

PART 1 - GENERAL**1.1 RELATED REQUIREMENTS**

- .1 Section 01 74 19 – Waste management and disposal.
- .2 Section 04 20 00.08 – Masonry for minor works.
- .3 Section 05 50 00 – Metal fabrications.
- .4 Section 09 91 99 – Painting for minor works.

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 635/C 635M-07, 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-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .3 ASTM E 1477-98a(2008), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - .4 ASTM A653/A653M-17 - Standard Specification for Sheet Steel, Zinc-coated (Galvanized) or Zinc-Iron Alloy-coated (Galvannealed) by the Hot-Dip Process
 - .5 ASTM C423-17 - Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .6 ASTM D3273-16 - Resistance to Growth of Mold of Interior Coatings in an Environmental Chamber
 - .7 ASTM D4828 (2016)- Standard Test Methods for Practical Washability
 - .8 ASTM E84-18- Surface Burning Characteristics of Building Materials
 - .9 ASTM E119-18 - Fire Tests of Building Construction and Materials
 - .10 ASTM E580/E580M-17 - Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
 - .11 ASTM E1264-14- Classification for Acoustical Ceiling Products
 - .12 ASTM E1414/E1414M-16 - Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
 - .13 ASTM E580/E580M-17 (Section 4) - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units.
 - .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
 - .4 Seismic Design Category C : 2009 & 2006 IBC® International Building Code - Section 1613 (2007 CBC California Building Code)
 - .1 American Society of Civil Engineers 7-05 : Minimum Design Loads for Buildings and Other Structures.
 - .2 CISCA : Guidelines for Seismic Restraint Direct Hung Suspended Ceiling Assemblies Seismic Zones 0-2.
 - .5 Seismic Design Category C : 2012 IBC® International Building Code - Section 1613 (2010 CBC California Building Code)
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- .1 American Society of Civil Engineers 7-10 : Minimum Design Loads for Buildings and Other Structures.
- .6 CISCA Ceiling Systems Installation Handbook.
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .7 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .8 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-[A2007], Architectural Coatings.
- .9 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2007, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .10 NFPA 70 - 2008 National Electrical Code (NEC) Section 410-36

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [ceiling panels and ceiling suspension system] and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 The submitted shop drawings must bear the seal and signature of a competent earthquake engineer recognized or authorized to practice in Canada, in the province of Quebec, to the effect that the design of the ceilings' suspension frames respects the prescriptions of the National Building Code of Quebec 2010 regarding installation precautions relating to earthquakes (article 4.1.8.18 and part 4 Calculation rule, Paragraph J.223 which refers to the CSA S-832 standard (referring to the standard American ASTM E580).
 - .2 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, change in level details, acoustical unit support at ceiling fixture and lateral bracing and accessories.
- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit duplicate full size samples of each type acoustical units.

1.4 QUALITY ASSURANCE

- .1 Regulatory agencies' requirements
 - .1 Sole Supplier Responsibility: To obtain the combined warranty for the suspension system and acoustic tiles, guarantee color match or compatibility of ceiling tiles and suspension system, all acoustic tiles and all Suspension system components must be manufactured and supplied by a single manufacturer. The use of materials supplied by more than one manufacturer is not acceptable.
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- .2 Subcontractor qualifications: The installer must have satisfactory experience in the installation of suspended ceiling systems for projects with requirements similar to those of this specification.
- .3 **Regulatory agencies' requirements:** Floor / ceiling and roof / ceiling assemblies with a degree of fire resistance: certified by a Canadian certification body accredited by the Standards Council of Canada.
- .4 Quality control of the supply:
 - .1 Test reports: The manufacturer must provide tests certification with respect to minimum requirements in accordance with applicable industry standards or according to performance standards prescribed by various organizations.

1.5 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 off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store materials inside, level, under cover. Protect from weather, damage from construction operations and other causes, in accordance with manufacturer's printed instructions.
 - .3 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.
 - .4 Store and protect [acoustic ceiling materials] from [nicks, scratches, and blemishes].
 - .5 Replace defective or damaged materials with new.
- .4 Waste Management and Disposal:
 - .1 Waste Management and Disposal
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .2 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials in accordance with Section 01 74 19 - Waste Management and Disposal.

1.6 CONDITIONS OF IMPLEMENTATION

- .1 Installation of acoustic tiles must not begin until the building is closed, the permanent heating and air conditioning system is working and residual moisture due to plastering, concreting, or terrazzo works is dissipated.
- .2 Do not use ceiling tiles in excessive humidity conditions or in areas constantly exposed to high humidity or exposed directly to weather or water. Ceiling tiles are sized and designed for use in humidity and temperature conditions within the normal occupancy range, i.e. between 18 and 29 ° C (65 and 85 ° F) and relative humidity not exceeding 70%
- .3 Allow the necessary time to vary the dimensions of the ceiling tiles stored in temperature and humidity conditions well outside the recommended indices.

1.7 REPLACEMENT MATERIALS

- .1 Provide acoustic elements for replacement in accordance with section 01 78 00 - Documents / Elements to be submitted upon completion of work.

- .2 Provide an additional quantity of acoustic elements equivalent to 10% of the gross ceiling area, for each type and model of acoustic elements used in the context of this work.
- .3 Ensure that the replacement materials come from the same manufacturing lots as the materials used for the work.
- .4 Clearly identify each type of acoustic element, also indicating color and texture.
- .5 Deliver the replacement materials to the Departmental Representative, once the work hereunder this section has been completed.

1.8 WARRANTY

- .1 Provide a written warranty, issued in the name of the owner, certifying that the work specified in this section will be free from any defect in materials and workmanship, for a period of one (1) year from the date of final acceptance.
- .2 Provide a written warranty from the suspension system manufacturer, issued in the name of the owner, certifying that the work specified in this section will be free from manufacturing defects, for a period of ten (10) years from the date of purchase.

PART 2 - PRODUCTS

2.1 CONCEPTION CRITERIAS

- .1 Design requirements: Maximum deflection: deflection 1/360 of span, determined by deflection tests prescribed in ASTM C635 / ASTM C635M.
- .2 Ceiling location category (design): category C

2.2 ACOUSTICAL CEILING ELEMENTS

- .1 Acoustic tiles for suspended ceilings type PF1: in accordance with ASTM E1264.
 - .1 Material: hydroformed mineral fiber with transparent acoustic membrane.
 - .2 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
 - .3 Smoke developed 50 or less in accordance with CAN/ULC-S102.
 - .4 Class A fire resistance.
 - .5 Noise Reduction Coefficient (NRC) designation of 0.85, (CAP) : 28.
 - .6 Light Reflectance (LR) range of 0.86 to ASTM E 1477.
 - .7 Depression resistance: Humiguard plus
 - .8 Anti-mold and bacteria: Bio-block antimicrobial treatment
 - .9 Edge type bevelled.
 - .10 Finish: transparent acoustic membrane with factory-applied latex paint
 - .11 Colour Standard white.
 - .12 Size 600mm x 610mm x 22 mm thick (imperial).
 - .13 Texture: Smooth.
 - .14 Accepted product: (standard edifice), Armstrong Calla # 2822.

2.3 SUSPENSION FRAME FOR ACOUSTIC CEILINGS

- .1 Suspension frames for acoustic ceilings, type PF1, exposed tee system 15/16 ".
 - .1 Visible framing elements with a T profiles grid: double-web steel construction with 25mm exposed visible flange design. Secondary tees surmounted by a rectangular tubing, with web terminated in tabs Ensuring attachment to the main tees, with a lower flange with a flush offset at crossings.

- .2 Characteristics: intermediate strength, according to ASTM C635.
- .3 Material and finish: hot-dipped galvanized steel.
- .4 Type: no fire resistance degree, consisting of a visible T-profiles grid.
- .5 Color: powder-coated finish in Blizzard White (ZW), factory-applied.
- .6 Size: 15/16 " (imperial).
- .7 Accepted Product: (Building standard), Armstrong Prelude XL

2.4 SUSPENSION FRAME ACCESSORIES FOR ACOUSTIC CEILINGS (Seismic Category C)

- .1 Ceiling weight including all services: equal to or less than 2.5 lb / p².
- .2 Perimeter molding: 23.8 mm (15/16 ").
- .3 Fasteners and staples (clip): earthquake-resistant type, Armstrong BERC2.
- .4 Hangers and ties: soft annealed, galvanized steel wire, 12 gauge.
- .5 All accessories, materials, and equipment required for the installation of a seismic ceiling.
- .6 Accessories: fishplates, fasteners, wire ties, staples and wall-ceiling joint moldings necessary to make a complete suspension frame, in accordance with the manufacturer's recommendations.
- .7 Fasteners for hangers: specially manufactured

2.5 ACCESSORIES

- .1 Flush 23 mm (15/16 ") transition molding for drywall / acoustic tile transition.

PART 3- EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to acoustical ceiling installation.
 - .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 INSPECTION

- .1 The start of the installation work implies acceptance of the present conditions in the area that will receive the ceiling tiles.
 - .2 Examine the areas that will receive the ceiling tiles in order to detect conditions likely to have a negative impact on the installation.
 - .3 Do not begin work until unsatisfactory conditions have been corrected.
 - .4 Work that will be concealed: Ensure that work above the ceiling is completed and executed in a way that will not interfere with the layout and installation of ceiling tiles.
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- .5 Protect work completed above the ceiling system from damage during installation of ceiling elements.
- .6 Requirements for fire resistant systems: Any work above an assembly with a fire resistance rating must comply with the UL / ULC assembly requirements.

3.3 ASSEMBLY – GENERAL WORKS

- .1 Install framing elements in accordance with ASTM C 636 except where specified otherwise.
- .2 Suspension System:
 - .1 Erect ceiling suspension system after work above ceiling has been inspected by Departmental Representative.
 - .2 Secure hangers to overhead structure using attachment methods as indicated.
 - .3 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
 - .4 Lay out centreline of ceiling both ways, to provide balanced borders at room perimeter. Lay out system according to reflected ceiling plan.
 - .5 Install wall moulding to provide correct ceiling height.
 - .6 Completed suspension system to support super-imposed loads, such as lighting fixtures and diffusers.
 - .7 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.
 - .8 Interlock cross member to main runner to provide rigid assembly.
 - .9 Ensure finished ceiling system is square with adjoining walls and level within 1:1000.
- .3 Acoustic Panels:
 - .1 Install acoustical panels and tiles in ceiling suspension system.
 - .2 Co-ordinate ceiling work with work of other sections such as interior lighting, fire protection communication, and intrusion and detection systems.

3.4 ASSEMBLY FOR SEISMIC CEILINGS (CATEGORY C)

- .1 Install seismic ceilings in accordance with the manufacturer's written recommendations, ASTM E580, the Cisca Ceiling Systems Handbook, and the National Building Code, Quebec edition.
- .2 Ensure that the maximum weight of the ceiling including tile, suspension, lighting fixtures is 2.5 lbs / p² maximum.
- .3 Ensure that the main and secondary suspension tees will have a compressive tensile strength of at least 60 lbs. Leave a space of at least 3/8 " between the wall and the ends of the tees on two of the adjacent walls. The BERC2 earthquake-resistant fasteners on these two adjacent walls allow the tees to move freely.
- .4 On the two other adjacent walls, the tees are cut, the tees are against the wall and the BERC2 seismic fasteners are used to lock the ceiling in place.
- .5 The entire perimeter must be stabilized with BERC2 ties.
- .6 The hangers should be attached to the main beams every 1220 mm c/c and banding 3 times around the hangers on 75 mm (3 ") and secured to the structure above.
- .7 Install a 15/16 "min. Perimeter molding. On two of the walls, maintain a minimum clearance of 9.5mm (3/8 ") between the end of the grid and the wall. Perimeter tees must be supported by additional wire no more than 200mm from the wall.

- .8 The mesh connection fastened to two adjacent walls is prohibited for a category C earthquake-resistant assembly.
- .9 Link the ends of perimeter tees.
- .10 Anchors to the slab or to the structure must be able to support at least 100 lbs each.
- .11 Lighting devices (all types) must be mechanically fastened to the grid in accordance with NEC code 410-06 (two fasteners per device unless the device is supported separately).
- .12 Support pendant lights directly to the structure with 9 gauge wire
- .13 Rigid free-standing or recessed lighting fixtures must be properly fastened according to their weight and applicable standards.
- .14 The air diffusers, if they are less than 20 lbs, must be securely attached to the grid and if they are between 21 and 56 lbs they must be securely attached to the grid and provided with two 12 gauge wires attached to the structure
- .15 Provide 9.5 mm clearance on all sides of sprinkler heads and other penetrations.

3.5 WORK COORDINATION

- .1 Coordinate the installation of the ceiling system with the other trades works affected by this installation, with special attention given to mechanical and electrical work to be installed and operating before ceiling work can begin.
- .2 Coordination with other work:
 - .1 General: Coordinate works supported by the ceiling or penetrating it, including mechanical and electrical work, and partition systems.
 - .2 Mechanical work: Before the installation of the ceiling elements, the ducts above the ceiling must be installed and the permanent heating and air conditioning equipment must be in operation according to the expected climatic conditions.
 - .3 Electrical work: The installation of conduits above the ceiling must be completed before the installation of the ceiling elements.
 - .4 Fire protection work: Ducts or fire protection equipment above the ceiling must be in place and tested before installation of ceiling elements.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

3.7 PROTECTION

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

END OF SECTION
