

**Part 1            General**

1.1            RELATED SECTIONS

- .1            Section 06 10 00 – Rough Carpentry
- .2            Section 09 29 00 – Gypsum Board

1.2            REFERENCES

- .1            American Society for Testing and Materials (ASTM)
  - .1            ASTM C 645-99, Standard Specification for Nonstructural Steel Framing Members or latest.
  - .2            ASTM C 754-98a, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products. or latest
- .2            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-1.40-97, Primer, Structural Steel, Oil Alkyd Type or latest.
- .3            CAN/CGSB-19.21-M87, Sealing and Bedding Compound Acoustical or latest.

1.3            WASTE MANAGEMENT AND DISPOSAL

- .1            Divert steel scraps from landfill by disposal into the On Site metal recycling bin or at nearest metal recycling facility.
- .2            Divert reusable Materials for reuse at nearest used building Materials facility or similar type facility.
- .3            Divert unused primer Materials from landfill through disposal at a special wastes depot.

**Part 2            Products**

2.1            MATERIALS

- .1            Non-load bearing channel stud framing: to ASTM C 645 or latest, stud size as indicated on Drawings, roll formed, hot dipped galvanized steel sheet, for screw attachment of gypsum board, with knock-out service holes. Unless otherwise noted, 22 ga. typical thickness for standard interior wall assemblies and 20 ga. thickness for all ceiling and bulkhead assemblies. Refer to Structural Drawings for other gauges.
- .2            Floor and ceiling tracks: to ASTM C 645 or latest, in widths to suit stud sizes, 32 mm flange height. Slip tracks to be provided at all interior partitions.
- .3            Metal channel stiffener: size as indicated on Drawings, thickness as indicated on Drawings, cold rolled steel, coated with rust inhibitive coating.
- .4            Acoustical sealant: to CAN/CGSB-19.21 or latest.
- .5            Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

**Part 3**

**Execution**

3.1

**ERECTION**

- .1 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.
- .2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .3 Place studs vertically as indicated on Drawings and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom and ceiling track using screws unless indicated otherwise.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for Work specified in other Sections.
- .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .9 Install double heavy gauge single jamb studs at all openings typically.
- .10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Provide 38 mm wood stud secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .13 Install blocking between studs where required for attaching electrical and other boxes.
- .14 Extend partitions to ceiling height except where noted otherwise on Drawings.
- .15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Refer to Drawings for details.
- .16 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .17 Install two continuous beads of acoustical sealant under top and bottom tracks and at end studs, around the perimeter of all sound rated partitions.
- .18 Where steel stud walls meet substrates that are not completely level, the bottom and top tracks shall follow the substrate as snug as possible. Fill all gaps between tracks and substrate with foam insulation or acoustic caulking to suit.

**END OF SECTION**

- Part 1            General**
- 1.1            SECTION INCLUDES
- .1           Interior decorative polished plaster finish system for installation over walls and ceilings.
- 1.2            RELATED SECTIONS
- .1           Section 09 26 00 – Gypsum Board Assemblies
- 1.3            REFERENCES
- .1           ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 1998.
- .2           ASTM D 2486 - Standard Test Method for Scrub Resistance of Wall Paints; 1996.
- .3           ASTM D 3363 - Standard Test Method for Film Hardness by Pencil Test; 1992a.
- .4           ASTM E 84 - Standard Test method for Surface Burning Characteristics of Building Materials; 1999.
- .5           ASTM D 3273 – Standard Test Method for Resistance to the Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- .6           ASTM D 3274 – Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.
- .7           ASTM D 3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
- 1.4            SYSTEM PERFORMANCE REQUIREMENTS
- .1           Polished plaster P01, P20, P30 or P66 shall be tested by a qualified independent testing agency for the following properties according to the following test methods:
- .1           Compressive strength: 8,000 PSI
- .2           Scrub Resistance: Minimum 10,000 cycles using 10 grams of scrubbing medium and 5 grams of water applied by brush.
- .3           Chemical Exposure: Passes ASTM D 1308.
- .4           Mold Resistance – Minimum rating of 10 when tested according to ASTM D 3273 and D 3274.
- .5           VOC content – Top coat plaster to have 0g/lit (0lbs/gal) when tested according to ASTM D3960.
- 1.5            SUBMITTALS
- .1           See Section 01 33 00 – Submittal Procedures.
- .2           Product Data: Provide manufacturer's technical data on products specified, including installation instructions.
- .3           Shop Drawings: Indicate designs, colors, and locations.
- .4           Samples: Submit samples, (300mm x 300mm) 12" x 12" in size, illustrating finish color and texture.
- .5           Qualification Data: Certificate issued by distributor indicating that installer has attended training class and is authorized to install specified product.
- .6           Warranty: Sample copy of manufacturer's warranty stating obligations, remedies, limitations, and exclusions of warranty.
- 1.6            QUALITY ASSURANCE
- .1           Installer Qualifications: Company specializing in performing Work of this Section with a minimum of five years documented experience. Include list of at least three completed

projects of similar scope with project names and addresses and details of ownership and professionals involved.

- .2 Fire-Test-Response Characteristics: Provide finished system with the following surface-burning characteristics as determined per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

- .1 Flame Spread: 10 or less.
- .2 Smoke Contribution: 10 or less.

#### 1.7 MOCK-UP

- .1 Prior to installing polished plaster, construct mock-up of finished surface, 4 feet long by 1 foot wide, illustrating surface finish and color.
- .2 Locate where as indicated on Drawings, or as per Contract Administrator's directions.
- .3 Mock-up may remain as part of the Work if deemed acceptable by Contract Administrator.

#### 1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver Materials to Site in their original packaging with manufacturer's labels identifying Manufacturer and Product; color designation; lot number; and date of manufacture.
- .2 Inspect Materials upon delivery and immediately report to Contract Administrator damaged or defective Materials.
- .3 Store Materials in a well ventilated area with minimum ambient temperature of 7°C (45°F). Prevent deterioration due to moisture, temperature changes, contamination, or other causes.

#### 1.9 PROJECT CONDITIONS

- .1 Environmental Requirements: Do not apply polished plaster when substrate or ambient air temperatures is under 7°C or over 35°C.
- .2 Maintain these conditions 24 hours before, during and after installation of polished plaster.

#### 1.10 WARRANTY

- .1 See Section 01 78 00 – Closeout Submittals, for additional warranty requirements.
- .2 Provide manufacturer's standard written warranty.
  - .1 Period of Warranty: 10 years.

### **Part 2 Products**

#### 2.1 MANUFACTURERS

- .1 Acceptable Manufacturers:
  - .1 Armourcoat Surface Finishes, 4330 Production Court, Las Vegas, Nevada 89115, USA Tel: 702 644 0606. Fax: 702 644 0554. E-mail: [sales@usa.armourcoat.com](mailto:sales@usa.armourcoat.com).
- .2 Substitutions for equal in accordance with B7.

#### 2.2 PRODUCTS

- .1 Products: Armourcoat Polished Plaster, Armourcoat Ltd.
- .2 Finish: Smooth
- .3 Color: Custom colour to be specified by Contract Administrator.

#### 2.3 MATERIALS

- .1 Polished Plaster System: Provide manufacturer's complete system of proprietary Materials specifically formulated for compatibility with one another including:

- .1 K40 Primer  
K149 Keycoat  
P01/P20/P30/P66 Polished Plaster  
Colourant
- .2 Water: Clean, fresh, potable and free of mineral or organic matter which can affect plaster.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Verify the suitability of existing conditions before starting Work. Do not begin Work of this Section until unsatisfactory conditions have been corrected.
- .2 If depth of exposed Material is greater than 13mm (½") use blocking and face with gypsum board.
- .3 Acceptable Substrate Tolerances: Verify that substrates are true and level. Substrates shall be constructed to the following tolerances:
  - .1 ± 1mm (0.05 inches) in 610mm (2') and ± 4mm (0.15 inches) in 1829mm (6').

**3.2 PREPARATION**

- .1 Comply with manufacturer's written instructions for substrate preparation.
- .2 Remove hardware, electrical switch and outlet plates, lighting fixtures and other items already in place that are not to receive plaster finish.
  - .1 After completion of Work, reinstall items using workers skilled in the trades involved.
- .3 Protect adjacent surfaces and items that are not to receive plaster finish, but which cannot be removed, from finish Work. Use masking Materials that will not damage protected items and surfaces.
- .4 Clean substrates of substances that could impair bond including mold, mildew, oil, grease, salts, contamination and dirt using methods recommended by manufacturer.
- .5 Substrate: For existing masonry substrate, ensure the masonry units at cut opening are returned for flush surface. Remove any excess dust and dirt from the wall with brush.
- .6 Substrate: For gypsum board substrates, apply coats of joint compound over joints and fasteners to achieve a minimum of a Level 4 finish. Use ready-mixed or job-mixed, drying-type, all-purpose or topping compound, or proprietary product specifically formulated for joint coating. Touch up and sand as needed to produce a surface free of visual defects, tool marks, or ridges, and conforming to a smooth flat surface. Apply Polished Plaster to Regular Gypsum Board that is fire resistant and complies with ASTM C 1396.
- .7 Prepare all Materials in accordance with manufacturer's recommendations.

**3.3 INSTALLATION**

- .1 Mix and apply plaster in accordance with manufacturer's instructions to obtain designed strength and consistency.
- .2 Add colourant according to manufacturer's recommendation.
- .3 Coats to be applied on one application for uniform texture and consistency.
- .4 Use clean steel trowel.
- .5 Prime coat: Apply K40 primer coat and allow to dry.
- .6 Keycoat: Mix and apply K149 Keycoat in accordance with manufacturer's instructions. Allow to dry.
- .7 Feather plaster to edge of surface for clean and crisp edge.

- .8 Finish: Apply finish coats as recommended by manufacturer to achieve desired results. Number of coats and total dry mil thickness shall be as recommended by manufacturer for specific system. Allow to dry.
  - .9 Wax: Apply Ecowax to obtain desired sheen in accordance with manufacturer's instructions.
  - .10 Provide finish free of unsightly variations in texture and other defects.
  - .11 For final finished surface Work the plaster with a clean finishing trowel to remove all trowel marks and blemishes for a smooth shine and burnished effect.
  - .12 Coordinate with Contract Administrator level of gloss desired.
- 3.4 CLEANING AND PROTECTION
- .1 Remove temporary coverings used to protect adjacent surfaces and reinstall hardware, plates, lighting fixtures and other items previously removed.
  - .2 Clean and repair adjacent surfaces and items soiled or damaged during Work of this Section.
  - .3 Maintain and protect completed polished plaster surfaces until time of acceptance at Substantial Performance.

**END OF SECTION**

**Part 1**

**General**

- 1.1 RELATED SECTIONS
  - .1 Section 07 25 00 – Air/Vapour Barriers Membrane
  - .2 Section 07 84 00 – Firestopping
  - .3 Section 07 92 00 – Joint Sealing
  - .4 Section 08 11 00 – Steel Doors and Frames
  - .5 Section 09 22 16 – Non Structural Framing
  - .6 Section 09 90 00 – Painting
- 1.2 REFERENCES
  - .1 Aluminum Association
    - .1 Designation for Aluminum Finishes-1997 or latest.
  - .2 American Society for Testing and Materials (ASTM)
    - .1 ASTM C 36-95, Specification for Gypsum Wallboard or latest.
    - .2 ASTM C 442-92, Specification for Gypsum Backing Board and Coreboard or latest.
    - .3 ASTM C 475-94, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board or latest.
    - .4 ASTM C 557-93a, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing or latest.
    - .5 ASTM C 630-93, Specification for Water-Resistant Gypsum Backing Board or latest.
    - .6 ASTM C 840-95, Specification for Application and Finishing of Gypsum Board or latest.
    - .7 ASTM C 954-93, Specification for Steel Drill Screws for the Application of Gypsum Board or latest.
    - .8 ASTM C 1002-93, Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases or latest.
    - .9 ASTM C 1047-94, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base or latest.
  - .3 Canadian General Standards Board (CGSB)
    - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction or latest.
    - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs or latest.
  - .4 Underwriters Laboratories of Canada (ULC)
    - .1 CAN/ULC-S102-1988, Building Materials and Assemblies, Standard Method of Test for Surface Burning Characteristics of or latest.

**NOTE: Subcontractors to coordinate with Section 07 84 00 to achieve required fire ratings.**

1.3 SITE ENVIRONMENTAL REQUIREMENTS

- .1 Maintain temperature minimum 10°C, maximum 21°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.

1.4 DESCRIPTION OF WORK

- .1 Types of Work: The types of Work herein specified include the following:
  - .1 Gypsum drywall applied to steel stud framing system.
  - .2 Gypsum drywall applied to wood framing.
  - .3 Gypsum drywall backing board as substrate for other finishes.
  - .4 Gypsum drywall applied to solid substrates.
  - .5 Gypsum drywall applied to ceilings.
  - .6 Gypsum drywall finishing including joint tape and compound treatment.
- .2 The Work included under this Section shall conform to the industry standard and be accepted by the local construction and trade associations.

1.5 QUALITY ASSURANCE

- .1 Fire-resistance Ratings: Where gypsum drywall assemblies with fire-resistance ratings are indicated, provide Gypsum system that provides the required rating.
  - .1 Provide fire-resistance rated assemblies identical to those indicated by reference to GA File Nos. in GA Fire Resistance Design Manual or to design designations in UL Fire Resistance Directory, Warnock Hersey (WHI) listing, or in listing of other testing and agencies acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver Materials in original packages, containers or bundles bearing 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.

1.7 PROJECT CONDITIONS

- .1 Environmental Requirements General: Comply with requirements of gypsum board application standards for environmental conditions before, during and after application of gypsum board.
- .2 Cold Weather Protection: When outdoor temperature is below 10 °C, maintain building working temperature of not less than 10 °C for a period of 48 hours prior to, during and following application of gypsum board and joint treatment Materials or bonding adhesives.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment Material immediately after its application.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Remove from Site and dispose of packaging Materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging Material for recycling in accordance with Waste Management Plan.
- .3 Divert unused gypsum from landfill to gypsum recycling facility for disposal approved by Contract Administrator.
- .4 Divert unused metal Materials from landfill to metal recycling facility approved by Contract Administrator.
- .5 Divert unused wood Materials from landfill to recycling, composting facility approved by Contract Administrator.
- .6 Divert unused paint and caulking Material from landfill to official hazardous Material collections Site approved by Contract Administrator.
- .7 Do not dispose of unused paint and caulking Materials into sewer systems, into lakes, streams, onto ground or in other locations where it will pose health or environmental hazard.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Give preference to gypsum board manufacturers that manufacture in the Province of the Work or have recycled content.
- .2 Standard interior board: to ASTM C 36 regular, Type X, 1220mm wide x maximum practical length, square ends with edges bevelled. Thicknesses as noted on Drawings.
- .3 Water resistant backer board for all washroom walls behind ceramic tile: to ASTM C630/C630M regular, 13 mm thick, in maximum practical width and length. Acceptable products: Durock Tile Backer Board (CGC), DensShield Tile Backer, or approved equal; cover joints with tape type as per manufacturer's directions.
- .4 Exterior wall and soffit sheathing board: DensGlass Gold by Georgia Pacific or approved equal. Thicknesses as noted on Drawings.
- .5 Exterior roof parapet sheathing board: DensDeck by Georgia Pacific or approved equal. Thicknesses as noted on Drawings.
- .6 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .7 Resilient channel: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .8 Steel drill screws: to ASTM C 1002 or latest.
- .9 Stud adhesive: to CAN/CGSB-71.25 or latest.
- .10 Laminating compound: as recommended by manufacturer, asbestos-free.
- .11 Sealants: in accordance with Section 07 92 00 – Joint Sealers.
- .12 Acoustic sealant: See Section 07 92 00 – Joint Sealers.
- .13 Polyethylene: to CAN/CGSB-51.34 or latest, Type 2.
- .14 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .15 Joint compound: to ASTM C 475 or latest, asbestos-free.

**Part 3**

**Execution**

3.1

ERECTION

- .1 Do application and finishing of gypsum board in accordance with ASTM C 840 or latest except where specified otherwise.
- .2 Do application of gypsum sheathing in accordance with ASTM C 1280 or latest.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C 840 or latest except where specified otherwise.
- .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.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers and grilles.
- .7 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .8 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .9 Install wall furring for gypsum board wall finishes in accordance with ASTM C 840 or latest, except where specified otherwise.
- .10 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .11 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .12 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm o.c. and not more than 150 mm from ceiling/wall juncture. Secure to each support with 38 mm common nail or 25 mm drywall screw.
- .13 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.2

APPLICATION

- .1 Do not apply gypsum board until bucks, anchors, blocking, electrical and mechanical Work are approved.
- .2 Apply single or double layer gypsum board to wood or metal furring or framing using screw fasteners for first layer , screw fasteners for second layer. Maximum spacing of screws 300 mm o.c.
- .3 Apply single layer gypsum board to concrete or concrete block surfaces, where indicated, using laminating adhesive. Brace or fasten gypsum board until fastening adhesive has set. Gypsum board shall be mechanically fastened at top and bottom of each sheet.
- .4 Apply water-resistant gypsum board where wall tiles to be applied and adjacent to slop sinks and janitors closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .5 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.

- .6 On ceilings: Apply base layer prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 300mm (1'-0"). Apply base layers at right angles to supports unless otherwise indicated.

### 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 at 150 mm.
- .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.
- .4 Feather coats onto adjoining surfaces so that difference is max 1 mm.
- .5 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Locate control joints where indicated on Drawings and at a maximum 6m (30').
- .8 Install control joints straight and true.
- .9 Apply J-trim and Fast-Mask trim to all visible surfaces of dissimilar Materials: ie. To timber, PVC, metal, masonry, glass, etc.
- .10 Install access doors to electrical and mechanical fixtures specified in respective Sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .11 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.
- .12 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.
- .13 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.
- .14 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .15 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .16 Remove ridges by light sanding or wiping with damp cloth.
- .17 Install sound attenuation blankets where indicated.
- .18 Install ceiling boards in the direction that will minimize the number of end-but joints. Stagger end joints at least 300mm (1'-0").
- .19 Install gypsum board on wall vertically to avoid end-but joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .20 Install gypsum board with face side out. Do not install damaged or damp boards.
- .21 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite side of wall.

3.4 SCHEDULES

- .1 Construct fire rated assemblies where indicated.
- .2 Use water resistant drywall in showers and where indicated.

**END OF SECTION**

**Part 1**

**General**

1.1 RELATED SECTIONS

- .1 Section 01 33 00 – Submittal Procedures
- .2 Section 01 78 00 – Closeout Submittals
- .3 Section 07 92 00 – Joint Sealing

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) or latest.
  - .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) or latest.
  - .3 CTI A118.4-92, Specification for Latex Portland Cement Mortar (included in ANSI A108.1) or latest.
  - .4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1) or latest.
  - .5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1) or latest.
- .2 American Society for Testing and Materials (ASTM International) International
  - .1 ASTM C144-99, Specification for Aggregate for Masonry Mortar or latest.
  - .2 ASTM C 207-91(1997), Specification for Hydrated Lime for Masonry Purposes or latest.
  - .3 ASTM C847-95(2000), Specification for Metal Lath or latest.
  - .4 ASTM C979-99, Specification for Pigments for Integrally Coloured Concrete or latest.
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86 (R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction or latest.
  - .2 CGSB 71-GP-22M-78, Adhesive, Organic, for Installation of Ceramic Wall Tile or latest.
  - .3 CAN/CGSB-75.1-M88, Tile, Ceramic or latest.
  - .4 CAN/CGSB-25.20-95, Surface Sealer for Floors or latest.
- .4 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000-98, Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98) or latest.
  - .2 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt or latest.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09300 2000, Tile Installation Manual.

.2 Tile Maintenance Guide 2000.

### 1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 – Submittal Procedures.

.2 Include manufacturer's information on:

.1 Each tile type, size, and shape required.

.2 Chemical resistant mortar and grout (Epoxy and Furan).

.3 Cementitious backer unit.

.4 Dry-set Portland cement mortar and grout.

.5 Divider strip.

.6 Elastomeric membrane and bond coat.

.7 Reinforcing tape.

.8 Leveling compound.

.9 Latex-Portland cement mortar and grout.

.10 Commercial Portland cement grout.

.11 Organic adhesive.

.12 Slip resistant tile.

.13 Waterproofing isolation membrane.

.14 Fasteners.

### 1.4 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.

.2 Submit duplicate 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 11 mm thick plywood and grout joints to represent project installation.

### 1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver Materials in containers with labels legible and intact and grade-seals unbroken.

.2 Store Material so as to prevent damage or contamination.

.3 Store Materials in a dry area, protected from freezing, staining and damage.

.4 Store cementitious Materials on a dry surface.

### 1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Remove from Site and dispose of all packaging Materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging Material [in appropriate on-site] for recycling in accordance with Waste Management Plan.

- .3 Unused adhesive, sealant and coating Materials must be disposed of at an official Hazardous Materials collections Site as approved by the Contract Administrator.
- .4 Unused adhesive, sealant and coating Materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.
- .5 Broken ceramic Materials must be diverted from landfill to a local facility as approved by Contract Administrator.

#### 1.7 ENVIRONMENTAL CONDITIONS

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

#### 1.8 EXTRA MATERIAL

- .1 Provide maintenance Materials in accordance with Section 01 78 00 - Closeout Submittals, to a minimum 2% of the total area of each tile type and colour required for maintenance use to the City and store where directed.
- .2 Maintenance Material to be of same production run as installed Material.

### **Part 2 Products**

#### 2.1 FLOOR TILES

- .1 Porcelain tile: to CAN/CGSB-75.1 or latest, Type, Class MR (02 -3.0%), with slip resistant surface.
- .2 Field and accent tile: "Deluxe Collection" honed non-slip porcelain tile as manufactured and distributed by Iris, or approved equal. Colour from full series as determined by Contract Administrator available in 304 mm x 609 mm (12" x 24") size.
- .3 Coved base tile: same as 2.1.2.
- .4 All tiling to include matching specialty tiles for external corner and angles, and coved bases.

#### 2.2 WALL TILES

- .1 To CAN 2-75.1M or latest; Wall tile shall be matte or bright glazed. Standard of acceptance:
- .2 Field and accent tile: "Natural Hues" Field Tile glazed porcelain tile as manufactured and distributed by Daltile, or approved equal. Colour from full series as determined by Contract Administrator available in 48mm x 197mm (2"x8") size.
- .3 All tiling to include matching specialty tiles for external corner and angles, and coved bases.

#### 2.3 MORTAR AND ADHESIVE MATERIALS

- .1 Portland 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 portland cement mortar and thin set bond coat.
  - .5 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.
- 2.4 BOND COAT
- .1 Dry set Portland cement mortar: to ANSI A108.1.
  - .2 Organic adhesive: to [CGSB 71-GP-22M, Type [1] [2]] [ANSI A136.1].
  - .3 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/cm<sup>2</sup>.
    - .2 Bond Strength: 53 kg/cm<sup>2</sup>.
    - .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.
- 2.5 GROUT
- .1 Colouring Pigments:
    - .1 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
    - .2 Colouring pigments to be added to grout by manufacturer. (Site coloured grout is not acceptable).
    - .3 Use in Commercial Portland Cement Grout, Dry-Set Grout, and Latex-Portland Cement Grout.
  - .2 Commercial Portland Cement Grout: to CTI A118.6.
  - .3 Dry-Set Grout: to CTI A118.6.
  - .4 Latex-Portland Cement Grout: to ANSI A108.1, fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.
- 2.6 ACCESSORIES
- .1 Reinforcing mesh: 50 x 50 x 1.6 x 1.6 mm galvanized steel wire mesh, welded fabric design, in flat sheets, where required.
  - .2 Transition Strips: purpose made metal extrusion; anodized aluminum type.
  - .3 Reducer Strips: purpose made metal extrusion; anodized aluminum 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 Sealers.

- .6 Floor sealer and protective coating: to CAN/CGSB-25.20, Type 1 to tile and grout manufacturers recommendations with 0 or low VOC.
- 2.7 MIXES
- .1 Portland Cement:
    - .1 Scratch coat: 1 part portland 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: portland cement and water mixed to creamy paste. Latex additive may be included.
    - .3 Mortar bed for floors: 1 part portland 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 portland 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 portland cement, 4 parts sand, minimum 1/10 part latex additive, 1 part water including latex additive.
    - .6 Bond or setting coat: 1 part portland 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.
  - .4 Mix bond and levelling coats, and grout to manufacturer's instructions.
  - .5 Adjust water volumes to suit water content of sand.
- 2.8 PATCHING AND LEVELING COMPOUND
- .1 Portland 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.
- 2.9 CLEANING COMPOUNDS
- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting Materials including patching and levelling compounds and elastomeric waterproofing membrane and coat. Materials containing acid or caustic Material are not acceptable.

**Part 3**

**Execution**

3.1

**WORKMANSHIP**

- .1 All tile Work shall be in accordance with TTMAC Tile Installation Manual 2000, "Ceramic Tile", unless specified otherwise, and appropriate to the location and to the substrate.
- .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 a minimum of 1/2 size. Centre patterns as shown on Drawings.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Allow minimum 24 h after installation of tiles, before grouting.
- .9 Clean installed tile surfaces after installation and grouting cured.
- .10 Make control joints at 3m in each direction. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00 – Joint Sealers. Keep building expansion joints free of mortar and grout.

3.2

**FLOOR SEALER AND PROTECTIVE COATING**

- .1 Apply in accordance with manufacturer's instructions.

**END OF SECTION**

**Part 1 General**

1.1 SUMMARY

.1 Section Includes:

.1 Materials and application of acoustical ceiling tile units for application and installation within a suspended ceiling.

.2 Related Sections:

.1 Section 01 33 00 – Submittal Procedures

.2 Section 01 35 30 – Health and Safety Requirements

.3 Section 01 45 00 – Quality Control

.4 Section 01 78 00 – Closeout Submittals

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C423-02a, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method or latest

.2 ASTM E1264-98, Standard Classification for Acoustical Ceiling Products or latest.

.3 ASTM E1477-98a(2003), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers or latest.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988 or latest.

.2 CAN/CGSB-92.1-M89, Sound Absorptive Prefabricated Acoustical Units or latest.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples or latest.

.4 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA), 1999, c. 33 or latest.

.2 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34 or latest.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Underwriter's Laboratories of Canada (ULC)

.1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies or latest.

1.3 SUBMITTALS

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures

.2 Submit duplicate samples of each type and colour of acoustical units.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements:

.1 Fire-resistance rated floor/ceiling and roof/ceiling assembly (where applicable): certified by Canadian Certification Organization accredited by Standards Council of Canada.

.2 Health and Safety:

.1 Construction occupational health and safety shall be in accordance with Section 01 35 30 - Health and Safety Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Protect on Site stored or installed absorptive Material from moisture damage.

.2 Waste Management and Disposal:

.1 Remove from Site and dispose of packaging Materials at appropriate recycling facilities.

.2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging Material [in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP)].

.3 Separate for reuse and recycling and place in designated containers waste in accordance with Waste Management Plan.

.4 Place Materials defined as hazardous or toxic in designated areas.

.5 Handle and dispose of hazardous Materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.

.6 Ensure emptied containers are sealed and stored safely.

.7 Fold up metal and plastic banding, flatten and place in designated area for recycling.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Permit wet Work to dry before beginning of installation.

.2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20- 40% before and during installation.

.3 Store Materials in Work area 48 hours prior to installation.

1.7 EXTRA MATERIALS

.1 Provide extra acoustic ceiling tile units in accordance with Section 01 78 00 - Closeout Submittals, to an extra quantity of 2% of the gross ceiling area for each pattern, type, and colour selected for this project. Ensure extra Materials are from same production run as installed Materials.

.2 Clearly identify each type of acoustic unit, including colour and texture.

.3 Deliver to the City upon completion of the Work of this section and store as directed.

**Part 2**

**Products**

2.1 MATERIALS – SUSPENSION SYSTEM

- .1 Suspension system to meet load compliance to ASTM C635: commercial quality cold rolled steel with hot dipped galvanized coating and minimum recycled content of 25%.
- .2 Hanger wire: galvanized soft annealed steel wire.
  - .1 3.6 mm diameter for accessible tile ceilings to ULC design requirements for fire rated assemblies.
  - .2 2.6 mm diameter for other ceilings.
- .3 Hanger inserts: purpose made.
- .4 Carrying channels: 38 x channel, of galvanized steel.
- .5 Accessories: splices, clips, wire ties, retainers and wall moulding to complement suspension system components, as recommended by system manufacturer.
- .6 Suspension system: non-fire rated unless otherwise noted. Two-directional exposed tee system with standard type wall moulding clip. Colour white. Acceptable Material: CGC Centricitee DXT track, Chicago Metallic ACT-1 Tempra 4000, CertainTeed Ceilings Elite Narrow Stab System, or approved equal in accordance with B7 Substitutions.

2.2 MATERIALS – ACOUSTICAL TILES

- .1 Acoustical Panels: CGC Mars Clima Plus, Armstrong Health Zone OPTIMA, CertainTeed Symphony m, or Contract Administrator approved equal in accordance with B7. 24"x24". Fire Class A. Colour white. Minimum standards: NRC 0.70; LR 0.85; recycled content 75%. Edge to be determined by Contract Administrator.
- .2 Acoustical Panels Scrubbable
  - .1 Acoustic lay-in units for non-rated (Class A) suspended ceiling systems. Vinyl faced gypsum lay-in panels. Standard of acceptance: Celotex "Vinyltone" VTS-897. Products by CGC and Armstrong are acceptable "as Equal".

2.3 MATERIALS – WOOD SLAT SUSPENDED CEILING

- .1 Prefinished pre-manufactured oak veneer wood slat suspended ceiling system
- .2 Size: 2490mm x 95mm x 19mm (98 x 3 3/4 x 3/4") with 19mm (3/4") reveal (nominal sizes)
- .3 Suspension system: 3658mm (12') heavy duty linear carrier (concealed) with integral clips (factory applied) spaced 610 mm (2') on centre, for nominal 114mm (4 1/2") modules
- .4 Concealed standard factory applied acoustic fleece, in black
- .5 Finish texture: smooth
- .6 Core: Fire retardant particle board
- .7 Edge banding: to match face veneer, by manufacturer
- .8 Standard manufacturer's warranty

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Install acoustical panels and tiles after ceiling space above has been inspected by the Contract Administrator.

**3.2 INSTALLATION**

- .1 Install acoustical tile units to fit snugly into ceiling suspension system, in accordance with manufacturer's printed instructions.
- .2 Install acoustical units generally parallel to building lines with border units not less than 50% of a typical unit width and to patterns as shown on the drawings.
- .3 Scribe acoustic units to fit adjacent Work. Butt joints tight and terminate edges with purpose made edging.

**3.3 INTERFACE WITH OTHER WORK**

- .1 Co-ordinate and cut ceiling units to accommodate components such as light fixtures, diffusers, speakers, sprinkler heads, and all other items that penetrate through.

**END OF SECTION**

**Part 1**

**General**

1.1

REFERENCES

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM D 2369-95, Standard Test Methods for Volatile Content of Coatings or latest.
  - .2 ASTM D 2832-92(1999), Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings or latest.
  - .3 ASTM D 5116-90, Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products or latest.
  - .4 ASTM D 2394-93, Method For Simulating Service Testing of Wood and Wood-based Finished Flooring or latest.
- .2 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction or latest.
- .3 Canadian Lumbermen's Association (CLA)
  - .1 CLA Grading Rules for Canadian Hardwood Strip Flooring 1997 or latest.
- .4 Canadian Standards Association (CSA)
  - .1 CAN/CSA-ISO 14040-[97], Environmental Management-Life Cycle Assessment-Principles and Framework or latest.
  - .2 CAN/CSA-ISO 9001, Requirements for Quality Assurance, Parts 1, 2 and 3 or latest.
  - .3 CSA Z760-94, Life Cycle Assessment or latest.
- .5 Environmental Choice Program (ECP)
  - .1 ECP-44-92, Adhesives or latest.
  - .2 ECP-67-95, Recycled Water-borne Surface Coatings or latest.
  - .3 ECP-69-94, Polyethylene Plastic Film Products or latest.
  - .4 ECP-76-98, Surface Coatings or latest.

1.2

SUBMITTALS

- .1 Submit proof of manufacturer's CCMC Listing and listing number to Contract Administrator.
- .2 Submit proof of manufacturer's ISO 9001 registration and compliance to Contract Administrator.
- .3 Submit proof of manufacturer's ISO 14001 registration and compliance to Contract Administrator.
- .4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, and cleaning procedures.

1.3

SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

- .2 Submit duplicate 600 mm long samples of finish flooring strips.
- 1.4 CLOSEOUT SUBMITTALS
  - .1 Provide maintenance data for floor finish and care for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- 1.5 DELIVERY, STORAGE AND HANDLING
  - .1 Store Materials in fully enclosed ventilated, clean and dry storage space in areas of installation for minimum of 72 hours prior to commencing of Work.
  - .2 Deliver, store, handle and protect Materials in accordance with Section 01 60 00 - Basic Product Requirements.
  - .3 Ensure concrete, masonry, sheetrock, paint and framing members are thoroughly dry before flooring is delivered.
  - .4 Do not truck or unload flooring in rain, snow or other excessively humid conditions.
  - .5 Cover flooring with tarpaulin or vinyl if atmosphere is foggy or damp.
  - .6 Store in enclosed, well ventilated building with weather proof windows.
  - .7 Leave adequate room for good air circulation around stacks of flooring.
  - .8 Maintain heat near occupancy levels for five days prior to delivery and until sanding and finishing are complete during winter months.
  - .9 Deliver flooring and break into small lots in rooms where it will be installed.
  - .10 Remove packaging and allow 5 days for acclimation.
  - .11 Check and record moisture content of both flooring and subflooring before beginning installation.
- 1.6 WASTE MANAGEMENT AND DISPOSAL
  - .1 Close and seal tightly all partly used sealant containers. Store protected in well ventilated fire-safe area at moderate temperature.
  - .2 Place used sealant tubes and other containers in areas designated for hazardous Materials
  - .3 Dispose of all waste in accordance with applicable local, provincial and national regulations.
  - .4 Give preference to suppliers who will take back packaging Materials.
- 1.7 ENVIRONMENTAL REQUIREMENTS
  - .1 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of Materials.
  - .2 Ventilation.
    - .1 Provide continuously during and after installation. Run system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of installation.
    - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
  - .3 Temperature

- .1 Maintain ambient temperature of not less than 18°C nor more than 21°C from 7 days before installation to at least 48 hours after completion of Work and maintain relative humidity not higher than 40% during same period.
- .2 Maintain minimum temperature 10°C within area of installation until final acceptance of building.
- .3 Ensure substrate is within moisture limits prescribed by flooring manufacturer.
- .4 Manufacturing process.
  - .1 To CAN/CSA-ISO 14040 or latest.

**Part 2 Products**

2.1 MATERIALS

- .1 Engineered 57x19 (2 ¼ x ¾") T&G White Oak by Wood Anchor or approved equal in accordance with B7 Substitutions. Allow for 1 color. Random lengths, tongue and groove edges and matched ends, to CLA Grading Rules for Canadian Hardwood Strip Flooring. Square edge profile. No V-groove will be accepted. Grade stamp each bundle of flooring.
- .2 Mastic: type recommended by flooring Material manufacturer
- .3 Adhesive: adhere hardwood to 19mm (¾") plywood. Type recommended by flooring manufacturer.
- .4 Thresholds: Aluminum – commercial grade.
- .5 Floor finish: 7 coats, prefinished clear.
  - .1 Test for acceptable VOC emissions in accordance with ASTM D 2369 and ASTM D 2832 or latest.

**Part 3 Execution**

3.1 PREPARATION

- .1 Wood Subfloor
  - .1 Plywood sheet underlayment
    - .1 Install with grain of faces at right angles to joists.
    - .2 Glue down application.
    - .3 Sweep subfloor clean.

3.2 INSTALLATION

- .1 Install finish flooring, as indicated.
- .2 Maintain tight joints and board ends. Install to manufacturers written instructions and in accordance with Drawings.
- .3 Maintain 7 mm expansion space at perimeter of floor surface.
- .4 Install base continuously at floor perimeter. Ensure base does not contact floor surface and is not secured to it.
- .5 Install thresholds at openings. Attach threshold to adjacent rigid floor surface. Threshold to act as ramp between floor surfaces over expansion space.

3.3 CLEANING

- .1 Clean flooring surfaces to flooring manufacturer's printed instructions.

3.4 PROTECTION

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

**END OF SECTION**

**Part 1            General**

1.1            RELATED WORK

- .1            Section 03 35 00 – Concrete Finishing
- .2            Section 09 30 13 – Ceramic Tile

1.2            SAMPLES

- .1            Submit sample 300mm (12") square pieces of all sheet Materials.

1.3            MAINTENANCE DATA/MATERIALS

- .1            Provide maintenance data for the City's use.
- .2            Provide Material equal to one percent (1%) of sheet flooring area (minimum 1200mm x 1800mm (4ft x 6ft)) for maintenance use.

1.4            ENVIRONMENTAL REQUIREMENTS

- .1            Air temperature and substrate temperature at flooring installation area must be above 20°C for 72 hours before, during, and 48 hours after installation.
- .2            Store Materials for three days prior to installation in area of installation to achieve temperature stability.

1.5            WARRANTY

- .1            The Flooring Subcontractor and the manufacturer are to jointly warrant this installation against defects in workmanship and Material for a period of two (2) years from date of Certificate of Substantial Performance.

1.6            WASTE MANAGEMENT AND DISPOSAL

- .1            Remove from Site and dispose of packaging Materials at appropriate recycling facilities.
- .2            Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging Materials for recycling in accordance with the Waste Management Plan.
- .3            Dispose of unused finish and adhesive Materials at official Hazardous Material collections Site approved by the Contract Administrator.
- .4            Do not dispose of unused finish and adhesive Materials into sewer system, into streams, lakes, onto the ground or in other locations where it will pose health or environmental hazard.

**Part 2            Products**

2.1            RESILIENT FLOORING MATERIALS

- .1            Resilient sheet flooring: Contract Administrator to choose from standard pattern and colour range (allow for 3 colours):
  - .1            Homogenous vinyl: 2.0mm thick, Granit by Johnsonite

- .2 Resilient rubber tile flooring: Contract Administrator to choose from standard pattern and colour range (allow for 2 colours):
  - .1 610mm x 610mm tile, 3.0mm thick, solid colour raised round by Johnsonite.
- .3 Resilient rubber base: top set coved, 3mm (1/8") thick, rubber, 100mm (4") high. Standard of acceptance: Roppe vinyl wall base. Colour: to be selected by Contract Administrator from standard range of colours.
- .4 Reducer strips: 25mm (1") wide, thickness of tile, rubber, colour to be selected from full range of colours. Standard of acceptance: Johnsonite "Color Match" system. Roppe products are acceptable "as Equal".
- .5 Primers and adhesives:
  - .1 Two-part polyurethane adhesive shall be used in areas with high risk of water or frost penetration, and as follows:
    - .1 Within 1m (39") of junction of ceramic tile at showers
    - .2 Within 1m (39") of exterior doors
- .6 Sub-floor filler: polymer modified cementitious-based floor patch, with acrylic additive. Standard of acceptance: Mapei Plani-Patch, Roberts R-Krete.
- .7 Poly-sheet: to CAN/CGSB-51.33, "Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction", Type 2, 0.15mm (6 mil) thick.

### **Part 3 Execution**

#### **3.1 SITE AND SUBSTRATE**

- .1 Building shall be dry and closed in, with minimum temperature of 18°C. All painting shall be completed.
- .2 Store Material in area of application 72 hours before application.
- .3 Accept or reject concrete substrate as to moisture content and level ( $\pm$  6mm/3000mm (1/4"/10ft) radius).
- .4 Ensure concrete floors exhibit negative alkalinity, carbonization, or dusting.
- .5 Ensure smooth, hard surface, without imperfections, which may 'telegraph' through the flooring.

#### **3.2 MOISTURE TESTING**

- .1 Ensure concrete floors are dry (maximum seven percent (7%) moisture content) by using test methods recommended by flooring manufacturer.

#### **3.3 SUBSTRATE PREPERATION**

- .1 Remove substrate ridges and bumps with power sander.
- .2 Fill minor low spots (up to 6mm (1/4")), cracks, joints, holes and other defects with sub-floor filler.
- .3 Clean substrate and apply filler, trowel and float to leave smooth, flat, hard surface. Prohibit traffic until filler cured.
- .4 Prime or seal substrate to resilient flooring manufacturer's recommendations.

### 3.4 INSTALLATION - SHEET FLOORING

- .1 Install in strict compliance with manufacturer's current installation Specifications, using skilled, trained installer technicians.
- .2 Unroll and layout strips full length, with seams parallel to building lines to produce a minimum number of seams. Cross-joints are not permitted. Border widths minimum 1/3 width of full Material.
- .3 Spread adhesive uniformly using recommended trowel and lay strips. Do not spread more adhesive than can be covered by flooring before initial set take place.
- .4 Double cut sheet joints and continuously seal. Heat weld sides and seams with manufacturer's matching vinyl thread with approved heat welding equipment.
- .5 As installation progresses, and after installation, roll flooring with a 45 kg (100 lb) roller to ensure full adhesion.
- .6 Cut flooring and fit neatly around fixed or excessively heavy objects.
- .7 Install feature strips and floor markings where indicated. Fit joints tightly.
- .8 Install flooring in pan type floor access covers. Maintain floor pattern.
- .9 Continue flooring over areas, which will be under built-in furniture.
- .10 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .11 Terminate flooring at centerline of door in openings where adjacent floor finish thickness or colour is dissimilar. Note locations where Material thickness changes, flooring Material on door swing side shall continue to accommodate door drop sound seals.
- .12 Install metal edge strips at unprotected or exposed edges where flooring terminates.
- .13 Install reducer strips at edge of tile and resilient sheet Material, seamless Material and tile of different thickness.
- .14 Seal with silicone sealant around perimeter at wall-floor joint before installing resilient base and at door frame-floor junction.
- .15 Install cove filler strip and provide 100mm (4") high self-base with cap, mitre inside corners, and fill outside corners.

### 3.5 INSTALLATION - BASE

- .1 Fit joints tight and vertical. Maintain minimum measurements of 24" between joints.
- .2 Miter internal corners. At vertical corners, "V" cut back of base strip to 2/3 of its thickness and fold.
- .3 Install base on solid backing. Bond tight to wall and floor surface.
- .4 Scribe and fit to door frames and other interruptions.

### 3.6 CLEANING

- .1 Section 01 74 00 – Cleaning. Clean Work.
- .2 Remove access adhesive from floor, base and wall surface without damage.
- .3 Clean, seal and wax floor and base surfaces in accordance with manufacturer's instructions.

- 3.7 PROTECTION OF FINISHED WORK
- .1 Prohibit traffic on floor finish for 48 hours after installation.
  - .2 Protect new floors with polyethylene cover until just before final cleaning or finish.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-4.129-93: Carpet for Commercial Use;
  - .2 CAN/CGSB-4-GP-156: Direct Glue-Down Carpet, Guide to Selection and Installation.
- .2 American Society for Testing and Materials (ASTM):
  - .1 ASTM E648 Class 1 (glue down) – Standard test method for critical radiant flux of floor-covering systems using a radiant heat Energy Source;
  - .2 ASTM E-662 Less than 450 – Standard test method for Specific optical density of smoke generated by solid Materials;
  - .3 ASTM D5252 – Standard practice for the operation of the Hexapod Tumble Drum Tester;
  - .4 ASTM F710 03, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring;
  - .5 ASTM F1869 03, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride;
  - .6 ASTM- F2170, Situ Probe rH Test Method.
- .3 Carpet and Rug Institute (CRI):
  - .1 CRI 104 2002, Standard for Installation of Commercial Carpet;
  - .2 CRI Indoor Air Quality Carpet Testing Program.
- .4 American Association of Textile Chemists and Colorists:
  - .1 Color Fastness to Lightfastness ASTCC 16-E;
- .5 American Association of Textile Chemists and Colorists (AATCC):
  - .1 Electrostatic Propensity of Carpet, AATCC -134 under 3.5KV;
- .6 Underwriters' Laboratories of Canada (ULC):
  - .1 CAN/ULC-S102

### 1.2 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Samples: Submit full size carpet tile samples and 300mm x 300mm (12"x12") samples for sheet carpet of each type of carpet, in each specified pattern, color and construction.
- .3 Manufacturer's Data: Two (2) copies of carpet manufacturer's Specifications and installation instructions for carpet and related items specified.
- .4 All applicable product warranties provided by manufacturer.
- .5 Submit two sets of tile layout Drawings, complete with carpet tile schedule and room designation consistent with construction Drawings.
- .6 Coordinate Site visit to inspect for special procedures and perimeter conditions.

### 1.3 QUALITY ASSURANCE

- .1 The carpet manufacturer shall have no less than fifteen years of production experience with modular carpet similar to type specified. Published product literature of carpet manufacturer must clearly indicate compliance of products with requirements of this Section.
- .2 Mockups: Provide carpet products with mockups specified in other Sections.
- .3 During flooring installation, the flooring manufacturer representative and floor Subcontractor shall conduct On-Site meetings for installation procedures and techniques for the entire flooring installation.

### 1.4 MAINTENANCE DATA

- .1 Provide manufacturer's instructions covering care and maintenance of Materials of this Section as per Section 01 33 00 – Submittal Procedures.
- .2 Maintenance Data: Include maintenance procedures, recommended maintenance Materials, and suggested schedule for cleaning.

### 1.5 EXTRA MATERIALS

- .1 Provide extra Materials of carpet tile and sheet carpet and accessories in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 2% or 23.2 sq metres (250 sq ft) of flooring, whichever is greater, and 23.2 sq metres (250 sq ft) of base, of each Material specified.
- .3 Extra Materials of sheet goods shall be one piece and from same production run as installed Materials.
- .4 Extra Materials to be packaged with protective covering for storage. Identify extra Materials with labels describing contents.

### 1.6 PROJECT CONDITIONS

- .1 Install carpet products after other finishing operations, including painting, have been completed.
- .2 Maintain ambient temperatures within range recommended by Manufacturer, but not less than 18°C (65°F) or more than 29°C (85°F) in spaces to receive carpet products during the following time periods:
  - .1 48 hours before installation.
  - .2 During installation.
  - .3 48 hours after installation.
- .3 Maintain the ambient relative humidity between 40% and 60% during installation.
- .4 Operate ventilation fans of appropriate size, at maximum capacity during carpet tile and adhesive removal and during and for at least 72 hours after glue-down installation.
- .5 Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 13°C or more than 29°C.

### 1.7 PRODUCT HANDLING, DELIVERY AND STORAGE

- .1 Deliver carpet tile and other accessories in original cartons or packaging clearly marked with the manufacturer's name, Material description, colour, pattern, size, type, dye lot and quantity.

- .2 Store under cover and away from moisture. Keep dry at all times.

## 1.8 WARRANTY

- .1 Provide the following written warranties by carpet manufacturer for a period of not less than 15 years:
  - .1 Wear: Surface fiber wear shall not be more than 10% by weight in 15 years.  
(Note: Wear warranty shall not require use of chair pads)
  - .2 Static: Static generation at less than 3.0 kV at 70° F, and 20% R.H.
  - .3 No delamination
  - .4 No edge ravel
  - .5 No dimensional instability (i.e., shrinkage, curling and doming) which adversely affect the ability of the tile to lay flat
  - .6 Mergeability: Carpet that is of the same style/color, but from different dyelots and/or manufacturing dates, may be merged and used interchangeably, both at initial installation and at later selective replacement, to create a continuous carpeted surface with no tile appearing out of place
- .2 Submit manufacturer's NVLAP certified test results to show that carpet meets or exceeds product performance Specification criteria for carpet testing requirements.

## Part 2 Products

### 2.1 ACCEPTABLE MANUFACTURERS AND PRODUCTS:

- .1 Acceptable Manufacturers:
  - .1 FLOR
- .2 Acceptable Products:
  - .1 CPT 1 – FLOR, House Pet Collection
    - .1 Product Specifications:
      - .1 Product Number: 21-1031-03 - Ferret
      - .2 Product Construction: Textured Needle-punch Pile
    - .2 CPT 2 – FLOR, House Pet Collection
      - .1 Product Specifications:
        - .1 Product Number: 21-1031-21 - Chinchilla
        - .2 Product Construction: Textured Needle-punch Pile

### 2.2 SUBSTITUTIONS

- .1 In accordance with B7 Substitutions.

### 2.3 MATERIAL COMPONENTS

- .1 Carpet tile construction must meet or exceed the follow:
  - .1 Fibre Content: 82.5% Nylon/17.5 % Polyester
  - .2 Dye Method: 100% Solution Dyed. Accepted is minimum 90% Solution Dyed, 10% Space Dyed.

- .3 Tufted Weight: 41 oz/yd<sup>2</sup>
- .4 Gauge: Needlepunch
- .5 Pile Density: 11,964
- .6 Pile Thickness: 3.37mm (0.133")
- .7 Total Thickness: 8.6mm (0.34")
- .8 Tile size: 50 cm X 50 cm
- .9 Adhesive: FLORdots&trade
- .10 Total Recycled content: 36%
- .11 Backing system: Graphlar Tile
- .12 Inherent Static Control less than 3.0 Kilovolts at 21°C and 20% relative humidity.
- .13 Antimicrobial Treatment: (AATCC 138 Washed) (AATCC 174 Parts 2&3) Intersept
- .14 Lightfastness: (AATCC – 134) < 3.0 KV

#### 2.4 INSTALLATION MATERIALS

- .1 Leveling compound: Latex type as recommended by carpet manufacturer. Must be compatible with carpet adhesive and curing/sealing compound on concrete.
- .2 Installation connectors: Compounded acrylic adhesive, applied to PET polyester backing with PET polyester release liner (clear 3" x 3" polyester squares with small quantity of a pressure sensitive adhesive applied on one side of the polyester film). The squares connect the carpet modules together to form a stable surface over almost any hard surface. The connectors shall contain no liquid components and shall have "zero" calculated VOC's.
- .3 Carpet edge guard, non-metallic:
  - .1 Non-metallic, extruded or molded heavy-duty rubber "T" shaped cap insert and minimum 50 mm wide extruded aluminum anchorage flange, profiled to accept cap.
  - .2 Colour: selected by Contract Administrator from manufacturer's standard range. A different colour will be selected for each different colour of carpet tile.
- .4 Transitions: Refer to Section 09 65 00 – Resilient Flooring.
- .5 Resilient Base: Refer to Section 09 65 00 – Resilient Flooring.
- .7 Miscellaneous Materials - As recommended by manufacturer of carpet. Other carpeting products to be selected by installation provider to meet project requirements.

### Part 3 Execution

#### 3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerance and other conditions that may affect the performance of the carpet tile.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- .1 Comply with Carpet Manufacturers written instructions for preparing substrates indicated to receive carpet installation.
- .2 Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions and protrusions in the substrate. Fill or level cracks, holes and depressions 3mm wide or wider and protrusions more than 0.8mm, unless more stringent requirements are identified in the carpet tile manufacturer's written instructions.
- .3 Trowel and float to produce a smooth, flat surface. Allow to cure properly.
- .4 Remove coatings, including curing compounds and other substances from concrete subfloor that are not compatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents using mechanical methods recommended in writing by the carpet tile manufacturer.
- .5 Broom and vacuum clean substrate to remove dust and other small particles. Cover prior to installing carpet tile.
- .6 Substrate to have acceptable level of absorbency as per manufacturer's written instructions. After cleaning, examine substrates for acceptable levels of moisture, alkaline salts, carbonation, or dust before proceeding with installation.
- .7 When underlayment has cured, clean substrate surface and allow to dry.
- .8 To ensure requirements are achieved test cementitious substrate for porosity, moisture content and alkalinity.

### 3.3 INSTALLATION

- .1 Comply with Carpet Manufacturers written instructions for carpet installation.
- .2 Install carpet according to carpet manufacturer's printed instructions and in accordance with the Carpet and Rug Institute's Installation Standard.
- .3 "Chair Pads" shall not be recommended or required within installation instructions.
- .4 Comply with manufacturer's instructions and recommendations. A "no-glue" method of installation is preferred. In the event a releasable glue method of installation is required, the following adhesive description applies. Adhesive must be water-based and allow for removal of carpet tile at any time without damage to carpet or substrate. Adhesive must contain antimicrobial preservative and have "zero" calculated VOC's.
- .5 Install carpet under open-bottom obstructions and under removable flanges and furnishings, and into alcoves and closets of each space.
- .6 Provide cut outs where required. Conceal cut edges with protective edge guards or overlapping flanges.
- .7 Run carpet under open bottom items such as heating convectors and install tight against walls, columns and cabinets so that the entire floor area is covered with carpet. Cover over all floor type door closures.
- .8 Install edging guard at all openings and doors wherever carpet terminates, unless indicated otherwise.
- .9 Cutting shall be done in accordance with the manufacturer's recommendation, using the tools designed for the carpet being installed.
- .10 Use leveling compound where necessary. Any floor filling or leveling shall have a minimum of 4'0" of feather.

- .11 Expansion joints: Do not bridge building expansion joints with continuous carpeting.
- .12 Layout: Where multiple carpet types are used in a mixture allow for an even blend of each type. Where carpet types transition in an open area provide a smooth pattern transition. Layout and pattern to indicated on tile Shop Drawings.
- .13 Maintain dye-lot integrity. Do not mix dye lots in same area unless the specific carpet style is manufactured as a merge-able dye lot product.

3.4 CLEANING AND PROTECTION

- .1 On completion of the installation in each area, all dirt, carpet scraps, etc. must be removed from the surface of the carpet.
- .2 Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
- .3 Remove debris, and sort pieces to be saved from scraps to be redirected and recycled.
- .4 Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.
- .5 At the completion of the Work, vacuum carpet using commercial dual motor vacuum of type recommended by carpet manufacturer. Remove spots and replace carpet where spots cannot be removed. Remove rejected carpeting and replace with new carpeting. Remove any protruding yarns with shears or sharp scissors.

**END OF SECTION**

**Part 1            General**

1.1            RELATED SECTIONS

Section 01 33 00 – Submittal Procedures

Section 01 45 00 – Quality Control

Section 01 60 00 – Basic Product Requirements

Section 01 77 00 – Closeout Procedures

Section 01 78 00 – Closeout Submittals

Section 03 35 00 – Concrete Finishing

Section 04 05 10 – Common Masonry

Division 05 – Metals

Division 06 – Wood, Plastics and Composites

Division 08 – Openings

Section 09 29 00 – Gypsum Board

Division 21 – Mechanical General Requirements

Division 26 – Electrical

1.2            REFERENCES

Master Painters Institute (MPI) Architectural Painting Specifications Manual, current edition.

Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).

Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

National Fire Code of Canada.

1.3            QUALITY ASSURANCE

Contractor shall have a minimum of five (5) years proven satisfactory experience. When requested, provide a list of last three (3) comparable jobs including, job name and location, specifying authority, and project manager.

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.

Conform to latest MPI requirements for interior painting Work including preparation and priming.

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.

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.

Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Contract Administrator.

Standard of Acceptance:

- .1 Walls and Vertical Surfaces (i.e. columns): No defects visible from a distance of 1000 mm at 90 deg to surface.
- .2 Ceilings: No defects visible from floor at 45 deg to surface when viewed using final lighting source.
- .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 SCHEDULING OF WORK

Submit Work schedule for various stages of painting to Contract Administrator for approval. Submit schedule minimum of 48 hours in advance of proposed operations.

Obtain written authorization from Contract Administrator for any changes in Work schedule.

Schedule painting operations to prevent disruption of occupants in and about the building.

1.5 SUBMITTALS

Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with Section 01 33 00 - Submittal Procedures.

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.

1.6 SAMPLES

Upon request, submit 300 x 300 mm sample panels of each paint, stain and special finish 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 3 mm plate steel for finishes over metal surfaces.
- .2 13 mm birch plywood for finishes over wood surfaces.
- .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
- .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

When approved, sample panels shall become acceptable standard of quality for appropriate On-Site surface with one of each sample retained On-Site.

1.7 QUALITY CONTROL

When requested by Contract Administrator, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval. When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar On-Site Work.

1.8 EXTRA MATERIALS

Submit maintenance Materials in accordance with Section 01 78 00 - Closeout Submittals.

Submit one - four litre can of each type and colour of stain and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.

Deliver to Site and store where directed by the City.

#### 1.9 DELIVERY, HANDLING AND STORAGE

Deliver, store and handle Materials in accordance with Section 01 60 00 - Basic Product Requirements.

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.

Remove damaged, opened and rejected Materials from Site.

Provide and maintain dry, temperature controlled, secure storage.

Observe manufacturer's recommendations for storage and handling.

Store Materials and supplies away from heat generating devices.

Store Materials and equipment in a well ventilated area with temperature range 7 °C to 30 °C.

Store temperature sensitive Products above minimum temperature as recommended by manufacturer.

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.

Remove paint Materials from storage only in quantities required for same day use.

Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of Hazardous Materials.

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.

#### 1.10 SITE REQUIREMENTS

Heating, Ventilation and Lighting:

- .1 Ventilate enclosed spaces.
- .2 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 deg C for 24 hours before, during and after paint application until paint has cured sufficiently.
- .3 Where required, provide continuous ventilation for seven (7) days after completion of application of paint.

- .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.

Temperature, Humidity and Substrate Moisture Content Levels:

- .1 Unless specifically pre-approved by the specifying body 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.

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.

Additional Interior Application Requirements:

- .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

## 1.11 WASTE MANAGEMENT AND DISPOSAL

Paint, stain and wood preservative finishes and related Materials (thinners, solvents, etc.,) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.

Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.

Place Materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground the following procedures shall be strictly adhered to:

- .1 Retain cleaning water for water-based Materials to allow sediments to be filtered out.
- .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
- .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
- .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
- .5 Empty paint cans are to be dry prior to disposal or recycling (where available).

Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.

Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

#### 1.12 PROTECTION

Adequately protect other surfaces from paint and damages. Make good any damage as a result of inadequate or unsuitable protection.

## Part 2 Products

### 2.1 MATERIALS

- .1 Acceptable general products/manufacturers are:
  - .1 ICI/Dulux
    - .1 Dulux Lifemaster
    - .2 Devflex/Devguard
    - .3 Glidden Pro
    - .4 Weatherguard
  - .2 General Paint (GP)
    - .1 Enviroguard series.
    - .2 Z-Coat Enviro-Friendly
  - .3 Wooster Products Inc.
    - .1 Epoxy WP-70 Anti slip coating
      - .1 Allow for 2 colours: Black and Safety Yellow

NOTE: All other paint Materials shall be listed in the MPI Approved Products List (APL).

- .2 Only paint Materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .3 Paint Materials for paint systems shall be products of a single manufacturer.
- .4 Only qualified products with E2 "Environmentally Friendly" rating are acceptable for use on this project. Use E3 rated products where possible.

- .5 Paints, stains, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
  - .1 Be water-based unless otherwise specified.
  - .2 Be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .3 Do not contain toxic metal pigments.
  - .4 Have a recycled content if cost neutral.
- .6 Water-borne surface coatings must be manufactured and transported in a manner that steps of process, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .7 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .8 Water-borne surface coatings and recycled water-borne surface coatings must have a flash point of 61.0°C or greater.
- .9 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
  - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
  - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .10 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.
- .11 Recycled water-borne surface coatings must not contain:
  - .3 Lead in excess of 600.0 ppm weight/weight total solids.
  - .4 Mercury in excess of 50.0 ppm weight/weight total product.
  - .5 Cadmium in excess of 1.0 ppm weight/weight total product.
  - .6 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
  - .7 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.
- .12 The following must be performed on each batch of consolidated post-consumer Material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
  - .8 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
  - .9 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
  - .10 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

## 2.2 COLOURS

### .1 Paint:

- .1 Provide to the Contract Administrator colour fans (samples) of manufacturer.
- .2 Colour selection will be based on two (2) base colours, and four (4) accent colours with a maximum of three (3) deep or bright colours. No more than six (6) colours will be selected for the entire project, and no more than three (3) colours will be selected in each area. Note that this does not include pre-finished items by others, e.g. flashings, windows, etc.
- .3 Paint colours will be selected by the Contract Administrator. One (1) copy of the colour schedule will be provided to the Contractor prior to commencement of painting operations.
- .4 Maintain one copy of the colour schedule on Site during painting.

### .2 Wood Clear Coat/Stain:

- .1 Provide the Contract Administrator with clear coat/stain samples from manufacturer on each wood substrate in the project.
- .2 Allow for three colours of stain, and one clear coat for wood Materials. Stain selection to be done by the Contract Administrator.

## 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 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Contract Administrator.
- .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 shall be defined as the sheen rating of applied paint, in accordance with the following values:

Gloss Level Category	Units @ 60 deg	Units @ 85 deg
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.

## 2.5 EXTERIOR PAINTING SYSTEMS

- .1 Fibre Cement Panels: to MPI EXT 3.3C
  - .1 1 coat acrylic factory primer;
  - .2 2 coats water-borne light industrial coating to Gloss level G5 (MPI #163).
- .2 Galvanized steel: doors, frames, misc. steel, pipes, as indicated in Drawings to MPI EXT 5.3K
  - .1 One (1) coat epoxy primer (MPI #101)
  - .2 Two coats water-borne light industrial coating to Gloss level G5 (MPI #163).
- .3 Primed Ferrous Metal: to MPI EXT 5.1D
  - .1 One (1) coat alkyd metal primer (MPI #79)
  - .2 Two (2) coats alkyd enamel to Gloss level G6 (MPI #9)
- .4 Wood clear-coat
  - .1 One coat clear, 2 component polyurethane (MPI #78)
- .5 Epoxy anti-slip coating
  - .1 Priming/coating as per manufacturer's written instructions and in accordance with Contract Drawings.

## 2.6 INTERIOR PAINTING SYSTEMS

- .1 Concrete floors: all areas to MPI INT 3.2G, and to GPS level E3
  - .1 One (1) coat waterborne clear acrylic sealer– first coat reduced as per manufacturer's recommendations for more penetration into concrete (MPI #99)
  - .2 One (1) coat water borne clear acrylic sealer (MPI #99)
- .2 Concrete: exposed ceilings only, soffits, beams, columns, to be left natural to MPI INT 3.1A
  - .1 One (1) coat latex sealer/primer (MPI #50)
  - .2 Two (2) finish coats of acrylic latex to Gloss level G4 (MPI #43).
- .3 Concrete walls: to MPI INT 4.2A
  - .1 One (1) coat latex block filler/primer (MPI #4)
  - .2 Two (2) finish coats of acrylic latex to Gloss level G3.
- .4 Concrete walls (epoxy) at washrooms, kitchenette, and other wet areas: to MPI INT 4.2G
  - .1 One (1) coat epoxy block filler (MPI #116)
  - .2 Two (2) coats epoxy coating to Gloss level G5 (MPI #115 x-green)
- .5 Structural steel and metal fabrications exposed (not galvanized): to MPI INT 5.1Q
  - .1 One (1) coat spot primer
  - .2 One (1) coat alkyd primer (MPI #76)
  - .2 Two (2) finish coats of acrylic latex to Gloss level G5 typical (except to Gloss level G1 at ceilings) (MPI #54)
- .6 Galvanized steel: doors, frames, railings, misc. steel, pipes, as indicated in Drawing to MPI INT 5.3M

- .1 One (1) coat waterborne galvanized primer (MPI #134)
- .2 Two (2) two finish coats of high performance architectural latex to Gloss level G5 (MPI #141)
- .7 Galvanized metal roof deck: to MPI INT 5.3H
  - .1 Two (2) coats waterborne dry fall coating to Gloss level G1 (MPI #133)
- .8 Dressed Lumber: solid hardwood trim, wood ceilings to MPI INT 6.3Q
  - .1 One (1) coat sand-able sealer (MPI #128)
  - .2 Two (2) coats clear, waterborne acrylic to Gloss level G4 (MPI #128)
- .9 Gypsum Board: to MPI INT 9.2A
  - .1 One (1) coat latex sealer/primer (MPI #50)
  - .2 Two (2) finish coats of acrylic latex to Gloss level G3 (for walls) and G3 (ceilings & bulkheads). (MPI #52)
- .10 Gypsum Board (epoxy): to MPI INT 9.2F
  - .1 One (1) coat latex sealer/primer (MPI #50)
  - .2 Two (2) coats, two-component epoxy coating (MPI #115)

**Part 3 Execution**

**3.1 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.

**3.2 EXISTING CONDITIONS**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Contract Administrator any 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%.

**3.3 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 passing pedestrians and general public 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 Contractor. Items shall be securely stored and re-installed after painting is completed by Contractor.
- .6 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.

### 3.4 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 or wiping with dry, clean cloths.
  - .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 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.

### 3.5 APPLICATION

- .1 Apply paint and other finishes in accordance with MPI Painting Manual Premium Grade finish requirements.
- .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 Apply paint in a workmanlike manner using skilled and trade qualified applicators.
- .4 Apply each coat at the proper consistency.
- .5 Each coat of paint is to be slightly darker than the preceding coat, unless otherwise approved by the Contract Administrator.
- .6 Unless otherwise approved, apply a minimum of four (4) coats of paint where deep or bright colours are used to achieve satisfactory results.
- .7 Sand and dust between each coat to provide an anchor for next coat and to remove defects visible from a distance up to 1000mm (39").
- .8 Do not apply finishes on surfaces that are not sufficiently dry. Unless manufacturer's directions state otherwise, each coat shall be sufficiently dry and hard before a following coat is applied.
- .9 Paint finish shall continue through behind all wall-mounted items (re: white and tack boards).
- .10 Where clear finishes are required, ensure tint fillers match wood. Work fillers well into the grain before it has set. Wipe excess from the surface.
- .11 Back prime interior woodwork, which is to receive a paint or enamel finish, with enamel undercoat paint.
- .12 Back prime interior woodwork, which is to receive stain and/or varnish finish, with a gloss varnish, reduced by twenty-five percent (25%) with mineral spirits.
- .13 Apply enamel undercoat to all primed and galvanized/zinc coated doors, frames, etc.
- .14 Prime top and bottom edges of metal doors with enamel undercoater when they are to be painted.
- .15 Prime top and bottom edges of wood doors with gloss varnish when they are to receive a stain or clear finish.

- .16 Paint tops of low partitions (partitions stopping below ceiling height).
- .17 At locations where demolition has exposed previously unpainted surfaces, provide additional base coats so new finish will blend with adjacent painted surfaces.

### 3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, prime and paint finished area exposed insulated and bare pipes, conduits, piping, hangers, brackets, collars, and supports, except where items are plated or covered with a pre-finished cladding. Paint to colours of adjacent walls, ceiling etc. to Contract Administrator's direction.
- .2 In service rooms, leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .3 Colour coding of equipment, piping, conduit, and exposed ductwork: All colour banding and identification (flow arrows, naming, etc.) shall be coordinated with Mechanical and Electrical Subcontractors.
- .4 For hot surfaces, such as hot water piping, use "Bonding Primer" and "Industrial Enamel" for heat-resistant primer and finish.
- .5 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .6 Do not paint over nameplates.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint, extending min. 450mm behind grille.
- .8 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .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 All mechanical equipment including equipment on roof shall be cleaned and coated with semi-gloss latex.
- .11 Do not paint interior transformers and substation equipment.

### 3.7 RESTORATION

- .1 Clean and re-install all hardware items removed before undertaking 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 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.

### 3.8 CLEANING

- .1 As the Work proceeds, and upon completion, promptly remove all paint where spilled, splashed, spattered, or sprayed, using means and Materials that are not detrimental to affected surfaces.

- .2 During the progress of Work, keep premises free from any unnecessary accumulation of tools, equipment, surplus Materials and debris.
  - .3 Remove combustible rubbish Materials and empty paint cans each day and safely dispose of same in accordance with requirements of authorities having jurisdiction.
  - .4 Upon completion of Work, leave premises neat and clean, to the satisfaction of the Contract Administrator.
- 3.9 ACCENT & DEEP COLOURS
- .1 Contract Administrator to provide colour schedule and diagrams for locations of accent colour finishes, bands and wall areas, super-graphics, etc. Note that deep tone colours may be required as per the colour schedules.
  - .2 Use deep tone primers for deep tone colours.
- 3.10 PREFINISHED ITEMS
- .1 This trade should note that casework in Section 06 40 00 – Architectural Woodwork is all prefinished, where plastic laminates are used.
  - .2 This trade should note that doors in Section 08 14 00 – Wood Doors, are all factory finished.
- 3.11 SITE TOLERANCES
- .1 Painting surfaces shall be considered unacceptable if any of the following are evident under natural lighting source for exterior surfaces and final lighting source (including daylight) for interior surfaces:
    - .1 Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000mm (39")
    - .2 Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000mm (39")
    - .3 Visible defects are evident on ceiling, soffit or other overhead surfaces when viewed at normal viewing angles
    - .4 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture, and hiding across full surface area

**END OF SECTION**