

SECTION 093000

CERAMIC TILE

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

- A. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tile as shown on the drawings and/or specified herein, including, but not limited to, the following:
 - 1. Ceramic mosaic floor tile.
 - 2. Ceramic glazed wall tile and matching base.
 - 3. Waterproof membrane.
 - 4. Stone saddles.
 - 5. Setting beds, grout and sealant.

1.3 RELATED SECTIONS

- A. Concrete - Existing.
- B. Gypsum drywall – Section 092900.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:
 - 1. Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.
 - 2. Install all ceramic tile in accordance with the recommendations contained in Handbook for Ceramic Tile Installation of the Tile Council of America, Inc., latest edition.

1.5 SUBMITTALS**A. Samples**

1. Before any ceramic tile is delivered to the job site, submit to the Commissioner sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.
2. Submit 6" length of marble saddles.

B. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Commissioner a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.**C. Certification:** Copies of waterproofing membrane manufacturer's certification that the anti-fracture and/or waterproofing membrane materials are compatible with the setting materials to be used in the installation**1.6 PRODUCT HANDLING****A. Delivery and Storage**

1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.

B. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.**C. Replacements:** In the event of damage, immediately make all repairs and replacements necessary.**1.7 PROJECT CONDITIONS**

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

PART 2 PRODUCTS**2.1 MANUFACTURERS OF TILE**

- A. Provide tile manufactured by American Olean, or approved equal made by United States Ceramic Tile Co., Summitville Tiles Inc., Dal-Tile Corp. or approved equal meeting these specifications. The Commissioner reserves the right to pick tile from any price group.

2.2 WALL TILE AND BASE

- A. Provide porcelain type, 2" x 2" ceramic wall tile in colors as noted on drawing sheet A-006.00 "Finish Specifications and Glazing Schedule".
- B. Provide sanitary cove base to match wall tile.

2.3 FLOOR TILE

- A. Provide porcelain type ceramic mosaic floor tile with all-purpose edge, 2" x 2", color and pattern as noted on drawing sheet A-006.00 "Finish Specifications and Glazing Manual". Tile shall have water absorption not to exceed 0.5%.

2.4 TRIM AND SPECIAL SHAPES

- A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.

2.5 STONE SADDLES

- A. Provide sound stone saddles as selected by the Commissioner, minimum 3/4" thick, with an abrasive hardness of not less than 10.0, when tested in accordance with ASTM C 241. Cut saddle to fit jamb profile, honed finish.

2.6 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
 - 1. Products: Subject to compliance with requirements, [provide one of the following:
 - a. Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
 - b. Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
 - c. MAPEI Corporation; Mapelastic L (PRP M19).

2.7 SETTING MATERIALS

- A. Latex Portland Cement Thin Set Mortar: ANSI A118.4, Prepackaged liquid acrylic or SBR resin type latex modified cement mortar for thin set application, with a VOC content of 65 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24). Factory proportioned cement, sand and polymer additives in dry blend to be mixed with water. Provide one of the following:
1. "PremiumPlus Thin Set Mortar" with "CustomFlex Ultra Strength Thin Set Additive" (Custom Building Products).
 2. "Laticrete 211 Crete Filler Powder" with "Laticrete 4237 Thin Set Mortar Additive" (Laticrete International, Inc.).
 3. "Kerabond (AM)" with "Keralastic (AM)" with (Mapei Corp).
 4. "Full Set Plus Premium Thin Set Mortar TA-380/381" with "XtraFlex Acrylic Mortar Additive TA-872"(TEC Incorporated).
- B. Water-Cleanable, Tile-Setting Epoxy: 100% solids, minimum compressive strength of 3500 psi (24MPa), chemical resistant, water cleanable and complying with ANSI A118.3, with a VOC content of 65 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).Provide one of the following:
1. "Hydroment Color-Poxy" (Bostik Findley).
 2. "100% Solids Epoxy Mortar" (Custom Building Products).
 3. "Latapoxy 300 Epoxy Adhesive" (Laticrete International, Inc.).
 4. "Kerapoxy 410 Mortar" (Mapei).
 5. "100% Solids Epoxy Mortar and Grout" (TEC Incorporated).
- C. Organic Adhesive: ANSI A136.1, Type I, water resistant latex emulsion, with a VOC content of 65 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).Provide one of the following:
1. "Hydroment Multi-Purpose Mastic" (Bostik Findley).
 2. "AcrylPro Ceramic Tile Adhesive" (Custom Building Products).
 3. "Laticrete 15 Multi Mastic Adhesive" (Laticrete International, Inc.).
 4. "Ultra Mastic Eco Type 1" (Mapei Corp).
 5. "Double Duty Ceramic Tile Adhesive for Walls and Floors TA-122" (TEC Incorporated).

2.8 GROUT MATERIALS

- A. Latex Portland Cement Sanded Grout for Unglazed Tile: ANSI 118.6,polymer modified cement grout suitable for non-absorptive tile. Factory proportioned cement, sand, liquid polymer additives and alkali resistant non-fading mineral pigments in dry blend to be mixed with water. Custom color grout as selected by Architect. Provide one of the following:
1. "Hydroment Ceramic Tile Grout (sanded)" with "425 Multi-Purpose Acrylic Latex Admixture" (Bostik Findley).
 2. "Classic Blend Sanded Tile Grout with "Acrylic Mortar Admix" (Custom Building Products).
 3. "Laticrete Tri-Poly Fortified Floor Grout (1500 Series)" with "Laticrete 1776 Grout Admix Plus" (Laticrete International, Inc.).
 4. "AccuColor Premium Sanded Grout TA-650" with "Acrylic Grout Additive TA-869"(TEC Incorporated).

- B. Latex Portland Cement Unsanded Grout for Glazed Tile: ANSI A118.6, polymer-modified cement grout for use with non-absorptive vitreous type tile. Factory proportioned cement, liquid polymer additives and alkali resistant non-fading mineral pigments in dry blend to be mixed with water. Grout color as selected by Architect. Provide one of the following:
 - 1. "Hydroment Dry Tile Grout (Unsanded)", with "425 Multi-Purpose Acrylic Latex Admixture" (Bostik Findley).
 - 2. "Laticrete Tri-Poly Fortified Unsanded Grout (1600 Series)" with "Laticrete 1776 Grout Admix Plus" (Laticrete International, Inc.
 - 3. "AccuColor Premium Unsanded Grout TA-620" with "Acrylic Grout Additive TA-869"(TEC Incorporated).
- B. Water Cleanable Epoxy Grout: ANSI A118.3chemical-resistant and water cleanable epoxy grout with 100% solids content; Custom color as shown or as required to match Architect's sample; Provide one of the following:
 - 1. "100% Solids Epoxy Grout" (Custom Building Products).
 - 2. "Latapoxy 2000 Industrial Epoxy Grout" (Laticrete International, Inc.).
 - 3. "Kerapoxy (AM) KER 400 Series Grout" (Mapei Corp).
 - 4. "100% Solids Epoxy Mortar and Grout" (TEC Incorporated).
- C. Grout for PregROUTed Tile Sheets: Same product used in factory to pregROUT tile sheets.

2.9 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, Portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Temporary Protective Coating: Either product indicated below that is applied in the tile manufacturer's factory and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, applied hot, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg. F. per ASTM D 87.
 - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, equal to "Concentrated Stone & Tile Cleaner" made by Aqua-Mix or approved equal, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints, with a VOC content of 200 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and that does not change color or appearance of grout.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bonsal American; an Oldcastle company; Grout Sealer.
 - b. Bostik, Inc.; CeramaSeal Grout & Tile Sealer.
 - c. C-Cure; Penetrating Sealer 978.
 - d. Custom Building Products; SurfaceguardSealer.
 - e. Jamo Inc.; Matte Finish Sealer.

- f. MAPEI Corporation; KER 003, Silicone Spray Sealer for Cementitious Tile Grout].
- g. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
- h. TEC; a subsidiary of H. B. Fuller Company; TA-257 Silicone Grout Sealer.

2.10 SEALANT

- A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.
- B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.
- C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.
- D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Commissioner. Sealant shall be equivalent to 1700 Sanitary Sealant made by General Electric or approved equal.

2.11 MIXING MORTARS AND GROUT

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

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels
 - 1. Floors: + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.
- B. Grind or fill concrete substrates as required to comply with allowable variations.

3.3 PREPARATION

- A. Etch concrete substrate as may be required to remove curing compounds or other substances that would interfere with proper bond of setting bed. Rinse with water to

remove all traces of treatment. Surface must meet finish requirements as noted in ANSI 108.01.

- B. Blending: for tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at project site before installing.
- C. Field Applied Temporary Protective Coating: Pre-coat tile with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.4 JOINTS IN TILE WORK

- A. Joint Widths: 1/16" wide in ceramic tile.
- B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Commissioner.
- C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.
 - 1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to ceramic tile.

3.5 WATERPROOFING INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.
- B. Install waterproofing across entire floor substrate and extend up walls 4 inches onto moisture resistant gypsum board substrates.
- C. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
 - 1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors composed of tiles 8 by 8 inches or larger.
 - c. Tile floors composed of rib-backed tiles.

- B. Comply with the following installation standards
 - 1. Interior Wall Installations, Metal Studs or Furring:
 - a. Tile Installation W245: Thin-set mortar on coated glass-mat, water-resistant gypsum backer board; TCA W245.
 - b. Thin-Set Mortar: Latex-portland cement mortar.
 - c. Grout: Polymer-modified unsanded grout.
 - 2. Interior Floor Installations, Concrete Subfloor:
 - a. Tile Installation F122: Thin-set mortar on waterproof membrane; TCNA F122.
 - b. Thin-Set Mortar: Medium-bed, latex-Portland cement mortar.
 - c. Grout: Polymer-modified sanded grout.
- C. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
 - 1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.
 - 2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
 - 3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.
- D. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.
- E. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
- F. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.
- G. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

3.7 INSTALLATION OF STONE SADDLES

- A. Install stone saddles cut to profiles and sizes shown, accurately fitted to jambs, coped at stops, set in full bed of mortar herein specified, and with grouted edge joints as specified for floor tile.
- B. Do not extend waterproofing under thresholds set in latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on waterproofing with elastomeric sealant.

3.8 CLEANING AND PROTECTION

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to insure removal of all cleaning material.
 - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings from tile surfaces.
- E. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

END OF SECTION

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SECTION 095113**ACOUSTIC PANEL CEILINGS****PART 1 GENERAL****1.1 GENERAL REQUIREMENTS**

- A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the acoustic panel ceilings as shown on the drawings and/or specified herein, including but not limited to, the following:
 - 1. Acoustical panel units.
 - 2. Exposed "T" suspension system, including hangers and inserts.
 - 3. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
 - 4. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
 - 5. Perimeter and column moldings, trim and accessories for acoustical ceilings.

1.3 RELATED SECTIONS

- A. Drywall ceilings - Section 092900.
- B. Diffusers, grilles and related frames - Division 23.
- C. Lighting fixtures - Division 26.

1.4 QUALITY ASSURANCE

- A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contractor's Association.
- B. Qualifications of Installers
 - 1. The suspended ceiling subcontractor shall have a record of successful installation of similar ceilings acceptable to Commissioner and shall be currently approved by the manufacturer of the ceiling suspension system.
 - 2. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.
- C. The work is subject to the following standards:

1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.
 2. ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.
- D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by prevailing Codes and Ordinances.

1.5 SUBMITTALS

- A. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:
1. Any deviations from Commissioner's reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into Commissioner's ceiling layout due to dimensional restrictions of field conditions.
 2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
 3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.
 4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.
 5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane.
 6. Details of construction and installation at all conditions.
 7. Materials, gauges, thickness and finishes.
- B. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.
1. Twelve (12) inch long sample of each components of suspension systems, including moldings.
 2. Acoustical units — full size.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

1.7 PROJECT CONDITIONS

- A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.8 COORDINATION

- A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

1.9 EXTRA STOCK

- A. Extra Stock: Deliver stock of maintenance material to City of New York. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.
 - 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of amount installed.

PART 2 PRODUCTS**2.1 ACOUSTICAL UNITS**

- A. ACT-01: Ultima #1912" (Armstrong World Industries); 24 in. x 24 in. x 1 in. thick, tegular tile, with 0.70 NRC, 35 CAC, white color; use with Silhouette XL 9/16 in. aluminum bolt-slot grid and 1/8 in. reveal. Subject to compliance with requirements equivalent products from the following will be considered:
 - 1. "Mars Climaplus, #86985" (USG Interiors).
 - 2. "OVT-1 Symphony m #1222F" Certaineed, Division St. Gobain.
- B. Panels shall have factory applied white finish with Dura-Brite membrane with light reflectance value of 0.90. Panels shall meet ASTM E 1264, Type IV, Form 2, Pattern E, Class A, with a UL flame spread rating of 0-25.

2.2 SUSPENSION SYSTEM

- A. Primary Metal Suspension System: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C 635 Classification "Heavy Duty", and ASTM 580 requirements, of suitable design and adequate strength to support the acoustic materials, light fixtures, diffusers and other items occurring in or on the ceiling.
 - 1. Comply with Referenced Standards in Appendix R of the NYC Building Code.
- B. Suspension Systems: Provide systems complete with carriers, runners, splice sections, connector clips, alignment clips, leveling clips, hangers, molding, trim, retention clips, load-resisting struts, and other suspension components required to support ceiling units and other ceiling-supported construction.
- C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - a. Type: Post-installed expansion anchors.
 - b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 for Class SC 1 service condition.
 2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.
- D. Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint; one of the following:
1. 3/16 in. x 1 in. steel straps.
 2. ASTM A510, 1/4 in. diameter mild carbon steel rods.
- E. Strap Iron Hanger Inserts: Mild steel flats hot dip galvanized or with manufacturer's standard rust inhibiting coating, 1 in. x 3/16 in. x 3 in. with 7/16 in. dia. holes punched on center line and lower ends, designed to develop the full strength of hangers.
- F. Hanger Anchorage Devices: Screws, clips, bolts or other devices fabricated from corrosion resistant materials, applicable to the indicated method of structural anchorage for ceiling hangers. Provide anchorage devices sized for five (5) times the calculated load supported.
- G. Carrying Channels: ASTM C754, cold rolled steel channels, 1-1/2 in., 414 lbs. per 1000 linear ft.
- H. Clips: Provide support clips, clamps, fasteners, and other attachment devices as required to connect components and transfer imposed loads of primary suspension system.
- I. Hold-Down Clips (For use in fire rated ceilings): Where indicated, provide manufacturer's standard spring-loaded, 100% fully accessible, hold-down clips easily removed without special tools spaced 24 inches o.c. on all cross tees.
1. Provide hold-down clips on acoustical panels within 20 feet of an exterior door.

2.3 EXPOSED METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

- A. 9/16 inch Recessed Reveal Grid: Manufacturer's standard design complying with ASTM C635 Classification "Heavy Duty"; complete with hangers, main tees, cross tees, splices, stepped angle molding, and accessories. Provide components as follows:
1. Primary Mechanical Suspension System
 2. Main Tees and Cross Tees: 1-5/8 in. high with a 9/16 in. face with 1/8 in. center regress fabricated from commercial grade galvanized cold-rolled steel sections; notched and mitered at all intersections.

3. Metal Wall Moldings: Commercial grade galvanized cold-rolled steel, stepped to provide same reveal as main tees and cross tees.
4. Accessories: Galvanized steel, specifically designed for use with the main components.
5. Exposed Finish: Chemically clean, electro-galvanize and bonderize all rolled formed parts. Finish with a white baked-on organic coating, to match finish of acoustic panels unless otherwise shown. Color as selected by Architect.
6. Provide one of the following:
 - a. "Ultraline 3600" (Chicago Metallic Corp.)
 - b. "Fineline DXFF 1/8" (USG Interiors).
 - c. "Silhouette XL 1/8" (Armstrong World Industries).

B. Metal Edge Moldings and Trim

1. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - a. Armstrong World Industries, Inc.
 - b. BPB USA.
 - c. Chicago Metallic Corporation.
 - d. Fry Reglet Corporation.
 - e. Gordon, Inc.
 - f. USG Interiors, Inc.
2. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.
 - a. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
 - b. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
 - c. For narrow-face suspension systems, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.
 - d. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements and the following:
 - e. Aluminum Alloy: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of aluminum extrusions complying with ASTM B 221 for Alloy and Temper 6063-T5.

- C. Fascia Closures: Provide fascia closures fabricated from extruded aluminum "L" panels coated to match the face of the panel. Provide system, with 18 ga. steel angles, 1 in. x 1 in. x length required for mounting extrusions, splice plates for securing Ls butted together. Provide manufacturer's mounting brackets for securing fascia panels to the

edge of suspended ceiling grid. Provide system complete with internal steel reinforcement, hangers, brackets, fasteners, mounts and all other accessories for a complete installation. Finish exposed surfaces with baked enamel finish in color as selected by Architect.

1. "Axiom Perimeter Trim" (Armstrong World Industries, or approved equal); edge trim.

2.4 METAL FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
 1. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; organic coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.
 - a. Organic Coating: Thermosetting, primer/topcoat system with a minimum dry film thickness of 0.8 to 1.2 mils
- B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.
 1. High-Humidity Finish: Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" where high-humidity finishes are indicated.

2.5 ACOUSTICAL SEALANT

- A. Products: Subject to compliance with requirements, provide one of the following:
 1. Acoustical Sealant for Exposed and Concealed Joints:
 - a. Pecora Corporation; AC-20 FTR Acoustical and Insulation Sealant.
 - b. USG Corporation; SHEETROCK Acoustical Sealant.
 - c. PL Acoustical Sealant; Chemrex, Inc., Contech Brands.
 2. Acoustical Sealant for Concealed Joints:
 - a. OSI Sealants, Inc.; Pro-Series SC-175 Rubber Base Sound Sealant.
 - b. Pecora Corporation; BA-98.
 - c. Tremco, Inc.; Tremco Acoustical Sealant.
- B. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant, with a VOC content of 250 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

- C. Acoustical Sealant for Concealed Joints: Manufacturer's standard nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant, with a VOC content of 250 grams/Liter or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), recommended for sealing interior concealed joints to reduce airborne sound transmission.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine the areas where acoustic panel ceilings are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

3.2 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.3 INSTALLATION

- A. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.
- B. Install suspension systems to comply with ASTM C 636, with wire hangers supported only from building structural members. Locate hangers not more than 6" from each end and spaced 4'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0".
- C. Space rod or flat iron (New York City) hangers not more than 4'-0" o.c. along main carrying channels; attach by clips and black iron to building structure. Locate hangers not more than 6" from each end. Space main carrying channels 4'-0" o.c. Attach suspension system to carrying channels using clips, leveling to a tolerance of 1/8" in 12'-0".
- D. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.
- E. Install edge moldings at edges in each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.
 - 1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
 - 2. Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than sixteen (16) inches o.c. between end holes. Miter corners accurately and connect securely. Fasten tight against vertical surfaces.

3. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".
- F. Install edge trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 1. Screw attach moldings to substrate at intervals not more than 16 inches o. c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet.
 2. Miter corners accurately and connect securely to provide hairline joints at corners.
- G. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- H. Install hold-down clips; space 2'-0" o.c. on all cross tees.
- I. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.

3.4 ADJUST AND CLEAN

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION