

## **PART 1- GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 23 37 13 - Diffusers, Registers and Grilles: Air inlets and outlets to be coordinated with ceiling work.

### **1.2 REFERENCE STANDARDS**

- .1 ASTM International
  - .1 ASTM C 635/C 635M-17, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .2 ASTM C 636/C 636M-13, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
  - .3 ASTM E 1264-14, Standard Classification for Acoustical Ceiling Products.
  - .4 ASTM E 1414/E 1414M 16 Standard Test Method for Sound Attenuation between Rooms Sharing a Common Ceiling Plenum.
  - .5 ASTM E 1477-17, Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-2010, Surface Burning Characteristics of Building Materials and Assemblies.

### **1.3 COORDINATION**

- .1 Do not begin erection of ceiling suspension system until work above ceiling has been inspected by Departmental Representative.

### **1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for acoustical suspension, acoustic panels, and system accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
  - .2 Submit duplicate samples of each component proposed for use in ceiling suspension system.

- .3 Submit duplicate 150 mm x 100 mm samples of each type of acoustical unit.

### **1.5 CLOSEOUT SUBMITTALS**

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit operation and maintenance data for acoustical suspension for incorporation into manual.

### **1.6 MAINTENANCE MATERIALS**

- .1 Provide extra acoustical units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type of acoustical panel, suspension system and trim required for project, minimum 1 complete factory-sealed package of each.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Deliver extra materials for each type of acoustical unit in original unopened packages clearly identified, including colour and texture.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.

### **1.7 MOCK-UPS**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up 10 m<sup>2</sup> minimum of acoustical ceiling assembly including one inside corner and one outside corner . Ceiling system mock-up to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, and acoustical unit installation.
- .3 Construct mock-up where directed.
- .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with ceiling work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work upon acceptance by Departmental Representative.

### **1.8 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials flat, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect acoustical ceiling panels suspension grid components from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.
  - .4 Store extra materials required for maintenance, where directed by Departmental Representative.

### **1.9 ENVIRONMENTAL REQUIREMENTS**

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20-40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

## **PART 2 - PRODUCTS**

### **2.1 SUSTAINABLE REQUIREMENTS**

- .1 Materials and products in accordance with Section 01 47 15 – Sustainable Requirements

### **2.2 DESIGN CRITERIA**

- .1 Design Requirements:
  - .1 Intermediate duty system to ASTM C 635/ASTM C635M.
  - .2 Maximum deflection: 1/360th of span to ASTM C 635/ASTM C635M deflection test.

### **2.3 ACOUSTICAL CEILING SUSPENSION**

- .1 Acoustical Ceiling Suspension system: non fire rated, made up as follows:
  - .1 2 directional exposed tee bar grid.

- .2 Basic materials for suspension system: commercial quality cold rolled steel zinc coated.
- .3 Exposed tee bar grid components: shop painted satin sheen white Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .4 Hanger wire: galvanized soft annealed steel wire:
  - .1 3.6 mm diameter for access tile ceilings.
- .5 Hanger inserts: purpose made.
- .6 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.

## **2.4 FIBERGLASS REINFORCED CEILING (FRP) GRID**

- .1 High strength pultruded FRP ceiling grid system
- .2 FRP grid shall be moisture resistant and will not support growth of mold and mildew and will not rust or corrode.
- .3 Components:
  - .1 Wall Angles: 4000 mm length fasteners directly to the wall with nylon drive rivets.
  - .2 Hanger Wire: Provided by others, manufacturer's standard; secured with stainless steel anchors.
  - .3 Main Runners: 3700 mm, notched on 60 mm centers.
  - .4 Cross Tee: 1200 mm, 620 mm and 620 mm lengths, prenotched ends.
  - .5 Connector Clip: Joins main runners.
  - .6 Holddown Clips: Provide holddown clips for use with ceiling panels 7.1mm-12.7mm.
  - .7 Wall Anchor (as recommended by manufacturer): Secures main runner and cross tees to wall angle.
- .4 Colour: White
- .5 Properties
  - .1 Meets Class A finish requirements: Flame spread of less than 25, smoke developed less than 450 per ASTM E-84 latest version.
  - .2 Meets USDA/FSIS Requirements.

## **2.5 ACOUSTICAL CEILING PANELS**

- .1 Acoustical Panel: to ASTM E 1264 and as follows.
  - .1 Type: 111, Form 2.
  - .2 Pattern Designation: C E
  - .3 Fire Classification: Class A.
    - .1 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
    - .2 Smoke developed 50 or less in accordance with CAN/ULC-S102.
  - .4 Noise Reduction Coefficient (NRC) designation of 0.70.
  - .5 Ceiling Attenuation Class (CAC) rating 35 in accordance with ASTM E 1414.
  - .6 Light Reflectance (LR) range of .85 to ASTM E 1477.

- .7 Edge type square.
- .8 Colour White
- .9 Size 610 x 610 x 19 mm thick.
- .10 Shape flat.

## **2.6 FIBERGLASS REINFORCED PLASTIC (FRP) CEILING PANELS**

- .1 Composite ceiling panel consisting of white embossed FRP skin bonded to a fluted polypropylene substrate.
- .2 Size: 610 x 610 x 10 mm
- .3 FRP ceiling panels shall be moisture resistant and will not support growth of mold and mildew and will not corrode.
- .4 Meets Class C finish requirements to ASTM E84.

## **PART 3- EXECUTION**

### **3.1 EXAMINATION**

- .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
  - .1 Visually inspect substrate in presence of Departmental Representative.
  - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
  - .3 Proceed with installation only after unacceptable conditions have been remedied [and after receipt of written approval to proceed from Departmental Representative.

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

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

### **3.3 SUSPENSION SYSTEM INSTALLATION**

- .1 Comply with manufacturer's written installation instructions and recommendations, including product technical bulletins, product carton installation instructions, and data sheets.
- .2 Install suspension system in accordance with accepted shop drawings, and ASTM C 636/C 636M except where specified otherwise.
- .3 Lay out system according to reflected ceiling plan.

- .4 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .5 Secure hangers to overhead structure using attachment methods acceptable to Departmental Representative.
- .6 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .7 Ensure suspension system is coordinated with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above ceiling.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide 10 % ceiling access.

### **3.4 ACOUSTICAL CEILING PANEL INSTALLATION**

- .1 Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.

### **3.5 SITE QUALITY CONTROL**

- .1 Arrange for periodic site visits by design professional responsible for delegated ceiling design work to review installed work for conformity to design.
- .2 Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
- .3 Submit written site reports by designer to Departmental Representative within 3 days of visit.

### **3.6 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.

- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
  - .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

### **3.7 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical suspension installation.

**END OF SECTION**