Association (CISCA):
 - Annual Issue.....Ceiling Systems Handbook
 - Annual Issue.....Acoustical Ceilings: Use and Practice
 - Annual Issue.....Recommendations for Direct-Hung Acoustical Tile and Lay-In Panel Ceilings (Seismic Zones 0-2)
 - Annual Issue.....Guidelines for Seismic Restrain of Direct-Hung Suspended Ceiling Assemblies (Seismic Zones 3 and 4)

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 the following unless specified otherwise.
 - a. Galvanized cold-rolled steel, bonderized.
 - 2. Use same construction for cross runners as main runners. Use of lighter-duty sections for cross runners is not acceptable.
- B. Exposed grid suspension system for support of lay-in panels:
 - 1. Exposed grid width not less than 24 mm (15/16 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.

C. Acceptable Products:

1. Armstrong World Industries, Prelude, or equal, as acceptable to Owner and Architect.

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. General: Anchorage devices applicable to required method of structural anchorage for ceiling hangers and whose suitability for intended application has been proven through construction practices or by certified test data, except as otherwise required.
- B. Anchor Fasteners: Expansion, chemical, cast-in-place and like anchor fasteners, fabricated from steel, zinc coated (galvanized after application), with means for attaching hangers, and capable of sustaining without failure a load equal to 5 times load indicated in ASTM C635, Table 1, Direct Hung, for required structural classification, imposed by actual ceiling hanger, including items supported by ceiling construction, as determined when evaluated meeting requirements of ASTM E488 conducted by an independent testing agency.
- C. Actuated Fasteners: Powder, pneumatic and like power activated fasteners, fabricated from corrosion resistant materials, with means for attaching hangers, and capable of sustaining without failure a load equal to 10 times load indicated in ASTM C635, Table 1, Direct Hung, for required structural classification, imposed by actual ceiling hanger, including items supported by ceiling construction, as determined when evaluated meeting requirements of ASTM E1190 conducted by an independent testing agency.
- D. 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.

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 ACOUSTICAL UNITS

- A. General:
- Ceiling Tile shall meet minimum 37% bio-based content in accordance with USDA Bio-Preferred Product requirements.
 - ASTM E1264, weighing 3.6 kg/m² (3/4 psf) minimum for mineral fiber panels.
 - Class A Flame Spread: ASTM 84
 - Minimum NRC (Noise Reduction Coefficient): 0.70 unless specified otherwise: ASTM C423.
 - Manufacturers standard finish, minimum Light Reflectance (LR) coefficient of 0.90 on the exposed surfaces.
 - Lay-in panels: Sizes as shown, with square edges .
- B. Type IV Units - Mineral base with membrane-faced overlay, Form 2 - Water felted, minimum 16 mm (5/8 inch) thick. Apply over the paint coat on the face of the unit a poly (vinyl) chloride overspray having a flame spread index of 25 or less when tested in accordance with ASTM E84.
- Acceptable Products:
 - Armstrong World Industries, Ultima, or equal, as acceptable to Owner and Architect.

2.7 ACCESSORIES

- A. Acoustic Blanket/Pad: Acoustic blanket or pad standard of manufacturer, Class A for exposed applications with 25 maximum flame spread and 50 maximum smoke developed when evaluated meeting requirements of ASTM E84, plenum rated and black in color, for enhanced acoustical performance with limited visibility.

2.8 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.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION

- A. General:
 - 1. Install metal suspension system for acoustical 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^2 (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:
 - 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.
- C. 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.
- D. 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.
- E. 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. 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.

3.4 CLEAN-UP AND COMPLETION

- A. Replace damaged, discolored, dirty, cracked and broken acoustical units.
- B. Leave finished work free from defects.

3.5 ACOUSTICAL CEILING SCHEDULE

- A. Acoustical Ceiling ACT-1:
 - 1. Size: 600 mm x 1200 mm (24" x 48").
 - 2. Grid: 24 mm (15/16 inch) wide flanges.
 - 3. Panel: Type IV - Standard, Armstrong World Industries, Ultima 1910.
 - 4. Edge: Square lay-in edges.
 - 5. Color: White.

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SECTION 09 54 23
LINEAR METAL CEILINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section Includes:

1. Suspended metal grid ceiling system including trim.
2. Decorative, linear, formed metal ceiling panels, mechanically mounted on a ceiling suspension system.
3. Accessories:
 - a. Closures, trim, edge molding and all other items required to provide complete installation.

B. Unit size, texture, finish, and color as specified.

1.2 RELATED WORK

- A. Access Doors: Section 08 31 13, ACCESS DOORS AND FRAMES.
- B. Acoustical Ceilings: Section 09 51 00, ACOUSTICAL CEILINGS.
- C. Sprinkler System: Section 21 10 00, WATER-BASED FIRE-SUPPRESSION SYSTEMS.
- D. Air Outlets and Inlets: Division 22, PLUMBING.
- E. Interior Lighting: Section 26 51 00, INTERIOR LIGHTING.

1.3 QUALITY CONTROL

A. Qualifications:

1. Approval required of products or service of proposed manufacturer, suppliers and installers, and shall be based upon submission by Contractor of certification that:
 - a. Manufacturer regularly and presently, manufactures and installs linear metal ceiling systems and related accessories as one of its principal products and has a record of successful in-service performance.
 - b. Accessories required for linear metal ceiling systems shall be manufacturer's standard or other systems compatible with linear metal ceiling system manufacturer's material. Items shall be of materials and construction which shall provide desired functional service.
2. Installer: Approved in writing by manufacturer.

- B. Coordination of Work: Coordinate layout and installation of linear metal ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any):

1. Sprinkler heads and light fixtures: Shall typically penetrate center of a panel width.
2. HVAC Air Outlets and Inlets: Shall be planned to occur within center of panel systems or provide for equal distance on each side parallel to length of panels

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Product Data:
 1. Manufacturer's standard details and fabrication methods.
 2. Data on finishing, hardware, components, and accessories.
 3. Recommendations for maintenance and cleaning of finish surfaces.
- C. Shop Drawings:
 1. Submit complete composite fabrication, and installation shop drawings including associated components.
 2. Identify panel sections, baffles, edge trim, lighting trim, air diffuser sections and trim, sprinkler head locations and trim, other component parts, not included in manufacturer's product data, by name and material and showing design, construction, installation, and anchorage.
 3. Layout and installation details, including relation to adjacent work such as walls and bulkheads.
 4. Composite reflected ceiling plans, at 1:50 (1/4 inch) scale, showing location of all accessories, mechanical and electrical components. _
Indicate following:
 - a. Joint pattern.
 - b. Ceiling suspension members.
 - c. Method of attaching hangers to building structure.
 - d. Ceiling-mounted items including light fixtures, air outlets and inlets, speakers, sprinkler heads, and access panels. Special moldings at walls, column penetrations, and other junctures with adjoining construction.
 5. Detail sections of typical composite members, at wall surfaces, mechanical diffusers and grilles, sprinkler heads, and light fixtures.
 6. Provisions for expansion and contraction.
 7. Anchors and reinforcements.
- D. Samples:
 1. Submit pairs of samples of each specified color and finish on 300 mm (12 inch) long sections of extrusions or formed shapes for following:

- a. Linear metal panel.
 - b. Each exposed molding and trim sections.
 - c. Suspension system members.
 - d. Filler strips.
 - e. Insulation.
 - f. End cap.
2. Where normal color variations are anticipated, include 2 units in set indicating extreme limits of color variations.
- E. Certificates:
- 1. Indicating manufacturer's and installer's meet qualifications as specified.
 - 2. Submit list of equivalent size installations which have had satisfactory operation.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Materials: Deliver to site in manufacturer's original unopened containers with brand name and type clearly marked.
- B. Materials: Carefully handle and store in dry, watertight enclosures.
- C. Immediately before installation, linear metal ceiling units shall be stored for not less than 48 hours at same temperature and relative humidity as space where they will be installed to assure temperature and moisture conditions in accordance with manufacturer's recommendations.

1.6 APPLICABLE PUBLICATIONS

- A. Publications listed below form a part of this specification to extent referenced. Publications are referred to in text by basic designation only.
- B. American Architectural Manufacturers Association (AAMA):
2605-11.....High Performance Organic Coatings on
Architectural Extrusions and Panels.
- C. American Society for Testing and Materials (ASTM):
A641/641M-09.....Zinc-coated (Galvanized) Carbon Steel Wire.
A653/A653M-10.....Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot-Dip Process.
B209/B209M-07.....Aluminum and Aluminum-Alloy Sheet and Plate.
C635-07.....Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
C636-08.....Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

- E90-09.....Laboratory Measurement of Airborne Sound
Transmission Loss of Building Partitions.
- E580-10.....Application of Ceiling Suspension Systems for
Acoustical Tile and Lay-in Panels in Areas
Requiring Seismic Restraint.

D. National Association of Architectural Metal Manufacturers (NAAMM):
Metal Finishes Manual (2006)

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Uniform temperature of not less than 16 °C, (60 °F) nor more than 27 °C, (80 °F) and a relative humidity of not more than 70 percent shall be maintained for a period of 48 hours before, during, and for 48 hours after installation of linear metal ceiling units. After above period, room temperature shall not fall below 13 °C (55 °F).

1.8 SCHEDULING

- A. Interior finish work such as plastering, gypsum board finishing, painting, concrete and terrazzo work shall be complete and dry before installation. Mechanical, electrical, and other work above ceiling line shall be completed and 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 two (2) years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Linear Metal Ceiling System, General:
1. Sheet Metal Characteristics: Form metal panels from sheet metal free from surface blemishes where exposed to view in finished unit. Do not use materials whose exposed surfaces exhibit pitting, seam marks, roller marks, stains, discolorations, or other imperfections.
 2. Fabrication: Die-form linear metal panels into units standard with manufacturer and finished as specified herein.
 3. Acceptable Products:
 - a. Hunter Douglas Architectural Products, Inc.; Box 6, or equal, as acceptable to Owner and Architect.
- B. Accessories: Stabilizer bars, clips, and splices as required for suspended grid system.

C. Linear Metal Panels ACT-2:

1. General: Formed to snap on and be securely retained on carriers without separate fasteners.
2. Aluminum Panels: ASTM B209/B209m, roll-formed sheet, alloy 3005-H26, complying with following requirements:
 - a. Minimum Nominal Thickness: 0.025 inch.
 - b. Linear Module Width: 6 inches.
 - c. Panel Length: Standard 12 feet.
 - d. Closure: Recessed butterfly filler strip: Roll formed aluminum recessed filler strip to fit above panel legs between carrier tabs.
 - e. Perforation: Non-perforated.
 - f. Panel Finish: Wood Veneer.
 1. Color: As selected by Architect to match VENEER ART; 983-WG GOLDEN OAK.

D. Suspension Systems, General:

1. Standard for Metal Suspension Systems: Provide manufacturer's standard types, structural classifications, and finishes indicated that comply with ASTM C635 requirements. 2. Anchors: Type as recommended by manufacturer. Size for five times design load indicated in ASTM C635, Table 1, Direct Hung, unless otherwise indicated.

E. Wire for Carriers, Hangers, and Ties: ASTM A641/A641m, Class 1, zinc coating, soft temper.

1. Gage: Minimum 12 gage. Shall support a minimum of 1330 N, (300 pounds ultimate vertical load without failure of supporting material or attachment.

F. Edge Moldings and Trim: Manufacturer's standard molding for edges and penetrations of ceiling.

G. Carriers: Universal hat shaped, .038 inch roll-formed aluminum section with hook shaped tabs spaced to receive ceiling panels at 2 inch on center and 27/32-inch apart. Support holes spaced 4 inch on center.

H. Finish: Factory applied black enamel. K. Miscellaneous Components and Materials:

1. Access Doors: Refer to Section 08 31 13, ACCESS DOORS AND FRAMES for requirements. Access doors, required for use in linear metal ceiling system, shall match adjacent ceiling panel units and shall be designed and equipped with suitable framing and fastenings for removal and replacement without damage. Provide locking device for this type access door as used in general access doors.

- I. Access Identification: Refer to Section 09 91 00, PAINTING for requirements of identification markers for use, with various mechanical systems above ceiling, under this section.

2.2 FINISHES

- A. Comply with NAAMM "Metal Finishes Manual".
- B. Protect mechanical finishes on exposed surfaces from damage by application of strippable, temporary protective covering before shipment.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent ceiling units not acceptable. Noticeable variations in same piece not acceptable.
- D. Touch-up Paint For Concealed Items: Zinc rich type.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Ceiling Areas: Conform with details, dimensions and tolerances shown on approved linear metal ceiling system composite reflected ceiling plan shop drawings.
- B. Conditions which may adversely affect linear metal ceiling system installation shall be brought to Contractors attention, for repair, prior to commencement of linear metal ceiling system installation. Do not start ceiling installation until affected area has been repaired to Installer's satisfaction.
- C. Where linear metal ceiling system is installed adjacent to masonry, washdown of adjacent masonry shall be completed prior to erection of ceiling system to prevent damage to material finish by cleaning materials.

3.2 PREPARATION

- A. Measure each ceiling area and establish layout of linear metal panel units to balance border widths at opposite edges of each ceiling. Avoid using units less than half wide at borders.

3.3 INSTALLATION

- A. Standard for Installation of Ceiling Suspension Systems: Comply with ASTM C636 as applicable to linear metal panel ceiling suspension system.
- B. Suspend ceiling hangers from building structural members and as follows:
 - 1. Install hangers plumb, free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system. Splay hangers where required to avoid obstructions and offset resulting horizontal forces by bracing, counter splaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
 3. Secure hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for structure to which hangers are attached as well as for type of hanger involved, and in a manner that will not cause them to deteriorate or fail because of age, corrosion, and elevated temperatures.
 4. Space hangers not more than 1200 mm (48 inches) on center along each member supported directly from hangers, unless otherwise shown.
- C. Install edge moldings at edge of each linear metal ceiling area and at locations where edge of units would otherwise be exposed after completion of Work. Level moldings with ceiling suspension system to level tolerance of 3 mm (1/8 inch) in 3600 mm (12 feet).
1. Hollow Masonry or Stud Construction: Fasten with toggle bolts or similar self-expanding screw anchors.
- D. Ceiling Access Doors:
1. Ceiling access doors shall be located directly under items which require access.
- E. Scribe and cut metal panel units for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness exceeding referenced standards for stretcher-leveled metal sheet.
- F. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions, unless otherwise-shown.
- G. Install panels with butt joints using internal concealed panel splices and in joint configurations shown in reflected ceiling plan.
- H. Install acoustical insulation blankets at right angle to panels so that they do not hang unsupported.

3.4 CLEANING

- A. Following installation, dirty or discolored surfaces of linear metal ceiling units shall be cleaned, in accordance with manufacturer's written recommendations, and left free from defects. Units that are damaged or improperly installed shall be removed and new units provided as directed.

3.5 PROTECTION

- A. Protect linear metal ceiling systems from damage until final inspection and acceptance.

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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 base.

1.2 RELATED WORK

- A. Section 09 65 19, RESILIENT TILE FLOORING.

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. Installer is approved by manufacturer of materials and has technical qualifications, experience, trained personnel, and facilities to install specified items.
 2. 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 resilient base and accessories 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 manufacturer shall certify that products supplied for installation comply with local regulations controlling use of volatile organic compounds (VOC's).

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. Description of each product.
 2. Base 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. Adhesive: Literature indicating each type.

1.5 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.

1.6 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.

1.7 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):
F1861-08.....Resilient Wall Base

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. General: Use only one type of base throughout, unless otherwise indicated by Contract Documents.
- B. Rubber Base: ASTM F1861, Type TV, Group 1, solid homogenous vinyl, color and pattern throughout thickness of base.
 - 1. Height: 4 inches.
 - 2. Thickness: 6 mm (1/4 inch) thick, wedge shape with hidden spacer to accept floor material.
 - 3. Style:
 - b. Resilient Flooring: Coved base.
 - 4. Corners: Project site formed corners and ends matching base.
 - 5. Surface: Smooth.
 - 6. Finish: Matte sheen.
 - 7. Acceptable Products:
 - a. Johnsonite, Inc., TightLock Carpet and Resilient Wall Base, or equal, as acceptable to Owner and Architect.

2.3 ADHESIVES

- A. Use products recommended by the material manufacturer for the conditions of use.

- B. Use low-VOC water based adhesive during installation.

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 Contracting Officer's Technical Representative.
- B. Submit proposed installation deviation from this specification to the Contracting Officer's Technical Representative indicating the differences in the method of installation.
- C. The Contracting Officer's Technical Representative 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 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.
 - 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 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 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.
- D. 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.

3.6 RESILIENT ACCESSORY SCHEDULE

A. Resilient Base, WB:

1. Type: Vinyl base.
2. Style: Johnsonite, TightLock Carpet and Resilient Wall Base.
3. Height: 100 mm (4 inches).
4. Color: 09 Clay.

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SECTION 09 65 19
RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies the installation of solid vinyl tile flooring and accessories.

1.2 RELATED WORK

- A. 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.
 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):
 - 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
 - F1700-04 (R2010).....Solid Vinyl Floor Tile
- C. 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 SOLID VINYL-TILE

- A. ASTM F1700, 300 mm (12 by 12 inches) square, 3 mm (1/8 inch) thick, homogenous throughout.
- B. Color and Pattern uniformly distributed throughout thickness.
- C. Where solid vinyl tiles are specified, seek products with recycled content.
- D. Acceptable Products:
 - 1. Halo Floors, Stones & More Luxury Vinyl Tile, or equal, as acceptable to Owner and Architect.

2.3 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.

2.4 PRIMER (FOR CONCRETE SUBFLOORS)

- A. Low-VOC as recommended by the adhesive and tile manufacturer.

2.5 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.

2.6 CLEANERS

- A. Cleaners RFCI CL-1.

2.7 EDGE STRIPS

- A. 27 mm (1 inch) wide unless shown otherwise.
- B. Bevel from maximum thickness to minimum thickness for flush joint unless shown otherwise.
- C. Transition Strip:
 - 1. Basis-of-Design Product: Schluter; Schiene, E100.
 - a. Material and Finish: Stainless steel Type 304.
 - b. Height: 3/8 inch (10 mm).

2.8 FEATURE STRIPS

- A. Use same material as floor tile.
 - 1. Color: Copper.
- 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:
 - 1. 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:
 - 1. 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 - GENERAL

- 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 Contracting Officer's Technical Representative 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 and prepare flooring surfaces meeting instructions and recommendations of manufacturer.
- B. Clean adhesive marks on exposed surfaces during the application of resilient materials before the adhesive sets. Exposed adhesive is not acceptable.
- C. Keep traffic off resilient material for a minimum 72 hours after installation.
- D. Clean 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.
- E. When construction traffic occurs over tile, cover resilient materials with reinforced kraft paper properly secured and maintained until removal is directed by Contracting Officer's Technical Representative . 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 Contracting Officer's Technical Representative.

- F. When protective materials are removed and immediately prior to acceptance, replace any damage tile, re-clean resilient materials, lightly buff floors.

3.5 LOCATION

- A. Extend tile flooring for room into adjacent closets and alcoves.

3.6 RESILIENT TILE FLOORING SCHEDULE

- A. Resilient Tile Flooring, LVT-1:
1. Type: Solid Vinyl tile flooring.
 2. Style: Halo Floors, Stones & More - Slate.
 3. Size: 12 inch x 24 inch.
 5. Color: SL239 Cappuccino.
- B. Resilient Tile Flooring, LVT-2:
1. Type: Solid Vinyl tile flooring.
 2. Style: Halo Floors, Stones & More - Strings.
 3. Size: 18 inch x 18 inch.
 5. Color: ST05 Tan.
- C. Resilient Tile Flooring, LVT-3:
1. Type: Solid Vinyl tile flooring.
 2. Style: Halo Floors, Stones & More - Piazza.
 3. Size: 24 inch x 24 inch.
 5. Color: PZ02 Cornerstone.
- D. Resilient Tile Flooring, LVT-4:
1. Type: Solid Vinyl tile flooring.
 2. Style: Halo Floors, Stones & More - Cafe.
 3. Size: 18 inch x 18 inch.
 5. Color: CF01 Spice.
- E. Divider Strips:
1. Style: Halo Floors, Stones & More.
 2. Size: 3/16 inch x 1/8 inch.
 3. Color: STR60 Copper.

- - - E N D - - -

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 12 - FURNISHINGS, 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.

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. Attach labels to panel stating the following:
 - a. Federal Specification Number or manufacturers name and product number of paints used.
 - b. Product type and color.
 - c. Name of project.
4. 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, apply paint as specified to an area, not to exceed 9 m² (100 ft²), selected by Contracting Officer's Representative.
- B. Finish and texture approved by Contracting Officer's Representative will be used as a standard of quality for remainder of work.

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PART 2 - PRODUCTS**2.1 MATERIALS**

- A. Plastic Tape:
 - 1. Pigmented vinyl plastic film in colors as specified.
 - 2. Pressure sensitive adhesive back.
 - 3. Widths as shown.
- B. Identity markers options:
 - 1. Pressure sensitive vinyl markers.
 - 2. Snap-on coil plastic markers.
- C. Interior Stain Blocking Primer: MPI 137.
- D. Interior Latex, Institutional, Low Odor/VOC, Eggshell (LE): MPI 145 X-Green.
- E. Interior Primer Sealer, Institutional Low Odor/VOC: MPI 149 X-Green
- F. Interior Light Industrial Acrylic Coating, Water Based, Semi-Gloss (IS-1): MPI 153
- G. Interior Light Industrial Acrylic Coating, Water Based, Gloss (IG-1): MPI 154
- H. Exterior Light Industrial Acrylic Coating, Water Based, Semi-Gloss (IS-2): MPI 163
- I. Interior Epoxy-Modified Acrylic: MPI 215 (AE).

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. 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.
- D. Zinc-Coated (Galvanized) Metal, Aluminum, Copper and Copper Alloys Surfaces Specified 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.
- E. 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.
 5. 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.
 6. 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.
- F. 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 Contracting Officer's Representative.
- 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 Contracting Officer's Representative, 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.
- H. 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. Metal:
 1. General: Ferrous and non-ferrous metals, except factory finished metals, boilers, incinerator stacks, and engine exhaust pipes.
 2. Exterior Metal:
 - a. Ferrous and Non-Ferrous Metal:
 - 1) System: MPI 163 (Light Industrial Acrylic Coating, Water Based, Exterior, Semi-Gloss (MPI Gloss Level 5)), self-priming.
 - 2) Acceptable Products:
 - a) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Semi-Gloss, or equal, as acceptable to Owner and Architect.
 - b. Machinery:
 - 1) System: MPI 163 (Light Acrylic Industrial Coating, Water Based, Exterior, Semi-Gloss (MPI Gloss Level 5)), self-priming.
 - 2) Acceptable Products:
 - a) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Semi-Gloss, or equal, as acceptable to Owner and Architect.
 3. Interior Metal:
 - a. Ferrous and Non-Ferrous Metal:
 - 1) System: MPI 153 (Light Industrial Acrylic Coating, Water Based, Interior, Semi-Gloss (MPI Gloss Level 5)), self-priming.
 - 2) Acceptable Products:

- a) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Semi-Gloss, or equal, as acceptable to Owner and Architect.
 - b. Machinery:
 - 1) System: MPI 153 (Light Industrial Acrylic Coating, Water Based, Interior, Semi-Gloss (MPI Gloss Level 5)), self-priming.
 - 2) Acceptable Products:
 - a) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Semi-Gloss, or equal, as acceptable to Owner and Architect.
- F. Gypsum Board:
- 1. Typical:
 - a. System: MPI 149 X-Green (Primer Sealer, Interior, Institutional Low Odor/VOC)
 - b. Acceptable Products:
 - 1) Benjamin Moore & Co., Eco Spec WB Interior Latex Primer 372, or equal, as acceptable to Owner and Architect.
 - 2. Bathrooms/Kitchen Spaces:
 - a. System: MPI 137 (Primer, Stain Blocking, Water Based)
 - b. Acceptable Products:
 - 1) Benjamin Moore & Co., Fresh Start All Purpose 100% Acrylic Primer 023, or equal, as acceptable to Owner and Architect.

3.6 INTERIOR FINISHES

- A. General: Apply following finish coats over prime coats in spaces or on surfaces where indicated in Contract Documents.
- B. Concrete Floors:
 - 1. System: 2 coats, 100 percent solids slip-resistant floor epoxy, abrasion and stain resistant, self leveling with slip resistant aggregate broadcast into first coat.
 - 2. Acceptable Products:
 - a. 1st Coat: Benjamin Moore & Co., Super Spec HP 100% Solids Floor Epoxy P40, or equal, as acceptable to Owner and Architect.
 - b. Non-Slip Aggregate: Benjamin Moore & Co., Super Spec HP Anti-Slip Aggregate P67, or equal, as acceptable to Owner and Architect.
 - c. 2nd Coat: Benjamin Moore & Co., Super Spec HP 100% Solids Floor Epoxy P40, or equal, as acceptable to Owner and Architect.
- C. Metal:
 - 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 and Non-Ferrous Metal:

- a. System: 2 coats, MPI 153 (Light Industrial Acrylic Coating, Water Based, Interior, Semi-Gloss (MPI Gloss Level 5))
- b. Acceptable Products:
 - 1) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Semi-Gloss, or equal, as acceptable to Owner and Architect.

4. Machinery:

- a. System: 2 coats, MPI 154 (Light Industrial Acrylic Coating, Interior, Water Based, Gloss (MPI Gloss Level 6)).
- b. Acceptable Products:
 - 1) Benjamin Moore & Co., Super Spec HP D.T.M. Acrylic Gloss, or equal, as acceptable to Owner and Architect.

D. Gypsum Board:

1. Typical:

- a. System: 2 coats, MPI 145 X-Green (Latex, Interior, Institutional Low Odor/VOC (MPI Gloss Level 3))
- b. Acceptable Products:
 - 1) Benjamin Moore & Co., Eco Spec WB Interior Latex Eggshell Finish 374, or equal, as acceptable to Owner and Architect.

2. Toilet Rooms and Break Room Spaces:

- a. System: 2 coats, MPI 215 (Epoxy-Modified Latex, Interior Semi-Gloss (MPI Gloss Level 5))
- b. Acceptable Products:
 - 1) Benjamin Moore & Co., Super Spec Interior Acrylic Epoxy Coating 256, or equal, as acceptable to Owner and Architect.

3. Ceilings:

- a. System: 2 coats, MPI 143 X-Green (Latex, Interior, Institutional Low Odor/VOC, Flat (MPI Gloss Level 1)).
- b. Acceptable Products:
 - 1) Benjamin Moore & Co., Eco Spec WB Interior Latex Flat Finish 373 or equal, as acceptable to Owner and Architect.

3.7 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. Refinish areas as specified for new work to match adjoining work unless specified or scheduled otherwise.
- G. Sand or dull glossy surfaces prior to painting.
- H. Sand existing coatings to a feather edge so that transition between new and existing finish will not show in finished work.

3.8 PAINT COLOR

- A. Samples: Prior to beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for review. Samples will be reviewed only for visual characteristics, including color, finish, texture and sheen. Provide a listing of material and application for each coat of each finish sample.
 - 1. General: Submit 3 drawdowns of each product and color combination. Drawdown shall be applied using a 4 mil wet film thickness drawdown bar on Leneta Form WD half white and half black coated cards, size 4" x 6" minimum. Label each card with project name, date, product name and number, color number as stated in color schedule, and name, address and telephone number of supplying facility. Resubmit until acceptable color and sheen is achieved.
 - 2. Actual Surfaces: On actual indoor building surfaces and components to be painted, duplicate painted finishes of prepared samples meeting requirements of PDCA P5. On at least 100 square feet of surface as directed, provide full coat finish samples until required sheen, color and texture is obtained. Provide finished lighting conditions for review of painted surfaces.
 - 3. Final Aesthetic Acceptance: Final acceptance of colors, sheens and textures will be from sample areas with paint applied to actual building surfaces at project site.
- B. 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.
- C. 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.

3.9 PAINT COLOR AND GLOSS SCHEDULE:**A. Interior Colors:**

1. Basis of Design Colors: Pittsburgh Paints.
 - a. General Neutrals: See Room Finish Schedule.
 - b. General Accents: See Room Finish Schedule.
 - c. Gloss:
 - 1) Gypsum Board (walls): Eggshell.
 - 2) Metal and Wood Trim: Satin.
 - 3) Gypsum Board (ceilings): Flat.

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. Paint various systems specified in Division 21 - FIRE SUPPRESSION, Division 22 - PLUMBING, Division 23 - HEATING, VENTILATION AND AIR-CONDITIONING, Division 26 - ELECTRICAL, and Division 28 - ELECTRONIC SAFETY AND SECURITY.
- C. Paint after tests have been completed.
- D. Omit prime coat from factory prime-coated items.
- E. Finish painting of mechanical and electrical equipment is not required when located 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.
- F. Omit field painting of items specified in paragraph, Building and Structural WORK NOT PAINTED.
- G. Color:
 1. Paint items having no color specified to match surrounding surfaces.
 2. Paint colors as indicated 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.
- H. Apply paint systems on properly prepared and primed surface as follows:
 - 1. 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 153 (Light Industrial Acrylic Coating, Water Based, Interior, Semi-Gloss (MPI Gloss Level 5)) in the Federal Safety Orange color in exposed and concealed spaces full length of conduit.

3.11 BUILDING AND STRUCTURAL WORK FIELD PAINTING

- A. Painting and finishing of interior work except as specified under Paragraph - Building and Structural Work Not Painted, of this Article.
 - 1. Painting and finishing of new and existing work.
 - 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. 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. Above ceilings 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. 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.
- 5. Galvanized metal:
 - a. Except where specifically specified to be painted.
- 6. Gaskets.
- 7. Structural steel encased in concrete, masonry, or other enclosure.
- 8. Structural steel to receive sprayed-on fire proofing.
- 9. Ceilings, walls, columns in interstitial spaces.
- 10. Ceilings, walls, and columns in pipe basements.

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 ABBREVIATIONS
Drain Line		Green	White	Drain
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 _____*
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
Chemical Feed		Yellow	Black	Chem Feed
Pumped Condensate		Black		Pump Cond
Pump Recirculating		Yellow	Black	Pump-Recirc.
Vent Line		Yellow	Black	Vent
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
Sanitary Waste		Green	White	San Waste
Sanitary Vent		Green	White	San Vent
Pump Drainage		Green	White	Pump Disch
Atmospheric Vent		Green	White	ATV
Fire Protection Water				
Sprinkler		Red	White	Auto Spr
Standpipe		Red	White	Stand
Sprinkler		Red	White	Drain

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 // 15000 // 25000 //.
8. See Sections for methods of identification, legends, and abbreviations of the following:
 - a. Conduits containing high voltage feeders over 600 volts: Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS.

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.

3.13 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.

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SECTION 10 11 23
TACKBOARDS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section specifies tackboards (bulletin boards) and related items.
- B. Boards may be either factory or field assembled.

1.2 QUALITY ASSURANCE

- A. Boards shall be the products of one manufacturer.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Shop Drawings: Identifying all parts by name and material and showing design, construction, installation, anchorage and relation to adjacent construction.
- C. Manufacturer's Literature and Data:
 - 1. Tackboard.
- D. Samples:
 - 1. Tackboard, 300 by 300 mm (six by six inches), each color, mounted on backing.
 - 2. Integrally colored anodized aluminum, 300 mm (six inch) length.
 - 3. Each accessory (after approval, may be used in the work).

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. National Association of Architectural Metal Manufacturers (NAAMM):
 - AMP 500 Series.....Metal Finishes Manual
 - AMP 501.....Finishes for Aluminum
- C. American Society for Testing and Materials (ASTM):
 - B221/B221M-08.....Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes and Tubes
- D. Composite Panel Association (CPA):
 - A208.1-09.....Particleboard
 - A135.4-04.....Basic Hardboard

PART 2 - PRODUCTS

2.1 TACKBOARD

- A. Tackable Surface: Pure grain natural cork, without burlap backing, laminated to 6mm (1/4 inch) thick hardboard or particleboard backing.

B. Frames: Extruded aluminum 16mm (5/8 inch) thick, clear anodized.

C. Size: As indicated on drawings.

2.2 FABRICATION

A. Materials:

1. Aluminum, extruded: ASTM B221.
2. Cork: ASTM F104, Type II, mildew resistant, Class 2.
3. Backing: Hardboard, AHBA A135.4 or particleboard, CPA A208.1.

B. Components:

1. Tackboard: Cork face, 6 mm (1/4-inch) thick factory laminated to a hardboard or particleboard backing // of thickness required so that the face of the cork will be in the same plane as the face of the chalkboard writing surface, 6 mm to 9 mm (1/4 to 3/8-inch) thick. //
2. Frames (Trim): Extruded aluminum, 1.5 mm (0.060-inch) thick, snap-on type, approximate face width 44 mm (1-3/4 inch), depth and configuration as required to return to wall and engage clips.
3. Clips: Manufacturer's standard as required to support frame, mullions, and display rail,

C. Finish exposed aluminum surfaces as follows:

1. AA 45 chemically etched medium matte, with clear anodic coating Class II Architectural, 0.4 mils thick (AA-M12C22A32).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install units in accordance with the manufacturer's installation instructions, use concealed fasteners.
- B. Inspect surfaces and related construction to receive units. Partitions shall have reinforcing to receive fasteners. Verify type and placement of reinforcement.
- C. Do not proceed with the installation until reinforcement is in place and surfaces are flat.
- D. Assemble units as specified by the manufacturer.

3.2 INSTALLATION OF TACKBOARD:

- A. Install boards meeting instructions and recommendations of manufacturer.
 1. Unless otherwise indicated or required by the manufacturer, mount tackboards with adhesive and blocking pads spaced 16 inches on center each way.
 2. Grounds designed to receive clips for snap-on trim shall be continuous and be secured 300 mm (12 inches) on center. Space clips 300 mm (12 inches) on center.

3. Miter trim at corners, conceal fasteners. Modify trim as required to conform to surrounding construction details.

3.3 TACKBOARD SCHEDULE

A. Tackboard at Offices:

1. Description: Aluminum framed tackboard.
2. Size: As indicated on drawings.

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