

SECTION 09 2226**METAL SUSPENSION SYSTEM: Gypsum Board****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
1. Furnish and install ceiling suspension system as described in Contract Documents to receive gypsum board and to support items penetrating ceiling.
- B. Related Requirements:
1. Section 09 2900: 'Gypsum Board'.

1.2 REFERENCES

- A. Association Publications:
1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. www.cisca.org.
 - a. '*Ceiling Systems Handbook*': Recommendations for direct hung acoustical tile and lay-in panel ceiling installation.
 - b. '*Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 3-4)*' Covers Seismic Design Category D, E, and F.
 - c. '*Guidelines for Seismic Restraint for Direct-hung Suspended Ceiling Assemblies (zones 0-2)*' Covers Seismic Design Category C.
 - d. '*Production Guide*': Practical reference for ceiling systems and estimating costs.
- B. Definitions:
1. Ceiling Suspension System: System of metal members, designed to support a suspended ceiling. May accommodate lighting fixtures or air diffusers.
 2. Clips: Designs to suit applications such as fire resistance, wind uplift and impact.
 3. Cross Runner, Cross Tee: Cross runner is secondary or cross beams of mechanical ceiling suspension system, usually supporting only acoustical tile. Cross tee is inserted into main runner to form different module sizes. In some suspension systems, however, cross runners also provide support for lighting fixtures, air diffusers and other cross runners.
 4. Hanger Wires: Wire employed to suspend acoustical ceiling from existing structure. Standard material is 12 gauge (0.105 inch - 2.70 mm) galvanized, soft annealed steel wire, conforming to ASTM A641/A641M. Heavier gauge wire is available for higher load carrying installations, or situations where hanger wire spacing exceeds 4 feet (1.20 m) on center. Seismic designs or exterior installations subject to wind uplift may require supplemental bracing or substantial hanger devices such as metal straps, rods or structural angles.
 5. Heavy-Duty Systems: Primarily used for installations in which the quantities and weights of ceiling fixtures (lights, air diffusers, etc.) are greater than those for ordinary commercial structure.
 6. Main Beam, Main Runner, Main Tee: Primary or main beams of type of ceiling suspension system in which structural members are mechanically locked together. Provide direct support for cross runners and may support lighting fixtures and air diffusers, as well as acoustical tile. Supported by hanger wires attached directly to existing structure; or installed perpendicular to carrying channels and supported by specially designed sheet metal or wire clips attached to carrying channels.
 7. Stiffening Brace: Used to prevent uplift of grid caused by wind pressure in exterior applications.
- C. Reference Standards:
1. American Society of Civil Engineers:

- a. ASCE / SEI 7-05 (Supplement No. 2), 'Minimum Design Loads for Buildings and Other Structures.'
2. ASTM International:
 - a. ASTM A641/A641M-09a, 'Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.'
 - b. ASTM C635/C635M-07, 'Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.'
 - c. ASTM C636/C636M-08, 'Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.'
 - d. ASTM E580/E580M-11a, 'Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.'
3. International Code Council (IBC):
 - a. IBC 803.9.1.1, 'Suspended Acoustical Ceiling.'

1.3 SUBMITTALS

- A. Informational Submittals:
 1. Certificates:
 - a. Manufacturer's certifications that products comply with specified requirements.
 - b. Installer's certificates of training.
 2. Manufacturer's Instructions:
 - a. Manufacturer's details and installation instructions for seismic bracing. If requested, provide copy of code requirements applicable to Project.

1.4 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 1. Meet seismic bracing requirements of ASCE 7, ASTM C635/C635M and ASTM C636/C636M or equivalent governing standard for project site.
 2. Seismic Standard: Provide acoustical ceilings designed and installed to withstand the effects of earthquake motions according to the following:
 - a. Standard for Ceiling Suspension Systems Requiring Seismic Restraint: Comply with ASTM E580/E580M.
 - b. Cisca's Recommendations for Acoustical Ceilings: Comply with Cisca's "Recommendations for Direct-Hung Acoustical Tile and Lay-in Panel Ceilings—Seismic Zones 0-2." (Apply to Seismic Categories A & B).
 - c. Cisca's Guidelines for Systems Requiring Seismic Restraint: Comply with Cisca's "Guidelines for Seismic Restraint of Direct-Hung Suspended Ceiling Assemblies—Seismic Zones 3 & 4." (Apply to Seismic Categories C, D, E & F).
- B. Qualifications. Requirements of Section 01 4301 applies, but not limited to following:
 1. Installer:
 - a. Installer training (Ceiling Masters training course or equivalent).
 2. Manufacturer:
 - a. Manufacturer in good standing of Cisca (Ceiling and Interior Systems Construction Association).

1.5 WARRANTY

- A. Manufacturer Warranty:
 1. Suspension system: Manufacturer warranty including repair or replacement of rusting and defects.

PART 2 - PRODUCTS**2.1 SYSTEMS**

- A. Manufacturers:
 - 1. Type One Acceptable Systems:
 - a. Drywall Grid by Armstrong World Industries, Lancaster, PA www.armstrong.com.
 - b. Drywall Furring Suspended Ceiling System by Chicago Metallic Corporation, Chicago, IL www.chicagometallic.com.
 - c. Drywall Suspension System - Flat Ceilings by USG, Chicago, IL www.usg.com.
 - d. Equal as approved by Architect before bidding. See Section 01 6200.
- B. Miscellaneous Materials:
 - 1. Hanger Wire: 12 gauge (2.6 mm) minimum galvanized carbon steel, soft tempered, pre-stretched unless thicker required by ceiling loading in accordance with Suspension System Manufacturer's Literature.
 - 2. Joint Wire: 16 gauge (1.6 mm) galvanized for joints.

PART 3 - EXECUTION**3.1 EXAMINATION**

- A. Verification Of Conditions:
 - 1. Inspect for defects in support that are not acceptable.
 - 2. Notify Architect of unsuitable conditions in writing.

3.2 INSTALLATION

- A. Follow Manufacturer's instructions with modifications listed below, except where Manufacturer's instructions are more stringent:
 - 1. Main runners hanger wires 48 inches (1 200 mm) on center maximum.
 - 2. Cross runners hanger wires 24 inches (600 mm) on center maximum.
 - 3. Maintain flatness of assembly to within 1/8 inch (3 mm) in 12 feet (3.600 meters).
 - 4. Do not kink, twist, or bend hanger wires as a means of leveling assembly.

END OF SECTION

SECTION 09 2900**GYPSUM BOARD****PART 4 - GENERAL****4.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install gypsum board as described in Contract Documents, except behind ceramic tile.
 - 2. Furnish and install acoustical sealants as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 07 9219: Quality of acoustical sealants.
 - 2. Section 09 3013: Installation of backerboard joint reinforcing.

4.2 REFERENCES

- A. Definitions:
 - 1. Accessories: Metal or plastic beads, trim, or moulding used to protect or conceal corners, edges, or abutments of the gypsum board construction.
 - 2. Drywall Primer: Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads, and accessories and over skim coatings.
 - 3. Skim Coat: Either a thin coat of joint compound trowel applied, or a material manufactured especially for this purpose and applied in accordance with manufacturer's recommendations, over the entire surface.
 - 4. Texturing: Regular or irregular patterns typically produced by applying a mixture of joint compound and water, or proprietary texture materials including latex base texture paint, to a gypsum board surface previously coated with drywall primer.
- B. Reference Standards:
 - 1. ASTM International:
 - a. ASTM C11-10a, 'Standard Terminology Relating to Gypsum and Related Building Materials and Systems'.
 - b. ASTM C475/C475M-02(2007), 'Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board'.
 - c. ASTM C840-11, 'Standard Specification for Application and Finishing of Gypsum Board'.
 - d. ASTM C1002-07, 'Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs'.
 - e. ASTM C1047-10a, 'Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base'.
 - f. ASTM C1178/C1178M-11, 'Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel'.
 - g. ASTM C1396/C1396M-11, 'Standard Specification for Gypsum Board'.
 - h. ASTM E84-12, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - i. ASTM E119-12, 'Standard Test Method for Fire Tests of Building Construction and Materials'.
 - 2. Gypsum Association:
 - a. GA-214-10, 'Recommended Levels of Gypsum Board Finish'.
 - b. GA-216-10: 'Application and Finishing of Gypsum Panel Products'.

- c. GA-600-09, 'Fire Reference Design Manual'.
 - d. GA-801-07, 'Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors'.
3. Underwriters Laboratories, Inc.
- a. UL 263: 'Test Method for Fire Tests of Building Construction and Materials' (2011).
 - b. UL 723: 'Standard for Safety Test for Surface Burning Characteristics of Building Materials; (2010).

4.3 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference:
- 1. Schedule pre-installation conference immediately before installation of gypsum wallboard.
 - 2. In addition to agenda items specified in Section 01 3100, review following:
 - a. Finish requirements necessary for installation of finish materials over gypsum wallboard, and location and installation of ceramic tile backerboard.

4.4 SUBMITTALS

- A. Informational Submittals:
- 1. Test And Evaluation Reports:
 - a. Fire test results or assembly diagrams and numbers confirming products used will provide required fire ratings with installation configurations used.

4.5 DELIVERY, STORAGE, AND HANDLING

- A. General:
- 1. Following recommendations of GA-801 Guide for Handling and Storage of Gypsum Panel Products unless local, state or federal laws or agency rules differing from the recommendations shall take precedence.
- B. Delivery And Acceptance Requirements:
- 1. Deliver materials in original packages, containers, or bundles bearing brand name, applicable standard designation, and Manufacturer's name.
- C. Storage And Handling Requirements:
- 1. Store material under roof and keep dry and protected against damage from weather, condensation, direct sunlight, construction traffic, and other causes. Stack gypsum board flat to prevent sagging.

4.6 FIELD CONDITIONS

- A. Ambient Conditions:
- 1. Comply with ASTM C840 or GA-216 requirements, whichever are more stringent:
 - a. Do not install interior products until installation areas are enclosed and conditioned.
 - 1) Temperature shall be 50 deg F (10 deg C) and 95 deg F (35 deg C) maximum day and night during entire joint operation and until execution of Certificate of Substantial Completion.
 - 2) Provide ventilation to eliminate excessive moisture.
 - 3) Avoid hot air drafts that will cause too rapid drying.
 - b. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

PART 5 - PRODUCTS**5.1 MATERIALS****A. Manufacturers:**

1. Manufacturer Contact List:
 - a. American Gypsum, Dallas, TX www.americangypsum.com.
 - b. CertainTeed Gypsum, Inc; Tampa, FL www.certainteed.com.
 - c. Georgia Pacific, Atlanta, GA www.gp.com.
 - d. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - e. Pabco Gypsum, Newark, CA www.pabcogypsum.com.
 - f. United States Gypsum Co, Chicago, IL www.usg.com.

B. Materials:

1. Interior Gypsum Board:
 - a. General:
 - 1) Size:
 - a) Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
 - 2) Class Two Quality Standard:
 - a) Core: Fire-resistant rated gypsum core.
 - b) Complies with Type X requirements of ASTM C1396/C1396M (Section 5).
 - c) Surface paper: Face paper suitable for painting.
 - d) Long edges: Tapered edge.
 - e) Overall thickness: 5/8 inch (15.9 mm).

5.2 ACCESSORIES**A. Manufacturers:**

1. Manufacturer Contact List:
 - a. Kinetics Noise Control, Dublin, OH www.kineticsnoise.com.
 - b. Magnum Products, Lenaxa, KS www.levelcoat.com.
 - c. National Gypsum, Charlotte, NC www.nationalgypsum.com.
 - d. Soundproofing Co, San Marcos, CA www.soundproofing.org.
 - e. United States Gypsum Co, Chicago, IL www.usg.com.
 - f. Westpac Materials Inc, Orange, CA www.westpacmaterials.com.
 - g. Wm. Zinsser & Co, Somerset, NJ www.zinsser.com.
2. Gypsum Board Mounting Accessories:
 - a. Corner And Edge Trim:
 - 1) Metal, paper-faced metal, paper-faced plastic, or solid vinyl meeting requirements of ASTM C1047. Surfaces to receive bedding cement treated for maximum bonding.
 - b. Control Joint:
 - 1) Bent zinc sheet with V-shaped slot, perforated flanges, covered with plastic tape meeting requirements of ASTM C1047.
3. Joint Compound:
 - a. Best grade or type recommended by Board Manufacturer and meeting requirements of ASTM C475/C475M.
 - 1) Use Taping Compound for first coat to embed tape and accessories.
 - 2) Use Taping Compound or All-Purpose Compound for subsequent coats except final coat.
 - 3) Use Finishing Compound for final coat and for skim coat.
4. Joint Reinforcing:
 - a. Paper reinforcing tape acceptable to Gypsum Board Manufacturer.
5. Fasteners:
 - a. Bugle head screws meeting requirements of ASTM C1002:
 - 1) Gypsum Board:

- a) Type W: For fastening gypsum board to wood members, of length to penetrate wood framing 5/8 inch (15.9 mm) minimum.
- b) Type S: For fastening gypsum board to steel framing and ceiling suspension members, of length to penetrate steel framing 3/8 inch (9.5 mm) minimum.

PART 6 - EXECUTION

6.1 EXAMINATION

A. Verification Of Conditions:

- 1. Examine substrate and verify framing is suitable for installation of gypsum board.
- 2. Examine gypsum board before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- 3. Notify Architect of unsuitable conditions in writing.
 - a. Do not install board over unsuitable conditions.
- 4. Commencement of Work by installer is considered acceptance of substrate.

6.2 INSTALLATION

A. Interface With Other Work:

- 1. Coordinate with Division 06 for location of backblocking for edges and ends of gypsum board and for blocking required for installation of equipment and building specialties.
- 2. Do not install gypsum board until required blocking is in place.

B. General: Install and finish as recommended in ASTM C840 or GA-216 unless specified otherwise in this Section.

C. Interior Gypsum Board:

- 1. General:
 - a. Install so trim and reinforcing tape are fully backed by gypsum board. No hollow spaces between pieces of gypsum board over 1/8 inch (3 mm) wide before taping are acceptable.
 - b. Rout out backside of gypsum board to accommodate items that extend beyond face of framing, but do not penetrate face of gypsum board, such as metal door frame mounting brackets, etc.
- 2. Single Layer Application:
 - a. Apply ceilings first using minimum of two men.
 - b. Use board of length to give minimum number of joints.
 - c. On walls over 108 inches (2 700 mm) high and on ceilings, apply board perpendicular to support.
 - d. Stagger end joints. End and edge joints of board applied on ceilings shall occur over framing members or be back blocked with 2x4 (38 mm by 89 mm) blocking. End joints of board horizontally applied on walls shall occur over framing members. Edge joints of board vertically applied on walls shall occur over framing members.
 - e. Butt edges in moderate contact. Do not force in place. Shim to level.
 - f. Leave facings true with joint, finishing flush. Vertical work shall be plumb and ceiling surfaces level.
 - g. Scribe work closely. Keep joints as far from openings as possible. If joints occur near an opening, apply board so vertical joints are centered over openings. No vertical joints shall occur within 8 inches (200 mm) of external corners or openings.
 - h. Install board tight against support with joints even and true. Tighten loose screws.
 - i. Caulk perimeter joints in sound insulated rooms with specified acoustical sealant.
- 3. Fastening:
 - a. Apply from center of board towards ends and edges.
 - b. Apply screws 3/8 inch (9.5 mm) minimum from ends and edges, one inch (25 mm) maximum from edges, and 1/2 inch (13 mm) maximum from ends.

- c. Spacing:
 - 1) Ends: Screws not over 7 inches (175 mm) on center at edges where blocking or framing occurs.
 - 2) Wood Framed Walls And Ceilings: Screws 7 inches (175 mm) on center in panel field.
 - 3) Metal Framed Walls: Screws 12 inches (300 mm) on center in panel field.
 - d. Set screw heads 1/32 inch (0.8 mm) below plane of board, but do not break face paper. If face is accidentally broken, apply additional screw 2 inches (50 mm) away.
 - e. Screws on adjacent ends or edges shall be opposite each other.
 - f. Drive screws with shank perpendicular to face of board.
4. Trim:
- a. Corner Beads:
 - 1) Attach corner beads to outside corners.
 - a) Attach metal corner bead with staples spaced 4 inches (100 mm) on center maximum and flat taped over edges of corner bead. Also, apply screw through edge of corner bead where wood trim will overlay corner bead.
 - b) Set paper-faced trim in solid bed of taping compound.
 - b. Edge Trim: Apply where gypsum board abuts dissimilar material. Hold channel and 'L' trim back from exterior window and door frames 1/8 inch (3 mm) to allow for caulking.
5. Finishing:
- a. General:
 - 1) Tape and finish joints and corners throughout building as specified below to correspond with final finish material to be applied to gypsum board. When sanding, do not raise nap of gypsum board face paper or paper-faced trim.
 - 2) First Coat:
 - a) Apply tape over center of joint in complete, uniform bed of specified taping compound and wipe with a joint knife leaving a thin coating of joint compound. If metal corner bead is used, apply reinforcing tape over flange of metal corner bead and trim so half of tape width is on flange and half is on gypsum board.
 - b) Completely fill gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly if necessary to eliminate high spots or excessive compound.
 - 3) Second Coat:
 - a) Apply coat of specified joint compound over embedded tape extending 3-1/2 inches (88 mm) on both sides of joint center. Use finishing compound only if applied coat is intended as final coat.
 - b) Re-coat gouges, dents, and fastener dimples.
 - c) Allow to dry and sand lightly to eliminate high spots or excessive compound.
 - 4) Third Coat: Apply same as second coat except extend application 6 inches (150 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
 - 5) Fourth Coat: Apply same as second coat except extend application 9 inches (425 mm) on both sides of joint center. Allow to dry and sand with fine sandpaper or wipe with damp sponge.
 - 6) Gypsum Board Surfaces Under Acoustical Tile:
 - a) GA-214 Level 2: 'All joints and interior angles shall have tape embedded in joint compound and wiped with a joint knife leaving a thin coating of joint compound over all joints and interior angles. Fastener heads and accessories shall be covered with a coat of joint compound. Surface shall be free of excess joint compound. Tool marks and ridges are acceptable. Joint compound applied over the body of the tape at the time of tape embedment shall be considered a separate coat of joint compound and shall satisfy the conditions of this level.

6.3 FIELD QUALITY CONTROL

A. Non-Conforming Work:

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

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

6.4 CLEANING

- A. Remove from site debris resulting from work of this Section including taping compound spills.

END OF SECTION

SECTION 09 5116**ACOUSTICAL TILE CEILINGS****PART 7 - GENERAL****7.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install acoustical tile on backerboard as described in Contract Documents.
- B. Related Requirements:
 - 1. Section 09 2226: 'Metal Suspension System: Gypsum Board'.
 - 2. Section 09 2900: 'Gypsum Board'.

7.2 REFERENCES

- A. Association Publications:
 - 1. The Ceilings & Interior Systems Construction Association (CISCA), 405 Illinois Avenue, 2B, St Charles IL. www.cisca.org.
 - a. '*Ceiling Systems Handbook*': Recommendations for direct hung acoustical tile installation.
 - b. '*Production Guide*': Practical reference for ceiling systems and estimating costs.
- B. Definitions:
 - 1. Acoustical Tile: Prefinished material with various surface finishes installed in concealed suspension system or adhered to ceiling surface to provide improved sound absorption qualities.
 - 2. Acoustical Cement/Adhesive: Special type of adhesive or mastic used to stick up or adhere 12 inch x 12 inch (305 mm x 305 mm) acoustical tile to concrete or gypsum board.
 - 3. Absorption: Materials that have capacity to absorb sound. Absorption is the opposite of reflection.
 - 4. Bevel Edge: Acoustical tile is considered bevel edge when face of tile camfered at approximately 45 degree for 1/8 inch (3 mm) to 1/4 inch (6.4 mm) around the perimeter of tile.
 - 5. Ceiling Attenuation Class (CAC): Rates ceiling's efficiency as barrier to airborne sound transmission between adjacent closed offices. Shown as minimum value, previously expressed as CSTC (Ceiling Sound Transmission Class). Single-figure rating derived from normalized ceiling attenuation values in accordance with classification ASTM E413, except that resultant rating shall be designated ceiling attenuation class. (Defined in ASTM E1414.) Acoustical unit with high CAC may have low NRC.
 - 6. Center Line: Line indicating midpoint of surface in either direction. Used as guide in starting ceiling.
 - 7. Class A: Fire classification for product with flame spread rating of no more than 25 and smoke developed rating not exceeding 50, when tested in accordance with ASTM E84 or UL 723.
 - 8. Flame Spread: The propagation of flame over a surface.
 - 9. Flame Spread Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723.
 - 10. Interior Finish: Interior finish includes interior wall and ceiling finish and interior floor finish.
 - 11. Leveling Spline 3 inch (76 mm) fiber strip inserted into kerf at intersection of four (4) adhesively applied acoustical tiles.
 - 12. Kerf: Slit cut into midpoint of edge of tiles.
 - 13. Light Reflectance (LR): Percentage of light a surface reflected by ceiling surface expressed in decimal form.
 - 14. Mineral Base: Ceilings composed principally of mineral materials such as fibers manufactured from rock or slab, with or without binders.

15. Noise Reduction Coefficient (NRC): Average sound absorption coefficient measured at four frequencies: 250, 500, 1,000 and 2,000 Hertz expressed to the nearest integral multiple of 0.05. Rates ability of ceiling or wall panel or other construction to absorb sound. NRC is fraction of sound energy, averaged over all angles of direction and from low to high sound frequencies that is absorbed and not reflected.
16. Smoke-Developed Index: Comparative measure, expressed as a dimensionless number, derived from visual measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723.
17. Sound Absorption: Property possessed by materials and objects, including air, of converting sound energy into heat energy. Sound wave reflected by surface always loses part of its energy. Fraction of energy that is not reflected is called sound absorption coefficient of reflecting surface. For instance, if material reflects 80 percent of sound energy, then sound absorption coefficient would be 20 percent (0.20).
18. Surface Burning Characteristic: Rating of interior and surface finish material providing indexes for flame spread and smoke developed, based on testing conducted according to ASTM Standard E84 or UL 723.
19. Textured Pattern: Granular or raised (fine, coarse, or a blend), felted or matted surface as an integral part of the basic product or superimposed on the product surface.
20. Tile: Acoustical ceiling board, usually 12 inch x 12 inch (305 mm x 305 mm), which is stapled, cemented, or suspended by concealed grid system. Edges are often kerfed and cut back.

C. Reference Standards:

1. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
 - a. ASHRAE Standard 62.1-2010, 'Ventilation for Acceptable Indoor Air Quality'.
2. ASTM International;
 - a. ASTM D1779-98(2011), 'Standard Specification for Adhesive for Acoustical Materials'.
 - b. ASTM E84-12, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - c. ASTM E795-05, 'Standard Practices for Mounting Test Specimens During Sound Absorption Tests'.
 - d. ASTM E1264-08e1, 'Standard Classification for Acoustical Ceiling Products'.
 - e. ASTM E1414/E1414-11a, 'Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum'.
 - f. ASTM E1477 - 98a(2008), 'Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers'.
3. International Building Code (IBC) (2009 Edition):
 - a. Chapter 8, 'Interior Finishes':
 - 1) Section 803, 'Wall And Ceiling Finishes':
 - a) 803.1.1, 'Interior Wall and Ceiling Finish Materials'.
 - b) 803.1.2, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
4. National Fire Protection Association:
 - a. NFPA 101: 'Life Safety Code' (2009 Edition).
 - b. NFPA 265: 'Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls' (2011 Edition).
5. Underwriters Laboratories Inc.:
 - a. UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials' (Tenth Edition).

7.3 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conferences:

1. Participate in pre-installation conference specified in Section 09 2900 to review finish requirements for gypsum wallboard ceilings.
2. Schedule acoustical tile ceiling pre-installation conference after installation of gypsum wallboard but before beginning installation of tile.
3. In addition to items specified in Section 01 3100, review following:
 - a. Verify that tile comes from same dye lot and has same dye lot code.
 - b. Review requirements of acceptable and non acceptable tile.

7.4 SUBMITTALS

- A. Action Submittals:
 - 1. Samples:
 - a. One sample of each variant of specified tile series.
- B. Informational Submittals:
 - 1. Test And Evaluation Reports:
 - a. If requested by Owner, provide copies of Quality Assurance requirements for 'Class A' flame spread rating and 'Room-Corner Test'.
 - 2. Manufacturer Installations:
 - a. Published installation recommendations.
- C. Closeout Submittals:
 - 1. Include following in Operations And Maintenance Manual specified in Section 01 7800:
 - a. Warranty Documentation:
 - 1) Include final, executed copy of warranty.
 - b. Record Documentation:
 - 1) Manufacturers Documentation:
 - a) Manufacturer's literature on tile and adhesive.
 - b) Color and pattern selection.
- D. Maintenance Material Submittals:
 - 1. Extra Stock Materials:
 - a. Provide Owner with six (6) cartons of each type of tile with same dye lot code.

7.5 QUALITY ASSURANCE

- A. Regulatory Agency Sustainability Approvals:
 - 1. Fire-Test-Response Characteristics: As determined by testing identical ceiling tile applied with identical adhesives to substrates according to test method indicated below by qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - a. Surface-Burning Characteristics:
 - 1) Ceiling tile shall have Class A flame spread rating in accordance with ASTM E84 or UL 723 Type 1.
 - a) Class A (Flame spread index 0-25; Smoke-developed index 0-450).
 - b) Flash point: None.
 - 2. Passage of 'Room-Corner Test' as recognized by AHJ, is required for system. Adhesive cited in test literature is required for installation of ceiling tile on Project.
 - a. Room Corner Tests:
 - 1) ASTM E84, 'Standard Test Method for Surface Burning Characteristics of Building Materials'.
 - 2) IBC 803.2.1, 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 3) ISO 9705, 'Room/Corner Test: Simulations, Correlations and Heat Flux Measurements'.
 - 4) NFPA 265: 'Room Corner Test for Interior Wall or Ceiling Finish Materials'.
 - 5) UL 723, 'Standard for Safety Test for Surface Burning Characteristics of Building Materials'.

7.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Materials shall be delivered in original, unopened packages with labels intact.
- B. Storage And Handling Requirements:
 - 1. Store materials where protected from moisture, direct sunlight, surface contamination, and damage.

2. Store acoustic tile in cool, dry location, out of direct sunlight and weather, and at temperatures between 32 deg F (0 deg C) and 86 deg F (30 deg C).
3. Store adhesive on site at installation temperature, between 65 and 90 deg F (18 and 32 deg C), for one week before installation.
4. Handle acoustical ceiling tiles carefully to avoid chipping edges or damage. Use no soiled, scratched, or broken material in the Work.

7.7 FIELD CONDITIONS

A. Ambient Conditions:

1. Building shall be enclosed, mechanical system operating with proper filters in place, and temperature and humidity conditions stabilized within limits under which Project will operate before, during, and after installation until Substantial Completion.
2. Temperature at time of setting tile shall be 50 deg F (10 deg C) minimum and 100 deg F (38 deg C) maximum.

7.8 WARRANTY

A. Manufacturer Warranty:

1. Provide Manufacturer's ten (10) year limited system warranty for the following:
 - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.
 - b. Manufacturer's warranty against sagging and warping.
 - c. Manufacturer's warranty against mold/mildew, and bacterial growth.
2. Provide Manufacturer's system warranty for the following:
 - a. Manufacturer's warranty to be free from defects in materials and factory workmanship.

PART 8 - PRODUCTS

8.1 SYSTEM

A. Manufacturers:

1. Manufacturer Contact List:
 - a. Armstrong World Industries, Strategic Accounts, Lancaster, PA www.ceilings.com.
 - 1) For pricing and ordering of tile, contact Sherry Brunt, Phyllis Miller, or Beth Rinehart at (800) 442-4212, FAX 800-233-5598, or bpo_strategic_accounts@armstrong.com.
 - 2) For Strategic Account information, contact Randy Lay at (303) 775-1409 ralay@armstrong.com.
 - b. Franklin International, Inc, Columbus, OH www.titebond.com.
 - c. USG Inc, Chicago, IL www.usg.com.

B. Materials:

1. Description:
 - a. Size: 3/4 inch (19 mm) thick minimum by 12 inches (300 mm) square.
 - b. Color: White.
 - c. Grid Face: Tile glue-up.
 - d. Surface Finish: Factory-applied.
 - e. Wet-formed high density mineral fiber.
2. Design Criteria:
 - a. Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
 - b. Acoustics:
 - 1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
 - a) NRC rating: 60 minimum.
 - 2) CAC rating: 35 minimum.

- c. Anti Mold / Mildew:
 - 1) Resistance against growth of mold/mildew.
 - d. Durable:
 - 1) Impact-resistant.
 - 2) Scratch-resistant.
 - e. Edge Profile: Beveled K4C4.
 - f. Finish:
 - 1) Abuse-resistant/durable, factory applied vinyl latex paint.
 - g. Fire Performance:
 - 1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
 - h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.
 - i. Light Reflectance (LR): 0.86 Average (Range of 0.84 to 0.88).
 - j. Sag Resistance:
 - 1) Resistance to sagging in high humidity conditions up to, but not including, standing water and outdoor applications.
 - k. Texture: Embossed texture with fine fissuring and small perforations with natural variation in texture and color appearance between tile.
 - l. VOC Emissions:
 - 1) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
3. Acoustic Tile:
- a. Category Three National Account Approved Product. See Section 01 6200 for definitions of Categories:
 - 1) DuraTile Item No. MN80375 by Armstrong.

C. Materials:

- 1. Description:
 - a. Size: 3/4 inch (19 mm) thick minimum by 12 inches (305 mm) square.
 - b. Color: White.
 - c. Grid Face: Tile glue-up.
 - d. Surface Finish: Factory-applied.
 - e. Wet-formed high density mineral fiber.
- 2. Design Criteria:
 - a. Armstrong:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 2 (water felted), Pattern CE (perforated, small holes – lightly textured), Fire Class A.
 - 2) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 1 (nodular), Pattern E (lightly textured) or Pattern F (heavily textured), Fire Class A.
 - b. USG:
 - 1) Meet requirements of ASTM E1264, Type III (mineral base with painted finish), Form 4 (cast or molded), Pattern D (Fissured), Fire Class A.
 - c. Acoustics:
 - 1) Noise Reduction Coefficient (Rating expressed according to ASTM E1284 requirements:
 - a) NRC rating: 60 minimum.
 - 2) CAC rating:
 - a) Armstrong: 35 minimum.
 - b) USG: 25 minimum.
 - d. Anti Mold / Mildew:
 - 1) Resistance against growth of mold/mildew.
 - e. Durable:
 - 1) Impact-resistant.
 - 2) Scratch-resistant.
 - f. Finish:
 - 1) Abuse-resistant/durable, factory applied vinyl latex paint.
 - g. Fire Performance:
 - 1) Panels meet ASTM E84 or UL 723 Type 1 surface burning characteristics.
 - h. High Recycled Content (HRC): Classified as containing greater than 50 percent total recycled content.

- i. Light Reflectance (LR): 0.79 minimum.
 - j. VOC Requirements:
 - 1) Armstrong:
 - a) Low formaldehyde: Contributing less than 13.5 ppb in typical conditions per ASHRAE Standard 62, 'Ventilation for Acceptable Indoor Air Quality'.
 - 2) USG:
 - a) Zero.
 - 3. Acoustic Tile:
 - a. Category Four Approved Product. See Section 01 6200 for definitions of Categories.
 - 1) 'F' Fissured by USG.
- D. Accessories:
- 1. Adhesive:
 - a. Description:
 - 1) For use on acoustical ceiling tiles.
 - b. Design Criteria:
 - 1) Meet requirements of ASTM D1779.
 - 2) Meet NFPA Class A fire rating when tested in accordance with ASTM E84.
 - 3) Fast grab and 'no sag' installation.
 - 4) Water cleanup.
 - 5) Not recommended for use on tiles larger than 12 inch x 12 inch (305 mm x 305 mm).
 - c. Type Two Acceptable Products:
 - 1) Titebond No. 2704 Solvent Free Acoustical Ceiling Tile Adhesive by Franklin International.
 - 2) Highest quality of adhesive from manufacturer recommended by Tile Manufacturer as approved by Architect before use. See Section 01 6200.
 - 2. Edge Molding:
 - a. Steel 'U' molding with baked enamel finish.
 - b. Type Two Acceptable Products:
 - 1) US 12 RWS 14 by USG Interiors.
 - 2) Equal as approved by Architect before installation. See Section 01 6200.

PART 9 - EXECUTION

9.1 EXAMINATION

- A. Verification Of Conditions:
 - 1. Inspect for defects in backing and support that are not acceptable.
 - a. Examine areas around HVAC diffusers and light fixtures for tile installation problems.
 - b. Examine ceiling for levelness. Cisca '*Code of Practice*' requires ceiling to be free of irregularities and be level to within 1/4 inch (6 mm) in 12 foot (305 mm).
 - c. Examine substrate for any problems that will compromise adhesion of ceiling tile.
 - 2. Notify Architect in writing of unacceptable conditions.
 - 3. Do not apply ceiling tile until defects in backing and support are corrected.

9.2 PREPARATION

- A. Surface Preparation:
 - 1. Follow Manufacturer recommendations for surface preparation:
 - a. Substrate must be clean, free of grease and dirt, sound, smooth, even and level before applying tile to surface.
 - 1) Do not install new ceiling tile over old glue globs or bad substrate with any surface finish that is incompatible with tile adhesive.
 - b. Painted Surfaces: Avoid applying tile to newly painted ceiling.
 - c. Materials shall be dry and clean at time of application.

9.3 INSTALLATION

- A. Special Techniques:
1. Installation shall be in accordance with Manufacturer's recommendations:
 - a. Do not install tile when room temperature exceeds or below recommended ambient conditions.
 - b. Tile is directional tile and must be installed in same direction of pattern running parallel to long dimension of each room.
 - c. Remove loose dust from back of tile and ceiling where adhesive is to be applied.
 - d. Prime 3 inch (75 mm) minimum circle near each corner by buttering very thin coat of adhesive.
 - e. Apply daub of adhesive to each corner. Daubs will be of sufficient size to form a circle 2-1/2 to 3 inches (63 to 75 mm) in diameter and 1/8 to 1/4 inch (3 to 6 mm) thick when tile is pressed firmly in place. Do not apply daubs so far in advance of installation that adhesive skins over.
 - f. Install splines in kerfs at corners.
 - g. Do not bend tile during installation.
 2. Tile Layout:
 - a. Lay out tile symmetrically about center lines of room.
 - b. Lay out so tiles at room perimeters are at least 1/2 full tile size.
 - c. Leave tile in true plane with straight, even joints.
 - d. Tile joints shall be straight and in alignment, and exposed surface flush and level.
 - e. Furnish and install specified molding wherever tile has exposed edges or abuts walls, columns, and other vertical surfaces, except at curves of 3 inch (75 mm) radius or smaller.
 - f. Cut around penetrations that are not to receive moldings cleanly with sharp knife and at a slight angle away from cutout.
 3. Ceiling mounted items:
 - a. Locate light fixtures, speakers, and mechanical diffusers and grilles symmetrically in room and centered on tile centers or tile joints insofar as possible, unless shown otherwise.
 - b. Keep method of locating ceiling mounted items as consistent as possible throughout building.
 - c. Ceiling mounted item location method within each room shall always be consistent.

9.4 FIELD QUALITY CONTROL

- A. Non-Conforming Work:
1. Acoustical Tile. The following have been identified by the Manufacturer as tile defects, should not be installed, and will be replaced at no charge to Owner. Manufacturer will replace any material that does not meet product specifications. Installer to call 1 (800) 442-4212 immediately to report any tile discrepancies:
 - a. Obvious Tile Defects:
 - 1) Gross surface defects or damage.
 - 2) Gross damage to edges and corners.
 - 3) Bevels without paint.
 - b. Size Measurement:
 - 1) Tiles measure 12 inches (305 mm), plus or minus 1/32 inch (0.8 mm), measured across center of two (2) parallel sides.
 - c. Squareness Measurement:
 - 1) Measure two (2) diagonals of an individual ceiling tile.
 - 2) Diagonal measurements needs to be within 1/16 inch (1.6 mm) of each other. No more than 1/16 inch (1.6 mm) difference.
 - d. Warp:
 - 1) Tiles specification is plus or minus 0.050 inch (1.27 mm) as measured in the center of tile.
 2. Installer:
 - a. Substrate preparation and installation of ceiling tile not following CISCA Code of Practice will be unacceptable and considered defective and subject to replacement at no cost to Owner.

9.5 ADJUSTING

- A. 'Touch-up' minor abraded surfaces.

9.6 CLEANING

- A. Remove from site debris connected with work of this Section.

END OF SECTION