

PART 1 - GENERAL

1.1 Summary

- .1 Section includes exposed metal suspension systems for ceilings.
 - .1 White painted 24 mm wide face caps unless otherwise indicated.
- .2 Related Requirements:
 - .1 Division 09 Section *Acoustical Panel Ceilings* for ceiling panels.
- .3 Types of Items not described in this Section
 - .1 Coloured suspension assemblies.
 - .2 Exposed suspension systems having narrow or extra-wide faces.
 - .3 Exposed face suspension systems of aluminum construction.
 - .4 Suspended decorative ceiling grids
 - .5 Gaskets for clean rooms.
 - .6 Hold-down or impact clips.
 - .7 Suspended decorative grids.
 - .8 Ceilings consisting of concealed suspension systems.

1.2 Submittals

- .1 Product Data: For each type of product.
- .2 Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.
 - .1 Exposed Suspension-System Members, Mouldings, and Trim: Set of 150 mm long Samples of each type, finish, and colour.
- .3 Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - .1 Suspended ceiling components.
 - .2 Structural members to which suspension systems will be attached.
 - .3 Size and location of initial access modules for acoustical panels.
 - .4 Items penetrating finished ceiling including the following:
 - .1 Lighting fixtures.
 - .2 Air outlets and inlets.
 - .3 Speakers.

- .4 Access panels.
- .5 Perimeter mouldings.
- .6 Smoke development and flame spread rating.

1.3 Quality Assurance

- .1 Source Limitations: Obtain each type of acoustical ceiling panel and supporting suspension system from single source from single manufacturer.

1.4 Delivery, Storage and Handling

- .1 Deliver suspension-system components and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

1.5 Project Condition

- .1 Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
 - .1 Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 Performance Requirements

- .1 Fire-Resistance Ratings: Comply with CAN 4 S101M; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - .1 Indicate design designations from ULC's *Fire Resistance Directory* or from the listings of another qualified testing agency.

2.2 Metal Suspension Systems, General

- .1 Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- .2 Metal Suspension-System Standard: Provide manufacturer's standard direct-

hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M.

- .1 High-Humidity Finish: Comply with ASTM C 635/C 635M requirements for *Coating Classification for Severe Environment Performance* where high-humidity finishes are indicated.
- .3 Attachment Devices: Size for five times the design load indicated in ASTM C 635/C 635M, Table 1, *Direct Hung*, unless otherwise indicated. Comply with seismic design requirements.
 - .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 according to ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.
 - .1 Type: Postinstalled bonded anchors.
 - .2 Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) 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 according to ASTM E 1190, conducted by a qualified testing and inspecting agency.
- .4 Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

- .1 Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
- .2 Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, *Direct Hung*) will be less than yield stress of wire, but provide not less than 2.69 mm diameter wire.
- .3 Angle Hangers: Angles with legs not less than 22 mm wide; formed with 1 mm thick, galvanized-steel sheet complying with ASTM A 653/A 653M, Z275 coating designation; with bolted connections and 8 mm diameter bolts.

2.3 Metal Suspension System

- .1 Wide-Face, Capped, Double-Web, Hot-Dip Galvanized, Z180, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized according to ASTM A 653/A 653M, Z180 coating designation; with prefinished, cold-rolled, 24 mm wide galvanized steel or aluminum caps on flanges.
 - .1 Fire Rating: Only if indicated.
 - .2 Structural Classification: Heavy-duty system.
 - .3 Face Design: Flat, flush.
 - .4 Face Finish: Painted white, unless otherwise noted.

2.4 Metal Edge Mouldings and Trims

- .1 Mouldings and Trim:
 - .1 Manufactured from roll-formed sheet metal or extruded aluminum.
 - .2 Type and profile indicated or, if not indicated, manufacturer's standard stepped/reveal for edges and penetrations complete with splice plates, corner pieces, and attachments and other clips;
 - .3 same finish, and colour as that used for exposed flanges of suspension-system runners;
 - .4 For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- .2 Speciality Trims: Provide any speciality trims indicated, complete splice plates,

corner pieces, and attachments and other clips

PART 3 - EXECUTION

3.1 Examination

- .1 Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 Preparation

- .1 Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 Installation

- .1 General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M, according to manufacturer's written instructions and CISCA's *Ceiling Systems Handbook*.
- .2 Suspend ceiling hangers from building's structural members and as follows:
 - .1 Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
 - .2 Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
 - .3 Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members,

- install supplemental suspension members and hangers in form of trapezes or equivalent devices.
- .4 Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
 - .5 Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
 - .6 Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
 - .7 When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
 - .8 Do not attach hangers to steel deck tabs.
 - .9 Do not attach hangers to steel roof deck. Attach hangers to structural members.
 - .10 Space hangers not more than 1200 mm o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 200 mm from ends of each member.
 - .11 Size supplemental suspension members and hangers to support ceiling loads

within performance limits
established by referenced standards
and publications.

- .3 Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.
- .4 Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
 - .1 Screw attach mouldings to substrate at intervals not more than 400 mm o.c. and not more than 75 mm from ends, leveling with ceiling suspension system to a tolerance of 3.2 mm in 3.6 m. Mitre corners accurately and connect securely.
 - .2 Do not use exposed fasteners, including pop rivets, on mouldings and trim.
- .5 Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
- .6 Install speciality trims in accordance with manufacturer's installation instructions.

3.4 Cleaning

- .1 Clean exposed surfaces of suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.