

| NO. | ROOM NAME | FLOORS | BASE | WALLS | | | | CEILING | REMARKS |
|-----|--------------------------|--------|------|-----------|------------|-----------|------------|---------|---------|
| | | | | WEST WALL | NORTH WALL | EAST WALL | SOUTH WALL | | |
| | Kitchen | PU | PU | FRP-2 | FRP-2 | FRP-2 | FRP-2 | ACT | |
| | Male and Female Washroom | MMA | MMA | FRP-1 | FRP-1 | FRP-1 | FRP-1 | Ex. Exp | |

LEGENDS

| FLOOR AND BASE | | WALLS | CEILINGS |
|----------------|---------------------|-------|-----------------------|
| MMA | Methyl Methacrylate | FRP-1 | Acoustic Ceiling Tile |
| PU | Polyurethane | FRP-2 | Exposed Ceiling |
| | | | Ex Existing |

GENERAL NOTES

- .1 All wall finishes and wall base to be continuous behind all wall fixtures.
- .2 Vertical bulkheads/down drops to be finished same as horizontal U.O.N.
- .3 Return wall finishes into window frames at jambs and head U.O.N.
- .4 Wall finishes to extend down to floor with applied base over.
- .5 All ceiling GWB to be water resistant GWB.

END OF SECTION 09 06 00

1.0 GENERAL**1.1 RELATED REQUIREMENTS**

- | | | |
|----|------------------------------|------------------|
| .1 | Rough Carpentry | Section 06 10 11 |
| .2 | Joint Sealants | Section 07 92 00 |
| .3 | Non-Structural Metal Framing | Section 09 22 16 |
| .4 | Interior Painting | Section 09 91 23 |

1.2 REFERENCES

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03 (R2009), Designation System for Aluminum Finishes.
- .2 ASTM International
 - .1 ASTM C 475-12 Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 514-04 (2009e1), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C 557-03 (2009) e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C 840-11, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C 954-07, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .6 ASTM C 1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C 1047-10a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C 1280-13, Standard Specification for Application of Gypsum Sheathing.
 - .9 ASTM C 1177/C 1177M-08, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .10 ASTM C 1178/C 1178M-08, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
 - .11 ASTM C 1396/C 1396M-06a, Standard Specification for Gypsum Wallboard.
- .3 Association of the Wall and Ceiling Contractors (AWCC)
 - .1 Specifications Standards Manual 2012
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86 (R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.

- .6 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
 - .1 SCAQMD Rule 1113-A2007, Architectural Coatings.
 - .2 SCAQMD Rule 1168-A2005, Adhesives and Sealants Applications.
- .7 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-07, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Sustainable Design Submittals.
 - .1 Low-Emitting Materials:
 - .1 Submit listing of adhesives and sealants and used in building, showing compliance with VOC and chemical component limits or restriction requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store gypsum board assemblies materials level off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
 - .3 Protect from weather, elements and damage from construction operations.
 - .4 Handle gypsum boards to prevent damage to edges, ends or surfaces.
 - .5 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .6 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.

1.5 AMBIENT CONDITIONS

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

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

2.0 PRODUCTS

2.1 MATERIALS

- .1 Standard board: to ASTM C 1396/C 1396M regular, 12.7mm and 15.9 mm thick Type X, 12.7 mm and 15.9 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges tapered.
- .2 Water-resistant board: to ASTM C 1396/C 1396M regular, 12.7mm and 15.9 mm thick and Type X, 12.7mm and 15.9mm thick, 1220 mm wide x maximum practical length.
- .3 Glass mat water-resistant gypsum backing board: to ASTM C 1178/C 1178M, 12.7 and 15.9mm thick, 1200 mm wide x maximum practical length.
- .4 Glass mat gypsum substrate sheathing: to ASTM C 1177/C 1177M, 15.9 mm thick, 1200 mm wide x maximum practical length.
- .5 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .6 Resilient clips and drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .7 Nails: to ASTM C 514.
- .8 Steel drill screws: to ASTM C 1002.
- .9 Laminating compound: as recommended by manufacturer, asbestos-free.
- .10 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, zinc-coated by hot-dip process, 0.5 mm base thickness, perforated flanges, one piece length per location.
- .11 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
 - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
 - .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .12 Joint compound: to ASTM C 475, asbestos-free.

3.0 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION

- .1 Do application and finishing of gypsum board to ASTM C 840 except where specified otherwise.
- .2 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C 840 except where specified otherwise.
- .3 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .4 Install work level to tolerance of 1:1200.
- .5 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
- .6 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .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 to ASTM C 840, 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.

3.3 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking as specified in Section 06 08 99, sound attenuation, electrical and mechanical work have been approved by Departmental Representative.
- .2 Apply single or double layer gypsum board to wood furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C 840.
 - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
 - .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.

- .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
- .3 Apply base layers at right angles to supports unless otherwise indicated.
- .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, and ducts, in partitions where perimeter sealed with acoustic sealant.
- .4 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .5 Install gypsum board with face side out.
- .6 Do not install damaged or damp boards.
- .7 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 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 on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Locate control joints at changes in substrate construction at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.
- .8 Install control joints straight and true.
- .9 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .10 Install expansion joint straight and true.

- .11 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .12 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .13 Splice corners and intersections together and secure to each member with 3 screws.
- .14 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .15 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.
- .16 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 At typical wall and ceiling locations. Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and edges.
- .17 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.
- .18 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.
- .19 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .20 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION

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

END OF SECTION 09 21 16

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- | | | |
|----|-------------------------|------------------|
| .1 | Rough Carpentry | Section 06 08 99 |
| .2 | Thermal Insulation | Section 07 21 00 |
| .3 | Gypsum Board Assemblies | Section 09 21 16 |

1.2 REFERENCES

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|----|---|
| .1 | ASTM International |
| .1 | ASTM C 645- 13, Specification for Nonstructural Steel Framing Members. |
| .2 | ASTM C 754- 11, Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products |
| .2 | Green Seal Environmental Standards (GS) |
| .1 | GS-11-2008, 2nd Edition, Paints and Coatings. |
| .3 | Association of Wall and Ceiling Contractors of BC (AWCC) |
| .1 | Specification Standards Manual, 2012 Edition. |

1.3 SUBMITTALS

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|----|--|
| .1 | Submit in accordance with Section 01 33 00 - Submittal Procedures. |
| .2 | Product Data: |
| .1 | Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations. |
| .3 | Shop Drawings: |
| .1 | Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada. Submit BCBC 2012 Schedule B and C-B or Model Schedule S-B and S-C. |
| .2 | Indicate system dimensions, framed opening requirements and tolerances, adjacent construction, anchor details anticipated deflection under load, affected related Work, weep drainage network, expansion and contraction joint location and details, and field welding required. |

1.4 QUALITY ASSURANCE

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|----|--|
| .1 | Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties. |
| .2 | Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. |

1.5 WASTE MANAGEMENT AND DISPOSAL

- | | |
|----|---|
| .1 | Separate and recycle waste materials in accordance with Section 01 74 21 - Waste Management And Disposal. |
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2.0 PRODUCTS2.1 MATERIALS.1 Steel Studs & Steel Stud Furring:

- .1 Conform to ASTM C645, non-loadbearing; C-shape, hot dipped galvanized steel studs with Z180 (G60) zinc coating.
Studs to have knurled face and pre-punched pass-through holes for horizontal runs of wiring and piping. Length to suit, no splicing allowed.
- .2 Flange: Depth not less than 32mm, edges bent back 90 deg. and edges hemmed 5mm minimum.
- .3 Widths: As scheduled and indicated.
- .4 Gauges: Interior steel stud to be a minimum of 0.88mm (20 gauge). Interior door jamb studs: 0.88 mm (20 gauge), two (2) studs each side of opening. Increase gauge of steel studs at over-height locations to suit stud manufacturer's design tables, in order to maintain overall partition dimension as detailed in wall schedule and in accordance with the BC Building Code. Exterior steel stud to be minimum 1.23 mm (18 gauge).
- .5 Colour code steel studs for gauge in accordance with AWCC colour code chart.

.2 Stud Tracks:

- .1 Top and bottom runner tracks fabricated from same materials as studs; leg design min. 32mm high, slightly bent in to hold studs; widths to equal stud width.
- .2 Use extended leg top track to partitions as required for deflection.
- .3 Stud Fasteners: Manufacturer's standard, suitable for intended application.
- .4 Shaft Wall Framing Supports: Stud and track metal components fabricated from hot-dipped zinc coated steel meeting ASTM C645. Zinc coating shall be Z180 (G60). Steel studs, J-tracks, T-splines, L-runners, fasteners shall be of design gauge as used within appropriate shaft wall system tested under design numbers indicated in wall schedule.
- .5 Furring Channels: Hat section; roll formed from 0.53mm hot dipped galvanized steel having a Z180 (G60) coating, dimensions 68.2 mm or 66.7mm overall width, face width 35 mm by 22.2mm deep, face knurled.
- .6 "Z-bar" Furring: Roll formed from 0.46mm (26 ga.) hot dipped galvanized steel having a Z180 (G60) coating, 32mm face dimension x depth to suit rigid insulation thickness, see drawings and wall schedule.
- .7 Gypsum Board Ceiling Framing: Conform to Section 9.7, Part 2, Item 4 of the A.W.C.C. Standards which are minimum and as otherwise described below to exceed that minimum.
 - .1 Tie Wire: 1.62mm (16 ga.) galvanized steel tie wire.
 - .2 Hangers: 3.6mm (9 ga.) diameter galvanized soft annealed steel wire, or 4.8mm diameter zinc coated or cadmium plated steel rods. Ceiling area supported:

| <u>Area</u> | <u>Size of Hangers</u> |
|---------------------------|--|
| Up to 1.15m ² | 3.6 mm (9 ga.) diameter galvanized wire. |
| Up to 1.48 m ² | 4.8mm diameter rods |
 - .3 Inserts: Able to develop full strength of supported hangers.
 - .4 Main Carrying Channels: Cold formed steel channels of dimension and weight as follows and protected with rust inhibitive coating. Main carrying channels shall not be less than 38mm x 12.7mm x 1.37mm cold formed channels.

| <u>Maximum Spacing of Hangers</u> | <u>Maximum Spacing of Main Runners</u> |
|---------------------------------------|--|
| 900mm | 1200mm |
| 1000mm | 1000mm |
| 1200mm | 900mm |

- .5 Cross Furring/Ceilings: Cross furring members shall be hat-shaped furring channels as specified in Clause 2.5, above. Max. spacing between furring channels shall conform to the following requirements, based on gypsum board thicknesses and layers.
- .6 Metal Backing Plates: Flat sheet from 0.91mm (20ga.) thick galvanized steel of same type as the studs as blocking to support work of other sections.
- | Maximum
Gypsum Board Thickness | Furring Spacing |
|-----------------------------------|-----------------|
| Single 12.7mm board | 400 mm |
| Single 15.9mm board | 600 mm |
| Double layer | 400 mm |

3.0 EXECUTION

3.1 ERECTION

- .1 Fire Resistance Rated Walls: Comply with requirements of testing agency approved by the Consultant for wall systems detailed on Drawings.
- .2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .3 Place studs vertically at on centre as detailed 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 pop rivets.
- .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 heavy gauge single jamb studs at openings.
- .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 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .13 Extend partitions to ceiling height except where noted otherwise on drawings.

- .14 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks.
- .15 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .16 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.
- .17 Provide clearances and isolation felt to ensure no contact between steel stud system and adjacent metal components to eliminate electrolytic action.

3.4 CEILING AND SOFFIT SUSPENSION

- .1 Hangers:
 - .1 Ensure hangers for suspended gypsum board ceilings support independent of walls, columns, pipes, ducts, and are erected plumb and securely anchored to structural frame or imbedded in concrete slabs. Do not use powder actuated fasteners/anchors.
 - .2 Space hangers at 1200mm maximum centers along runner channels and not more than 150mm from boundary walls, interruptions of continuity and change in direction.
 - .3 Provide at least 25mm clearance at walls.

3.6 CLEANING

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION 09 22 16

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Rough Carpentry Section 06 10 11

1.2 REFERENCES

- .1 AWCC (Association of Wall and Ceiling Contractors) Specification Standards Manual.
- .2 ASTM C635, "Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings".
- .3 ASTM C636, "Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels".
- .4 ASTM A641M, "Specification for Zinc-Coated (Galvanized) Carbon Steel Wire".
- .5 ASTM E580, "Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels in Areas Subject to Earthquake Ground Motions".
- .6 ASTM E 1264, Classification for Acoustical Ceiling Products.
- .7 CAN/CGSB 92.1, Sound Absorptive Prefabricated Acoustical Units.
- .8 CSA B111-74(R2003), Wire Nails, Spikes and Staples.
- .9 CAN/ULC-S102-10, Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00.
- .2 Manufacturer's Data: Submit manufacturer's specifications and installation instructions for each metal ceiling system component required. Include reports and other data as may be required to show compliance with these specifications.
- .3 Samples
- .1 Submit one representative model of suspension system. Ceiling system to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.
- .2 Submit metal panel color and material in size 100mm square samples.
- .4 Shop drawings:
- .1 Shop drawings and calculations shall be prepared under the supervision of a professional Engineer registered in B.C. The Engineer shall verify by sealing the shop drawings that the drawings were prepared under the Design Engineer's supervision and that the Work of this Section meets the design and performance requirements of the Drawings and Specifications. The Design Engineer shall submit BCBC 2012 Schedule B and C-B or Model Schedule S-B and S-C.

- .2 Shop drawings shall incorporate plans, sections and full size details for all work included in this Section. The full size details shall show detail profiles, die drawings, and specify all Products, Materials and finishes, provision for seismic restraint, all anchorage assemblies and components, provisions for adjustment, fabrication and erection tolerances for the work of this section and layout of all anchors.
- .5 Maintenance Data: Submit for incorporation into maintenance manual complete instructions for the maintenance of ceiling materials installed in the work.

1.4 QUALITY ASSURANCE

- .1 Execute all work of this section by approved and licensed workmen experienced in acoustic ceiling panel installations and in accordance with good trade practice.
- .2 Conform to the requirement of the NBC for Class 25 (incombustible) Flame Spread Index according to Federal Specification SS-S-118a and have a Class 1 Flame Spread Rating according to ASTM E-84, for use in non-combustible construction for acoustic ceiling panels.
- .3 Noise Reduction Coefficient (NRC), Light Reflectance Value, and Sound Transmission Class (STC) shall not be less than that listed in the "Acoustical and Board Products Association (ABPA) Bulletin", latest edition, for each tile specified, unless otherwise specified.
- .4 All suspension anchoring devices and all seismic restraint Work shall be designed and certified by a Professional Engineer registered in BC, who shall carry out periodic site reviews during construction and at completion, and submit Model Letters of Assurance S-B and S-C. Costs to be included in the Contract Price. Site reviews by the Design Engineer are supplementary to the Contractor's own primary quality control and supervisory procedures.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver ceiling panels and suspension system components to Project site in original, unopened packages and store them in a fully enclosed space. Protect against damage from moisture, direct sunlight, surface contamination, and other causes.
- .2 Handle ceiling panels carefully to avoid chipping edges or damaging units in any way.

1.6 SITE CONDITIONS

- .1 Environmental Conditions:
 - .1 Ensure temperature of surrounding areas remains above 14°C (58°F) before, during, and after application and relative humidity is not in excess of 80%.
 - .2 Do not install ceiling assembly until building is enclosed, weatherproof, dust generating activities have terminated, overhead mechanical work completed, tested and approved, and painting finished.
- .2 Protection:
 - .1 Protect work of this Section against damage by others.
 - .2 Protect work of other sections against damage, resulting from work of this Section.
 - .3 Repair and make good damage to approval of Consultant.

1.7 SCHEDULING

- .1 Co-ordinate layout and installation of acoustical panels and suspension system components with other construction that penetrates ceilings or is supported by them, including but not limited to signage, light fixtures, HVAC equipment, fire-suppression system components, and partition assemblies.

1.8 WARRANTY

- .1 Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:
 - 1. Ceiling Panels: Dent, rusting and warping
 - 2. Grid System: Rusting and manufacturer's defects
- .2 Warranty Period:
 - 1. Ceiling Metal panels: Ten (10) years from date of substantial completion
 - 2. Grid: Ten (10) years from date of substantial completion
- .3 The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

2.0 PRODUCTS

2.1 CEILING PANELS

- .1 Acoustical Metal Panels:
 - .1 Surface Texture: Smooth.
 - .2 Composition: Electrogalvanized Steel thickness 0.028".
 - .3 Color: Walnut Effect with contrasting filler-strip.
 - .4 Size: 102mm wide including minimal 25mm reveal, by 2440 long.
 - .5 Edge Detail: Square with extended flange.
 - .6 Perforation Option: Unperforated.
 - .7 Fire Performance: ASTM E84 and CAN/ULC S102 Flame Spread rating 25 or less. Smoke Development 50 or less.
 - .8 Wind Uplift: To meet building code.

2.2 METAL SUSPENSION SYSTEMS

- .1 Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with type exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel. Main beams and cross tees shall have rotary stitching.
 - .1 Recycle Content: Post-Consumer - 23% Pre-Consumer - 7%.
 - .2 Sustainability: Environmental Product Declaration (EPD), Health Product Declaration (HPD).
- .2 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- .3 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least three times design load, but not less than 12 gauge.
- .4 Edge Moldings and Trim: 7800 - 12' Wall Molding.
- .5 Accessories: 7903 - 1" Flush "T" Act. to Drywall Transition Molding.

3.0 EXECUTION

3.1 INSPECTION/PREPARATION

- .1 Inspect the work of other Sections upon which the Work of this Section depends. Proceed only after deficiencies, if any, in the Work of other Sections have been corrected.
- .2 Refer to drawing for types and locations of acoustic ceilings.
- .3 Ensure all drop bulkheads are located and completed.
- .4 Lay out grid system in accordance with reflected ceiling plans. Measure each ceiling area and establish the layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and conform to the layout indicated on reflected ceiling plans.
- .5 Obtain data and dimensions from mechanical and electrical trades governing the exact location and suspension of ceiling fixtures and fittings.

3.2 INSTALLATION, APPLICATION, PERFORMANCE

- .1 Suspension Systems:
 - .1 Install suspension systems in accordance with ASTM C636, manufacturer's directions and conforming to ceiling layout as shown on the drawings.
 - .2 Provide and install framing members and hangers of adequate strength to safely carry all loads. Do not hang on mechanical or electrical lines, ducts or services.
 - .3 Maximum deflection shall be $\frac{1}{360}$ th of the span.
 - .4 Install wall and edge moldings where tile abuts walls and other vertical surfaces, and where necessary to conceal edges of acoustical panels.
 - .5 Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
 - .6 Use laser equipment to lay out, align, and level the ceiling system.
 - .7 Center system on room axis leaving equal and greater than half border units or as indicated in Drawings.
 - .8 Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions.
- .2 Panels:
 - .1 Ensure mechanical, electrical work and finished painting have been completed and inspected before installing panels.
 - .2 Neatly cut and fit metal panels to suspension system. Acoustic panels should be installed with undamaged edges.
 - .3 Make cutouts as required for fixtures.
 - .4 Install metal panels in ceiling suspension system.

- .3 Suspension Systems - Seismic Restraint Requirements:
 - .1 Ensure suspension conforms to requirements of ASTM E580 and local building code.
 - .2 Wall angles or channels will have no special structural value assessed to themselves or method of attachment to walls.
 - .3 Main and across runners shall be attached to perimeter members on two adjacent walls; provide and maintain a clearance of 6.35 mm. between main/cross runners and perimeter members on the two remaining adjacent walls.
- .4 Suspension Wire:
 - .1 Space suspension wires along each main runner in accordance with the load carrying capacity of the system using a minimum of 2.05 mm. (12 ga.) soft annealed galvanized steel wire.
 - .2 Attach each vertical wire to the ceiling suspension member with a minimum of three turns and to the structure above with a connection capable of carrying not less than 45.4 kg. allowable load; ensure points of hanger wire supports do not permit disengagement through vertical lifting.
 - .3 Ensure suspension wires do not hang more than one in six out of plumb unless counter sloping wires are provided.
 - .4 Design connection so wires do not attach to, or bend around interfering material, such as ducts; use a trapeze or equivalent device where obstructions preclude direct submission.
 - .5 Support the terminal ends of each cross runner or main runner independently, maximum 203 mm. from each wall with 2.05 (12 ga.) wire.
 - .6 Provide horizontal restraint by using four 2.05 mm. wires secured to the main runner within 51 mm. of the cross runner intersection and splayed 90 degrees from each other, at an angle not exceeding 45 degrees from the plane of the ceiling.
 - .7 Provide horizontal restraint points 3.7 m. o.c. in both directions, with the first point within 1.2 m. from each wall.
 - .8 Ensure attachment of the restraint wires to the structure above is adequate for the load imposed; horizontal restraint is not required for room sizes less than 37.2 m² where surrounding walls connect directly to the structure above; walls will provide the required restraint for room sizes less than 37.2 m².

3.3 ADJUSTING AND CLEANING

- .1 Upon completion of the work, replace any defective or marked tile or suspension systems.
- .2 Adjust and level suspension as required.

END OF SECTION 09 51 33

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Gypsum Board Assemblies Section 09 21 16

1.2 REFERENCES

- .1 ASTM International
- .1 ASTM C 635/C 635M- 07, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .2 ASTM C 636/C 636M- 08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .3 ASTM E 1477- 98a (2008), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
- .2 Canadian General Standards Board (CGSB)
- .1 CAN/CGSB-92.1- M89, Sound Absorptive Prefabricated Acoustical Units.
- .3 Green Seal Environmental Standards (GS)
- .1 GS-11- 2008, 2nd Edition, Paints and Coatings.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
- .1 Material Safety Data Sheets (MSDS).
- .5 South Coast Air Quality Management District (SCAQMD), California State, Regulation XI. Source Specific Standards
- .1 SCAQMD Rule 1113- A2007, Architectural Coatings.
- .6 Underwriter's Laboratories of Canada (ULC)
- .1 CAN/ULC-S102- 2007, Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
- .1 Submit manufacturer's instructions, printed product literature and data sheets for ceiling panels and ceiling suspension system and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements
- 3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of British Columbia, Canada. The Engineer shall submit Letters of Assurance of BCBC 2012 Schedule B and C-B or Model Schedule S-B and S-C along with sealed shop drawings and Schedule
 - .2 Submit reflected ceiling plans for special grid patterns as indicated.
 - .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, change in level details, and acoustical unit support at ceiling fixture lateral bracing and accessories .

- .4 Samples:
 - .1 Submit for review and acceptance of each unit.
 - .2 Samples will be returned for inclusion into work.
 - .3 Submit duplicate full size samples of each type of acoustical units.
- .5 Sustainable Design Submittals:
 - .1 Construction Waste Management:
 - .1 Submit calculations on end-of-project recycling rates salvage rates, and landfill rates per Construction Waste Management Plan.
 - .2 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
 - .3 Regional Materials: submit evidence that project incorporates required percentage 10 % of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.
 - .4 Low-Emitting Materials:
 - .1 Submit listing of touch-up paints used in building, comply with VOC and chemical component limits or restriction requirements.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type required for project.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.
- .7 Operation and Maintenance Data: submit operation and maintenance data for ceiling materials installed in the work for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store materials inside, level, under cover. Protect from weather, damage from construction operations and other causes, in accordance with manufacturer's printed instructions.
- .3 Handle materials to prevent damage to edges or surfaces. Protect metal accessories and trim from being bent or damaged.
- .4 Store and protect acoustic ceiling materials from nicks, scratches, and blemishes.
- .5 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Waste Management and Disposal.

2.0 PRODUCTS

2.1 INTERIOR FINISH MATERIAL & COLOUR SCHEDULE

- .1 This schedule will be issued as a separate document and may list specific manufacturer's related to patterns and colours upon which the colour scheme for the project is based.
- .2 The following material specifications, which are prescriptive in nature, are presented in order to establish a quality of product upon which a price can be tendered.
- .3 The Departmental Representative will consider substitute Products which meet or exceed the properties of the specified Product and are similar in material, construction, thickness, colour, texture, and overall quality, provided that proposals are submitted to the Departmental Representative complete with samples and whatever other data the Departmental Representative may require in order to evaluate the proposed substitute Product. If the Departmental Representative approves the proposed substitute Product, the Contractor will have the option of providing Product listed in the Finish schedule or an approved alternative.

2.2 COMPONENTS

- .1 Washable acoustic units for suspended ceiling system: to CAN/CGSB-92.1.
 - .1 ASTM E1264 Classification: Type IV, Form 2.
 - .2 Pattern E, Fire Class A.
 - .3 Flame spread rating of 25 or less in accordance with CAN/ULC-S102.
 - .4 Smoke development Classification 50 or less in accordance with CAN/ULC-S102.
 - .5 Noise Reduction Coefficient (NRC) designation: N/A.
 - .6 Light Reflectance (LR) range of 0.80 to ASTM E 1477.
 - .7 CAC Rating: 40.
 - .8 Edge type: Square Lay-in, 9.4 mm (15/16")
 - .9 Colour: White.
 - .10 Size: 610 mm x 1220 mm x 16 mm
 - .11 Shape: flat.
 - .12 Surface Finish: Vinyl-faced membrane
 - .13 Recycled Content: Contains greater than 50% total recycled content on product composition of post-consumer and pre-consumer recycled content.
 - .14 Warranty: Minimum 30 year performance guarantee.
 - .15 Refer to Interior Finish Material and Colour Schedule.
- .2 Acoustical Suspension:
 - .1 Intermediate duty system to ASTM C 635.
 - .2 Basic materials for suspension system: commercial quality cold rolled steel, zinc coated.

- .3 Suspension system: non fire rated, two directional exposed tee bar grid.
 - .4 Exposed tee bar grid components: shop painted satin sheen, white colour. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
 - .5 Hanger wire: galvanized soft annealed steel wire, 3.6 mm diameter for access tile ceilings.
 - .6 Hanger inserts: purpose made.
 - .7 Carrying channels: of size, thickness and weight to carry spans; painted galvanized steel. Where spans exceed 1200mm use channels of adequate strength.
 - .8 Accessories: splices, clips, wire ties, retainers and wall moulding flush reveal, to complement suspension system components, as recommended by system manufacturer.
 - .9 ULC-approved hold-down clips where noted and required.
- .3 Performance/Design Criteria:
 - .1 Maximum deflection: 1/360th of span to ASTM C 635 deflection test.

2.3 ACCESSORIES

- .1 Touch-up paint : in accordance with manufacturer's recommendations for surface conditions:
 - .1 Paint: VOC limit 250 g/L maximum to and GS-11 and SCAQMD Rule 1113.

3.0 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions prior to acoustical ceiling installation.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

- .1 Installation: in accordance with ASTM C 636 except where specified otherwise.
- .2 Suspension System:
 - .1 Erect ceiling suspension system after work above ceiling has been inspected by Departmental Representative
 - .2 Secure hangers to overhead structure using attachment methods as indicated acceptable to Departmental Representative.
 - .3 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
 - .4 Lay out system according to reflected ceiling plan. Where not indicated, layout centerline of ceiling both ways, to provide balanced borders at room perimeter with border units not less than 50% of standard unit width
 - .5 Install wall moulding to provide correct ceiling height.
 - .6 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
 - .7 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
 - .8 Interlock cross member to main runner to provide rigid assembly.
 - .9 Ensure finished ceiling system is square with adjoining walls and level within 1:1000.

- .3 Acoustic Panels:
 - .1 Install acoustical panels and tiles in ceiling suspension system.
 - .2 Co-ordinate ceiling work with work of other sections such as interior lighting, fire protection communication, and intrusion and detection systems.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical ceiling installation.

END OF SECTION 09 51 99

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Special Wall Surfacing Section 09 77 00

1.2 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit samples and manufacturer's installation instructions to the Departmental Representative for review.
- .3 Submit copies of manufacturer's technical data, test reports, installation instructions and general recommendations.
- .4 Submit samples for each type and colour of floor coatings to be applied on site, to mix design as noted on Interior Finish Material and Colour Schedule.
- .5 Submit maintenance data for incorporation into maintenance manuals. Include manufacturer's printed data covering the care, cleaning and maintenance of resinous finishes.

1.3 QUALITY ASSURANCE

- .1 All work under this section shall be inspected by an independent inspection agency.
- .2 Manufacturer must show a minimum 10 year history of manufacturing MMA products for the specified application
- .3 Manufacturer's Technical Representative:
- .1 To inspect the surfaces the coatings are applied to and confirm the Departmental Representative in writing is acceptable for the application of flooring.
- .2 Carry out regular site inspections to ensure that the installation is in accordance with manufacturer's printed installation instructions and all deficiencies are corrected.
- .3 Coordinate site inspections with the Departmental Representative.
- .4 Submit written inspection reports to the Departmental Representative covering quality of installation and acceptance of completed work of corrections required.
- .4 Applicator Qualifications:
- .1 Submit to the Departmental Representative, within 7 days of award of contract a written verification from the manufacturer that the applicator is qualified to install the specified products.
- .2 Applicator must be trained by the Manufacturer in all phases of surface preparation and application of the specified flooring system(s).
- .3 Applicator must have five years experience of installing the specified flooring system or has completed five projects using specified flooring materials.
- .5 Acceptance Sample:
- .1 Submit a minimum 300 x300mm square representative sample of the specified flooring system shall be prepared by the Manufacturer's representative and submitted to the Departmental Representative within 7 day of award of the contract.
- .6 Bond Testing:
- .1 Evaluate surface preparation by conducting Bond Tests at the site prior to application of the flooring system(s).
- .2 Consult with Material Manufacturer for specific procedure.

1.4 PRE-INSTALLATION CONFERENCE

- .1 Prior to commencement of Work on site, convene a pre-installation conference to be attended by the Contractor, coating Subcontractor, manufacturer's technical representative, Departmental Representative to review:
 - .1 Technical representative's schedule for reviewing Work.
 - .2 Quality Control Procedures.
 - .3 Product selections including colours, patterns, samples and mock-ups required, flooring accessories.
 - .4 Procedures and tests for verifying acceptability of substrate for application of products.
 - .5 Environmental requirements for installation.
 - .6 Installation procedures.
 - .7 Protected of finished Work.

1.5 PRODUCT DELIVERY, STORAGE, HANDLING

- .1 Deliver all materials undamaged in the original manufacturer's containers with all labels and seals intact.
- .2 Store material in a dry protected area, at a temperature of between 160C to 320C.

1.6 PROJECT CONDITIONS

- .1 Do not apply coating until overhead mechanical and electrical work completed, tested and approved.
- .2 Other coating, painting and finishing in areas to receive coating to be completed.
- .3 Maintain an ambient air temperature of not less than 180C and a floor temperature of not less than 160C for at least seven (7) days prior to installation and for at least 48 hours.
- .4 Take moisture readings to ensure that substrates are within limits prescribed by the manufacturer.
- .5 Comply with the requirements of Workplace Hazardous Materials Information System (WHMIS) regarding the use, handling, storage and disposal of hazardous material
- .6 Continuously ventilate area where coating is being applied during and for 24 hours after installation.

1.7 EXTRA MATERIALS

- .1 Submit samples of each colour of decorative flakes / quartz broadcast for selection by Departmental Representative and provide a list showing a mixture percentage of decorative quartz broadcast of selected colour mix for maintenance purposes.
- .2 Package, clearly label and store on Site in a location selected by the Departmental Representative.

1.8 WARRANTY

- .1 Provide Departmental Representative with a two year warranty, covering both material and workmanship commencing from date of installation, in accordance with General Conditions.

2.0 PRODUCTS

2.1 INTERIOR FINISH MATERIAL AND COLOUR SCHEDULE

- .1 This schedule is attached in the appendix and may list specific manufacturers related to style and quality upon which the scheme for the project is based.

- .2 The following component specifications, which are prescriptive in nature, are presented in order to establish a quality of product upon which a price can be tendered.
- .3 The Departmental Representative will consider substitute Products which meet or exceed the properties of the specified Product and are similar in material, construction, thickness, colour, texture, and overall quality, provided that proposals are submitted to the Departmental Representative complete with samples and whatever other data the Departmental Representative may require in order to evaluate the proposed substitute Product. If the Departmental Representative approves the proposed substitute Product, the Contractor will have the option of providing Product listed in the Finish schedule or an approved alternative.

2.2 MATERIALS

- .1 Seamless Methyl Methacrylate (MMA) Acrylic flooring system as indicated below consisting of resin, curing agent, and filler.
- .2 Cementitious urethane based self-leveling seamless flooring system with colored quartz aggregate broadcast and a fast curing, uv stable polyurea topcoat.

2.3 FLOORING SYSTEMS - MMA

- .1 Provide primers and accessories as required for complete systems inside the Male and Female Washrooms.
- .2 Provide fluid applied seamless MMA resinous floor and integral formed wall base coating with a decorative flake / quartz broadcast in areas as indicated and specified.
- .3 Seamless Methyl Methacrylate (MMA) Acrylic flooring system comprised of the following materials:
 - .1 Saturating Primer/Sealer: MMA 100% Solids Low Viscosity Primer.
 - .2 Coving, with appropriate filler.
 - .3 Patching/Sloping.
 - .4 Topping / Wearcoat: MMA 100% Solids Self-Leveling pigmented with Color Flakes / Quartz broadcast, medium non-slip finish; colours as specified in Interior Finish Material and Colour Schedule.
 - .5 Top Coat. Apply two coats MMA 100% Solids colorless flat top coat, minimum 1.5 mils thickness.
 - .6 Pigment: Color to compliment Colored Flakes / Quartz.
 - .7 Colored Flakes / Quartz for broadcasting: Colour coordinated coloured flakes / quartz broadcast aggregate.
 - .8 MMA-1: ¼" Flakes Acrylic Broadcast Floor Coating System.
 - .9 MMA-2: Quartz Acrylic Broadcast Floor Coating System.
- .4 Product Requirements:
 - .1 Low Viscosity Primer Performance Criteria:
 - .1 Percentage Reactive Resin - 100%
 - .2 Water Absorption, ASTM D570, Wt. % - less than 0.06
 - .3 Tensile Strength, ASTM D638, psi - 3550
 - .4 Tensile Modulus, ASTM D638, [psi x 10⁵] 2.1
 - .5 Coefficient of Thermal Expansion, ASTM D696, in./in./F - .000035
 - .6 Pot Life @ 68°F, minutes -10-15
 - .7 Cure Time @ 68°F, minutes -30
 - .8 Re-coat Time @ 68°F, minutes -30
 - .9 Multi-coat applications shall achieve a "solution weld" chemical bond between each coat for a monolithic film characteristic.
 - .2 Self-Leveling Topping / Wearcoat Flakes / Quartz Broadcast Performance Criteria:

- .1 Percentage Reactive Resin - 100%
- .2 Water Absorption, ASTM D570, Wt. % - 0.04
- .3 Tensile Strength, ASTM D638
 - .1 Unfilled Resin, psi -1450
 - .2 Filled 3:1 Colored Flakes/Quartz: Resin, psi -1050
- .4 Tensile modulus, ASTM D638
 - .1 Unfilled Resin, psi - 440,000
 - .2 Filled 3:1 Colored Flakes/Quartz: Resin, psi - 720,000
- .5 Flexural Strength, psi - 3500
- .6 Coefficient of Thermal Expansion, ASTM D696, in./in./F -.000019.
- .7 Pot Life @ 68deg°F, minutes - 15
- .8 Cure Time @ 68°F, minutes - 40
- .9 Re-coat Time @68°F, minutes - 40
- .10 Multi-coat applications shall achieve a "solution-weld" chemical bond between each coat for a monolithic film characteristic.
- .3 Colorless Topcoat Performance Criteria:
 - .1 Percent Reactive Resin - 100%
 - .2 Water Absorption, ASTM D570, Wt. % - 0.05
 - .3 Tensile Strength, ASTM D638, psi - 3555
 - .4 Tensile Modulus, ASTM D638, psi - 210,000
 - .5 Coefficient of Thermal Expansion, ASTM D696, in./in./F -.000035
 - .6 Water Vapor Transmission, (ASTM E96) [G/M²/24hrs] Method "E" 2.5 at 9 mils
 - .7 Pot Life @ 68°F, minutes - 10-15
 - .8 Cure Time @ 68°F, minutes - 30-45
 - .9 Re-coat Time @ 68°F, minutes - 30-45
 - .10 Taber Abrasion Resistance (ASTM D4060) mg loss/1000 cycles CS17 wheel – 54.
 - .11 Multi-coat applications shall achieve a "solution-weld" chemical bond between each coat for a monolithic film characteristic.

2.4 FLOORING SYSTEMS – POLYURETHANE FLOORING

- .1 Provide primers and accessories as required for complete system inside kitchen.
- .2 The work shall consist of preparation of the substrate, the furnishing and application of a cementitious urethane based self-leveling seamless flooring system with colored BCM quartz aggregate broadcast and a fast curing, uv stable polyurea topcoat.
- .3 The system shall have the color and texture as specified with a nominal thickness of 6.35mm (¼"). It shall be applied to the prepared area(s) as defined in the plans strictly in accordance with the Manufacturer's recommendations.
- .4 Integral flash cove base to be applied where PU flooring is indicated to 150mm H and per manufacturers standard details unless otherwise noted.
- .5 System Materials:
 - .1 Topping: Base, Hardener, pigment pack and Filler to the following requirements.
Topping to be supplied with Polygiene anti-microbial additive.
 - .1 Percent Solids: 100 %
 - .2 VOC: <10 g/L
 - .3 Bond Strength to Concrete ASTM D 4541: > 400 psi, failure in substrate
 - .4 Compressive Strength, ASTM C 579: 8,128 psi
 - .5 Tensile Strength, ASTM C 307: 1,450 psi
 - .6 Flexural Strength, ASTM C 580: 2,900 psi

- .7 Impact Resistance @ 125 mils, MIL D-3134, No visible damage or deterioration:
160 inch lbs
- .2 Aggregate: shall be Estes BCM quartz aggregate in a blend to a light grey color.
- .3 Topcoat: Base, Hardener to the following requirements.
 - .1 Percent Solids: 100%
 - .2 VOC: 5 g/L
 - .3 Elongation at Break, ASTM C 638: 10%
 - .4 Abrasion Resistance, ASTM D4060/CS17, 1000 Cycles: 40mg weight loss
- .6 Patch Materials:
 - .1 Shallow Fill and Patching up to 6.35mm (¼ inch): Same product from same manufacturer.
 - .2 Deep Fill and Sloping Material (over 6.35mm): From same manufacturer as recommended.

2.5 WATERPROOFING MEMBRANE

- .1 Waterproof Membrane: Under setting bed in shower stalls (on floor's curb and full height of wall), and all exterior tiled area as shown on drawings. Acceptable manufacturer: Perma-Guard, Laticrete anti-fracture waterproof membrane, or approved alternative; conform to manufacturer's printed installation instructions; coordinate with Plumbing.
- .2 Location: Kitchen Male and Female washroom floor and wall base to 200mm above floor level.

3.0 EXECUTION

3.1 PREPARATION

- .1 New concrete must have a curing period of 28 days minimum at 21o C. The surface must be clean and dry, physically sound and free of contamination. Surfaces must be free of holes, voids or defects. Cracks and abrupt changes in surface profile must be corrected. Fins and projections must be removed. All curing compounds and sealers must be removed.
- .2 Existing Floor Preparation:
 - .1 Removal of existing flooring reference Section 02 41 99 Demolition for Minor Works.
- .3 Evaluate all surface preparation by conducting bond tests at strategic locations.
- .4 Thoroughly clean substrates to receive coatings of deleterious material that would affect the proper bonding and performance of the floor coating free from loose particles; droppings, projections, grease, solvent, paint, and other foreign matter, and from other unsuitable conditions which would affect tile work
- .5 Clean surfaces that are heavily contaminated with the appropriate degreaser, detergent, or other appropriate cleaner/surfactant followed by thoroughly rinsing with fresh water to remove the accumulation prior to mechanical cleaning efforts.
- .6 Remove fittings, fixtures, cover plates, surface hardware and fastenings. Store these items in a safe place and, replace, in undamaged, clean condition on completion of Work and after flooring has cured.
- .7 Mask off and protect adjacent surfaces and material from Work of this section.
- .8 Ensure floor drains and clean-out plates are set to proper elevation to provide flush finish with floor coating.

3.2 PRE-WORK INSPECTION

- .1 Examine all surfaces to be coated with Resinous material systems and report any conditions that will adversely affect the appearance or performance of these coating systems and that cannot be put into acceptable condition.
 - .1 Verify that moisture content is within range acceptable to flooring manufacturer.
 - .1 Concrete to have a moisture emission rate of no more than 2.27kg per 93 sm. Per 24 hour period as determined by proper Calcium Chloride Testing using calcium chloride test kit in accordance with ASTM F-1869.
 - .2 Ensure surfaces are sound, satisfactory and meet the approval of the manufacturer's technical representative.
 - .3 Notify the Departmental Representative in writing of any defects which would affect the proper application and performance of the coating.
- .2 Do not proceed with application until the surface is acceptable or authorization to proceed is given by the Departmental Representative.

3.3 BOND TESTING

- .1 Evaluate all surface preparation by conducting bond tests at strategic locations.
- .2 Mix six 170 grams of the primer to be used in the application with #10412 mesh, dry quartz sand until an easily trowel on mixture is obtained. Add 10% by volume SRS Powder Hardener and mix well. Apply palm-sized patties 3mm to 6mm thick.
- .3 After one (1) hour at (20o C.), patties must be cured tack-free and cooled to ambient temperature of concrete. Remove patties with hammer and chisel and examine fracture/delamination plane. Concrete with fractured aggregate must be attached to the entire underside of the patty.
- .4 If only laitance or a small amount of concrete is attached or if interface between patty and substrate is tacky, further substrate preparation is required.
- .5 If further surface preparation is required, conduct bond tests again when this has been completed.
- .6 If no amount or kind of surface preparation produces satisfactory bond tests, submit report to the Departmental Representative.

3.4 INSTALLATION - MMA

- .1 Apply flooring and 150 mm high coved base over prepared substrates in accordance with manufacturer's printed instructions.
 - .1 Application of Seamless Methyl Methacrylate (MMA) Acrylic flooring decorative flakes / quartz broadcast system consists of:
 - .1 applying the primer/sealer,
 - .2 applying coving,
 - .3 performing patching and sloping with R17 (if required),
 - .4 re-priming R17 areas,
 - .5 applying the topping, broadcasting the Colored Flakes / Quartz,
 - .6 applying the topcoat
 - .7 Time for curing: allow (45 – 60 minutes) between each coat.
 - .2 Prime Coat:
 - .1 Measure, add, the mix the components, and initiator (SRS Powder Hardener) into the respective resin components in the proportions recommended by the Material Manufacturer.
 - .2 Pour the mixture batches onto the floor surface and use a 230 mm or 460 mm wide, 13 mm - 19 mm thick-napped, solvent-resistant paint roller to roll out the material at a rate of 100 sq. ft./ gal. to form a uniform, continuous film, ensuring

- that all crevices, cracks, other surface discontinuities have been saturated and coated. Use a paint brush to reach areas inaccessible to the roller. Work quickly and deliberately; the pot life is short (10 -15 minutes). Do not leave any puddles'; roll out any such accumulations.
- .3 Allow primer/sealer to cure.
 - .4 If any of the concrete has absorbed all of the primer or if the concrete still has a dry look, re-prime these areas before applying body coat or topcoat.
- .3 Coving
 - .1 Surface Preparation:
 - .1 If walls are to be finished prior to installation of cove base, the bottom portion of the walls shall remain un-coated to the height of the cove base to insure a proper bond to the concrete block wall and cement board.
 - .2 Install cove base according to manufacturers recommendations and ensure:
 - .1 CB Filler Cove Base consisting of "spooned in" radius and brush on body coat OR
 - .2 Trowel-On Cove Base consisting of a trowel applied radius/base mix with a termination strip installed at the top of the base.
 - .3 Cove base will receive a broadcast and top coat consistent with flooring system.
 - .4 Patching
 - .1 Measure, add, and mix the R17 Resin, Powder Component, and necessary aggregate (if required) in the proportions recommended by the Material Manufacturer.
 - .2 Use mixture to repair any damaged concrete.
 - .3 Once cured, material must be re-primed before topping system is applied.
 - .5 Topping:
 - .1 Size the batches, and mix according to Manufacturer's instructions. The entire batch should be poured and spread at once, i.e., do not let material set in pail.
 - .2 Spread the topping material with a gauge rake set to a depth of 3 mm Lightly trowel to a uniform thickness of 3 mm as necessary.
 - .3 Immediately after application, roll with a porcupine roller available from the Manufacturer to release any trapped air from the topping.
 - .4 Broadcast Colored Quartz into the fresh material before it begins to cure. It is important that the sand "rains" down, and not be thrown into, the surface.
 - .5 Allow the topping to cure.
 - .6 Remove excess Quartz by sweeping and vacuuming
 - .6 Top Coat:
 - .1 Apply with clean rollers at a rate of 90 - 100 sq. ft./gal. in the same way as the Primer/Sealer.
 - .2 Allow topcoat to cure.
 - .7 Second Top Coat:
 - .1 Apply with clean rollers at a rate of 100 - 125 sq. ft./gal. in the same way as the Primer/Sealer.
 - .2 Allow topcoat to cure.
- .2 Install joint sealant over saw-cuts and in other locations as recommended by the manufacturer.
 - .3 Finished surfaces to be uniform, without pinholes, bubbles, dust, sag, runs, lumps, abraded areas, scratches or discolouration, and of uniform colour and gloss equal in quality and appearances to approved samples and mockups.
 - .4 Finished surfaces will be considered to lack uniformity and soundness if any of the following defects are apparent
 - .1 Runs, sags, hiding or shadowing by inefficient application methods.

- .2 Evidence of poor coverage at corners and re-entrant angles.
- .3 Damage due to touching before coating is sufficiently dry, contamination of paint due to airborne particles or from other trades, or any other contributory cause.

3.5 INSTALLATION - PU

- .1 Apply flooring and 150 mm high coved base over prepared substrates in accordance with manufacturer's printed instructions.
- .2 General:
 - .1 The system shall be applied in three distinct steps as listed below:
 - .1 Substrate preparation.
 - .2 Topping application with quartz aggregate broadcast.
 - .3 Topcoat application.
 - .2 Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
 - .3 The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance with the Manufacturer's recommendations.
 - .4 The system shall follow the contour of the substrate unless pitching or other leveling work has been specified otherwise.
 - .5 A neat finish with well-defined boundaries and straight edges shall be provided by the applicator.
- .3 Topping:
 - .1 The topping shall be applied as a self-leveling system as specified. The topping shall be applied in one lift with a nominal thickness of 4.76mm (3/16").
 - .2 The topping shall be comprised of four components, Base A, Hardener B, pigment pack and Filler C as supplied by the Manufacturer.
 - .3 The pigment pack shall be added to the Base and thoroughly dispersed then the Hardener shall be added to the Base and pigment and be thoroughly mixed by suitably approved mechanical means. Filler C shall then be added to the mixing vessel and mixed in a manner to achieve a homogenous blend.
 - .4 The topping shall be applied over horizontal surfaces using a pin/gauge rake, trowels or other systems approved by the Manufacturer.
 - .5 Immediately upon placing, the topping shall be rolled with a loop roller.
 - .6 Quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.6 lbs/ sq ft.
 - .7 Allow material to cure. Vacuum, sweep and/or blow to remove all loose aggregate.
- .4 Topcoat:
 - .1 The topcoat shall be mixed and applied per manufacturer recommended procedure.
 - .2 The topcoat shall be comprised of 2 components, Base A and Hardener B as supplied by the manufacturer.
 - .3 The topcoat will be applied at the rate of 90 sq ft per gallon.
 - .4 The finish floor will have a nominal thickness of 6.35mm (1/4").

3.6 COATING SCHEDULE

- .1 Primer (R41i) application rate: approx. 2 m² per liter (approx. 12 mils).
- .2 Coving (R61) with appropriate filler installed per manufacturers recommendations.
- .3 Patching/Sloping material: RI7.

- .4 Body coat (R61SL): applied with a gauge rake set at 3 mm for a rate of 3.7 m² per batch. Broadcast Colored Quartz into the uncured topping. Broadcast the Colored Quartz at the rate of 340 gm per m².
- .5 Clear topcoat (R71): apply at the rate of 1.8 - 2 m² per liter for the first coat and 2 - 2.5 m², per liter for the second application.

3.7 FIELD QUALITY CONTROL/INSPECTION

- .1 Arrange for the manufacturer's technical representative to review the Work and report on the work as follows:
 - .1 Review and acceptance of surface preparation.
 - .2 Review and acceptance of the prime seal coat.
 - .3 Review and acceptance of the:
 - .1 Broadcast Flakes / Quartz installation.
 - .2 Top Coat and Second Top Coat.
 - .3 Slip Resistance.
 - .4 Identify Work not acceptable and procedures for correction, schedule, and acceptance.

3.8 PROTECTION

- .1 At completion of work close off areas to trades for a minimum of 24 hours.
- .2 Ensure that temperature and humidity in areas where flooring is installed is regularly monitored to ensure that conditions are within prescribed limits.

3.9 CLEANING

- .1 Clean adjacent material and surfaces of excess flooring material, using products recommended by the flooring manufacturer that would not damage permanent finishes.
- .2 Confirm compatibility of solvent with other surfaces and material before using.
- .3 Clean flooring at completion. Remove tools, equipment and surplus material from Site.

END OF SECTION 09 67 23

1.0 GENERAL**1.1 RELATED REQUIREMENTS**

- | | | |
|----|------------------------------------|------------------|
| .1 | Rough Carpentry | Section 06 08 99 |
| .2 | Joints Sealants | Section 07 92 00 |
| .3 | Gypsum Board Assemblies | Section 09 21 16 |
| .4 | Resilient Flooring for Minor Works | Section 09 65 99 |
| .5 | Toilet Bath Accessories | Section 10 28 10 |

1.2 REFERENCES

- | | |
|----|--|
| .1 | ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor. |
| .2 | ASTM D5319 – Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels. |
| .3 | ASTM D5420 - Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact). |
| .4 | ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials. |

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- | | | | | | | | | | | | |
|----|---|----|--|----|---|----|--|----|---|----|--|
| .1 | Product Technical Data: For each type of product required, including preparation instructions and recommendation, storage and handling requirements, and installation methods. | | | | | | | | | | |
| .2 | Shop Drawings: Showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location of paneling and dimension of joints and fastener attachment on elevations of each wall. | | | | | | | | | | |
| .3 | Samples: <table border="0"><tr><td>.1</td><td>Section Samples: Submit manufacturer's standard colour pattern selection samples representing manufacturer's full range of available colours and patterns.</td></tr><tr><td>.2</td><td>Samples for Verification: Submit appropriate section of panel for each finish selected indicating the colour, texture, and pattern required.<table border="0"><tr><td>.1</td><td>Submit complete with specified applied finish.</td></tr><tr><td>.2</td><td>For selected patterns show complete pattern repeat.</td></tr><tr><td>.3</td><td>Exposed Molding and Trim: Provide samples of each type, finish and colour.</td></tr></table></td></tr></table> | .1 | Section Samples: Submit manufacturer's standard colour pattern selection samples representing manufacturer's full range of available colours and patterns. | .2 | Samples for Verification: Submit appropriate section of panel for each finish selected indicating the colour, texture, and pattern required. <table border="0"><tr><td>.1</td><td>Submit complete with specified applied finish.</td></tr><tr><td>.2</td><td>For selected patterns show complete pattern repeat.</td></tr><tr><td>.3</td><td>Exposed Molding and Trim: Provide samples of each type, finish and colour.</td></tr></table> | .1 | Submit complete with specified applied finish. | .2 | For selected patterns show complete pattern repeat. | .3 | Exposed Molding and Trim: Provide samples of each type, finish and colour. |
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| .2 | For selected patterns show complete pattern repeat. | | | | | | | | | | |
| .3 | Exposed Molding and Trim: Provide samples of each type, finish and colour. | | | | | | | | | | |
| .4 | Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements | | | | | | | | | | |
| .5 | Test and Evaluation Reports: Showing compliance with specified performance characteristics and physical properties. | | | | | | | | | | |
| .6 | Maintenance Materials: Deliver to Owner extra materials from same production run as products installed. Provide minimum of 1m ² for each type and colour of trim and grout for future repairs. Package products with protective covering and identify with descriptive labels. Comply with Section 01 77 00 Closeout Submittals Section. Store in locations where directed by Consultant. | | | | | | | | | | |

- .7 Operation and Maintenance Data: For installed products including maintenance methods and precautions against cleaning materials and methods detrimental to finishes and performance.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications:
 - .1 At least five years experience in the installation of fiberglass reinforced plastic panels (FRP).
 - .2 Experience on at least five projects of similar size, type and complexity as this Project.
 - .3 Employer of workers for this Project who are competent in techniques required by manufacturer for installation indicated.
- .2 Obtain fiberglass reinforced panels, moldings and other accessories from a single manufacturer.

1.5 PROJECT CONDITIONS

- .1 Ambient Conditions:
 - .1 Do not begin installation until building is enclosed, permanent heating and cooling equipment is in operation, and residual moisture from plaster, concrete or terrazzo work has dissipated.
 - .2 During installation, and within 48 hours prior to installation, maintain ambient temperature and relative humidity within limits required by type of panel adhesive used and recommendation of panel adhesive manufacturer.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to Project site.
- .2 Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels and trims lying flat in a dry indoor location at Project site. Remove any foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action. Allow panels to acclimate to room temperature (70°) for 48 hours prior to installation.

1.7 WARRANTY

- .1 Manufacturer's standard form in which manufacturer agrees to repair or replace FRP panels that fail within specified warranty period.
 - .1 Failures shall include, but not be limited to substantial defects in material and workmanship, rotting, rusting, corrosion, development of structural surface cracks, or requiring painting or refinishing.
 - .2 Warranty Period: 10 (Ten) years from date of Substantial Completion.
- .2 Installer's standard warranty for a period of 10 (Ten) years from date of Substantial Completion in which installer agrees to repair or replace FRP panels that fail due to poor workmanship or faulty installation within the specified warranty period.

2.0 PRODUCTS

2.1 INTERIOR FINISH MATERIAL AND COLOUR SCHEDULE

- .1 This schedule is attached in the appendix and may list specific manufacturers related to patterns and colours upon which the colour scheme for the project is based.
- .2 The following material specifications, which are prescriptive in nature, are presented in order to establish a quality of product upon which a price can be tendered.

- .3 The Departmental Representative will consider substitute Products which meet or exceed the properties of the specified Product and are similar in material, construction, thickness, colour, texture, and overall quality, provided that proposals are submitted to the Departmental Representative complete with samples and whatever other data the Departmental Representative may require in order to evaluate the proposed substitute Product. If the Departmental Representative approves the proposed substitute Product, the Contractor will have the option of providing Product listed in the Finish schedule or an approved alternative.

2.2 FIBERGLASS REINFORCED PLASTIC PANELS (FRP)

- .1 General: Fiberglass reinforced plastic panels complying with ASTM D5319.
- .2 Coating: Multi-layer print, primer and finish coats or applied over-layer.
- .3 Nominal Thickness: 2.3 mm (0.09 inch).
- .4 Wall Panel Size: 1.2 m (4 feet) by 3 m (10 feet) or 2.4 m (8 feet) as required.
- .5 Scratch Resistance: ASTM D2583, Barcol Hardness of 40~72.
- .6 Izod Impact Strength of 72 ft. lbs/ in ASTM D 256.
- .7 Flexural Strength – 1.0×10^4 psi per ASTM D 790. (7.0 kilogram-force/ square millimeter)
- .8 Flexural Modulus – 3.1×10^5 psi per ASTM D 790. (217.9 kilogram-force/ square millimeter)
- .9 Tensile Strength – 7.0×10^3 psi per ASTM D 638. (4.9 kilogram-force/ square millimeter)
- .10 Tensile Modulus – 1.6×10^5 psi per ASTM D 638. (112.5 kilogram-force/ square millimeter).
- .11 Water Absorption – 0.72% per ASTM D 570.
- .12 Style & Pattern: Refer to Interior Finish Material and Colour Schedule.
- .13 FRP-1 (For Washrooms)
.1 Color: Woodgrains or Abstract as selected by Departmental Representative from Manufacturer's Standard full range.
.2 Location: Washrooms.
- .14 FRP-2 (For Kitchen)
.1 Color: Bright White
.2 Finish: Pebbled Surface
.3 Location: Kitchen.

2.3 ACCESSORIES

- .1 Co-extruded, dual-durometer polypropylene/monprene colour-through trim profiles with Dual-Seal Technology and high-performance pressure sensitive adhesive by same panel manufacturer recommended for panels. Trims should not contain PVC, ABS, or BPA compounds.
.1 Inside Corner
.2 Outside Corner
.3 Division
.4 Edge
.5 Colour: To match panels.
.6 Style: Refer to Interior Finish Material and Colour Schedule.

- .2 Panel Adhesive: As recommended by panel manufacturer for the required substrates.
- .3 Panel Sealant: Single-component, mildew-resistant silicone, clear, as recommended by panel manufacturer.

3.0 EXECUTION

3.1 EXAMINATION

- .1 General: Comply with manufacturer's product data, including product technical bulletins, and installation instructions in product catalogs and product packaging.
- .2 Verify that substrates previously installed under other sections are acceptable for product installation in accordance with FRP manufacturer's instructions.
 - .1 Examine substrate surfaces to determine that corners are plumb and straight, that surfaces are smooth, sound and uniform, that nails or screw fasteners are countersunk, and that joints and cracks are filled flush and smooth with adjoining surfaces.
 - .2 Do not begin panel installation until substrate surfaces are in satisfactory condition.

3.2 PREPARATION

- .1 Clean substrates to remove substances that could impair bond of adhesive, including oil, grease, dirt, dust or other contamination.
- .2 Condition panels by unpacking and placing in installation space no less than 24 hours before installation.
- .3 Lay out paneling before beginning installation. Locate panel joints to provide equal panel widths at ends of walls and so that trimmed panels at corners are not less than 300 mm (12 inches) wide.

3.3 INSTALLATION

- .1 General: Comply with panel manufacturer's Installation guide and recommendations.
- .2 Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.
- .3 Install panels with manufacturer's recommended gap for panel field and corner joints.
 - .1 Pre-drill fastener holes in panels, 3.2 mm (1/8 inch) greater in diameter than fastener.
 - .2 Install panels in a full spread of adhesive. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.
- .4 Install trim accessories with adhesive and nails or staples. Do not fasten through panels.
- .5 Sealant:
 - .1 Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
 - .2 Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths.

3.4 CLEANING

- .1 Remove temporary coverings and protection of adjacent work areas.
- .2 Repair or replace any installed products that have been damaged.
- .3 Clean installed panels in accordance with manufacturer's instructions prior to Owner's Acceptance.

- .4 Remove and lawfully dispose of construction debris from Project site.

3.5 PROTECTION

- .1 Protect installed product and finish surfaces from damage during construction.

END OF SECTION 09 77 00

Fort Langley National Historical Park

Kitchen Upgrade
Fort Langley, BC
Project No. R.081108.001

09 91 13 EXTERIOR PAINTING

November 2017

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- .1 Cedar Shakes and Sidings Section 07 31 00
- .2 Metal Doors and Frames Section 08 11 00

1.2 REFERENCES

- .1 Environmental Protection Agency (EPA)
 - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual – November 2007.
 - .2 Standard GPS-1- 05, MPI Green Performance Standard for Painting and Coatings.
- .4 National Fire Code of Canada 2015.
- .5 Society for Protective Coatings (SSPC)
 - .1 Systems and Specifications, SSPC Painting Manual 2005.

1.3 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
 - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting work
 - .3 Apprentices: may be employed provided they work under direct supervision of qualified journeyperson in accordance with trade regulations.
- .2 Conform to the standards contained in the Master Painters Institute Architectural Painting Specification Manual, latest edition (hereafter referred to as MPI Painting Specification Manual) for all painting products including preparation and application of materials. MPI Painting Specification Manual as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
- .3 All paint manufacturers and products used shall be as listed under the "Approved Products" section of the MPI Painting Specification manual.
- .4 Other paint materials 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.
- .5 Single-Source Responsibility: provide primers and undercoat paint produced by the same manufacturer as the finish coat.

- .6 All painting and decorating work shall be inspected by Paint Inspection Agency (inspector) acceptable to the specifying authority and the local MPI Accredited Quality Assurance Association. The painting contractor shall notify the Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of the project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .7 All surfaces requiring painting or repainting shall be inspected by the inspection agency who shall advise on all aspects of painting work including preparation, notifying the Consultant, the Contractor and the Trade Contractor of any defects or problems prior to commencing painting work or after the prime coat shows defects in the substrate, and as the work progresses.
- .8 Standard of Acceptance:
 - .1 Wall: No defects visible from a distance of 1000mm at 90° to surface.
 - .2 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .9 Mock-Ups:
 - 1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Locate where directed.
 - .4 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
- .10 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .11 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.4 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
 - .1 Provide paint products meeting MPI "Environmentally Friendly" E2 ratings based on VOC (EPA Method 24) content levels.
- .2 Green Performance in accordance with MPI Standard GPS-1.

1.5 SCHEDULING

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

1.6 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOCs during application.
- .3 Samples:
 - .1 Submit manufacturer's standard range of color choices on each specified color type as listed in Colour Schedule of this section for selection, review and acceptance of each color.
 - .2 Submit triplicates 200 x 300 mm sample panels of each paint with specified paint in colours, gloss/sheen and textures required, based on selected colors, to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 1 mm plate steel for finishes over metal surfaces.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface.
 - .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.
 - .3 Organochlorines and PCBs: presence of and amounts.
 - .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
 - .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.

1.7 MAINTENANCE

.1 Extra Materials:

- .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
- .2 Quantity: provide one - 4 litre (1 gallon) can of each type and colour of primer stain finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.8 DELIVERY, STORAGE & HANDLING

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

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

.2 Waste Management and Disposal:

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .2 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.

- .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the 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).
- .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .7 Set aside and protect surplus and uncontaminated finish materials: Deliver to or arrange collection by employees, individuals, or organizations for verifiable re-use or re-manufacturing.
- .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

1.9 AMBIENT CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities to be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is over 32 degrees 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 Relative humidity is above 85 % or when dew point is less than 3 degrees C variance between air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
 - .5 Do not apply paint when:

- .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
- .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
- .3 Surface to be painted is wet, damp or frosted.
- .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.10 GUARANTEE

- .1 All painting and decorating work shall be in accordance with MPI Painting Manual requirements and shall be inspected by the local MPI Accredited Quality Assurance Association's Paint Inspection Agency (inspector). Provide MPI Accredited Quality Assurance Association's Guarantee.

2.0 PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Only qualified products with E2 "Environmentally Friendly" ratings are acceptable for use on this project.
- .4 Use only MPI listed materials.
- .5 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water-based.
 - .2 Be non-flammable biodegradable.
 - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .6 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada.
- .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 flash point of 61.0 degrees 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 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.
- .11 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of 600.0 ppm weight/weight total solids.
 - .2 Mercury in excess of 50.0 ppm weight/weight total product.
 - .3 Cadmium in excess of 1.0 ppm weight/weight total product.
 - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
 - .5 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.
 - .1 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.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

2.2 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award. Submit proposed Colour Schedule to Departmental Representative for approval.
- .2 Colour schedule will be based upon selection of three base colours and three accent colours. No more than six colors will be selected for entire project and no more than three colours will be selected in each area.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.

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 Departmental Representative's written permission.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.

- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative .
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

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

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

2.5 EXTERIOR PAINTING SYSTEMS

- .1 Wood Siding.
 - .1 EXT 6.6H Varnish, Semi-Gloss.
- .2 New Metal Door.
 - .1 EXT 5.3G Waterborne Light Industrial Gloss Level 5 coating.
- .3 All paint systems to be MPI Premium Grade minimum 3 coat system.
- .4 Provide additional coat as required to achieve the desired colour output, such as light colour over dark surface or dark accent colour.

3.0 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXISTING CONDITIONS

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.3 EXAMINATION

- .1 Exterior repainting work: inspected by MPI Accredited Paint Inspection Agency (inspector) acceptable to specifying authority and local Painting Contractor's Association. Painting contractor to notify Paint Inspection Agency minimum of one week prior to commencement of work and provide copy of project repainting specification and Finish Schedule.
- .2 Exterior surfaces requiring repainting: inspected by both painting contractor and Paint Inspection Agency who will notify Departmental Representative in writing of defects or problems, prior to commencing repainting work, or after surface preparation if unseen substrate damage is discovered.
- .3 Where assessed degree of surface degradation of DSD-1 to DSD-3 before preparation of surfaces for repainting is revealed to be DSD-4 after preparation, repair or replacement of such unforeseen defects discovered are to be corrected, as mutually agreed, before repainting is started.

3.4 PROTECTION

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Departmental Representative.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about building.
- .5 Remove light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Store items and re-install after painting is completed.
- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Departmental Representative.

3.5 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush or roller. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative
 - .5 Remove runs, sags and brush marks from finished work and repaint.

- .3 Spray Application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers when no other method is practical in places of difficult access and when specifically authorized by Departmental Representative.
- .5 Apply coats of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, duct work and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Paint fire protection piping red.
- .5 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

3.7 RESTORATION & CLEANING

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

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- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.
- .6 Proceed in accordance with Section 01 74 11 - Cleaning.
 - .1 Remove paint where spilled, splashed, splattered or sprayed as work progresses using means and materials that are not detrimental to affected surfaces.

3.8 COLOUR SCHEDULE

- .1 All exterior doors to be stained to match existing.

END OF SECTION 09 91 13

- .5 Single-Source Responsibility: provide primers and undercoat paint produced by the same manufacturer as the finish coat.
- .6 All painting and decorating work shall be inspected by Paint Inspection Agency (inspector) acceptable to the specifying authority and the local MPI Accredited Quality Assurance Association. The painting contractor shall notify the Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of the project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .7 All surfaces requiring painting or repainting shall be inspected by the inspection agency who shall advise on all aspects of painting work including preparation, notifying the Consultant, the Contractor and the Trade Contractor of any defects or problems prior to commencing painting work or after the prime coat shows defects in the substrate, and as the work progresses.
- .8 Mock-Ups:
 - 1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .1 Prepare and paint designated surface, area, room or item (in each colour scheme) to specified requirements, with specified paint or coating showing selected colours, gloss/sheen, textures.
 - .2 Mock-up will be used:
 - .1 To judge workmanship, substrate preparation, operation of equipment and material application and workmanship to MPI Architectural Painting Specification Manual standards.
 - .3 Locate where directed.
 - .4 Allow 24 hours for inspection of mock-up before proceeding with work.
 - .5 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.
- .9 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting one week prior to beginning work of this Section and on-site installations in accordance with Section 01 32 16.07 - Construction Progress Schedules - Bar (GANTT) Chart
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.
- .10 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Section 01 35 33 - Health and Safety Requirements.

1.4 PERFORMANCE REQUIREMENTS

- .1 Environmental Performance Requirements:
 - .1 Provide paint products meeting MPI "Environmentally Friendly" E2 ratings based on VOC (EPA Method 24) content levels.
- .2 Green Performance in accordance with MPI Standard GPS-1.

1.0 GENERAL

1.1 RELATED REQUIREMENTS

- | | | |
|----|-------------------------|------------------|
| .1 | Finish Carpentry | Section 06 20 00 |
| .2 | Flush Wood Doors | Section 08 14 16 |
| .3 | Gypsum Board Assemblies | Section 09 21 16 |

1.2 REFERENCES

- | | |
|----|---|
| .1 | Department of Justice Canada (Jus) |
| .1 | Canadian Environmental Protection Act (CEPA), 1999, c. 33 |
| .2 | Environmental Protection Agency (EPA) |
| .1 | EPA Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 - 1995, (for Surface Coatings). |
| .3 | Health Canada / Workplace Hazardous Materials Information System (WHMIS) |
| .1 | Material Safety Data Sheets (MSDS). |
| .4 | Master Painters Institute (MPI) |
| .1 | MPI Architectural Painting Specifications Manual, November 2007. |
| .2 | MPI Maintenance Repainting Manual, latest edition. |
| .5 | National Fire Code of Canada - 2015 |
| .6 | Society for Protective Coatings (SSPC) |
| .1 | SSPC Painting Manual, Volume Two, 8th Edition, Systems and Specifications Manual. |

1.3 QUALITY ASSURANCE

- | | |
|----|---|
| .1 | Qualifications: |
| .1 | Contractor: minimum of five years proven satisfactory experience. Provide list of last three comparable jobs including, job name and location, specifying authority, and project manager. |
| .2 | Journeymen: qualified journeymen who have "Tradesman Qualification Certificate of Proficiency" engaged in painting work. |
| .3 | Apprentices: working under direct supervision of qualified trade's person in accordance with trade regulations. |
| .2 | Conform to the standards contained in the Master Painters Institute Architectural Painting Specification Manual, latest edition (hereafter referred to as MPI Painting Specification Manual) for all painting products including preparation and application of materials. MPI Painting Specification Manual as issued by the local MPI Accredited Quality Assurance Association having jurisdiction. |
| .3 | All paint manufacturers and products used shall be as listed under the "Approved Products" section of the MPI Painting Specification manual. |
| .4 | Other paint materials 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. |

- .3 Collect and separate for disposal paper, plastic, polystyrene corrugated cardboard and packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan (WMP).
- .4 Separate for recycling and place in designated containers Steel, Metal, Plastic waste in accordance with Waste Management Plan (WMP).
- .5 Place materials defined as hazardous or toxic in designated containers.
- .6 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, Regional and Municipal, regulations.
- .7 Ensure emptied containers are sealed and stored safely.
- .8 Unused paint, coating materials must be disposed of at official hazardous material collections site as approved by Departmental Representative.
- .9 Paint, stain and wood preservative finishes and related materials (thinners and solvents) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .10 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .11 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
- .12 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into ground follow these procedures:
 - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
 - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - .4 Dispose of contaminants in approved legal manner in accordance with hazardous waste regulations.
 - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .13 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .14 Set aside and protect surplus and uncontaminated finish materials. Deliver to or arrange collection by organizations for verifiable re-use or re-manufacturing.

1.9 SITE CONDITIONS

- .1 Heating, Ventilation and Lighting:
 - .1 Provide heating facilities to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .2 Provide continuous ventilation for seven days after completion of application of paint.
 - .3 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
 - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
 - .5 Provide minimum lighting level of 323 Lux on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:

- .1 Unless pre-approved written approval by Paint Inspection Agency Authority and product manufacturer, perform no painting when:
 - .1 Ambient air and substrate temperatures are below 10 degrees C.
 - .2 Substrate temperature is above 32 degrees C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are not expected to fall within MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is under 85% or when the dew point is more than 3 degrees C variance between the air/surface temperature. Paint should not be applied if the dew point is less than 3 degrees C below the ambient or surface temperature. Use sling psychrometer to establish the relative humidity before beginning paint work.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
- .6 Ensure that conditions are within specified limits during drying or curing process, until newly applied coating can itself withstand 'normal' adverse environmental factors.
- .2 Perform painting work when maximum moisture content of the substrate is below:
 - .1 Allow new concrete and masonry to cure minimum of 28 days.
 - .2 15% for wood.
 - .3 12% for plaster and gypsum board.
- .3 Test for moisture using calibrated electronic Moisture Meter. Test concrete floors for moisture using "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits.
 - .3 Apply paint when previous coat of paint is dry or adequately cured.
- .4 Additional interior application requirements:
 - .1 Apply paint finishes when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
 - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

1.10 GUARANTEE

- .1 All painting and decorating work shall be in accordance with MPI Painting Manual requirements and shall be inspected by the local MPI Accredited Quality Assurance Association's Paint Inspection Agency (inspector). Provide MPI Accredited Quality Assurance Association's Guarantee.

2.0 PRODUCTS

2.1 MATERIALS

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.

- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Only qualified products with E2 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .5 Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) in accordance with MPI Architectural Painting Specification Manual "Approved Product" listing.
- .6 Linseed oil, shellac, and turpentine: highest quality product from approved manufacturer listed in MPI Architectural Painting Specification Manual, compatible with other coating materials as required.
- .7 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids:
 - .1 Water-based.
 - .2 Non-flammable.
 - .3 Manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
 - .4 Manufactured without compounds which contribute to smog in the lower atmosphere.
 - .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .8 Formulate and manufacture water-borne surface coatings with no aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .9 Flash point: 61.0 degrees C or greater for water-borne surface coatings and recycled water-borne surface coatings.
- .10 Ensure manufacture and process of both water-borne surface coatings and recycled water-borne surface coatings does not release:
 - .1 Matter in undiluted production plant effluent generating 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to natural watercourse or sewage treatment facility lacking secondary treatment.
 - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to natural watercourse or a sewage treatment facility lacking secondary treatment.
- .11 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of 600.0 ppm weight/weight total solids.
 - .2 Mercury in excess of 50.0ppm weight/weight total product.
 - .3 Cadmium in excess of 1.0ppm weight/weight total product.
 - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
 - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

2.2 INTERIOR FINISH MATERIAL AND COLOUR SCHEDULE

- .1 This schedule is attached in the appendix and may list specific manufacturers related to patterns and colours upon which the colour scheme for the project is based.
- .2 The following material specifications, which are prescriptive in nature, are presented in order to establish a quality of product upon which a price can be tendered.

- .3 The Departmental Representative will consider substitute Products which meet or exceed the properties of the specified Product and are similar in material, construction, thickness, colour, texture, and overall quality, provided that proposals are submitted to the Departmental Representative complete with samples and whatever other data the Departmental Representative may require in order to evaluate the proposed substitute Product. If the Departmental Representative approves the proposed substitute Product, the Contractor will have the option of providing Product listed in the Finish schedule or an approved alternative.

2.3 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award. Submit proposed Colour Schedule to Departmental Representative for approval.
- .2 Colour schedule refer to Section 3.10 Paint Colour Schedule.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .6 Refer to Colour Schedule of this Section, and Section 09 06 00 Finish Schedule and drawings for identification and location of colours.

2.4 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 Thin paint for spraying in accordance with paint manufacturer's instructions.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.5 GLOSS/SHEEN RATINGS

- .1 Paint gloss is defined as sheen rating of applied paint, in accordance with following values:

1.5 SCHEDULING

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

1.6 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Section 01 35 33 - Health and Safety Requirements.
- .3 Samples:
 - .1 Submit manufacturer's standard range of color choices on each specified color type as listed in Colour Schedule of this section for selection, review and acceptance of each color.
 - .2 Submit triplicates 200 x 300 mm sample panels of each paint with specified paint in colours, gloss/sheen and textures required, based on selected colors, to MPI Architectural Painting Specification Manual standards submitted on following substrate materials:
 - .1 3 mm plate steel for finishes over metal surfaces.
 - .2 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .3 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
 - .3 Retain reviewed samples on-site to demonstrate acceptable standard of quality for appropriate on-site surface. 50mm concrete block for finishes over concrete or concrete masonry surfaces.
 - .4 Test reports: submit certified test reports for paint from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
 - .1 Lead, cadmium and chromium: presence of and amounts.
 - .2 Mercury: presence of and amounts.
 - .3 Organochlorines and PCBs: presence of and amounts.
 - .5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
 - .7 Closeout Submittals: submit maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.

1.7 MAINTENANCE

- .1 Extra Materials:
 - .1 Deliver to extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Section 01 78 00 - Closeout Submittals.
 - .2 Quantity: provide one - 4 litre (1 gallon) can of each type and colour of primer stain finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
 - .3 Delivery, storage and protection: comply with Departmental Representative requirements for delivery and storage of extra materials.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Pack, ship, handle and unload materials in accordance with Section 01 61 00 - Common Product Requirements and manufacturer's written instructions.
- .2 Acceptance at Site:
 - .1 Identify products and materials with labels indicating:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Storage and Protection:
 - .1 Provide and maintain dry, temperature controlled, secure storage.
 - .2 Store materials and supplies away from heat generating devices.
 - .3 Store materials and equipment in well-ventilated area with temperature range 7 degrees C to 30 degrees C.
- .5 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .6 Keep areas used for storage, cleaning and preparation clean and orderly. After completion of operations, return areas to clean condition.
- .7 Remove paint materials from storage only in quantities required for same day use.
- .8 Fire Safety Requirements:
 - .1 Provide one 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 National Fire Code of Canada requirements.
- .9 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
 - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

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

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

2.6 INTERIOR PAINTING SYSTEMS – NEW CONSTRUCTION

- .1 New Gypsum Board:
 - .1 INT 9.2B High Performance architectural latex (gloss level 4) finish.
- .2 Existing Gypsum Board Re-paint:
 - .1 RIN 9.2B High Performance architectural latex (gloss level 4) finish.
- .3 Galvanized Metal:
 - .1 RIN 5.3J High Performance architectural latex (gloss level 4) finish.
- .4 Interior Door Re-finish:
 - .1 RIN 6.3Y Clear two component polyurethane finish.
- .5 New Interior Door:
 - .1 INT 6.3Z Polyurethane, clear 2 components.
- .6 All paint systems to be MPI Premium Grade 3 coat systems.
- .7 Provide additional coat as required to achieve the desired colour output such as light colour over dark surface or dark accent colour.

2.7 SOURCE QUALITY CONTROL

- .1 Perform following tests on each batch of consolidated post-consumer material before surface coating is reformulated and canned. Testing by laboratory or facility which has been accredited by Standards Council of Canada.
 - .1 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.
 - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
 - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

3.0 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

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

3.3 EXAMINATION

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Departmental Representative damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using properly calibrated electronic moisture meter, except test concrete floors for moisture using simple "cover patch test". Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
 - .1 Stucco, plaster and gypsum board: 12%.
 - .2 Concrete: 12%.
 - .3 Clay and Concrete Block/Brick: 12%.
 - .4 Wood: 15%.

3.4 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
 - .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .2 Surface Preparation in accordance with MPI Repainting Manual:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
 - .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
 - .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by wiping with dry, clean cloths or compressed air.

- .2 Wash surfaces with a biodegradable detergent and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
- .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
- .4 Allow surfaces to drain completely and allow to dry thoroughly.
- .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
- .6 Use trigger operated spray nozzles for water hoses.
- .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply 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.
- .6 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.
- .7 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes or vacuum cleaning.
- .8 Touch up of shop primers with primer as specified.
- .9 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

3.5 APPLICATION

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, air or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
 - .1 Apply paint in uniform layer using brush and/or roller type suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush using spray daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces free of roller tracking and heavy stipple.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application:

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in uniform layer, with overlapping at edges of spray pattern. Back roll first coat application.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes and rollers to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access.
- .5 Apply coats of paint continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish closets and alcoves as specified for adjoining rooms.
- .10 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

3.6 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as indicated.
- .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .5 Do not paint over nameplates.
- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint fire protection piping red.

- .9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .10 Paint natural gas piping yellow.
- .11 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.
- .12 Do not paint interior transformers and substation equipment.

3.7 SITE TOLERANCES

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

3.8 FIELD QUALITY CONTROL

- .1 Interior painting and decorating work shall be inspected by a Paint Inspection Agency (inspector) acceptable to the specifying authority and local Painting Contractor's Association. Painting contractor shall notify Paint Inspection Agency a minimum of one week prior to commencement of work and provide a copy of project painting specification, plans and elevation drawings (including pertinent details) as well as a Finish Schedule.
- .2 Interior surfaces requiring painting shall be inspected by Paint Inspection Agency who shall notify Departmental Representative and General Contractor in writing of defects or problems, prior to commencing painting work, or after prime coat shows defects in substrate.
- .3 Where "special" painting, coating or decorating system applications (i.e. elastomeric coatings) or non-MPI listed products or systems are to be used, paint or coating manufacturer shall provide as part of this work, certification of surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to Departmental Representative.
- .4 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .5 Cooperate with inspection firm and provide access to areas of work.
- .6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.

3.9 RESTORATION

- .1 Clean and re-install hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.

- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and patten immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Departmental Representative. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Departmental Representative.

3.10 PAINT COLOUR SCHEDULE

- .1 All metal doors / frames: Allow different colour for door and frame.
- .2 Ceiling: White.
- .3 Allow 2 colours for kiosk interior wall surfaces.

END OF SECTION 09 91 23