

PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 09 29 00 - Gypsum board.
- 1.2 References .1 ASTM International (ASTM).  
.1 ASTM C636/C636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustic Tile and Lay-In Panels.  
.2 ASTM C645-14, Standard Specification for Nonstructural Steel Framing Members.
- 1.3 Design Criteria .1 Design Requirements:  
.1 Suspension system shall support the ceiling assembly shown on drawings or specified herein, with maximum deflection of 1/360th of span.
- 1.4 Submittals .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.  
.2 Product data:  
.1 Catalogue cuts or standard drawings indicating details of system with project conditions clearly identified.  
.3 Submit manufacturer's written installation instructions.
- 1.5 Regulatory Requirements .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- 1.6 Delivery, Storage and Handling .1 Deliver materials in original unopened packages, clearly labelled with manufacturer's name and description.  
.2 Store materials in a manner to prevent warp, scratches and damage.  
.3 Take care when handling to avoid racking, distortion and damage.

PART 2 - PRODUCTS

- 2.1 T-Bar Grid System .1 Recycled content: suspension system shall contain a minimum of 25% recycled content.

- .2 Fireguard, suitable for ceilings with one (1) hour fire resistance rating.
- .3 Heavy duty system: to ASTM C645.
- .4 Basic materials for suspension system: commercial quality cold rolled steel, hot dip galvanized to obtain Z120 (G40) coating.
- .5 Suspension system: consisting of main tees and furring cross channels or cross tees, certified for use in fire-rated assemblies.
- .6 Components:
  - .1 Main tee: roll formed, non-handed, double web design, 38 mm high, rectangular top bulb, 38 mm wide flange, fabricated of 0.45 mm steel, reversible end splice, enamel finish. Furring cross channel holes 100 mm from ends; 200 mm o.c. Hanger wire holes 1200 mm o.c.
  - .2 Furring cross channels: 73 mm wide x 22 mm high, 47 mm wide knurled screw surface, fabricated of 0.53 mm steel, integral end locks at each end, enamel finish.
  - .3 Furring cross tee: double web design, 38 mm high, rectangular top bulb, 38 mm wide knurled screw surface and steel cap, high-tensile steel end clenched to web.
  - .4 Cross tee: double web design, 38 mm high, rectangular top bulb, 24 mm wide exposed flange and steel cap, high-tensile steel end clenched to web.
  - .5 Channel moulding: U-shaped, hemmed edges, 25 mm flange x 25 mm opening x 12 mm flange.
- .7 Hanger wire: galvanized soft annealed steel wire, yield stress load at least three (3) times design load; minimum 2.6 mm.
- .8 Accessories: provide clips, splices, fasteners and other accessories necessary for complete installation.

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- 2.2 Metal Furring  
Suspension System
- .1 Furring channel: 0.53 mm electrozinc sheet steel, knurled face, 22 mm deep.
  - .2 Runner channels: 38 mm x 19 mm, made from 1.52 mm cold-rolled steel; electrozinc coated.
  - .3 Hangers: galvanized wire or zinc coated mild steel rods.

PART 3 - EXECUTION

- 3.1 T-Bar Grid System  
Installation
- .1 Install suspension system in accordance with ASTM C636/C636M and manufacturer's instructions.
  - .2 Start ceiling suspension system work only after work above ceiling has been reviewed by Departmental Representative.
  - .3 Secure hangers to overhead structure using attachment methods acceptable to Departmental Representative.
  - .4 Install hangers on main tee spaced at maximum 1200 mm centres and as specified in ULC Fire Resistance Directory.
  - .5 Ensure suspension system is coordinated with location of related components.
  - .6 Install channel moulding on wall to provide correct ceiling height.
  - .7 Completed suspension system to support superimposed loads, such as lighting fixtures, diffusers, grilles and speakers.
  - .8 Support light fixtures and diffusers on main tee and cross tees. Place additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
  - .9 Interlock cross member to main runner to provide rigid assembly.
  - .10 Finished ceiling system to be square with adjoining walls and level within 1:1000.

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- .11 Fire-rated systems: in addition to above provide the following:
- .1 Butt joints in gypsum board requires installation of additional cross channel 200 mm on each side of joint.
  - .2 Light fixtures require installation of additional cross channel 200 mm from fixture edges.
- 3.2 Metal Furring Suspension System Installation
- .1 Hangers shall support grillage independent of walls, columns, pipes, ducts; erect plumb and securely anchored to structural frame; space at 1200 mm maximum centres and not more than 150 mm from boundary walls, interruptions of continuity and change in direction. Provide 25 mm clearance at walls.
  - .2 Space main carrying channels at 900 mm maximum centres and not more than 150 mm from boundary walls, interruptions of continuity and change in direction. Provide 25 mm clearance at walls. Splice main carrying channels by lapping minimum 200 mm and wire each end with two loops 50 mm from each end of overlap. Run main channels transversely to structural framing members.
  - .3 Fix main carrying channels to rod anchors by saddle tying so as to prevent turning or twisting of channels and to develop full strength of hangers.
  - .4 Space furring channels transverse to main carrying channels at 600 mm o.c. and not more than 150 mm from boundary walls, openings, interruptions in ceiling continuity and change in directions. Provide 25 mm clearance at walls. Level and shim furring channels to a maximum tolerance of 1:1200.
  - .5 Secure furring channels to each support with clips or double 1.2 mm wire ties. Splice joints by nesting and tying channels together.

- .6 Frame around items such as recessed fixtures, diffusers, openings and where normally required, in good standard practice.

END OF SECTION

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PART 1 - GENERAL

- 1.1 RELATED REQUIREMENTS
- .1 Section 09 22 26 - Suspension System for Gypsum Board Ceilings.
  - .2 Section 09 51 13 - Acoustical Panel Ceilings.
  - .3 Section 23 37 20 - Louvres, Intakes and Vents.
  - .4 Section 26 50 00 - Lighting.
- 1.2 REFERENCES
- .1 ASTM International (ASTM).
    - .1 ASTM C635/C635M-13a, Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustic Tile and Lay-In Panel Ceilings.
    - .2 ASTM C636/C636M-13, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustic Tile and Lay-In Panels.
- 1.3 DESIGN REQUIREMENTS
- .1 Maximum deflection: 1/360th of span to ASTM C635/C635M deflection test.

PART 2 - PRODUCTS

- 2.1 MATERIALS
- .1 Exposed steel grid system:
    - .1 Components: Components die cut. Main tee with double web, rectangular or custom shaped bulb and rolled cap on exposed face. Cross tee with rectangular or custom shaped bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
    - .2 Fireguard, suitable for ceilings with one (1) hour fire resistance rating.
    - .3 Finish: flat white to match acoustic panels.
  - .2 Hanger wire: galvanized soft annealed steel wire; 2.6 mm diameter.

- .3 Accessories: splices, clips, wire ties, retainers, wall moulding, to complement suspension system components, as recommended by system manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

- .1 Install in accordance with ASTM C636 and manufacturer's instructions.
- .2 Secure hangers to overhead structure using attachment methods acceptable to Departmental Representative.
- .3 Erect ceiling suspension system after items such as anchors, blocking, sound and fire barriers, electrical and mechanical work above ceiling have been reviewed by Departmental Representative.
- .4 Lay out system according to reflected ceiling plan.
- .5 Ensure suspension system is coordinated with location of related components.
- .6 Install wall mouldings to provide correct ceiling height. Finished ceiling system to be level within 1:1200.
- .7 Support suspension system main tees at 1220 mm o.c., or closer spacing as required to accommodate loading, with hanger wire from building structural system. Complete assembly shall support superimposed loads, such as lighting fixtures, diffusers and grilles.
- .8 Frame at openings for light fixtures and air diffusers.
- .9 Support light fixtures and diffusers with supplemental hangers as follows:
  - .1 Standard 610 mm x 1220 mm fluorescent light fixtures and mechanical and electrical fixtures weighing more than 11.4 kg: within 150 mm of each corner of light fixture.

.2 Smaller fixtures: no supplemental hangers required.

.10 Interlock cross member to main tee to provide rigid assembly.

3.2 CLEANING

.1 Touch up scratches, abrasions, voids and other defects in painted surfaces.

END OF SECTION

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PART 1 - GENERAL

- 1.1 Related Requirements
- .1 Section 07 84 00 - Firestopping.
  - .2 Section 07 92 10 - Joint Sealing.
  - .3 Section 09 22 26 - Suspension System for Gypsum Board Ceilings.
  - .4 Section 09 91 23 - Painting.
- 1.2 References
- .1 ASTM International (ASTM).
    - .1 ASTM C475/C475M-12, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
    - .2 ASTM C840-13, Specification for Application and Finishing of Gypsum Board.
    - .3 ASTM C919-12, Standard Practice for Use of Sealants in Acoustical Applications.
    - .4 ASTM C1396/C1396M-14, Specification for Gypsum Board.
    - .5 ASTM C1047-14, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
    - .6 ASTM D3273-12, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
    - .7 ASTM D1784-11, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds).
    - .8 ASTM D3678-14, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Interior-Profile Extrusions.
  - .2 Underwriters' Laboratories of Canada (ULC)
    - .1 CAN/ULC-S101-07, Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- 1.3 DELIVERY, STORAGE AND HANDLING
- .1 Deliver, store and handle materials in accordance 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 level off ground in  
dry location and in accordance with  
manufacturer's recommendations in  
clean, dry, well-ventilated area.
  - .2 Store and protect from nicks,  
scratches, and blemishes.
  - .3 Protect from weather, elements and  
damage from construction  
operations.
  - .4 Handle gypsum boards to prevent  
damage to edges, ends or surfaces.
  - .5 Replace defective or damaged  
materials with new.
- 1.4 Ambient  
Conditions
  - .1 Ensure temperature of surrounding areas  
are within recommended range - minimum  
10°C, maximum 21°C - 7 days before,  
during and 4 days after entire gypsum  
board and joint treatment operations.  
Avoid concentrated or irregular heating  
during drying. Ensure proper  
ventilation to eliminate excessive  
moisture.
  - .2 Report to Departmental Representative,  
in writing, defects of work which may  
adversely affect the quality of  
workmanship of this section.
  - .3 Commencement of work shall imply  
acceptance of conditions.

PART 2 - PRODUCTS

- 2.1 Gypsum Board  
Types
  - .1 Standard: regular and Type X; to ASTM  
C1396/C1396M, 1200 mm wide x maximum  
practical lengths, tapered edges.
  - .2 Moisture-resistant board: regular and  
Type X; to ASTM C1396/C1396M, 1220 mm  
wide x maximum practical lengths,  
tapered edges.
    - .1 Mould resistance: to ASTM D3273,  
score of 10.

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- .3 Impact-resistant board:
    - .1 Physical properties to meet ASTM C1396/C1396M.
    - .2 Performance requirements: to ASTM C1629, with minimum results as follows:
      - .1 Surface abrasion - Level 2.
      - .2 Surface Indentation - Level 1.
      - .3 Soft-Body Impact - Level 3.
      - .4 Hard-Body impact - Level 3.
    - .3 Fire rating: equivalent to Type X gypsum board when tested in accordance with CAN/ULC-S101.
    - .4 Mould resistance: to ASTM D3273, score of 10.
  
  - 2.2 Accessories
    - .1 Drywall screws: self-drilling, self-threading, case-hardened to give minimum penetration of 16 mm into wood, 10 mm into steel.
  
    - .2 Casing beads, corner beads and control joints: fill type, to ASTM C1047; perforated flanges, one-piece length per location.
      - .1 PVC construction: to ASTM D1784 and ASTM D3678.
        - .1 Adhesive: spray adhesive; type as recommended by manufacturer.
        - .2 Staples: 12.5 mm divergent type.
        - .3 Casing bead to have tear-away caulking channel.
      - .2 Steel construction: nominal 0.5 mm commercial grade sheet steel with Z275 zinc finish.
  
    - .3 Acoustic insulation: Fire-rated. ULC labelled.
  
    - .4 Acoustical sealant: to ASTM C919.
  
    - .5 Jointing material:
      - .1 Tape: as recommended by gypsum board manufacturer.
      - .2 Joint compound: to ASTM C475/C475M, asbestos-free.

- .6 Insulating strip: rubberized, moisture resistant, 3 mm thick cork closed cell neoprene strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as required.
- .7 Resilient channels: 0.48 mm commercial grade sheet steel with Z275 zinc finish, perforated flanges, 12.7 mm deep; use 0.79 mm thick sheet steel for impact-resistant board.
- .8 Metal corner guards: 1.6 mm stainless steel, 6 mm corner radius, minimum 38 mm leg x 1220 mm height; satin finish, with removable protective cover, concealed mechanically mounted.

### PART 3 - EXECUTION

#### 3.1 Resilient Channel Installation

- .1 Erect resilient channels transversely across framing members at maximum 400 mm o.c. and not more than 150 mm from wall/ceiling junctures. Secure with 38 mm common nails into wood studs or 25 mm drywall screws into wood or metal studs.
- .2 Make splices over framing members. Nest lengths together, lapping minimum 75 mm. Secure with nails or screws.
- .3 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions to which resilient channels are installed.

#### 3.2 Gypsum Board Application - General

- .1 Apply gypsum board in accordance with ASTM C840, locations as follows:
  - .1 Impact-resistant type - where indicated on drawings.
  - .2 Moisture-resistant board behind wall tile.
  - .3 Type X - where indicated on drawings as "Type X," "Fireguard" or "Fire rated".
  - .4 Standard, regular - used elsewhere.
- .2 Apply after bucks, anchors, blocking, electrical and mechanical work are approved.

- .3 Provide support at cutouts and openings for impact-resistant board.
- .4 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .5 Keep end joints away from prominent locations and central positions of ceilings.
- .6 Locate vertical joints at least 50 mm from jamb lines of openings.
- .7 Start securing in central portion of board and work towards ends and edges. Hold board firmly against framing member while installing. Install perimeter screws a minimum of 10 mm and maximum 13 mm from edges and ends of boards and opposite the screws on adjacent boards.
- .8 Screw spacing for single layer construction.
  - .1 Nonfire-rated construction - Metal stud construction.
    - .1 Ceilings - 300 mm field and edges.
    - .2 Walls - 300 mm field and edges.
  - .2 Fire-rated construction - Metal stud construction.
    - .1 Ceilings - 200 mm field and edges.
    - .2 Walls - 300 mm field; 200 mm edges.
- .9 Drive screws with a power screw gun, and set with countersunk head slightly below surface of board.
- .10 Use maximum practical length of gypsum board. Bring boards into contact, but do not force into place. Neatly fit ends and edges where they abut.

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- 3.3 Accessories .1 Casing beads, corner beads and control joints.
- .1 Erect straight, plumb/level, rigid and at proper plane. Use full-length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges.
  - .2 Reinforce exterior corners with corner beads.
  - .3 Install casing beads where assembly terminates against dissimilar material, against a surface having no trim concealing its juncture, and where shown on drawings.
  - .4 Installation method:
    - .1 Metal installation: screw fasten at 150 mm o.c. at alternating sides along entire length of bead.
    - .2 PVC installation:
      - .1 Apply spray adhesive to surface and trim at rate recommended by manufacturer.
      - .2 Press into place ensuring full contact.
      - .3 Staple each leg at 150 mm to 200 mm o.c.
- .2 Install acoustical batt insulation in walls indicated. Spot adhere insulation to prevent slumping.
- .3 Apply bead of acoustical sealant to top and bottom joints of gypsum board, on both sides of partitions that extend to underside of structure.
- .4 Mechanically fasten corner guards above floor base extended to 1220 mm, at locations indicated.
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- 3.4 Control Joints .1 Provide control joints:
- .1 at expansion or control joints in substrate.
  - .2 at approximate 9 m spacing on ceiling.
  - .3 at approximate 9 m spacing on walls/partitions.

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- .4 at doors and other changes in superficial areas of walls.
  - .5 and where Departmental Representative deems necessary.
  - .2 Construct control joints using standard manufactured control joint. Maintain 13 mm clearance between gypsum panels.
  - .3 Ensure framing member is located at each side of joint.
- 3.5 Access Doors
- .1 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .2 Rigidly secure frames to furring or framing systems.
- 3.6 Joint Finishing
- .1 Mix joint compound in strict accordance with manufacturer's recommendations.
  - .2 Finish joints either manually, using tools of the trade, or by a mechanical taping and filling machine of proven efficiency.
  - .3 Prefill open spaces between boards, 6 mm and wider, 24 hours before embedding tape.
  - .4 Standard board: apply joint compound, reinforcing tape and topping compound in accordance with manufacturer's written instructions.
  - .5 Impact-resistant board: same as standard board; except, only tape permitted is paper tape.
  - .6 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed accordance with manufacturer's directions and feathered out onto panel faces.
  - .7 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:

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- .1 Levels of finish:
    - .1 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
    - .2 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
    - .3 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.
  
  - .8 Ensure finish is smooth, seamless, plumb, true and flush with square, neat corners.
- 3.7 Patching .1 Perform patching and making good to gypsum board surfaces as required, using materials specified under this section.
- 3.8 Cleanup .1 After completion of gypsum board work, wipe dust from walls and ceilings, and leave work ready for painters.

END OF SECTION

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PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 03 35 00 - Concrete Finishing.  
.2 Section 07 92 10 - Joint Sealing.
- 1.2 REFERENCES .1 American National Standards institute (ANSI)  
.1 ANSI A118.11-2013, EGP Latex Portland Cement Mortar.  
.2 ANSI A137.1-2012, American National Specifications for Ceramic Tile.  
.2 American Society for Testing and Materials (ASTM)  
.1 ASTM C144-04, Specification for Aggregate for Masonry Mortar.  
.2 ASTM C920-14, Specification for Elastomeric Joint Sealants.  
.3 ASTM C979-05, Standard Specification for Pigments for Integrally Colored Concrete.  
.3 Canadian Standards Association (CSA)  
.1 CSA A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).  
.4 Terrazzo Tile and Marble Association of Canada (TTMAC)  
.1 TTMAC Specification Guide 09 30 00 Tile Installation Manual, 2016-2017.
- 1.3 Action and Informational Submittals .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.  
.2 Product data:  
.1 Include manufacturer's information on:  
.1 Each tile type specified; marked to show construction, size and shapes; slip resistant coefficients.  
.2 Mortars including ISO 13007 compliance data.  
.3 Latex-Portland cement mortar and grout.  
.4 Commercial Portland cement grout.

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- .5 Waterproofing.
  - .6 Transition strips.
- .3 Samples:
    - .1 Tile: submit duplicate full-size samples of each colour, texture, size, and pattern of tile.
- 1.4 DELIVERY,  
STORAGE AND HANDLING
- .1 Deliver materials in containers with labels legible and intact and seals unbroken.
  - .2 Store material so as to prevent damage or contamination.
  - .3 Store materials in a dry area, protected from freezing, staining and damage.
  - .4 Store cementitious materials on a dry surface.
- 1.5 ENVIRONMENTAL  
CONDITIONS
- .1 Air temperature and structural base temperature at ceramic tile installation area shall be above 12°C for 48 h before, during, and 48 h after, installation.
  - .2 Do not install tiles at temperatures less than 12°C or above 38°C.
- 1.6 EXTRA MATERIAL
- .1 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
  - .2 Maintenance material to be of same production run as installed material.
- PART 2 - PRODUCTS
- 2.1 Tile Tolerances
- .1 Floor and wall flatness is critical for this project.
  - .2 Do not use tiles with warpage that will cause lippage in excess to that specified herein.
- 2.2 TILE
- .1 Provide matching bullnose, profile shapes and trim to suit applications.
  - .2 Colours and patterns to be selected by Departmental Representative from manufacturer's full colour range.

- .3 CT-1: Ceramic field floor tile to TTMAC, Type 7; natural matte finish with exposed aggregate concrete appearance.
  - .1 Class MR 1.
  - .2 Dynamic coefficient of friction to ANSI A137.1 (Section 6.2).
  - .3 Suitable for wet locations.
  - .4 Size: nominal 600 mm x 600 mm x 8 mm.
- .4 CT-2: Ceramic accent floor tile to TTMAC, Type 7; grip finish with exposed aggregate concrete appearance.
  - .1 Class MR 1.
  - .2 Dynamic coefficient of friction to ANSI A137.1 (Section 6.2).
  - .3 Suitable for wet locations.
  - .4 Size: nominal 600 mm x 600 mm x 8 mm.
- .5 CT-3: Ceramic wall tile to TTMAC, Type 5; shade variation: V1, matte finish.
  - .1 Class MR 4.
  - .2 Size: nominal 100 mm x 400 mm x 6 mm.
- .6 CT-4: Ceramic wall tile to TTMAC, Type 5; shade variation: V1, bright / gloss finish.
  - .1 Class MR 4.
  - .2 Size: nominal 100 mm x 400 mm x 6 mm.
- .7 CT-5: Porcelain mosaic floor tile to TTMAC, Type 2; shade variation: V1, matte finish.
  - .1 Class MR 4.
  - .2 Dynamic coefficient of friction to ANSI A137.1 (Section 6.2).
  - .3 Suitable for washrooms and showers.
  - .4 Size: nominal 48 mm x 48 mm x 6 mm (sheet size 303 mm x 505 mm).

2.3 MORTAR MATERIALS

- .1 Portland cement: to CSA A3000, Type 10.
- .2 Sand: to ASTM C144, passing 16 mesh.
- .3 Latex additive: formulated for use in portland cement mortar and thin set bond coat.

- .4 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
  - .5 Mortar (bond coat): Polymer modified, to ANSI A118.11 and ISO 13007 Series, Classification C2TE; S1 deformability; suitable for large format tiles.
- 2.4 GROUT
- .1 Floor grout: sanded, to ISO 13007 Series, Classification CG2 WA.
    - .1 Colours: based upon Mapei colours
      - .1 FG-1: #27 - Silver.
        - .1 Location: CT-1 & CT-2.
      - .2 FG-2: #47 - Charcoal.
        - .1 Location: CT-5.
    - .2 Wall grout: unsanded, to ISO 13007 Series, Classification CG2 WA.
      - .1 Colour based upon Mapei colours
        - .1 WG-1: #47 - Charcoal.
          - .1 Location: CT-3 & CT-4.
    - .3 Colouring Pigments:
      - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
      - .2 Colouring pigments to be added to grout by manufacturer.
      - .3 Job coloured grout are not acceptable.
- 2.5 ACCESSORIES
- .1 Sealant: non-sag, two-part urethane, to ASTM C920, Type M, Grade NS, Class 25.
    - .1 Colour: as selected by Departmental Representative.
  - .2 Sealers: below-surface penetrating sealer type, breathable, not affected by solvent based strippers or cleaners.
    - .1 Tile sealer: use of sealer as recommended by tile manufacturer.
    - .2 Grout sealer: use of sealer as recommended by grout manufacturer.
  - .3 Trim:

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- .1 Floor tile: extruded aluminum, satin anodized finish, wedge shaped, thickness to suit tile and adjacent flooring.
    - .1 Acceptable Materials: Reno-U (AE) Series by Schlüter.
  - .2 Wall tile: extruded aluminum, square outside corner, satin anodized finish.
    - .1 Acceptable Materials: Quadec (AE) Series by Schlüter.
  - .3 Tile cap: extruded aluminum, sloped vertical square edge, satin anodized finish.
    - .1 Acceptable Materials: Jolly (AE) Series by Schlüter.
  - .4 Control joint: PVC construction, resilient movement zones of colour to match grout colour.
    - .1 Acceptable Materials: Dilex Series by Schlüter.
  - .4 Waterproofing: either of the following:
    - .1 Trowel applied: to ANSI 118.10 requirements for waterproofing; one-component, trowel-applied; incorporating mold and mildew resistance additive; complete with reinforcing mesh, transition membranes and components necessary for complete installation.
    - .2 Membrane system: proprietary waterproofing membrane system designed for waterproofing behind ceramic tile.
  - .5 Transition strips: purpose-made metal extrusion, stainless steel.
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- 2.6 MIXES
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- .1 Mix bond coats and grout in accordance with manufacturer's instructions.
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- 2.7 PATCHING AND LEVELLING COMPOUND
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- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
  - .2 Ready for use in 48 hours after application.

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- 2.8 Accessories .1 Tile spacer/leveller: of design to properly space and level tiles; plastic construction consisting of break-away spacer/leveller clip and reusable wedge. Provide separate spacer if joint width exceeds spacer/leveller.  
.1 Acceptable Materials: Raimondi Leveling System by Donnelly Distribution.
- 2.9 CLEANING COMPOUNDS .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.  
.2 Materials containing acid or caustic material are not acceptable.
- PART 3 - EXECUTION
- 3.1 Preparation .1 Patching and Levelling: install patching and levelling compound to provide smooth and level substrate, flat and true to tolerances in plane with additional requirements as follows:
- 3.2 WORKMANSHIP .1 Do tile work in accordance with TTMAC Tile Installation Manual, except where specified otherwise.  
.2 Apply tile to clean and sound surfaces.  
.3 Tape and fill joints of gypsum board.  
.4 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.  
.5 Maximum surface tolerance 1:800.  
.6 Make joints between tile uniform and approximately 6 mm wide, plumb, straight, true, even and flush with adjacent tile. Align patterns.  
.7 Lay out tiles so perimeter tiles are minimum 1/2 size.

- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Make internal angles square; use metal trim at external angles.
- .10 Use metal trim at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .11 Clean installed tile surfaces after installation and grouting cured.

### 3.3 TILE INSTALLATION

- .1 Start tiling only after permanent lighting is installed and operational. Install tiles with permanent lighting turned on, to ensure tile installation does not produce shadows.
- .2 Perform work in accordance with requirements of:
  - .1 TTMAC Specification Guide 09 30 00 Tile Installation Manual.
  - .2 Parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials,
  - .3 Manufacturer's instructions.
- .3 Provide levelling coat over substrate as required to ensure lippage tolerance can be met.
- .4 Periodically, pull tiles up to ensure proper bond is achieved. Adjust trowel size or techniques as necessary.
- .5 Spacer/leveller installation:
  - .1 Install spacer/leveller clips under tiles at "X" corners (where four tiles meet), "T" corners (where three tiles meet) and additionally, if necessary, along sides to ensure adjacent tiles are at same elevation. Insert reusable wedge between clip and draw tight using tension-adjustable-pliers.
  - .2 After grout has set, break away top of clip using rubber mallet or foot.

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<u>3.4 Metal trim installation:</u>	.1	Install metal trim on walls at exposed horizontal edges and exterior corners.
<u>3.5 TRANSITION STRIPS</u>	.1	Install transition strips at junction of tile flooring and dissimilar flooring and materials.
<u>3.6 CONTROL JOINTS</u>	.1	Provide control joints where indicated below. Keep building expansion joints free of mortar and grout. .1 Provide control joints: .1 Over similar joints in structure. .2 At approximate 3000 mm spacing in large, unbroken floor areas. .3 At changes in superficial areas in walls such as doors and windows. .4 Where Departmental Representative deems necessary. .2 Use control joint trim for interior floors. Make wall tile joint width same as tile joints and fill with sealant. Keep building expansion joints free of mortar and grout.
<u>3.7 Tolerances</u>	.1	Set and level tile flush with adjacent tile, with lippage tolerances as follows: .1 Standard lippage tolerance: 1 mm for joints up to 6 mm wide; 2 mm for joints wider than 6 mm. .2 Special lippage tolerance: to prevent unwanted shadowing on walls caused by ceiling mounted lights, lippage tolerance for wall tile will be in accordance with mock-ups approved by Departmental Representative.
<u>3.8 FLOOR SEALER AND PROTECTIVE COATING</u>	.1	Apply in accordance with manufacturer's instructions.
<u>3.9 Installation Schedule</u>	.1	Install tiles in accordance with following details in Tile Specification Guide 09300 Tile Installation Manual.

- .1 Walls - thinset method:
  - .1 Gypsum board: 304W; with waterproof membrane behind tiles in showers.
- .2 Floors:
  - .1 Concrete slab: 311F.
  - .2 Wood subfloor: 313F. Use waterproof membrane under tiles in entire room that have showers, not just within shower itself.

END OF SECTION

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PART 1 - GENERAL

- 1.1 RELATED Requirements
- .1 Section 09 22 27 - Acoustical Suspension.
  - .2 Section 23 37 20 - Louvres, Intakes and Vents
  - .3 Section 26 50 00 - Lighting.
- 1.2 REFERENCES
- .1 ASTM International (ASTM).
    - .1 ASTM E1264-14, Standard Classification for Acoustical Ceiling Products.
  - .2 Underwriter's Laboratories of Canada (ULC)
    - .1 CAN/ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- 1.3 Action and Informational Submittals
- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit product data indicating ceiling panel and characteristics.
  - .3 Submit duplicate 150 mm x 150 mm samples of each ceiling panel type.
- 1.4 DELIVERY, STORAGE AND HANDLING
- .1 Protect on site stored or installed absorptive material from moisture damage.
  - .2 Store extra materials required for maintenance where directed.
- 1.5 ENVIRONMENTAL REQUIREMENTS
- .1 Permit wet work to dry before beginning to install.
  - .2 Maintain uniform minimum temperature of 15°C and humidity of 20 - 40% before and during installation.
  - .3 Store materials in work area 48 hours prior to installation.
- 1.6 EXTRA MATERIALS
- .1 Provide extra acoustical ceiling panels amounting to 2% of gross ceiling area for each pattern and type required for project.

- .2 Ensure extra materials are from same production run as installed materials.
- .3 Clearly identify each type of acoustic unit, including colour and texture.
- .4 Deliver to site upon completion of work.

## PART 2 - PRODUCTS

### 2.1 Ceiling Tiles

- .1 General applications (ACT):
  - .1 Construction: mineral fibre.
  - .2 Pattern: non-directional fissured.
  - .3 Fire rating: Class A, suitable for a one (1) fire resistance.
  - .4 Flame spread rating: 25 or less in accordance with CAN/ULC-S102.
  - .5 Smoke developed: 50 or less in accordance with CAN/ULC-S102.
  - .6 Noise reduction coefficient (NRC): 0.55.
  - .7 Ceiling Attenuation Class (CAC) rating: 35 in accordance with ASTM E1264
  - .8 Light reflectance range: 0.85.
  - .9 Edge type: square.
  - .10 Colour: white.
  - .11 Size: 610 mm x 1220 mm x 15 mm.
  - .12 Shape: flat.
  - .13 Surface coverings: low VOC paint.
  - .14 Antimicrobial treatment: inorganic; resistant to growth of mold, mildew and bacteria.
  - .15 Suspension system: panel to lay in 23.8 mm exposed grid.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- .1 Install acoustical panels only when work above ceiling has been reviewed by Consultant.
- .2 Install where shown on drawings under conditions outlined in current bulletin of the Canadian Acoustical and Insulating Materials Association.
- .3 Scribe acoustic units to fit adjacent work.

- .4 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.
- .5 Replace damaged panels with new.

END OF SECTION

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PART 1 - GENERAL

1.1 RELATED Requirements	.1	Section 09 30 13 - Ceramic Tiling.
	.2	Section 09 65 19 - Resilient Tile Flooring.
1.2 References	.1	ASTM International (ASTM).
	.1	ASTM D2047-17, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by James Machine.
	.2	ASTM E648-18, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
	.3	ASTM F970-17, Standard Test Method for Static Load Limit.
	.4	ASTM F1869-16a, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
	.5	ASTM F2170-18, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
	.2	Green Seal, Inc. (GS).
	.1	GS-40, Green Seal Standard for Floor-Care Products for Industrial and Institutional Use; Edition 2.2.
	.3	South Coast Air Quality Management District (SCAQMD).
	.1	SCAQMD Rule 1168-2005, High-Pressure Decorative Laminates.
1.3 Quality Assurance	.1	Mechanics installing flooring shall have undergone training specific to the installation of the product being installed and have a minimum five (5) years' experience. Proof of training and/or certification is required.
1.4 Action and Informational Submittals	.1	Submit in accordance with Section 01 33 00 - Submittal Procedures.
	.2	Samples: submit duplicate 50 mm x 50 mm size samples of full range of colours.

- .3 Product data: submit product data for flooring and accessories. Indicate characteristics, performance requirements, size and thickness.
- .4 Installation instructions: submit manufacturer's installation instructions.
- .5 Closeout Submittals: Provide maintenance data for sheet flooring for incorporation into maintenance manual.

1.5 MOCK-UP

- .1 Construct mock-ups in accordance with Section 01 00 00 - General Instructions.
- .2 Construct mock-up for each type of flooring specified in this section, at locations as directed by Departmental Representative.
- .3 Construct mock-up 10 m<sup>2</sup> minimum of flooring including one corner and all components of entire floor system.
- .4 Mock-up will be used:
  - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
- .5 Allow 48 hours for inspection of mock-up by Departmental Representative. Obtain written approval before proceeding with work.
- .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Air temperature and structural base temperature at flooring installation area shall be between 18°C and 30°C for 48 hours before, during and 48 hours after installation.
- .2 Recommended ambient humidity control level is between 35% and 55%.

- 1.7 Site conditions .1 Subfloor surface shall be free of paint, wax, oil, grease, sealer, curing compound, solvent and other contaminants that may inhibit bond. Remove contaminants from surface via mechanical abatement.
- .2 Perform moisture and alkalinity tests on concrete substrates, under in-service conditions. It is recommended to turn on HVAC unit prior to performing moisture testing, in order to ensure stable testing conditions and accurate results. Concrete's surface pH should be between 7 and 10. Relative humidity of concrete slab must not exceed tolerance of adhesive specified, in accordance with ASTM F2170. Moisture vapour emissions from the concrete slab shall not exceed the tolerance of the adhesive specified, in accordance with ASTM F1869.
- 1.8 EXTRA MATERIALS .1 Provide additional 2% of each colour, pattern and type material required for project for maintenance use. Size: full width x minimum 3 m long.
- .2 Extra materials from same production run as installed materials.
- .3 Provide containers of adhesive in quantity to suit area of flooring.
- .4 Clearly identify each roll and each container of adhesive.
- .5 Deliver to Departmental Representative, upon completion of the work of this section. Store where directed.

PART 2 - PRODUCTS

- 2.1 Sheet Vinyl Flooring .1 Heterogeneous (PVC) sheet vinyl: to ASTM F1303; multi-layered, glass fiber reinforcement scrim between the film print and backing; semi-directional design, colour and pattern throughout.
- .1 Properties:
- .1 Wear layer thickness: 0.7 mm.
- .2 Total thickness: 2.85 mm.

- .3 Weight: 2.6 kg/m<sup>2</sup>.
  - .4 Width: 2000 mm.
  - .5 Surface treatment: treated to increase durability, toughness and wear resistance.
  - .6 Anti-bacterial and fungicidal treated.
  - .7 Recyclable.
  - .2 Performance requirements:
    - .1 Slip resistance: to ASTM D2047 (0.7 dry, 0.8 wet).
    - .2 Wear layer: 0.7 mm.
    - .3 Fire rating: Class 1.
  - .3 Colours / Patterns: Maximum Three (3) colours / patterns, as selected by Departmental Representative.
- 2.2 Materials
- .1 Moisture reduction barrier: 100% solids, multi-part epoxy designed to reduce moisture vapour transmission from 25 lb. per 1000 ft<sup>2</sup> to less than 3 lb.
  - .2 Transition strips: vinyl reducer strips; wedge shaped, of thickness to suit.
    - .1 Colour: as selected by Departmental Representative to a maximum of two (2).
  - .3 Primers and adhesives: low VOC, type as recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
    - .1 VOC Limits: maximum 60 g/L in accordance with SCAQMD Rule 1168.
  - .4 Patching and levelling compound
    - .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable.
    - .2 Have not less than the following physical properties:
      - .1 Compressive strength - 25 MPa.
      - .2 Tensile strength - 7 MPa.
      - .3 Flexural strength - 7 MPa.
      - .4 Density - 1.9.

- .3 Capable of application in layers up to 50 mm thick, being brought to feather edge, and trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.
- .5 Welding rod: PVC, of colour selected by Departmental Representative.
- .6 Dressing: sealer, wax, polish, etc.; Low VOC type, to GS-40; product recommended by flooring material manufacturer for flooring type and location.

### PART 3 - EXECUTION

#### 3.1 Inspection

- .1 Ensure substrate is clean and dry by using test methods recommended by flooring manufacturer.

#### 3.2 SubFloor PREPARATION

- .1 Test slab-on-grade concrete for moisture vapour transmission. Install moisture reduction barrier at thickness/coats recommended by manufacturer, for actual on-site moisture vapour transmission, to reduce moisture vapour transmission to limits acceptable for adhesives being used.
- .2 Floor levelling:
  - .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler and leveller.
  - .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
  - .3 Feather filler upwards so that flooring is level with top of ceramic flooring. Feathering shall extend a minimum of 900 mm.
- .3 Prime/seal concrete slab in accordance with resilient flooring manufacturer's printed instructions.

#### 3.3 APPLICATION

- .1 Flooring application:
  - .1 Install in accordance with manufacturer's current installation guide.

- .2 Apply adhesive uniformly in accordance with manufacturer's instructions. Do not spread more adhesive than can be covered before initial set takes place.
- .3 Install flooring wall to wall before installation of floor-mounted cabinets, casework, furniture, equipment and similar items.
- .4 Lay flooring to produce a minimum number of seams. Border widths minimum one-third width of full material.
- .5 Run sheets parallel to length of room.
- .6 As installation progresses, roll flooring with 45 kg roller to ensure full adhesion.
- .7 Cut flooring and fit neatly around fixed or excessively heavy objects.
- .8 Install transition strips at unprotected or exposed edges where flooring terminates.
- .9 Heat weld seams with welding rod in accordance with manufacturer's printed instructions.

3.4 CLEANING,  
MAINTENANCE AND  
PROTECTION

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- .1 Remove excess adhesive from floor, base and wall surfaces. Take care so as not to damage surface.
- .2 Initial maintenance:
  - .1 Clean flooring as noted in manufacturer's instruction.
- .3 Protect installed flooring as recommended by flooring manufacturer.

END OF SECTION

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PART 1 - GENERAL

- 1.1 Related Requirements .1 Section 09 30 13 - Ceramic Tiling.
- .2 Section 09 65 16 - Resilient Sheet Flooring.
- 1.2 References .1 American Society for Testing and Materials (ASTM)
- .1 ASTM D2047-17, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- .2 ASTM F1700-18a, Standard Specification for Solid Vinyl Floor Tile.
- .3 ASTM F1861-16, Standard Specification for Resilient Wall Base.
- 1.3 Submittals .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
- .1 Colour selection samples: submit duplicate 50 mm x 50 mm size samples of full range of colours for tiles and base.
- .2 Product verification samples: Submit duplicate tile in size specified; 300 mm long base; 300 mm long stair tread.
- .3 Product data: submit product data for flooring and accessories. Indicate characteristics, performance requirements, size and thickness.
- .4 Installation instructions: submit manufacturer's installation instructions.
- .5 Closeout submittals: Provide maintenance data for resilient tile flooring, base and stair treads for incorporation into maintenance manual.
- 1.4 Extra Materials .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Provide additional 2% of each colour, pattern and type flooring material required for this project for maintenance use.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each container of floor tile and each container of adhesive.
- .5 Deliver upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

PART 2 - PRODUCTS

2.1 Product Substitutions

- .1 Requests for use of product substitution (request for equals):
  - .1 In addition to requirements specified in Section 01 61 00 - Common Product Requirements, requests shall be accompanied by duplicate samples as follows:
    - .1 Pattern: submit full size samples to indicate pattern only; colour of sample at contractor's discretion.
    - .2 Colour: submit 38 mm x 38 mm sample of each colour available within specified pattern. Samples to be actual pieces of flooring; photographic reproductions are not acceptable.
    - .3 Requests will not be entertained unless samples are submitted.
  - .2 Consideration will be based upon technical requirements, and pattern and colour availability.

2.2 Flooring and Base

- .1 Commercial flooring (CF): to ASTM F1700, Class III printed vinyl plank.
  - .1 Wear layer thickness: 0.5 mm.
  - .2 Slip resistance (ASTM D2047): 0.55 wet/dry.
  - .3 Static load limit (ASTM F970): 105 kg/cm<sup>2</sup>.
  - .4 Size: 250 mm x 1000 mm x 4.5 mm size.

- .5 Colours/patterns: to be selected by Departmental Representative. Maximum of four(4)colours/patterns will be selected.
  - .2 Rubber base (RB): to ASTM F1861, coved, minimum 1200 mm length and 100 mm high x 3 mm thick, including premoulded corners and end stops.
    - .1 Colours: to be selected by Departmental Representative. Maximum of four (4) colours will be selected.
  - .3 Metal edge strips: aluminum extruded, smooth, mill finish polished with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- 2.3 Rubber Stair Accessories
- .1 Tread with integral riser (ST-1):
    - .1 Heavy duty: nominal 5.3 mm tapering to 2.8 mm thick, hammered texture, complete with one (1) rubber insert.
    - .2 Stair accessories to be full-width piece only.
    - .3 Tred riser and insert colours: to be selected by Departmental Representative. Maximum of two (2) colours will be selected.
- 2.4 Accessories
- .1 Installation products:
    - .1 Floating floor installation: double-sided, self-adhesive plastic squares.
    - .2 Fully adhered installation: waterproof, low-VOC primers and adhesives as recommended by manufacturer for specific material on applicable substrate, above, at or below grade.
  - .2 Sub-floor filler and leveller: Low VOC type, white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
  - .3 Dressing: sealer, wax, polish, etc. Low VOC type product recommended by flooring material manufacturer for material type and location.
  - .4 Caulking compound: epoxy type as recommended by manufacturer.

PART 3 - EXECUTION

- 3.1 Inspection .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.
- 3.2 Sub-Floor Treatment .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Prime/seal sub-floor in accordance with flooring manufacturer's printed instructions.
- 3.3 Tile Application .1 Install plank flooring using floating floor installation. Install accordance with flooring manufacturer's instructions.
- .2 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Perimeter tiles minimum half tile width.
- .3 Install flooring to square grid pattern with all joints aligned, with pattern grain alternating to produce basket weave pattern.
- .4 As installation progresses, roll flooring in two directions with 45 kg minimum roller to ensure full adhesion.
- .5 Cut tile and fit neatly around fixed objects.
- .6 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .7 Install metal edge strips at unprotected or exposed edges where flooring terminates.
- 3.4 Base Application .1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.

- .2 Clean substrate and prime with one coat of adhesive.
  - .3 Apply adhesive to back of base.
  - .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
  - .5 Install straight and level to variation of 1:1000.
  - .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
  - .7 Cope internal corners. Use premoulded corner units for right angle external corners.
- 3.1 Stair Accessories Application
- .1 Ensure surface is smooth, clean and dry.
  - .2 Cut and fit items prior to spreading adhesive.
  - .3 Install caulking compound to nose of treads.
  - .4 Hand roller items to ensure proper bonding.
- 3.2 Maintenance
- .1 Initial maintenance:
    - .1 Clean flooring, seal and apply minimum two coats of dressing in accordance with flooring manufacturer's instruction.
  - .2 Preparation for traffic:
    - .1 Prior to substantial completion; clean flooring and apply a minimum of three coats of dressing in accordance with flooring manufacturer's instructions.
  - .3 Clean, seal and wax base surfaces in accordance with flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.
- 3.3 Protection of Finished Work
- .1 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION



PART 1 - GENERAL

- 1.1 References .1 Master Painters Institute (MPI):
- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- 1.2 Submittals .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .1 Submit product data and instructions for each paint and coating product to be used.
  - .2 Submit product data for the use and application of paint thinner.
  - .3 Mark each product data sheet with the following:
    - .1 Specification paragraph cross-reference.
    - .2 MPI System number.
    - .3 Indicate whether product is primer or top coat.
  - .3 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOCs during application and curing.
  - .4 Samples:
    - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
  - .5 Manufacturer's Instructions:
    - .1 Submit manufacturer's installation and application instructions.
  - .6 Closeout Submittals: submit maintenance data for incorporation into maintenance manual include following:
    - .1 Product name, type and use.
    - .2 Manufacturer's product number.
    - .3 Colour numbers.
    - .4 MPI Environmentally Friendly classification system rating.
    - .5 Manufacturer's Material Safety Data Sheets (MSDS).

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- 1.3 Job Conditions .1 Examine surfaces to be finished and ensure that surfaces can be put in proper condition for finishing by customary cleaning, sanding and puttying operations.
- .2 Report to the Departmental Representative, in writing, defects of work which may adversely affect the quality of workmanship of this section.
- .3 Commencement of work shall imply acceptance of surfaces.
- 1.4 Maintenance Materials .1 Maintenance materials: from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
- .2 Quantity:  
.1 Finishing coat: turn over surplus full cans of paint. If, within each type and colour of finish coat, less than one can of paint remains, provide one (1) - one-litre can for maintenance purposes. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Delivery, storage and protection: comply with Departmental Representative's requirements for delivery and storage of extra materials.
- 1.5 Quality Assurance .1 Conform to latest MPI requirements for painting work including preparation and priming.
- .2 Retain purchase orders, invoices and other documents to prove that materials utilized meet requirements of specifications. Produce documents when requested by Departmental Representative.
- 1.6 Delivery, Storage and Handling .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Labels shall clearly indicate:
  - .1 Manufacturer's name and address.
  - .2 Type of paint or coating.
  - .3 Compliance with applicable standard.
  - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well-ventilated area with temperature range 7°C to 30°C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
  - .1 Provide fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.7 Site  
Requirements

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- .1 Heating, Ventilation and Lighting:
  - .1 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .2 Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .3 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Perform no painting work when:
    - .1 Ambient air and substrate temperatures are below 10°C.
    - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
    - .4 The relative humidity is above 85% or when the dew point is less than 3°C variance between the air/surface temperature.
    - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
  - .2 Perform no painting work when the maximum moisture content of the substrate exceeds:
    - .1 12% for concrete and masonry (clay and concrete brick/block).
    - .2 15% for wood.
    - .3 12% for gypsum board.

- 
- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
  - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- 
- .3 Surface and Environmental Conditions:
    - .1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
    - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
    - .3 Apply paint only when previous coat of paint is dry or adequately cured.
    - .4 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- 
- 1.8 Waste Management and Disposal
    - .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.,) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
    - .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
    - .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

- .4 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:
  - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
  - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .3 Return solvent and oil-soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .5 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

## PART 2 - PRODUCTS

### 2.1 Paint Materials

- .1 Paints, primers, coatings, varnishes, stains, lacquers etc. shall conform to Green Seal Standard GS-11, Green Seal Standard GC-03, or the California South Coast Air Quality Management District (SCAQMD) Rule #1113.
- .2 Materials (primers, paints, coatings, varnishes, stains, lacquers) shall be listed in the MPI Approved Products List (APL).
- .3 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

- .4 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .5 Where possible, provide paint materials for paint systems from single manufacturer.
- 2.2 Mixing and Tinting
- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Re mix paint in containers prior to and during application to ensure break up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.
- 2.3 Gloss/Sheen Rating
- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:

	Gloss @ 60 degrees	Sheen @ 85 degrees
Gloss Level 1 - Matte Finish (flat)	Max. 5	Max. 10
Gloss Level 2 - Velvet-Like Finish	Max. 10	10 to 35
Gloss Level 3 - Eggshell Finish	10 to 25	10 to 35
Gloss Level 4 - Satin-Like Finish	20 to 35	min. 35
Gloss Level 5 - Traditional Semi-Gloss Finish	35 to 70	
Gloss Level 6 - Traditional Gloss	70 to 85	
Gloss Level 7 - High Gloss Finish	More than 85	

- .2 Gloss level ratings of painted surfaces as indicated.

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- 2.4 Interior Painting Systems
- .1 Unless otherwise noted, all painting work shall be in accordance with MPI Premium Grade finish requirements.
  - .2 Metal Fabrications:
    - .1 INT 5.1R - High Performance Architectural Latex, Level 5 - semi-gloss coating using 100% acrylic latex.
      - .1 Primer: MPI#76
      - .2 Top coats: MPI#141.
      - .3 Location/items: stair guards and railings.
    - .3 Galvanized Metal:
      - .1 INT 5.3M High Performance Architectural Latex (over w.b. galvanized primer) G5 - semi-gloss finish using 100% acrylic latex.
        - .1 Primer: MPI#134
        - .2 Top coats: MPI#141.
        - .3 Location/items: doors and frames.
    - .4 Dressed Lumber:
      - .1 INT 6.3A - High Performance Architectural Latex (over latex primer) - G5 semi-gloss finish using 100% acrylic latex.
        - .1 Primer: MPI#39.
        - .2 Top coats: MPI#141.
        - .3 Location/items: wood doors, wood frames, and interior trim.
      - .2 INT 6.3WW - Waterborne Varnish, clear (over waterborne stain, Premium Grade, G3).
        - .1 Location: stair top rail, posts, balusters.
    - .5 Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc.
      - .1 INT 9.2A Latex G1 - flat finish (over latex sealer) - Zero VOC
        - .1 Primer: MPI #50 X-Green; only Zero VOC products are acceptable.
        - .2 Top coats: MPI #53 X-Green; only Zero VOC products are acceptable.
        - .3 Location/items: ceilings.

- .2 INT 9.2A Latex G4 - satin-like finish (over latex sealer) - Zero VOC
  - .1 Primer: MPI #50 X-Green; only 100% Acrylic Zero VOC products are acceptable.
  - .2 Top coats: MPI #43 X-Green; only 100% Acrylic Zero VOC products are acceptable.
  - .3 Location/items: walls.
  
- 2.5 Exterior Painting Systems
  - .1 Unless otherwise noted, all painting work shall be in accordance with MPI Premium Grade finish requirements.
  
  - .2 Galvanized Metal: steel doors and frames.
    - .1 EXT 5.3M - High Performance Architectural Latex (over w.b. primer) G5- semi-gloss finish.
      - .1 Primer: MPI#134.
      - .2 Top coats: MPI#311.
      - .3 Location/items: Doors and frames.
  
  - .3 Wood Doors, frames, and Deck:
    - .1 EXT 6.3P High performance architectural latex (over latex wood primer), Premium Grade, G4.
      - .1 Location: exterior wood doors and frames.
    - .2 EXT 6.5F - Deck Stain
      - .1 Top coats: MPI#33.

PART 3 - EXECUTION

- 3.1 General
  - .1 Perform preparation and operations for painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
  
  - .2 Apply paint materials in accordance with paint manufacturer's written application instructions
  
  - .3 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

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- 3.2 Examination .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- 3.3 Preparation .1 Protection:
- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
  - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
  - .3 Protect factory finished products and equipment.
- .2 Preparation:
- .1 Remove electrical cover plates, light fixtures, surface hardware on doors, washroom accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
  - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
  - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
- .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloth or other method acceptable to Departmental Representative.

- .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
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- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
  - .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
    - .1 Apply MPI #36 vinyl sealer over knots, pitch, sap and resinous areas.
    - .2 Apply wood filler to nail holes and cracks.
    - .3 Tint filler to match stains for stained woodwork.
  - .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air or vacuum cleaning.

- .7 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

3.4 Workmanship

- .1 Work shall be by skilled tradesmen working under direction of a capable foreman and in accordance with manufacturer's written instructions.
- .2 Apply materials in a workmanlike manner, with suitable equipment in clean condition.
- .3 Apply materials even, uniform in sheen, colour and texture, free from roller and brush marks, sags, crawls, runs or other defects detrimental to appearance or performance.
- .4 Apply sufficient paint to produce a solid, uniform appearance satisfactory to the Departmental Representative, regardless of the number of coats specified for any surface.
- .5 Areas exhibiting incomplete or unsatisfactory coverage shall have entire plane repainted. Patching will not be acceptable.

3.5 Application

- .1 Brush paint trim work. Brush or roller paint other work. Use of spray equipment only when approved by Departmental Representative.
- .2 Apply materials in strict accordance with manufacturer's application instructions.
- .3 Brush and Roller Application:
  - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
  - .2 Work paint into cracks, crevices and corners.

- .3 Paint surfaces and corners not accessible to brush or roller using spray, daubers and/or sheepskins. Use sheepskins or daubers only when specifically authorized by Departmental Representative.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .4 Spray application:
- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
  - .4 Brush out immediately all runs and sags.
  - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

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- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish closets and alcoves as specified for adjoining rooms.
- .10 Finish top, bottom, edges and cutouts of doors after fitting with enamel undercoater for painted finish; gloss varnish for stain or varnish finish.
- 3.6 Field Quality Control
- .1 Standard of Acceptance:
- .1 Walls: no defects visible from a distance of 1000 mm at 90° to surface.
- .2 Ceilings: no defects visible from floor at 45° to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- 3.7 Cleanup
- .1 Do not use solvents or thinners to clean hardware that will remove the permanent lacquer finish.
- .2 Clean and re-install all hardware items removed before undertaken painting operations.
- .3 Remove protective coverings and warning signs as soon as practical after operations cease.
- .4 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .5 Protect freshly completed surfaces from paint droppings and dust. Avoid scuffing newly applied paint.

- .6 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION

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