

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 07 92 00 – Joint Sealants
- .2 Section 09 90 00 - Painting

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C36/C36M-03e1 Specification for Gypsum Wallboard.
 - .2 ASTM C475/C475M-02(2007), Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .3 ASTM C514-04(2009), Specification for Nails for the Application of Gypsum Board.
 - .4 ASTM C840-08, Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C954-10, 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.
 - .6 ASTM C1002-07, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C1047-10a, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86 (R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data sheets for each type of gypsum board.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original packages, containers or bundles bearing manufacturer's brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

1.5 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with requirements of Contract Administrator.
- .2 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Metal furring runners, hangers, tie wires, inserts, anchors: to ASTM.
- .2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .3 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .4 Steel drill screws: to ASTM C1002.
- .5 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc-coated by electrolytic process 0.5 mm base thickness, perforated flanges, one piece length per location.
- .6 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .7 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Joint compound: to ASTM C475, asbestos-free.

Part 3 Execution

3.1 ERECTION

- .1 Use galvanized supports, members, angles and metal lathing in wet areas.
- .2 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .1 Ceiling Furring:
 - .1 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
 - .2 Install runners level to tolerance of 1:1200. Provide runners at interruptions of continuity and change in direction.
 - .3 Frame with furring channels, perimeter of openings to accommodate access panels, light fixtures, diffusers, and grilles.
 - .4 Support light fixtures by providing additional ceiling suspension hangers within 6" (150 mm) of each corner and at maximum 24" (600 mm) around perimeter of fixture.
 - .5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
 - .6 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
 - .7 Furr for vertical bulkheads within or at termination of ceilings.
 - .8 Furr above suspended ceilings for fire and sound stops and to form plenum areas indicated.
 - .9 In concrete, place anchors hangers by attachment to reinforcing steel by loops embedded at least 50 mm or by approved inserts.
 - .10 Brace suspension for exterior soffits and entrance vestibule ceilings to prevent upward movements due to wind pressure.
 - .11 Do not fasten hangers to steel roof deck.
- .2 Furr duct shafts, beams, columns, pipes and exposed services where indicated.

3.2 APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
- .2 Apply single layer gypsum board to metal, framing using screw fasteners. Maximum spacing of screws 12" (300 mm) on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

- .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
- .3 Apply ½" (12 mm) diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.
- .4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 10" (250 mm).
- .5 Install gypsum board with face side out.
- .6 Do not install damaged or damp boards.
- .7 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.3 INSTALLATION

- .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. Secure using contact adhesive for full length.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Install shadow mould at gypsum board/ceiling juncture. Minimize joints; use corner pieces and splicers.
- .6 Construct control joints of preformed units two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint.
- .7 Provide continuous polyethylene dust barrier behind and across control joints.
- .8 Locate control joints at changes in substrate construction, at approximate 30 ft (10 m) spacing on long corridor runs, at approximate 50 ft (15 m) spacing on ceilings.
- .9 Install control joints straight and true.
- .10 Construct expansion joints as detailed at building expansion and construction joints. Provide continuous dust barrier.
- .11 Install expansion joint straight and true.

- .12 Splice corners and intersections together and secure to each member with 3 screws.
- .13 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .14 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.
- .15 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 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. In unfinished areas.
 - .2 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. For all finished areas.
- .16 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.
- .17 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .18 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .19 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .20 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

3.4 SCHEDULES

- .1 Construct fire rated assemblies where indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 645-11a, Standard Specification for Nonstructural Steel Framing Members.
 - .2 ASTM C 754-92(1999), Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

1.3 QUALITY ASSURANCE

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with requirements of Contract Administrator.
- .2 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C 645, stud size as indicated, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.

- .2 Floor and ceiling tracks: to ASTM C 645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener: standard size, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Acoustical sealant: to CAN/CGSB-19.21.
- .5 Insulating strip: rubberized, moisture resistant 1/8" thick foam strip, 1/2" wide, with self-sticking adhesive on one face, lengths as required.

Part 3 Execution

3.1 ERECTION

- .1 Erect metal studding to tolerance of 1:1000.
- .2 Attach studs to bottom and ceiling.
- .3 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .4 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .5 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 2" leg ceiling tracks. Use double track slip joint as indicated.
- .6 Install continuous insulating strips to isolate studs from un insulated surfaces.
- .7 Install two continuous beads of acoustical sealant insulating strip under studs and tracks around perimeter of sound control partitions.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 21 16 – Gypsum board Assemblies
- .2 Section 09 51 13 – Acoustical Tiles

1.2 RELATED WORK

- .1 Trim for recessed mechanical fixtures and recessed electrical fixtures.

1.3 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
 - .1 ASTM C635/C645M-07, Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .2 ASTM C636/C636M-08, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

1.4 DESIGN REQUIREMENTS

- .1 Maximum deflection: 1/360th of span to ASTM C635 deflection test.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit reflected ceiling plans for special grid patterns as indicated.
- .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines, change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture, lateral bracing and accessories.
- .4 Submit one representative model of each type ceiling suspension system.
- .5 Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

1.6 REGULATORY REQUIREMENTS

- .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.

Part 2 Products

2.1 MATERIALS

- .1 Intermediate uty system to ASTM C635.
- .2 Basic materials for suspension system: non-corrosive aluminum exposed grid system, double web aluminum tee with aluminum cap and stainless steel "Quick-Release" clip.
- .3 Suspension system: non fire rated, made up as follows:
 - .1 Exposed tee bar grid.
 - .1 Acceptable material: DONN AX Suspension System from CGC.
 - .4 Exposed tee bar grid components: flat white. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .5 Hanger wire: galvanized soft annealed steel wire.
 - .1 3.6 mm diameter for access tile ceilings.
 - .2 2.6 mm diameter for other ceilings.
- .6 Hanger inserts: purpose made.
- .7 Carrying channels: manufacturer's standard.
- .8 Accessories: splices, clips, wire ties, retainers and wall moulding flush/reveal, to complement suspension system components, as recommended by system manufacturer.

Part 3 Execution

3.1 INSTALLATION

- .1 Installation: in accordance with ASTM C636 except where specified otherwise.
- .2 Install suspension system to manufacturer's instructions and Certification Organizations tested design requirements.
- .3 Do not erect ceiling suspension system until Work above ceiling has been inspected by Contract Administrator.
- .4 Secure hangers to overhead structure using attachment methods as indicated and as acceptable to Contract Administrator.
- .5 Install hangers spaced at maximum 4'-0" (1200 mm) centres and within 6" (150 mm) from ends of main tees.

- .6 Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width according to reflected ceiling plan..
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles, and speakers.
- .10 Support at light fixtures, diffusers with additional ceiling suspension hangers within 6" (150 mm) of each corner and at maximum 2'-0" (600 mm) around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Finished ceiling system to be square with adjoining walls and level within 1:1000.

3.2 CLEANING

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

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 54 13 – Gypsum Cement Underlayment
- .2 Section 07 92 00 – Joint Sealants

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-[99], Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-[92], Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-[92], Specification for Latex Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-[92], Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-[92], Specification for Ceramic Tile Grouts (included in ANSI A108.1).
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C144-[04], Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C207-[06], Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C847-[06], Specification for Metal Lath.
 - .4 ASTM C979-[05], Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-[M86(R1988)], Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-[78(AMEND.)], Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-75.1-[M88], Tile, Ceramic.
 - .4 CAN/CGSB-25.20-[95], Surface Sealer for Floors.
- .4 Canada Green Building Council (CaGBC)
 - .1 LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
- .5 Canadian Standards Association (CSA International)
 - .1 CSA A123.3-[05], Asphalt Saturated Organic Roofing Felt.

- .2 CAN/CSA-A3000-[03(R2006)], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .6 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1168-[05], Adhesives and Sealants Applications.
- .7 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09 30 00 [2006/2007], Tile Installation Manual.
 - .2 Tile Maintenance Guide [2000].

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide product data in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Include manufacturer's information on:
 - .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy and Furan).
 - .3 Cementitious backer unit.
 - .4 Dry-set cement mortar and grout.
 - .5 Divider strip.
 - .6 Elastomeric membrane and bond coat.
 - .7 Reinforcing tape.
 - .8 Levelling compound.
 - .9 Latex cement mortar and grout.
 - .10 Commercial cement grout.
 - .11 Organic adhesive.
 - .12 Slip resistant tile.
 - .13 Waterproofing isolation membrane.
 - .14 Fasteners.
 - .3 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Base tile: submit duplicate 12" x 12" (300 x 300 mm) sample panels of each colour, texture, size, and pattern of tile.
 - .2 Floor tile: submit duplicate 12" x 12" (300 x 300 mm) sample panels of each colour, texture, size, and pattern of tile.
 - .3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
 - .4 Adhere tile samples to 11mm thick plywood and grout joints to represent project installation.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance Submittals:

- .1 Manufacturer's Instructions: manufacturer's installation instructions.
- .2 Manufacturer's Field Reports: manufacturer's field reports specified.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling.

1.6 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.7 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 required for project for maintenance use. Store where directed.
 - .3 Maintenance material same production run as installed material.

Part 2 Products

2.1 FLOOR TILE

- .1 Ceramic mosaic tile: to CAN/CGSB-75.1, Type CT-1, Class MR, 2" x 2" x ¼" (50mm x 50mm x 6 mm) size, flat edges, slip resistant surface, solid pattern, solid colour as selected by Contract Administrator. Allow for 3 colours from manufacturer's colour range.
 - .1 Acceptable Product: Olympia Tile, Quebec Collection.

2.2 BASE TILE

- .1 Base: Create 4" base, top of tile to be RE. Grout lines to align with floor. Refer to Colour and Material Schedule and Room Finish Schedule.

2.3 TRIM SHAPES

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use slip resistant trim shapes for horizontal surfaces of showers, overflow ledges, recessed steps, shower curbs, drying area curbs, and stools.
- .3 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

2.4 UNCOUPLING MEMBRANE

- .1 Description: 1/8 inch (3 mm) thick, orange, high-density polyethylene membrane with a grid structure of 1/2 inch x 1/2 inch (12 mm x 12 mm) square cavities, each cut back in a dovetail configuration, and a polypropylene anchoring fleece laminated to its underside.
- .2 Conforms to definition for uncoupling membranes in the Tile Council of North America Handbook for Ceramic Tile Installation; and meet or exceed the requirements of the "American national standard specifications for load bearing, bonded, waterproof membranes for thin-set ceramic tile and dimension stone installation A118.10," and is listed by cUPC®, and is evaluated by ICC-ES (see Report No. ESR-2467).
- .3 Acceptable Product: Schluter DITRA

2.5 WATERPROOFING MEMBRANE

- .1 Seams and Corners material 0.004 inch (0.1 mm) thick, 5 inch (125 mm) wide, orange polyethylene membrane, with polypropylene fleece laminated on both sides.
- .2 Acceptable Product: Schluter KERDI-BAND

2.6 MORTAR AND ADHESIVE MATERIALS

- .1 Cement: to CSA-A5, type 10.
- .2 Sand: to ASTM C144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C207, Type N.
- .4 Latex additive: formulated for use in cement mortar and thin set bond coat.
- .5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- .6 Adhesives: as recommended by manufacturer.
 - .1 Maximum VOC limit 65 g/L to SCAQMD Rule 1168.

2.7 BOND COAT

- .1 Dry set cement mortar: to ANSI A108.1.
- .2 Organic adhesive: to CGSB 71-GP-22M, Type 1 ANSI A136.1.

- .1 Maximum VOC limit 65g/L to SCAQMD Rule 1168.
- .3 Latex Cement mortar: to ANSI A108.1, two-component universal dry-set mortar.
- .4 Epoxy bond coat: non-toxic, non-flammable, non-hazardous during storage, mixing, application, and when cured. To produce shock and chemical resistant mortars having the following physical characteristics:
 - .1 Compressive Strength: 246 kg/cm².
 - .2 Bond Strength: 53 kg/cm².
 - .3 Water Absorption: 4.0% Max.
 - .4 Ozone Resistance, 200 hours @ 200 ppm: no loss of strength.
 - .5 Smoke Contribution Factor: 0.
 - .6 Flame Contribution Factor: 0.
 - .7 Finished mortar and grout to be resistant to urine, dilute acid, dilute alkali, sugar, brine and food waste products, petroleum distillates, oil and aromatic solvents.
 - .8 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.
- .5 Chemical-Resistant Bond Coat:
 - .1 Epoxy Resin Type: CTI A118.3.
 - .2 Furan Resin Type: CTI A118.5.
 - .3 Bond Coat: maximum VOC limit 65 g/L to SCAQMD Rule 1168.

2.8 GROUT

- .1 Chemical-Resistant Grout:
 - .1 Pre-mixed urethane based sanded grout: Flextile Ltd., ColourMax Plus. Adhesive and grout by same manufacturer.

2.9 ACCESSORIES

- .1 Transition Strips:
 - .1 Ceramic Tile to RSF:
 - .1 Description: profile with sloped exposed surface, 5/32 inch (4 mm) tall leading edge, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - .2 Material and Finish: EB – Brushed Stainless Steel Type 304 = V2A.
 - .3 Height as required.
 - .4 Acceptable material: Schluter RENO-U
- .2 Cove-Shaped Profiles:
 - .1 Ceramic Tile Floor to Ceramic Tile Base:
 - .1 Description: rolled-formed stainless steel profile with integrated trapezoid-perforated anchoring legs, connected at a 90-degree angle by a cove-shaped section with 23/32" (18.5 mm) radius that forms the visible surface.

- .2 Material and Finish: EV4A – Stainless Steel Type 316L = V4A.
- .3 Height: as required.
- .4 Acceptable material: Schluter DILEX-EHK.
- .2 Top Cap, Internal and External Corners:
 - .1 Description: L-shaped profile with 1/4 inch (3.2 mm) wide visible surface integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - .2 Material and Finish: EV4A – Stainless Steel Type 316L = V4A.
 - .3 Height as required.
 - .4 Acceptable material: Schluter SCHIENE.
- .3 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.
- .4 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .5 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
 - .1 Sealants: maximum VOC limit 250 g/L to SCAQMD Rule 1168.

2.10 MIXES

- .1 Cement:
 - .1 Scratch coat: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand, 1 part water, and latex additive where required. Adjust water volume depending on water content of sand.
 - .2 Slurry bond coat: cement and water mixed to creamy paste. Latex additive may be included.
 - .3 Mortar bed for floors: 1 part cement, 4 parts sand, 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .4 Mortar bed for walls and ceilings: 1 part cement, 1/5 to 1/2 parts hydrated lime to suit job conditions, 4 parts sand and 1 part water. Adjust water volume depending on water content of sand. Latex additive may be included.
 - .5 Levelling coat: 1 part cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
 - .6 Bond or setting coat: 1 part cement, 1/3 part hydrated lime, 1 part water.
 - .7 Measure mortar ingredients by volume.
- .2 Dry set mortar: mix to manufacturer's instructions.
- .3 Organic adhesive: pre-mixed.
 - .1 Adhesives: maximum VOC limit 65g/L [to SCAQMD Rule 1168.

- .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
- .5 Adjust water volumes to suit water content of sand.

2.11 PATCHING AND LEVELLING COMPOUND

- .1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling 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 being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.12 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling 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 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 WORKMANSHIP

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2006/2007, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 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.
- .4 Maximum surface tolerance 1:800.

- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles bullnosed.
- .9 Use bullnose edged tiles at termination of wall tile panels, except where panel abuts projecting surface or differing plane.
- .10 Install divider strips at junction of tile flooring and dissimilar materials.
- .11 Allow minimum 24 hours after installation of tiles, before grouting.
- .12 Clean installed tile surfaces after installation and grouting cured.
- .13 Make control joints at 3 m in each direction. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00 - Joint Sealants. Keep building expansion joints free of mortar and grout.

3.3 FLOOR TILE

- .1 Install in accordance with TTMAC details.

3.4 BASE TILE

- .1 Install in accordance with TTMAC details.

3.5 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic Site visits for inspection of product installation in accordance with manufacturer's instructions.

3.6 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 09 22 27 – Acoustical Suspension

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM E1264-98, Classification for Acoustical Ceiling Products.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of each type acoustical units.

1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15 deg C and humidity of 20 - 40% before and during installation.
- .3 Store materials in Work area 48 hours prior to installation.

1.5 QUALITY ASSURANCE

- .1 Mock-up:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up minimum of acoustical tile.
 - .3 Construct mock-up where directed.
 - .4 Allow 24 hours for inspection of mock-up Contract Administrator before proceeding with ceiling work.
 - .5 When accepted, mock-up will demonstrate minimum standard for this Work. Mock-up may remain as part of the finished work.

1.6 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 by Contract Administrator.
- .3 Waste Management and Disposal:

- .1 Separate waste materials for reuse and recycling in accordance with requirements of Contract Administrator.
- .2 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan (WMP).

1.7 EXTRA MATERIALS

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.

Part 2 Products

2.1 MATERIALS

- .1 Acoustic units for suspended ceiling system:
 - .1 Manufacturer: CGC, Radar Ceramic ClimaPlus, Non-Directional Fissures.
 - .2 Size: 2'-0" x 4'-0" x 5/8".
 - .3 square lay in

Part 3 Execution

3.1 EXAMINATION

- .1 Do not install acoustical panels and tiles until Work above ceiling has been inspected by Contract Administrator.

3.2 INSTALLATION

- .1 Install acoustical panels and tiles in ceiling suspension system.

3.3 APPLICATION

- .1 Install acoustic units to clean, dry and firm substrate.
- .2 Install acoustical units parallel to building lines with edge unit not less than 50% of unit width. Refer to reflected ceiling plan.

- .3 Scribe acoustic units to fit adjacent Work. Butt joints tight, terminate edges with moulding.

3.4 INTERFACE WITH OTHER WORK

- .1 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.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 03 54 13 – Gypsum Cement Underlayment

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
 - .1 ASTM F1303-[04], Standard Specification for Sheet Vinyl Floor Covering with Backing.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 South Coast Air Quality Management District (SCAQMD), California State
 - .1 SCAQMD Rule 1113-[04], Architectural Coatings.
 - .2 SCAQMD Rule 1168-[05], Adhesives and Sealants Applications.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals and project data in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit duplicate 12" x 12" (300 x 300 mm) sample pieces of sheet material, 12" (300 mm) long base and edge strips.
- .3 Provide maintenance data for resilient flooring for incorporation into manual.

1.1 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:
 - .1 Separate waste materials for reuse and recycling in accordance with requirements of Contract Administrator.

1.2 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.
- .2 Do not begin installation unless subfloor has been tested for moisture at 3 lbs per 1,000 square feet or less (Calcium Chloride Test – Quantitative method) with test results within the manufacturer's range of acceptance. Subfloor to comply with the Floor Covering Manufacturer's recommended moisture emission limits.

Do not begin installation unless pH Test has been conducted with a result between 5 to 8 pH or neutral zone.

- .3 Report any unsatisfactory conditions in writing to Contract Administrator. Do not commence installation until conditions are satisfactory. Commencement of work shall imply acceptance of subfloors and environmental conditions.
- .4 Avoid static loads on newly installed flooring until adhesives have fully set, generally 72 hours. If unavoidable ensure that loads are distributed evenly over a larger area.
- .5 Prior to installation, store materials for three 3 days in area with the same environment of installation area to achieve temperature stability.

1.3 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Minimum 5 year manufacturing concrete resurfacing and rehabilitation products.
- .2 Installer Qualifications: Minimum two years installing similar products.
- .3 Mock-up: Provide 2 mock-ups for evaluation of surface preparation techniques and application workmanship.
 - .1 Do not proceed with remaining Work until workmanship, colour and sheen are approved by Contract Administrator.
 - .2 Refinish mock-up area as required to product acceptable work.

1.4 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide 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 roll of sheet flooring and each container of adhesive.
 - .5 Deliver to upon completion of the Work of this section.
 - .6 Store where directed by Contract Administrator.

Part 2 Products

2.1 MATERIALS

- .1 Sheet Vinyl RSF-1: to ASTM F 1913, homogeneous composition, 0.080" (2 mm) thick reinforced wear layer containing 50% or more binder content that is urethane reinforced, colour and pattern dispersed uniformly throughout top layer of product.

- .1 Acceptable Product: Johnsonite/Tarkett Optima
- .2 Colour: Allow for two colours. Contract Administrator to select from manufacturer's colour range.
- .2 Sheet Vinyl RSF-2: Slip Resistant Sheet Vinyl Manufacturer: Aquarius by Altro. Slip Resistance .88/DD .103/W. Colour: Contract Administrator to select from manufacturer's colour range.
- .3 Rubber Sheet Tile RSF-3: to ASTM F 1344, Class 1-A and 1-B, homogeneous composition of 100% synthetic rubber, 24" x 24", .125" (3.17 mm) thickness.
 - .1 Acceptable Product: Johnsonite, Roundel Square Raised Disk Pattern Rubber Tile
 - .2 Colours: Allow for two colours. Contract Administrator to select from manufacturer's colour range.
- .4 Self Levelling Fast Track Underlayment: Dura-Cap "Green" gypsum cement floor underlayment compound as manufactured by Maxxon Corporation.
- .5 Primer: self levelling primer for porous concrete.
 - .1 Acceptable Product: Maxxon Floor Primer
- .6 Heat welding rod: Acceptable material Vinyl welding rod by flooring manufacturer, sized to suit application, colours as indicated in Colour and Finish Schedule to match to each floor colour and type.
- .7 Feature strips: of same material and thickness as adjacent work in width, colour indicated.
- .8 Stainless steel Floor Collar: Floor covering installer to contact flooring manufacturer for provision of a stainless steel collar at drains located within the area of Work. Verify dimensions on Site
- .9 Resilient base: continuous, top set, complete with pre-moulded end stops and external corners:
 - .1 Type: rubber.
 - .2 Style: with toe.
 - .3 Thickness: 1/8".
 - .4 Height: 4".
 - .5 Lengths: cut lengths minimum 8'.
 - .6 Acceptable material: Johnsonite Traditional Rubber Wall Base
 - .7 Colours : Contract Administrator to select from manufacturer's colour range.

- .10 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
- .11 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .12 Vinyl Cove Former: Erv Parent $\frac{3}{4}$ " (19 mm).
- .13 Aluminum Edge Capping: Erv Parent.
- .14 Metal edge strips: Stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .15 External corner protectors: stainless steel, type recommended by flooring manufacturer.
- .16 Edging to floor penetrations: stainless steel type recommended by flooring manufacturer.

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 datasheets.

3.2 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
 - .1 Moisture test to be Calcium Chloride Moisture Test (Quantitative Method.) Conduct two tests for the first 1,000 square feet then one test for every additional 1,000 square feet as outlined in the most current edition of ASTM F 1869.
 - .2 PH test. Conduct one pH test for every 1,000 square feet of area. Leveld should be between 5 and 8 pH. If higher levels are found neutralize the floor with one part of Muriatic Acid and nine parts of water. Follow proper safety procedures and procedures for accurate testing.
- .2 Do not install flooring on concrete floors containing curing agents, sealers, or hardeners, co-ordinate with Division 3.

3.3 PREPARATION

- .1 Remove existing resilient flooring.

- .2 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .3 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .4 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .5 Prime sub floor to resilient flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air re-circulate through a district or whole building air distribution system.
- .2 Apply low VOC, water based 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 Run sheets in direction of traffic. Double cut sheet joints and continuously seal, heat weld according to manufacturer's printed instructions.
- .5 Heat weld seams of sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring neatly around fixed objects.
- .8 Floor Drains: Seal flooring around full perimeter of drain with two part polyurethane adhesive. Install flooring into drain collar; install fastening clamp and strainer.
- .9 Install feature strips and floor markings where indicated. Fit joints tightly.
- .10 Continue flooring over areas which will be under built-in furniture.
- .11 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .12 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

- .13 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 APPLICATION: BASE

- .1 Lay out base to keep number of joints at minimum.
- .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 pre-moulded end pieces at flush door frames.
- .7 Cove internal corners. Use pre-moulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .8 Use coved type.

3.6 APPLICATION: FLASH COVE BASE

- .1 Install minimum $\frac{3}{4}$ " radius vinyl cove former and top edge capping. Fill gap between GWB and floor to ensure a sound installation.
- .2 At flush door frames and other projections taper cove former 12" back from frame to provide a flush cove at face of frame.
- .3 Install flooring material with continuous seam parallel to building walls. Install cove and field material in one piece.
- .4 Use longest practical lengths to minimize vertical joints. Wherever vertical joints occur line up with joints in field material.
- .5 For sheet vinyl flooring self cove by heating and bending to form one piece to specified height, typically 6" height or as approved by Contract Administrator.
- .6 Flooring shall be in one piece flash cove except where border cove indicated. Refer to Colour Schedule.
- .7 Install straight and level to a tolerance of 1:1000.
- .8 Use same adhesive for flash cove as for flat areas unless specified otherwise. Apply sufficient adhesive to achieve a 100% bond.
- .9 External Corners: Flash cove outside corners shall be fitted with a 'butterfly – inset' being wrapped around at an angle of 45 degrees, starting from the base of the corner and joined on each side of the flash cove material.

- .10 Internal Corners: Flash cove inside corners shall be fitted with a 'half butterfly' formed by cutting material at 45 degrees from base of corner, sharply tucked into the inside corner, wrapped and joined to the cove material facing the non prominent side wall.
- .11 Heat weld with matching thread resulting joints or seams. Trim flush and remove any burr or rough spots along welded joints, unless otherwise recommended or specified by Contract Administrator.

3.7 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Provide manufacturer's field services consisting of product use recommendations and periodic Site visits for inspection of product installation in accordance with manufacturer's instructions.

3.8 CLEANING

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.

3.9 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection. Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 04 22 00 – Concrete Unit Masonry
- .2 Section 08 11 00 – Metal Doors and Frames
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).

1.3 QUALITY ASSURANCE

- .1 Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and Contract Administrator.
- .2 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they Work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .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.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .5 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.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Contract Administrator.
- .7 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90⁰ to surface.
 - .2 Ceilings: No defects visible from floor at 45⁰ to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .8 Mock-Ups:

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Provide 12" x 12" (300 mm x 300 mm) mock-up. Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Locate where directed.
 - .4 Allow 24 hours for inspection of mock-up before proceeding with Work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.4 SCHEDULING OF WORK

- .1 Submit Work schedule for various stages of painting to Contractor Administrator for approval. Submit schedule minimum of 48 hours in advance of proposed operations.
- .2 Obtain written authorization from Contract Administrator for any changes in Work schedule.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used.
- .3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 Manufacturer's Material Safety Data Sheets (MSDS).
- .4 Submit full range colour sample chips. Indicate where colour availability is restricted.
- .5 Submit duplicate 8" x 12" (200 x 300 mm) sample panels of each paint, stain with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
 - .1 1/8" (3 mm) plate steel for finishes over metal surfaces.
 - .2 1/2" (13 mm) birch plywood for finishes over wood surfaces.

- .3 2" (50 mm) concrete block for finishes over concrete or concrete masonry surfaces.
- .4 ½" (13 mm) gypsum board for finishes over gypsum board and other smooth surfaces..
- .6 When approved, sample panels shall become acceptable standard of quality for appropriate on-Site surface with one of each sample retained on-Site.

1.6 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 for 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 Contract Administrator requirements for delivery and storage of extra materials.

1.7 DELIVERY, HANDLING AND STORAGE

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements and manufacturer's written instructions.
- .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 to approval of Contract Administrator. After completion of operations, return areas to clean condition to approval of Contract Administrator.
- .10 Remove paint materials from storage only in quantities required for same day use.

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- .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 one 9 kg Type ABC 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.
 - .13 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with requirements of Contract Administrator.
 - .2 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
 - .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan (WMP).
 - .4 Place materials defined as hazardous or toxic in designated containers.
 - .5 Handle and dispose of hazardous materials in accordance regulations.
 - .6 Ensure emptied containers are sealed and stored safely.
 - .7 Unused paint coating materials must be disposed of at official hazardous material collections Site as approved by Contract Administrator.
 - .8 Paint, stain and wood preservative finishes 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.
 - .9 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
 - .10 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
 - .11 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).
- .12 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

1.8 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
 - .1 Ventilate enclosed spaces 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 Coordinate use of existing ventilation system with Contract Administrator and ensure its operation during and after application of paint as required.
 - .4 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.
 - .5 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by the specifying body, Paint Inspection Agency and the applied product manufacturer, 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.
 - .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 plaster and 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 Do not apply paint when:
 - .1 Temperature is expected to drop below 10 °C before paint has thoroughly cured.
 - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
 - .3 Surface to be painted is wet, damp or frosted.
 - .5 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
 - .6 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the Contract Administrator such that painted surfaces will have dried and cured sufficiently before occupants are affected.
- .4 Additional Interior Application Requirements:
- .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

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 Paint materials for paint systems shall be products of a 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 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .6 Epoxy Polyamide Paint:
 - .1 Preparation and Application: as per manufacturer's recommendations.
 - .2 Acceptable Material: 101 Line COROPOXY Polyamide.

- .7 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.

2.2 COLOURS

- .1 As indicated in in Colour & Finish Schedule. Selection of colours from manufacturer's full range of colours.
- .2 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats. For new walls use three coat system of one coat primer and two coats finish.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to Site. On-Site tinting of painting materials is allowed only with Contract Administrator's written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such 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.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss shall be defined as the sheen rating of applied paint, in accordance with the following values:
- | Gloss Level Category | Units @ 60° | Units @ 85° |
|------------------------|-------------|-------------|
| G1 - matte finish | 0 to 5 | max. 10 |
| G2 - velvet finish | 0 to 10 | 10 to 35 |
| G3 - eggshell finish | 10 to 25 | 10 to 35 |
| G4 - satin finish | 20 to 35 | min. 35 |
| G5 - semi-gloss finish | 35 to 70 | |
| G6 - gloss finish | 70 to 85 | |
| G7 - high gloss finish | > 85 | |
- .2 Gloss level ratings of painted surfaces shall be as specified herein and as noted on Finish Schedule.

2.5 INTERIOR PAINTING SYSTEMS NEW AND EXISTING

- .1 Concrete masonry units: smooth and split face block and brick:
- .1 INT 4.2D - Latex G3 finish.
- .2 INT 4.2G - Epoxy finish for wet environments, G5 finish.

- .3 RINT 4.2 – Latex G3 finish.
- .4 RINT 4.2G- Epoxy finish for wet environments, G5 finish.
- .2 Metal: doors, frames, metal fabrications:
 - .1 INT 5.3A – Latex G5 finish.
 - .2 INT 5.3D – Epoxy, G6 finish.
 - .3 RINT 5.3A – Latex G5 finish.
 - .4 RINT 5.3D – Epoxy, G6 finish.
- .4 Gypsum Board Ceilings: gypsum wallboard, drywall, "sheet rock type material", etc.:
 - .1 INT 9.2A - Latex, G1 finish.
- .5 Hardwood Window Frames:
 - .1 INT 6.3K – Polyurethane Varnish, G4 finish.

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 Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

3.3 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Contract Administrator damages, defects, unsatisfactory or unfavourable conditions before proceeding with Work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Contract Administrator. Do not proceed with Work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco, Plaster and Gypsum Board: 12%.
 - .2 Concrete: 12%.
 - .3 Clay and Concrete Block/Brick: 12%.

.4 Wood: 15%.

3.4 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 such surfaces as directed by Contract Administrator.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect building occupants in and about the building.
- .5 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking any painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
- .6 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Contract Administrator.

3.5 CLEANING AND PREPARATION

- .1 Clean and prepare surfaces in accordance with MPI 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 or compressed air.
 - .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. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 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.

- .3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply vinyl sealer to MPI #36 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.
- .4 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.
- .5 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.
- .6 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.
- .7 Do not apply paint until prepared surfaces have been accepted by Contract Administrator.

3.6 APPLICATION

- .1 Method of application to be as approved by Contract Administrator. Apply paint by brush/ roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 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 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 shall be free of roller tracking and heavy stipple unless approved by Contract Administrator.
 - .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 and only when specifically authorized by Contract Administrator.
- .4 Apply coats of paint as a 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 cutouts of doors after fitting as specified for door surfaces.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .2 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .3 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .4 Do not paint over nameplates.
- .5 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .6 Paint fire protection piping red.
- .7 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .8 Paint natural gas piping yellow.
- .9 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .10 Do not paint interior transformers and substation equipment.

3.8 FIELD QUALITY CONTROL

- .1 Advise Contract Administrator when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

3.9 RESTORATION

- .1 Clean and re-install all hardware items removed before undertaken painting operations.

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- .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 Contract Administrator. Avoid scuffing newly applied paint.
 - .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Contract Administrator.

END OF SECTION