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*Note to the Designer/Architect/Engineer: These Specifications are basic minimum criteria to be met in preparing the final project specifications for this section, which is the responsibility of the Designer*

York University Building Standards

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## 1.0 GENERAL

### 1.1 Scope of Work

- .1 This York University Building Standard includes, materials, equipment, tools and labour required for the supply and installation of suspended acoustical ceiling

### 1.2 Guideline and Design Principles

- .1 The following preferred standard Acoustical Ceiling Tile is stocked by Campus Services and Business Operations Stores and shall be used in campus renovation and new construction projects unless otherwise specified and agreed to by CSBO:
  - .1 Armstrong 763D Georgian in white colour size 609.6mm X 1,219.2mm (2' X 4')
  - .2 For large renovation projects or new construction, where suspended ceiling systems are specified and acoustical ceiling tiles are required, the acoustical tiles specified shall meet or exceed the minimum requirements specified in this Standard.
  - .3 Where other acoustical ceiling systems are proposed, the criteria for selection shall also focus on:
    - .1 ease of accessibility for removal and replacement
    - .2 durability
    - .3 high light reflectance
    - .4 mould and mildew resistance
  - .4 The actual average weight of the ceiling system, including grid, panel or tile, light fixtures, and air terminals must be 12.2 kg/m<sup>2</sup> (2.5 lb./ft<sup>2</sup>) or less. Services must be supported independently from the ceiling system, unless otherwise indicated

- .5 The main runners and cross runners of the suspended ceiling system and their splices, intersection connectors, and expansion devices shall be designed and constructed to carry a mean ultimate test load of not less than 27.2 kg (60 lb.) in tension with maximum 5° misalignment of the members in any direction and in compression
- .6 Maximum deflection: 1/360 of span in accordance with ASTM C635 deflection test
- .7 Maximum variation from dimensional position: 6 mm (1/4") and maximum variation from flat plane shall be 3 mm in 3 m (1/8" in 10'-0")
- .8 Fire resistance: as per applicable municipal, provincial requirements, standards
- .9 Resistance to seismic forces: per latest iteration of the Ontario Building Code and all other applicable regulations, standards and codes

### 1.3 Sustainable Design Requirements

- .1 Life-Cycle Analysis Costing – use suspended ceiling systems with a minimum 25 year life expectancy
- .2 Suspended Acoustical Ceiling tiles shall have a minimum of 50% post consumer recycled content

### 1.4 Submittals

- .1 Shop Drawings – for large projects and all new construction, submit shop drawings (S.D) of the suspension system. Shop Drawings of the suspension system shall be stamped and signed by an engineer member of the Ontario association of professional engineers, as to conformity with the requirements of seismic and load resistance

### 1.5 Related York University Standards and Guidelines

- .1 Painting Section 09 91 00
- .2 Metal Supports for Gypsum and Cement Board Section 09

21 00

### 1.6 Performance Standards References

- .1 Comply with latest iteration of the Ontario Building Code
- .2 ASTM C636 / C636M - 08 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels

- .3 ASTM C635 / C635M - 07 Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings
- .4 Refer to Natural Resources Canada information on seismic zones for the Keele and Glendon campuses "Southern Great Lakes Seismic Zone"
- .5 ASTM E580 / E580M - 11b Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions
- .6 CAN/CGSB 92.1-M89 Sound Absorptive Prefabricated Acoustical Units
- .7 ASTM E488 / E488M -10 Standard Test Method for Strength of Anchors in Concrete Elements
- .8 Acoustical Ceilings Use and Practice, and Ceiling Systems Handbook, Ceilings Interior Systems Construction Association

#### 1.7 Qualifications

- .1 The work covered by this section shall be undertaken by skilled labour, and in accordance with known industry best practices and the instructions of the manufacturer of the products being used

#### 1.8 Warranty (Standard Warranty and Extended Warranty)

- .1 Provide manufacturer's standard performance guarantees or warranties (for Armstrong 763D Georgian 30-year performance guarantee and warranty). Include an agreement with installer to repair or replace acoustical tiles that fail within the warranty period in the standard performance guarantee or warranty. Failures include, but are not limited to, sagging and warping of acoustical ceiling tiles, rusting and manufacturers defects of grid system

#### 1.9 Delivery, Handling and Storage

- .1 For large renovation projects and all new construction:
  - .1 Deliver materials to the site in the manufacturer's original unopened containers with brand name and type clearly marked
  - .2 Carefully handle and store materials in a dry, watertight enclosure
  - .3 Ensure that acoustical tile packages are protected against dirt, and constraints due to excessive loads or impact

- .4 Replace any damaged materials at no charge to the Owner. Warped or folded metallic elements are unacceptable
- .5 Before installation, store acoustical tiles for not less than 24 hours at the same temperature and relative humidity as the space where the acoustical ceiling tiles will be installed in order to assure proper temperature and moisture acclimation

#### 1.10 Environmental Conditions

- .1 Allow work generating humidity to dry before starting the work (covered by this Standard) do not start before dust generating activities have ceased
- .2 Maintain uniform temperature between 15°C and 29°C and relative humidity of between 20% and 70% before and during installation

#### 1.11 Scheduling

- .1 Schedule the installation of suspended acoustical ceiling tile system in accordance with the following parameters:
  - .1 Complete and dry interior finish work such as plastering, concrete and floor tiling or carpeting
  - .2 Complete mechanical, electrical and other work above ceiling line
  - .3 Install and start operating heating, ventilation and air conditioning systems in order to maintain temperature and humidity requirements

#### 1.12 Extra Material (Maintenance Requirements)

- .1 For new construction and large renovation projects that will deploy the York University standard acoustical ceiling tile (Armstrong 763D Georgian in white colour size 609.6mm X 1,219.2mm (2' X 4') deliver to CSBO Maintenance, 2% of total installed acoustical ceiling tiles used in the work
- .2 For new construction and large renovation projects that do not use the York University standard acoustical ceiling tile (Armstrong 763D Georgian in white colour size 609.6mm X 1,219.2mm (2' X 4') deliver to CSBO Maintenance, 10% of total for each colour and texture acoustical ceiling tile used in the work
- .3 Pack ceiling tiles in suitable containers, clearly date and identified as to type and location of installation in the Work, store where directed by York University Project

Representative

## 2.0 PRODUCTS

### 2.1 Metal Suspension Systems

- .1 Use hanger anchorage devices, screws, clips, bolts, concrete inserts and other hardware recommended by the acoustical ceiling tile system manufacturer
- .2 Size devices for 3 times calculated load supported except size direct pullout concrete inserts for 5 times calculated load
- .3 Concrete hanger anchors; post installed: steel eye bolts and nuts to suit ceiling hangers with capability to sustain, without failure, a load equal to 4 times that imposed by ceiling construction, as determined by testing per ASTM E488-10
- .4 Fasteners exposed to weather, condensation, and corrosion shall be Zinc-plated or stainless steel fasteners in applicable product lines
- .5 Hangers: Shall be galvanized wire, recommended by the manufacturer of the suspension system with a minimum 2.66mm diameter (0.1") 12 gauge
- .6 Tie wire: shall be 1.519 mm (0.06") diameter galvanized steel wire
- .7 Suspension system accessories:
  - .1 Splices, clips and perimeter moulding, of manufacturer's standard type to suit the applicable conditions unless special conditions and access area are shown or specified
  - .2 Angle wall mouldings; hemmed with prefinished exposed flanges:
  - .3 Main Tee with double web, rectangular bulb and 24 mm (15/16") rolled cap on exposed face
  - .4 York University adopted Standard grid system used for the Armstrong 763D Georgian follows a 609.6mm X 1,219.2mm x 15mm (2' x 4' x 5/8") pattern with square Lay-in
  - .5 Cross Tee similar, with web extended to form positive interlock with main Tee webs
  - .6 Lower flange extended and offset to provide flush intersection
  - .7 Exposed face of flange finished in low sheen baked enamel to match colour of tile or panel
  - .8 Suspension system shall comply with ASTM C635

### 2.2 Mineral Fibre Acoustical Panels (tiles)

- .1 Acoustical tiles shall be made from wet formed mineral fibre
- .2 Surface finish shall be factory applied latex paint
- .3 Fire performance shall conform to ASTM E84 and CAN/ULC S102 with surface burning characteristics, Flame spread index of 25 or less. Smoke Development Index of 50 or less. Acoustical tiles shall be UL labeled "Fire Guard" A fire restrictive ceiling when used in applicable UL assemblies

### 2.3 Metal Finish

- .1 Metal exposed in finished work shall have a pre-coated baked enamel finish in non-yellowing colour.
- .2 Exposed metal elements of the suspended ceiling shall match colour, texture and sheen of selected or existing ceiling fixtures including sprinkler and diffusers, lighting fixtures, speaker grilles, and other metal components in the ceiling assemblies
- .3 The standard colour for all exposed metal components of suspended ceiling system is: flat white

## 3.0 EXECUTION

### 3.1 General

- .1 Examine surfaces to receive suspended acoustical tile ceiling for unevenness, irregularities, and dampness that would affect the quality and execution of the work
- .2 Clean areas, where acoustical tiles will be cemented, of oils, form residue, or other materials that reduce bonding capabilities of the adhesives
- .3 Complete and dry interior finish work prior to commencing suspended acoustical ceiling work
- .4 Complete, test and commission mechanical, electrical HVAC and other work above ceiling line prior to the start of acoustical ceiling installation
- .5 Suspended acoustical ceiling shall be installed complete with all necessary fasteners, clips, and other accessories required for a complete installation.
- .6 Mechanical fasteners shall not be visible (exposed) in the finished installation
- .7 Provide, and install all necessary hangers necessary to support framing, around beams, ducts, columns, grilles and other penetrations through ceilings
- .8 Provide at least two main runners for each ceiling span

- .9 Where required to bypass an object with the hanger wires, install a suspension system so that all hanger wires are plumb
- .10 Install suspended acoustical ceiling system in accordance with manufacturer's documented instructions

### 3.2 Installation - Suspension System

- .1 Install suspension system rigid, secure, square level and plumb, framed and erected to maintain dimensions and contours indicated, and in accordance with ASTM C636 / C636M – 08 as well as Cisca installation standards and other applicable national or local code requirements
- .2 Attach hangers to structure with inserts and hanger supports. Do not use powder activated fasteners
- .3 Support hangers for suspended ceiling grid independent of walls, columns, pipes and ducts
- .4 Space hangers for ceilings at maximum 1220 mm (48") on centre in both directions. Provide additional hangers as required
- .5 Locate hangers at not more than 150 mm (6") from ends of main tee members
- .6 Erect suspension systems at required heights and water tube, transit, or laser beam level to tolerance of 1:1200
- .7 Allowable tolerances in accordance with ASTM C636 / C636M – 08
- .8 Design suspension systems for maximum mid-span deflection of not to exceed 1/360
- .9 Exposed tees shall be as long as possible to minimize joints. Make joints square, tight, flush and reinforce with splines. Distribute joints to prevent clustering in one area
- .10 Space tee bars to suit ceiling panels and as detailed, and to accommodate lighting fixtures, supply diffusers, exhaust grilles and other built-in items properly fit into ceiling module and finish flush with rest of ceiling
- .11 Space tee bars to suit ceiling panels and as detailed, and to accommodate lighting fixtures, diffusers and return grilles
- .12 Coordinate with Electrical and mechanical contractors in the installation of suspended ceiling systems, making adjustments where required to ensure that the lighting fixtures, supply diffusers, exhaust grilles and other built-in items properly fit into ceiling module and finish flush with the rest of the ceiling
- .13 restrict creep inside module panels so that in all cases strips are centred on module lines
- .14 Install edge moulding as detailed where ceiling abuts vertical



surfaces. Lap corners, use maximum lengths to minimize joints. Make joints square, tight and flush

- .1 Screw attach mouldings to substrates at intervals not more than 400 mm (16") on center and not more than 210 mm (8") from ends, leveling with suspension system to tolerance of 3 mm in 3660 mm (1/8" in 12'). Lap corners accurately and connect securely

### 3.3 Installation – Acoustical Tiles

- .1 Install acoustical tiles in accordance with manufacturer's documented instructions
- .2 Take precautions during the installation to ensure that tile edges are not chipped or otherwise damaged
- .3 Rectify cut tile edges of tile to match factory cut edges
- .4 Install acoustical tiles to form horizontal and level ceiling with all parts flush and joints butted tightly to hairline appearance
- .5 Distribute variations in colour and texture of ceiling tiles to obtain a uniform appearance
- .6 Minimize field cutting. Where necessary, match factory cut edge in colour
- .7 If the ceiling tile has a fire endurance rating, or the panels weigh less than 4.9 kilograms per square meter (1.0 pound per square foot), hold down clips are required.
- .8 Hold down clips are required where ceiling tiles are expected to be cleaned frequently, where panels may be displaced during cleaning
- .9 Arrange acoustical ceiling tiles so that units less than one half width are minimized
- .10 Ensure that edges of acoustical tiles are in close contact with metal supports, with each other, and in true alignment

### 3.4 Coordination

- .1 Coordinate with Mechanical and Electrical for the location of lighting, ventilation, sound and life safety protection systems
- .2 Coordinate with Paint (see Section 09 91 00 Painting) to ensure that perimeter rooms are painted at least 100 mm (4") above the suspension ceiling line

### 3.5 Cleaning

- .1 Following installation, clean dirty or discoloured surfaces of acoustical ceiling tiles and leave them free from defects
- .2 Remove acoustical ceiling tiles that are damaged or improperly installed and provide new acoustical ceiling tiles

as directed

**End of Section**