

Part 1 General

1.1 REFERENCES

- .1 ASTM International
 - .1 ASTM C475/C475M-15, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C557-03 (2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .3 ASTM C645-14, Non-Structural Steel Framing Members.
 - .4 ASTM C754-11, Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
 - .5 ASTM C840-13, Standard Specification for Application and Finishing of Gypsum Board.
 - .6 ASTM C954-11, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .7 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .8 ASTM C1047-14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .9 ASTM C1325-14, Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
 - .10 ASTM C1396/C1396M-14, Standard Specification for Gypsum Wallboard.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB 51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
- .3 Gypsum Association (GA)
 - .1 GA-214-15, Recommended Levels of Finish for Gypsum Board, Glass Mat, and Fiber-Reinforced Gypsum Panels.
 - .2 GA-216-13, Application and Finishing of Gypsum Panel Products.
- .4 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC S102-10, Standard Method of Fire Endurance Tests of Building Construction and Materials.

1.2 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies; include product characteristics, performance criteria, physical size, finish, and limitations.

1.3 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for fire rated assemblies in conjunction with Section 09 22 16 as follows:
 - .1 Fire resistance classifications to CAN/ULC S102.

1.4 MOCK-UPS

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Construct wall assembly, full height by 1200 mm wide, illustrating materials installation and interface.
- .3 Locate where directed.
- .4 Accepted mock-up may remain as part of finished work.
- .5 Allow for inspection of mock-up by Departmental Representative before proceeding with gypsum wall partition Work.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Deliver materials to site in original packaging, labelled with manufacturer's name and identification.
- .3 Storage and Handling Requirements:
 - .1 Store gypsum board assemblies materials level off ground and indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board assemblies 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 Protect prefinished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.
 - .6 Replace defective or damaged materials with new.

1.6 AMBIENT CONDITIONS

- .1 Maintain temperature 10°C minimum, 21°C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.

- .2 Apply board and joint treatment to dry, frost-free surfaces.
- .3 Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 MATERIALS

- .1 Standard gypsum board: ASTM C1396/C1396M, regular and Type X, thickness as shown on Drawings, 1200 mm wide x maximum practical length, ends square cut, edges square.
- .2 Cementitious Backer Board: ASTM C1325 or ANSI A118.9, high density, fibre reinforced cementitious board, thickness as shown on Drawings; maximum available size in place; smoothed edges, ends square cut.
- .3 Resilient channels: To ASTM C645, 0.58 mm (22 mil) thick steel, G40, with integral pre-punched attachment flange, screw attached.
 - .1 Furring channel is not acceptable in place of resilient channel.
 - .2 Resilient sound isolation clips: 0.5 mm base steel thickness galvanized steel, incorporating molded rubber isolator; for resilient attachment of gypsum board to framing to reduce sound transmission.
- .4 Carrying Channels: Cold rolled steel to ASTM C645, galvanized.
- .5 Tie Wire: To ASTM C754.
- .6 Hangers: To ASTM C754, galvanized.
- .7 Steel drill screws: ASTM C1002.
- .8 Stud adhesive: ASTM C557.
- .9 Laminating compound: As recommended by manufacturer, asbestos-free.
- .10 Sealants: In accordance with Section 07 92 00 - Joint Sealants.
- .11 Polyethylene: CAN/CGSB 51.34, Type 2.
- .12 Joint tape: ASTM C475, 52 mm wide fibre paper tape.
- .13 Joint compound: ASTM C475, asbestos-free.

2.2 WOOD FRAMING MATERIALS

- .1 Wood Framing: As specified in Section 06 10 00 – Rough Carpentry.

2.3 SHAFTWALL ASSEMBLY

- .1 Studs and Runners: ASTM C645; hot-dip galvanized sheet steel, base metal thickness to suit design assembly requirements.
 - .1 Studs: CH shape, with knurled faces.
 - .2 Runners: J shape
 - .3 Jamb Struts: J-shape.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify conditions of substrates are acceptable for installation of gypsum board assemblies in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 ERECTION

- .1 Apply and finish gypsum board to ASTM C840 or GA-216 except where specified otherwise.

3.3 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical work, and mechanical work have been approved.
- .2 Apply single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- .3 Double layer gypsum board:
 - .1 Base layer application:
 - .1 Apply gypsum board with long dimension parallel to studs.
 - .2 Position board with abutting edges located in centre of stud flanges.
 - .3 Stagger joints on opposite sides of partition so that joints occur on different studs.
 - .4 Screw-fasten base layer gypsum board to resilient channel in accordance with .
 - .2 Face layer application:
 - .1 Apply gypsum board with long dimension parallel to studs.
 - .2 Position board with abutting edges located in centre of stud flanges.
 - .3 Stagger joints from base layer joints, and on opposite sides of the partition.
 - .4 Screw-fasten face layer to steel studs with screws that are minimum 10 mm longer than the total thickness of the material being attached to the studs.
- .4 Install fire rated gypsum board in accordance with applicable ULC design number.
- .5 Apply board using stud adhesive on furring or framing.
- .6 Install gypsum board on walls vertically to avoid end-butt joints.

- .7 Install gypsum board with face side out.
- .8 Do not install damaged or damp boards.
- .9 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 INSTALLATION - GENERAL

- .1 Erect accessories straight, plumb or 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 Install access doors to electrical and mechanical fixtures as specified in their respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .3 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape, and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .4 Place corner beads at external corners.
 - .1 Use longest practical length.
 - .2 Place edge trim where gypsum board abuts dissimilar materials.
- .5 Finish gypsum board walls and ceilings to following levels in accordance with GA-214:
 - .1 Concealed areas: Level 1 - embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
 - .2 Exposed areas: Level 4 - 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; surfaces smooth and free of tool marks and ridges.
- .6 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.
- .7 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board to be invisible after surface finish is completed.
- .8 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .9 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.5 CEILING INSTALLATION

- .1 Install to ASTM C754 or GA-216.
- .2 Install ceiling framing independent of walls, columns, and above ceiling work.

- .3 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level, to tolerance of 1:1200.

3.6 TOLERANCES

- .1 Maximum variation of finished gypsum board surface from true flatness: 3 mm in 3 m, in any direction.

3.7 CLEANING

- .1 Progress Cleaning: Clean in accordance with Section 01 74 00 - Cleaning. Leave Work area clean at end of each day.
- .2 Final Cleaning: Upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
- .3 Waste Management: Remove waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

3.8 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by installation of gypsum board assemblies.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ANSI A108/A118/A136.1-2014, Specifications for the Installation of Ceramic Tile.
 - .2 ANSI A137.1-2012, American National Standard Specifications for Ceramic Tile.
- .2 ASTM International
 - .1 ASTM C109/C109M-13e1, Standard Test Method for Compressive Strength of Hydraulic Cement Mortars.
 - .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Coloured Concrete.
 - .3 ASTM E1155-14/E1155M, Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers.
 - .4 Tile Specification Guide 09 30 00, Tile Installation Manual 2016-2017.

1.2 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data:
 - .1 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Dry-set Portland cement mortar and grout.
 - .3 Finishing strip.
 - .4 Elastomeric membrane and bond coat.
 - .5 Levelling compound.
 - .6 Latex cement mortar and grout.
 - .7 Slip-resistant tile.
 - .8 Waterproofing isolation membrane.
- .3 Samples:
 - .1 Wall and floor tile: Submit duplicate, full-sized samples of each colour, texture, size, and pattern of tile proposed for installation.

1.3 QUALITY ASSURANCE

- .1 Conform to TTMAC Tile Installation Manual.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

- .2 Waste Management and Disposal: Remove waste material in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

1.5 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12°C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12°C or above 38°C.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide minimum 2% of each type and colour of tile installed to project, for maintenance use. Store where directed.
 - .3 Maintenance material same production run as installed material.

Part 2 Products

2.1 WALL TILE

- .1 CT-1: Kitchen backsplash.
 - .1 Dimensions: Nominal 100 x 400 mm x 8 mm thick.
 - .2 Finish: Glazed.
 - .3 Colour: As selected by Departmental Representative from manufacturer's standard range.
- .2 CT-2: Half-bath, full-bath backsplash.
 - .1 Dimensions: Nominal 75 x 152 mm x 8 mm thick.
 - .2 Finish: Glazed.
 - .3 Colour: As selected by Departmental Representative from manufacturer's standard range.

2.2 FLOOR TILE

- .1 CT-3: Washrooms, entry area.
 - .1 Dimensions: Nominal 300 x 600 mm x 10 mm thick.
 - .2 Edges: Rectified.
 - .3 Colour: As selected by Departmental Representative from manufacturer's standard range.
 - .4 Dynamic coefficient of friction to ANSI A137.1: Minimum 0.42 when wet.

2.3 SURFACE PREPARATION MATERIALS

- .1 Primer: Low VOC, low viscosity primer as recommended by manufacturer to suit substrate and site conditions; provide proof of bonding ability of setting system where manufacturer recommends that primer is not necessary to installation.
- .2 Leveling compound: Quick-setting, polymer-modified, fibre-reinforced cementitious leveling mortar.
 - .1 Compressive strength (ASTM C109): 14.5 MPa (2100 psi) at 24 h.
- .3 Sub-floor filler and leveller: Self-levelling cementitious compound capable of bonding to properly prepared substrate surfaces.
 - .1 Compressive strength: Minimum 36.5 MPa (5300 psi) at 28 days.
 - .2 Capable of being walked on without damage after 3 hours.
 - .3 Capable of being coated after 24 hours at 21°C.

2.4 BOND COAT

- .1 Wall tile systems:
 - .1 Mortar for thin-set interior installation: To ANSI A118.4 and ANSI A118.11, polymer-modified Portland cement, non-sag, lightweight.
- .2 Floor tile systems:
 - .1 Thin set interior installation: Unmodified Portland cement mortar meeting or exceeding requirements of ANSI A118.1, rated for floor traffic load bearing performance.

2.5 GROUT

- .1 To ANSI A118.7, premium polymer-modified Portland cement-based grout, unsanded, mould and mildew resistant.
 - .1 Flexural strength, 7 day: Minimum 6.9 MPa.
 - .2 Compressive strength: Minimum 20.7 MPa.
 - .3 Shrinkage, 7 day: Maximum 0.2%.
- .2 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 grouts are not acceptable.

2.6 ACCESSORIES

- .1 Uncoupling membrane: Polyethylene membrane, 3 mm thick, with grid structure of square cavities; anchoring fleece laminated to underside.
- .2 Finishing strips: Extruded Type 304 brushed stainless steel, profile with square visible surface, integrated perforated anchoring leg, and integrated grout joint spacer; brushed finish. Provide with matching inside and outside corners.

- .3 Sealant: In accordance with Section 07 92 00 - Joint Sealants.

2.7 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 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

- .1 Verify conditions of substrates are acceptable for installation of tile in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
- .2 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .3 Confirm flatness of floor substrate by measurements taken in accordance with ASTM E1155/E1155M.
 - .1 Composite flatness (F_F): Minimum 35.
 - .2 Composite levelness (F_L): Minimum 25.
- .4 Verify flatness of wall substrate. Apply leveling mortar to achieve flatness as required.
 - .1 Maximum wall substrate variance from flatness: 3 mm in 3.05 metres (1/8 inch in 10 feet).

3.3 INSTALLATION

- .1 Perform tile work in accordance with TTMAC Tile Installation Manual, except where specified otherwise.
- .2 Perform large-format tile installation in accordance with ANSI A108.19, except where specified otherwise.
- .3 Apply tile or backing coats to clean and sound surfaces.

- .4 Fit tile around corners, fittings, 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 3 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .7 Remove excess mortar from tile joint areas so at least 2/3 of the tile depth remains for grouting.
- .8 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .9 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .10 Use round edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .11 Install finishing strips at exposed edges.
- .12 Install divider strips at junction of tile flooring and dissimilar materials.
- .13 Allow minimum 24 hours after installation of tiles, before grouting.
- .14 Clean installed tile surfaces after installation and grouting cured.

3.4 WALL TILE

- .1 Install wall tile to GWB substrate in accordance with TTMAC 304W-2016-2017.

3.5 FLOOR TILE

- .1 Install floor tile to concrete substrate in accordance with TTMAC 311F-2016-2017, Detail A. Include uncoupling membrane in system.
- .2 Install floor tile to plywood substrate in accordance with TTMAC 313F-2016-2017, Detail D. Include uncoupling membrane in system.

3.6 CLEANING

- .1 Clean in accordance with Section 01 74 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 American Association of Textile Chemists and Colorists (AATCC)
 - .1 AATCC 134-2011, Electrostatic Propensity of Carpets.
- .2 ASTM International
 - .1 ASTM D412-06ae2, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
 - .2 ASTM D2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
 - .3 ASTM D2240-05 (2010), Standard Test Method for Rubber Property—Durometer Hardness.
 - .4 ASTM D3389-10, Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader).
 - .5 ASTM E648-10e1, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - .6 ASTM E662-12, Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - .7 ASTM E1155-14/E1155M-14, Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers.
 - .8 ASTM F970-07 (2011), Standard Test Method for Static Load Limit.
 - .9 ASTM F1700-13a, Standard Specification for Solid Vinyl Floor Tile.
 - .10 ASTM F1861-08 (2012)e1 – Standard Specification for Resilient Wall Base.
 - .11 ASTM F2199-09 (2014), Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat.
- .3 Canadian Standards Association (CSA)
 - .1 CSA B651-12, Accessibility for the Built Environment.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC S102.2-10, Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies.

1.2 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for tile adhesive, subfloor patching compound. Include product characteristics, performance criteria, physical size, finish, and limitations.
- .2 Submit WHMIS SDS in accordance with Section 01 35 29.06 – Health and Safety Requirements.
- .3 Samples:
 - .1 Submit duplicate sample vinyl tiles, full size, in proposed colours and patterns.
 - .2 Submit duplicate 150 mm pieces of rubber base, demonstrating profiles.
 - .3 Submit manufacturer's samples of stair treads and risers, including nosing, showing colours and finishes.
 - .4 Submit duplicate 100 mm pieces of transition strip in proposed colours and finish.
- .4 Shop Drawings: Indicate:
 - .1 Tile installation orientation.
 - .2 Cut-outs: Show locations where cut-outs are required.
 - .3 Edgings: Show location of edge mouldings.
- .5 Closeout Submittals:
 - .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 MOCK-UPS

- .1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.
- .2 Install vinyl sheet mock-up, minimum 1000 x 1000 mm in area designated by Departmental Representative; illustrate selected materials, colour schemes, pattern, texture, direction of installation, finish fit to walls and doorways, seam finish, and quality of work.
- .3 Locate where directed.
- .4 Allow for inspection of mock-up by Departmental Representative before proceeding with resilient flooring installation.
- .5 Accepted mock-up may remain as part of finished work.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.

1.5 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during, and 48 hours after installation.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide extra materials of vinyl tile flooring in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide 10 m² of each colour, pattern and type flooring material required for project for maintenance use.
 - .3 Extra materials one piece and from same production run as installed materials.
 - .4 Identify each box of vinyl tile flooring.
 - .5 Deliver to Departmental Representative, upon completion of the work of this section.
 - .6 Store where directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

- .1 Luxury vinyl tile (LVT): To ASTM F1700, Class III printed film vinyl tiles.
 - .1 Type B – embossed.
 - .2 Backing: Commercial grade.
 - .3 Wear layer: Minimum 0.76 mm (30 mil).
 - .4 Finish: Urethane.
 - .5 Edge treatment: square.
 - .6 Total thickness: 3.0 mm.
 - .7 Static load limit to ASTM F970: Minimum 250 psi.
 - .8 Slip resistance to ASTM D2047: Minimum 0.6.
 - .9 Flame spread to ASTM E662: Class I.
 - .10 Smoke evolved to ASTM E662: 450 or less.
 - .11 Tile dimensions: 152 x 1220 mm (6 x 48 inches).
 - .12 Pattern and colour: As selected by Departmental Representative.
- .2 Resilient sheet flooring (RSF) for stairs: Rubber, to ASTM F1859, Type 1, composition homogeneous throughout material.
 - .1 Thickness: 2 mm.
 - .2 Slip resistance (ASTM D2047): Minimum 0.5.
 - .3 Abrasion resistance (ASTM D3389): Pass.
 - .4 Flame spread to ASTM E662: Class I.
 - .5 Smoke evolved to ASTM E662: 450 or less.
 - .6 Static load limit to ASTM F970: Minimum 250 psi.
- .3 Resilient base: To ASTM F1861, continuous, top set, composition homogeneous throughout material.

- .1 Type: Thermoplastic rubber.
- .2 Thickness: 3.2 mm.
- .3 Height: 101.6 mm (4 inches).
- .4 Lengths: Cut lengths minimum 2400 mm.
- .5 Profile: Milled wood appearance, rectangular shape.
- .6 Colour: As selected by Departmental Representative.
- .4 Transition Mouldings: PVC with additives and colourants, composition homogeneous through material.
 - .1 Hardness to ASTM D2240: Minimum 85 Shore A.
 - .2 Abrasion resistance to ASTM D3389: 0.22 mg/cycle.
 - .3 Slip resistance: To meet ASTM D2047.
 - .4 Changes in level to comply with accessibility requirements of CSA B651:
 - .1 0 to 6 mm vertical rise: Vertical transition strip permitted.
 - .2 7 to 13 mm vertical rise: Bevelled transition, not to exceed 1:2 ratio for rise:run.
 - .3 Over 13 mm vertical rise: Bevelled transition, not to exceed 1:12 ratio for rise:run.
 - .5 Provide adhesive as recommended by transition strip manufacturer.
 - .6 Carpet-to-Vinyl transition strips: Height to be determined from flooring materials.
 - .1 Exposed horizontal width: 16 mm (5/8 inch).
- .5 Resilient stair tread: To ASTM F1861, thermoplastic rubber, with integral riser.
 - .1 Nosings: Texture and colour to contrast with tread and riser.
 - .2 Length: As required to cover full width of stair.
 - .3 Colours: As selected by Departmental Representative, to match rubber wall base.
- .6 Primers and adhesives: Types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
- .7 Sub-floor filler and leveller: Self-levelling cementitious compound capable of bonding to properly prepared substrate surfaces.
 - .1 Compressive strength: Minimum 36.5 MPa (5300 psi) at 28 days.
 - .2 Capable of being walked on without damage after 3 hours.
 - .3 Capable of being coated after 24 hours at 21°C.
- .8 Metal edge strips:
 - .1 Aluminum extruded, smooth, polished with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 EXAMINATION

- .1 Verify conditions of substrates are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
- .2 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .3 Confirm flatness of substrate by measurements taken in accordance with ASTM E1155/E1155M.
 - .1 Composite flatness (F_F): Minimum 32.
 - .2 Composite levelness (F_L): Minimum 20.
- .4 Ensure concrete substrate is free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers; curing, sealing, hardening, or parting compounds; alkaline salts, excessive carbonation or laitance, mould, mildew, and other foreign materials that might prevent adhesive bond.
- .5 Confirm moisture levels in concrete are within flooring manufacturer's recommendations.
- .6 Confirm alkalinity of concrete substrate is maximum pH 9.

3.3 PREPARATION

- .1 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .2 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .3 Prime substrate to resilient flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.

- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 As installation progresses, and after installation, roll flooring with 45 kg minimum roller to ensure full adhesion.
- .5 Cut flooring around fixed objects.
- .6 Continue flooring over areas that will be under built-in furniture.
- .7 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .8 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 APPLICATION: BASE

- .1 Clean substrate.
- .2 Install resilient base in lengths as long as practicable, without gaps at seams, and with tops of adjacent pieces aligned.
- .3 Do not stretch resilient base during installation.
- .4 Mitre base at corners.
- .5 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .6 Install base straight and level, with base in continuous contact with horizontal and vertical substrates.
- .7 Scribe and fit to door frames and other obstructions. Use pre-moulded end pieces at flush door frames.

3.6 APPLICATION: STAIR TREADS

- .1 Scribe and trim treads to ensure proper fit to substrate.
- .2 Dry-lay treads to confirm proper sizing and fit prior, to application of adhesive.
- .3 Trim treads to within 1/16 inch of riser and stringer to allow for expansion.
- .4 Do not overlap nosing over riser material.
- .5 Apply adequate amount of epoxy caulking nose filler to fill void between internal angle of stair tread and external edge of stair surface to ensure adhesion of nosing to substrate.
- .6 Bond tread and nosing directly to step surface, with adhesive recommended by manufacturer.
- .7 Roll treads with hand roller after installation to ensure proper bonding.

3.7 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.

- .2 Waste Management and Disposal: Remove waste material in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .3 Remove excess adhesive from floor, base and wall surfaces without damage.

3.8 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
- .2 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
 - .1 Safety Data Sheets (SDS).
- .3 Master Painters Institute (MPI)
 - .1 MPI Architectural Painting Specifications Manual, 2014.
- .4 National Fire Code of Canada 2015.
- .5 Transport Canada (TC)
 - .1 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.2 SCHEDULING

- .1 Submit work schedule for various stages of painting to Departmental Representative for review. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Departmental Representative for changes in work schedule.
- .3 Schedule painting operations to prevent disruption of occupants.

1.3 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 Submit Workplace Hazardous Materials Information System (WHMIS) Safety Data Sheets (SDS). Indicate VOCs during application.
- .3 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
 - .2 Submit duplicate 200 x 300 mm sample panels of each paint with specified paint or coating in colours, gloss/sheen and textures required to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.

- .2 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
- .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Manufacturer's Instructions:
 - .1 Submit manufacturer's application instructions.
- .6 Closeout Submittals: Submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.

1.4 MOCK-UPS

- .1 Mock-ups: Apply mock-ups of each paint system indicated, in each colour and finish selected, to verify preliminary selections made under sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Departmental Representative will select surfaces to represent surfaces and conditions for application of each paint system specified.
 - .1 Vertical and Horizontal Surfaces: Provide samples of at least 9 m² (100 ft²).
 - .2 Other Items: Departmental Representative will designate items or areas required.
 - .3 Apply mock-up samples after permanent lighting and other environmental services have been activated.
 - .4 Final approval of colour selections will be based on mock-ups.
 - .1 If preliminary colour selections are not approved, apply additional mock-ups of additional colours selected by Departmental Representative at no added cost to contract.
 - .5 Approved mock-up may remain as part of finished work.

1.5 MAINTENANCE

- .1 Extra Materials:
 - .1 Deliver to extra 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: provide one – 4 litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .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 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well-ventilated area within temperature range 7°C to 30°C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 9 kg Type ABC dry chemical 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 National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Remove waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

- .2 Place materials defined as hazardous or toxic in designated containers.
- .3 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
- .4 Ensure emptied containers are sealed and stored safely.
- .5 Unused paint materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
- .6 Paint and related materials (thinners, and solvents) 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.
- .7 Material that cannot be reused is to be treated as hazardous waste and disposed of in an appropriate manner.
- .8 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .9 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .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 approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .10 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .11 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by Departmental Representative for maintenance use.

1.7 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Provide continuous ventilation for seven days after completion of application of paint.
 - .2 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
 - .3 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating

- equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
- .4 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
- .1 Unless with written approval by product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is above 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
 - .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for gypsum board.
 - .3 Test for moisture using calibrated electronic Moisture Meter.
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
- .1 Apply paint finish 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 to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
- .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.

- .3 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .4 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .5 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes to meet minimum "Environmentally Friendly" E2 rating.

2.2 COLOURS

- .1 Selection of colours from manufacturer's full range of colours.
- .2 Where specific products are available in restricted range of colours, selection based on limited range.
- .3 Second coat in three-coat system to be tinted slightly lighter colour than topcoat to show visible difference between coats.

2.3 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 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 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.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with 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	More than 85	

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

2.5 INTERIOR PAINTING SYSTEMS

- .1 Systems: 3 coats including primer unless otherwise specified.
- .2 Galvanized metal: Metal-faced doors.
 - .1 INT 5.3M – High performance architectural latex.
 - .1 Doors: G5 finish.
- .3 Dressed lumber:
 - .1 Trim carpentry, moulded wood doors and door frames.
 - .1 INT 6.3A – High performance architectural latex over latex primer, G4 finish.
 - .2 Handrails and handrail assemblies:
 - .1 INT 6.3EE – Polyurethane varnish over waterborne stain – G4 (satin-like) finish.
 - .1 Coat 1: Semi-transparent stain, MPI #186.
 - .2 Coats 2 and 3: Polyurethane varnish, MPI #57.
 - .3 Colour: As selected by Departmental Representative.
- .4 Gypsum wallboard.
 - .1 INT 9.2B - High performance architectural latex, G4 finish.
- .5 Electrical backboards.
 - .1 INT 6.4PP – Fire retardant coating, pigmented, waterborne, MPI #64.
 - .1 Apply in accordance with manufacturer's instructions. Apply to all six sides of plywood electrical backboards.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 GENERAL

- .1 Perform preparation and operations for interior painting in accordance with MPI Architectural Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 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.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter. Do not proceed with work until conditions are within acceptable range as recommended by manufacturer.
- .3 Do not commence until such adverse conditions and defects have been corrected and surfaces and conditions are acceptable.
- .4 Maximum moisture content as follows:
 - .1 Gypsum board: 12%.
 - .2 Wood: 12%.

3.4 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.
 - .4 Protect passing pedestrians, building occupants, and general public in and about the building.
- .2 Surface Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath 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 be 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 cloths.
 - .2 Wash surfaces with a biodegradable detergent 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.
- .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 pre-treatment as soon as possible after cleaning and before deterioration occurs.
 - .5 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.
 - .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 vacuum cleaning.
 - .7 Touch up of shop primers with primer as specified.
 - .8 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.5 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush and roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .4 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

- .5 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .6 Sand and dust between coats to remove visible defects.
- .7 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.
- .8 Finish closets and alcoves as specified for adjoining rooms.
- .9 Finish top, bottom, edges and cut-outs of doors after fitting as specified for door surfaces.

3.6 SITE TOLERANCES

- .1 Walls: no defects visible from a distance of 1000 mm at 90 degrees to surface.
- .2 Ceilings: no defects visible from floor at 45 degrees to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

3.7 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

END OF SECTION