

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 07 31 29 - Wood Shingle Roofing
- .2 Section 08 03 52 Conservation Treatment for Period Wood Windows and Doors
- .3 Section 08 52 00 Wood Windows

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 1-GP-2M-80 Oil, Linseed, Boiled.
 - .2 CGSB 1-GP-16M-79 Shellac Varnish.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
 - .1 Maintenance Repainting Manual 2015, Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List.
- .4 National Fire Code of Canada.

1.3 SOURCE QUALITY CONTROL

- .1 Retain purchase orders, invoices and other documents to prove that material used in contract meets requirements of specification and produce when requested by Departmental Representative or Consultant.

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Provide Departmental Representative a review on site of samples of each paint delivered to site, samples from Manufacturer's containers and samples from painters pot.

1.5 DELIVERY AND STORAGE

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in manufacturers original container with labels intact.
- .3 Ensure dry delivery and storage of materials and equipment at site.
- .4 Store materials and equipment in a well-ventilated place with temperature range 20 to 30° C.

1.6 EXISTING CONDITIONS

- .1 Inspect and verify the state of substrate before conditioning and painting.
- .2 Report to Departmental Representative and Consultant conditions of deteriorated materials found during preparation, not previously disclosed. Record with Photographs.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Substrate and ambient temperature must be within limits prescribed by manufacturer.

1.8 PROTECTION

- .1 Protect paint and painting equipment before use and during length of contract from climatic elements.
- .2 Protect exterior of structure from markings and other damage. Protect completed work from paint droppings. Use non-staining coverings.
- .3 Provide for protection of passing pedestrians and the general public.
- .4 Protect completed work with breathable covering such as canvas during transportation to site. Do not use plastic covering.

1.9 SCHEDULING OF WORK

- .1 Submit work schedule starting and final completion dates for approval by Departmental Representative and Consultant.
- .2 Take measures necessary to complete work within approved scheduled time. Change in schedule must be approved by Departmental Representative.
- .3 Co-ordinate execution with other work at site.

1.10 ALTERNATES

- .1 No alternative will be accepted.

1.11 CLOSEOUT SUBMITTALS

- .1 Operation and Maintenance Data
 - .1 Provide maintenance data for incorporation into Maintenance Manual.
- .2 Record Documentation
 - .1 Provide records of products used. List products in relation to finish system and include following:
 - .1 Product name, type and use (i.e. materials and location).
 - .2 Manufacturer's product number.
 - .3 MPI Environmentally Friendly classification system rating.
 - .4 Manufacturer's Material Safety Data Sheets.

Part 2 Products

2.1 MATERIALS

- .1 Paint materials for each coating formulae to be products of a single manufacturer.
- .2 Paint materials to be as specified.
- .3 Paint, linseed oil paint to meet CGSB 1-GP-2M.
 - .1 Paint shall consist of cold-pressed, cleaned, filtered, sterilized, well-matured, cooked linseed oil only, with no solvents.
 - .2 Wood primer/conditioner: boiled linseed oil type, by same manufacturer as paint.
 - .3 Cleaning solution: linseed oil soap, by same manufacturer as paint.
 - .4 Pigment: natural pigment to colour, dry matter content of 100%.
 - .5 Standard of Acceptance; Allbäck or approved equivalent.

2.2 MIXING PAINT

- .1 Paint to be ready for application by brush or roller when received. Or custom mix by paint contractor of linseed oil and pigment.
- .2 All custom mix by paint contractor and/ or paint mixture as supplied by manufactured products system to be approved by Departmental Representative.
- .3 No solvents to be used with linseed oil paint system.
- .4 Reproduce historic paint by:
 - .1 Adding small amount of vehicle to pigment.
 - .2 Stir the paint thoroughly with a hand-blender before painting. Mixing well by propeller method.
 - .3 Adding slowly remainder of vehicle while mixing until coating is homogeneous.
 - .4 Adding small amounts of colouring matter (if necessary) until colour achieved.
 - .5 Mixing until homogeneous.
 - .6 Checking all labels for special manufacturer's instructions.
- .5 Do not mix or keep paint in suspension by means of an air stream under paint surface.

2.3 PROPORTIONS

- .1 Obtain approval, of Departmental Representative and Consultant to substitute paint defined herein.
- .2 For surfaces of new wood to be painted: one primer/conditioner coat of boiled linseed oil and three coats of linseed oil-based paint.
- .3 For surfaces of old wood to be painted: two primer/conditioner coats of boiled linseed oil and four coats of oil-based paint.

Part 3 Execution

3.1 PREPARATION FOR TASKS

- .1 Ensure that workers are informed of safety rules.
- .2 Ensure that safety measures have been taken each day before any job is started.
- .3 Verify that equipment meets safety standards.
- .4 Encourage workers to report hazards in their work.
- .5 Place safety devices and signs near work area as indicated or directed.

3.2 SURFACE PREPARATION

- .1 Clean wood surfaces:
 - .1 Scrub area with linseed oil soap solution and clean warm water using a stiff bristle brush to remove salt, dirt and oil. No high PH products are to be used on substrates to receive linseed oil paint finish.
 - .2 Wash scrubbed area with clean water until foreign matter is flushed from surface.
 - .3 Allow washed area to drain completely and allow to dry thoroughly.
- .2 New wood material to be clean, dry, moisture content according to related spec section.

3.3 PAINT APPLICATION

- .1 Method of application and uniform coats of specified film thickness be in agreement with paint supplier and Consultant. Paint film thickness of each coat to be 150 microns (approximately 0.15 mm) total finish.

3.4 FINISHES

- .1 Wood primer/conditioner:
 - .1 All work to be conditioned with cold-pressed, raw, cleaned, filtered linseed oil to impregnate the wood. The oil may be heated to 60°C to reduce viscosity and facilitate penetration into the wood. After initial application of oil, inspect surface of wood for areas requiring additional treatment. Apply additional oil for uniform conditioning. Wipe off excess oil laying on wood surface as demonstrated on fully conditioned wood.
- .2 Wood topcoats:
 - .1 Paint finish to be linseed oil type paint consisting of cleared, sterilized linseed oil and natural pigments to colour, dry matter content of 100%. Colours to match existing cannon carriage/traversing carriage wood work and assorted hardware (two colours).
 - .2 Stir the paint thoroughly and apply each coat to cover the entire surface completely in even layers. Spread the paint in several direction, to provide full coverage with one stroke.
 - .3 Allow boiled linseed oil to properly cure between subsequent coats for minimum time period as recommended by manufacturer.

3.5 WORKMENSHIP

- .1 All painting work to be carried out by qualified personnel and to job specifications.

3.6 FIELD QUALITY CONTROL

- .1 Examine surface for adequate preparation.
- .2 Check all materials for correctness.
- .3 Inspect during application for correct procedures.

3.7 CLEANING

- .1 Avoid paint splashing on exposed surfaces not to be painted. Smears and spatters must be removed, using compatible products.
- .2 Avoid scuffing newly applied paint.

3.8 PROTECTION OF COMPLETED WORK

- .1 Protect area where paint has been applied.
- .2 On completion of specified work remove surplus materials, tools and equipment and debris on work area; leave clean and tidy to complete satisfaction of Departmental Representative and Consultant.
- .3 To avoid spontaneous combustion, remove any and all oil-soaked rags from the site each day and soak rags in water and discard.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIREMENTS

- .1 Section 07 42 33 - Plastic Wall Panels.
- .2 Section 09 91 23 - Painting.

1.2 REFERENCE STANDARDS

- .1 ASTM International (ASTM).
 - .1 ASTM C475/C475M-17, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C840-16, Standard Specification for Application and Finishing of Gypsum Board.
 - .3 ASTM C1002-16, Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .4 ASTM C1396/C1396M-17, Standard Specification for Gypsum Board.
- .2 Association of the Wall and Ceilings Industries International (AWCI).
 - .1 AWCI Levels of Gypsum Board Finish-GA-214-2015.

1.3 ACTION AND INFORMATIONAL 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 Shop Drawings:
 - .1 Submit gypsum board assembly drawings stamped and signed by professional engineer registered or licensed in New Brunswick Canada.
 - .2 Indicate components such as fastener type, dimensions, spacing and locations at gypsum board edges, ends and in field of board as well as installation methods. Components and work to confirm to ASTM C840 standard specification for application and finishing of gypsum board.
 - .3 Indicate type of joint compound, and number of joint compound layers.
 - .4 Indicate number and location of electrical boxes for wall and ceiling.
- .4 Samples:
 - .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
 - .2 Submit 300 x 300 mm size samples of shadow mould.
 - .3 Samples will be returned for inclusion into work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address and applicable standard designation.
- .3 Exercise care in unloading gypsum board materials shipment to prevent damage.
- .4 Storage and Handling Requirements in accordance with ASTM C840:
 - .1 Store gypsum board assemblies' materials level flat 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 gypsum board from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
- .4 Protect ready mix joint compounds from freezing, exposure to extreme heat and direct sunlight.
- .5 Protect from weather, elements and damage from construction operations.
- .6 Handle gypsum boards to prevent damage to edges, ends or surfaces.
- .7 Protect prefinished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
- .8 Replace defective or damaged materials with new.

1.5 AMBIENT CONDITIONS

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

Part 2 - Products

2.1 MATERIALS

- .1 Moisture-resistant board: to ASTM C1396/C1396M, regular and Type X/Type C, thickness as indicated.
- .2 Steel drill screws: to ASTM C1002.
- .3 Casing beads, corner beads, control joints and edge trim: to ASTM C104, PVC, 0.5 mm base thickness, fill-type, perforated flanges, one-piece length per location.
- .4 Trims and Shadow moulds: sizes as indicated on drawings. Trims and moulds to receive paint finish (colour to be selected by Departmental Representative) unless noted otherwise.
- .5 Joint compound: to ASTM C475, asbestos-free.

Part 3 - Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of existing substrates and heritage assemblies to ensure acceptable for gypsum board assemblies' installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .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 C840; except, where specified otherwise.
- .2 Install work level to tolerance of 1:1200.
- .3 Coordinate location of finish face of gypsum board with adjoining finishes.

- .4 Install reveal trims and shadow moulds where new gypsum board assemblies meet existing heritage building fabric unless notes otherwise.

3.3 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply single layer gypsum board to framing using screw fasteners. Maximum spacing of screws 300 mm on centre. Apply gypsum board on walls vertically or horizontally, providing sheet lengths that will minimize number of board edges or end joints.
- .3 At moisture-resistant gypsum board, apply water-resistant sealant to edges, ends, and cut-outs that expose gypsum core, and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
- .4 Install gypsum board with face side out.
- .5 Do not install damaged or damp boards.
- .6 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 using contact adhesive and staples for full length.
- .2 Locate control joints at changes in substrate construction.
- .3 Install control joints straight and true.
- .4 Splice corners and intersections together and secure to each member with three (3) screws.
- .5 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .6 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.
- .7 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 Level 3: embed tape for joints and interior angles in joint compound and apply two (2) separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
 - .2 Level 4: embed tape for joints and interior angles in joint compound and apply three (3) separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
- .8 Finish corner beads, control joints and trim as required with two (2) coats of joint compound and one (1) coat of taping compound, feathered out onto panel faces.
- .9 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.
- .10 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

- .11 Completed installation smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .12 Mix joint compound slightly thinner than for joint taping.
- .13 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .14 Remove ridges by light sanding or wiping with damp cloth.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.
- .2 Waste Management: separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

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.

3.7 SCHEDULES

- .1 Construct fire rated assemblies where indicated.
 - .1 45 minute fire rated partition assembly is based upon ULC Design No.W302.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIREMENTS

- .1 Section 09 21 16 Gypsum Board Assemblies.
- .2 Section 09 67 70 - Epoxy Flooring

1.2 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108/A118/A136 -17, Installation of Ceramic Tile.
 - .2 ANSI A137.1-2012, Specification for Ceramic Tile.
- .2 ASTM International (ASTM):
 - .1 ASTM C144-11, Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C979/C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.
 - .3 ASTM C920-18, Specification for Elastomeric Joint Sealants.
 - .4 ASTM C979/C979M-16, Standard Specification for Pigments for Integrally Colored Concrete.
- .3 Canadian Standards Association (CSA).
 - .1 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .4 International Organization for Standardization (ISO).
 - .1 ISO 13007 Series-2013/2014, Ceramic Tiles - Grouts and Adhesives.
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC):
 - .1 Specification Guide 09 30 00 Tile Installation Manual, 2016-2017.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product data:
 - .1 Include manufacturer's information on:
 - .1 Tile: marked to show each type, size, shape required. Include slip-resistance test results.
 - .2 Mortar and grout.
 - .3 Sealant.
 - .4 Leveling compound.
 - .5 Uncoupling membrane.
- .3 Samples:
 - .1 Wall tile: submit 300 mm x 300 mm sample panels of each colour, texture, size, and pattern of tile.
 - .2 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

1.4 QUALITY ASSURANCE

- .1 Quality Assurance Submittals:
 - .1 Manufacturer's Instructions: manufacturer's installation instructions.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle products in manner to avoid damage.
 - .3 Deliver products to job site in manufacturer's unopened cartons with labels intact and legible.
 - .4 Keep cartons dry and protected from vandalism and away from heavy traffic areas.
 - .5 Store cartons in upright position.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Waste Management and Disposal.
- .3 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.

1.6 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature above 12°C for 48 hours before, during, and 48 hours after, installation.

1.7 MAINTENANCE

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

Part 2 - Products

2.1 TILE

- .1 CT-1: Glazed ceramic tile.
 - .1 Standard of Acceptance: Olympia Colour and Dimension Series, size and colour to be selected by Departmental Representative from manufacturer's complete colour range.
 - .2 Size: as selected by Departmental Representative from manufacturer's complete size range.
 - .3 Pattern to be coordinated with Departmental Representative.

2.2 MORTAR MATERIALS

- .1 Mortar (bond coat): Polymer modified, to ANSI A118.11 and ISO 13007 Series, Classification C2TE; S1 deformability.
- .2 Mortar bed materials:
 - .1 Portland cement: to CAN/CSA A3001, Type 10.
 - .2 Sand: to ASTM C144, passing 16 mesh.
 - .3 Latex additive: formulated for use in portland cement mortar and thin set bond coat.
 - .4 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

2.3 GROUT

- .1 Wall grout: unsanded, to ISO 13007 Series, Classification CG2 WA.

- .1 Colour as selected by Departmental Representative selected from manufacturer's complete colour range.
- .2 Colouring Pigments:
 - .1 Pure mineral pigments, lime-proof and nonfading, complying with ASTM C979/C979M.
 - .2 Colouring pigments to be added to grout by manufacturer.
 - .3 Job coloured grout are not acceptable.
- .3 Grout widths to be coordinated with Departmental Representative.

2.4 MIXES

- .1 Mortar bed for walls: 1-part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail; when mixed with water mortar bed shall be of consistency and workability that will allow maximum compaction during tamping of mortar bed, and achieve minimum compressive strength of 15 MPa after 28 days. Stronger mix can be achieved by adding latex to water.

2.5 METAL TRIM

- .1 Wall Corner Profile: profile with 3.5 mm reveal for outside corners of tiled walls, and 135 Degree integrated trapezoid-perforated anchoring leg. Provide with matching outside corners.
 - .1 Material and Finish: as selected by Departmental Representative from manufacturer's complete colour and coated finish range.
- .2 Wall Base Profile: L-shaped profile with 3.2mm wide visible surface, integrated trapezoid-perforated anchoring leg, and integrated grout joint spacer.
 - .1 Anchoring Leg: Provide with straight anchoring leg.
 - .2 Material and Finish: aluminum

2.6 ACCESSORIES

- .1 Sealant: non-sag, two-part urethane, to ASTM C920, Type M, Grade NS, Class 25.
 - .1 Colour: as selected by Departmental Representative.
- .2 Sealers: below-surface penetrating sealer type, breathable, not affected by solvent based strippers or cleaners.
 - .1 Tile sealer: use of sealer as recommended by tile manufacturer.
 - .2 Grout sealer: use of sealer as recommended by grout manufacturer.
- .3 Cleaning Compounds.
 - .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
 - .2 Materials containing acid or caustic material are not acceptable.

Part 3 - Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Examine materials ordered for the project before delivering to the site; open boxes and confirm that materials match accepted samples, are free from defects and breakage detrimental to final appearance and installation, and as follows:

- .1 Departmental Representative will only accept Grade 1 materials. Materials marked as seconds or discounted or that are not consistent with materials submitted for review will be rejected.
- .2 Replace unacceptable materials at no increase in contract price; order replacement materials using most expedient delivery method to minimize effect on construction schedule.
- .2 Examine substrates, areas, and conditions where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile and confirm the following:
 - .1 Verify that substrates for bonding tile are firm; dry; clean; free from oil, waxy films, and curing compounds.
 - .2 Verify that joints and cracks in tile substrates are coordinated with tile joint locations; adjust joints in consultation with Departmental Representative where joints are not coordinated.
 - .3 Verify that tile subject to colour variations has been blended in the factory and packaged so tile units taken from one package show the same range of colours as those taken from other packages. If not factory blended, blend tiles at site before installing.
 - .4 Verify that back of tile is free from contamination before installation.
- .3 Notify Departmental Representative in writing of any conditions that are not acceptable; do not proceed with installation until unsatisfactory conditions have been corrected.

3.3 PREPARATION

- .1 Protection: Protect surrounding work from damage and disfiguration arising from work of this Section.
- .2 Surfaces: Thoroughly clean substrate surfaces receiving tile finishes to remove grease, oil or dust film, and other contaminants affecting bond of materials within bonding systems and as follows:
 - .1 Clean back of each tile before installation to remove surface contaminants and cutting residue, firing release dust and other debris detrimental to bond and final surface appearance.
- .3 Surface Leveling: Apply patching and leveling material to make backing surfaces flat and true to tolerances in plane listed for performance requirements with additional requirements as follows:
 - .1 Install patching materials wherever a slight substrate irregularity exists.
 - .2 Use self leveling materials for thicknesses less than 8 mm where thin set tile methods are used.
- .4 Height of starting course of wall tile above finish floor to be set at a consistent height throughout entire building prior to installation of epoxy grout floor finish and associated cove base.
- .5 Coordinate epoxy grout cove base installation with wall tile finish.

3.4 TILE INSTALLATION

- .1 Perform work in accordance with requirements of:
 - .1 TTMAC Specification Guide 09 30 00 Tile Installation Manual.
 - .2 Parts of ANSI A108 Series of tile installation standards that apply to types of bonding and grouting materials,
 - .3 Manufacturer's instructions.
- .2 Extend tile work into recesses and under or behind equipment and fixtures to form a complete covering without interruptions:
 - .1 Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 - .2 Make cut edges smooth, even and free from chipping.

- .3 Do not split tile.
- .3 Accurately form intersections and returns; perform cutting and drilling of tile without marring visible surfaces:
 - .1 Cut, drill, and fit tile to accommodate work of other subcontractors penetrating or abutting work of this Section.
 - .2 Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints.
 - .3 Fit tile closely to piping, fixtures, and other penetrations so that plates, collars, or covers overlap tile and to provide a uniform joint appearance.
- .4 Lay tile in pattern indicated on drawings and as follows:
 - .1 Lay out tile Work and centre tile sites in both directions in each space or on each wall area.
 - .2 Cut tile accurately and without damage.
 - .3 Smooth exposed cut edges with abrasive stone, where exposed.
 - .4 Chipped or split edges are not acceptable.
 - .5 Adjust tile layout to minimize tile cutting.
 - .6 Provide uniform joint widths.
 - .7 Install wall tile in a consistent pattern throughout entire building
 - .8 Review tile pattern with Departmental Representative for approval prior to installation.
- .5 Bonding Bed: Set tile in place while bond coat is wet and tacky and as follows:
 - .1 Adjust amount of bonding materials placed on substrates based on temperature and humidity to prevent skinning over of bonding materials.
 - .2 Back Butter tiles as required to obtain 100% mortar coverage on backs of tiles, in accordance with applicable requirements for back buttering of tile in referenced TTMAC and ANSI A108 series of tile installation standards.
 - .3 Notch bond coat in horizontal straight lines and set on freshly placed bonding material while moving (sliding) tile back and forth at 90° to notches.
 - .4 Verify that corner and edges are fully supported by bonding material.
 - .5 Set tiles using tile spacer/leveller to provide smooth transition between adjacent tiles and prevent lippage greater than 1 mm over a 3 mm grout joint.
 - .6 Keep two-thirds of grout joint depth free of bonding materials.
 - .7 Clean excess bonding materials from tile surface prior to final set.
 - .8 Sound tiles after bonding materials have cured and replace hollow sounding tile before grouting.
- .6 Grouting: Install grout in accordance with manufacturer's written instructions, the requirements of TTMAC, and as follows:
 - .1 Allow proper setting time before application of grout.
 - .2 Pre-seal or wax tiles requiring protection from grout staining.
 - .3 Force grout into joints to a smooth, dense finish.
 - .4 Remove excess grout in accordance with manufacturer's written instructions and polish tile with clean cloths.

3.5 SETTING SYSTEM

- .1 Install on substrate in accordance with TTMAC detail:
 - .1 Walls: Gypsum board: 304W.

3.6 SEALING

- .1 Apply tile sealer and grout sealer in accordance with manufacturer's written instructions.

3.7 CLEANING

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

- .2 Clean surfaces so they are free of foreign matter using manufacturer recommended cleaning products and methods after completion of placement and grouting and as follows.
- .3 Remove grout residue from tile as soon as possible.

3.8 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Protection: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or other tile deficiencies as follows:
 - .1 Protect finished areas from traffic until setting materials have sufficiently cured in accordance with TTMAC requirements.
 - .2 Protect floor areas from traffic after grouting is completed in accordance with manufacturer's written instructions.
 - .3 Prevent foot and wheel traffic from floors for a minimum of 48 hours after completion of grouting.
 - .4 Use stepping boards where access is required for light foot traffic only after 24 hours from completion of grouting.
 - .5 Provide protective covering until Substantial Performance of the Work.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIREMENTS

- .1 09 30 13 - Ceramic Tiling

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions, Recommendations and Technical Data:
 - .1 For each type of product indicated, include manufacturer's technical data, application instructions, and recommendations.
 - .2 Indicate special handling criteria, installation sequence, cleaning procedures.
- .3 Samples:
 - .1 Submit duplicate 300 mm x 300 mm samples, on rigid backing, of each colour, and texture of epoxy flooring.
 - .2 Approved colour and texture samples shall become the standard of quality for colour and finish for this project.
- .4 Provide maintenance data for epoxy flooring for incorporation into manual specified in Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

- .1 Installation shall be done only by certified applicators. Submit written verification from manufacturer indicating certification of applicator.
- .2 Mock-ups
 - .1 Apply full-thickness coating of each finish to 10 m² area of surface to be treated.
 - .2 Include minimum 1 m length of integral cove base.
 - .3 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with coating work.
 - .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work upon Departmental Representative's approval.
- .3 Site Meetings: as part of Manufacturer's Services described in Article [3.5] - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.
 - .1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of Work, after cleaning is carried out.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver and store material in original, undamaged, unopened containers, with manufacturer's labels and seals intact.
- .2 Store materials to comply with manufacturer's directions to prevent deterioration due to moisture, heat, cold, direct sunlight or any other causes.
- .3 Keep containers sealed when not in use.

1.5 SITE CONDITIONS

- .1 Safety:
 - .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
 - .2 Ensure no open flame heating devices are used.

- .3 Discourage occupancy of treated space until volatile materials are no longer being emitted and there is no odour.
- .4 Provide adequate respiratory protection to exposed individuals.
- .2 Ventilation:
 - .1 Provide ventilation continuously during and after coating application. Run system 24 hours per day during application; provide continuous ventilation for 7 days after completion of application.
- .3 Environmental Limitations:
 - .1 Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.
 - .2 Maintain material and substrate temperature between 18°C and 30°C during resinous flooring application and for not less than 24 hours after application.
- .4 Lighting:
 - .1 Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.
- .5 Close spaces to traffic during resinous flooring application and for not less than 24 hours after application, unless manufacturer recommends a longer period.
- .6 Concrete substrate shall be properly cured for a minimum of 30 days.

Part 2 - Products

2.1 MATERIALS

- .1 Epoxy Flooring System (EF)
 - .1 Stonshield HRI by Stonhard or approved equivalent.
 - .2 Interior epoxy flooring materials:
 - .1 System Characteristics:
 - .1 Wearing Surface: Medium texture minimum, heavy anti-slip in shower locations as indicated in the Drawings.
 - .2 Integral Cove Base where indicated on drawings.
 - .3 Overall System Thickness: nominal 6 mm.
 - .2 System Components:
 - .1 Primer:
 - .1 Resin: Epoxy.
 - .2 Formulation Description: two (2) components.
 - .3 Application Method: Squeegee and roller.
 - .4 Number of Coats: (1) one.
 - .5 Acceptable Materials: type as per manufacturer's recommendations for applicable substrate.
 - .2 Base:
 - .1 Resin: Epoxy.
 - .2 Formulation Description: three (3) components.
 - .3 Application Method: Metal Trowel.
 - .4 Thickness of Coats: nominal 6 mm.
 - .5 Number of Coats: one (1).
 - .6 Aggregates: finely graded silica.
 - .7 Basis-of-design Material: StonShield HRI by Stonhard.
 - .3 Undercoat:
 - .1 Resin: epoxy.
 - .2 Formulation description: three component, free flowing.
 - .3 Number of Coats: one (1).
 - .4 Aggregate:
 - .1 Coloured quartz for broadcast application.
 - .5 Sealer:
 - .1 Resin: Epoxy.

- .2 Formulation Description: two (2) component.
 - .3 Type: clear.
 - .4 Number of Coats: one (1).
 - .6 Finish:
 - .1 Colours: To be Selected by Departmental Representative from Manufacturer's standard colour range.
 - .3 System Physical Properties:
 - .1 Provide epoxy flooring system with the following minimum physical property requirements when tested according to test methods indicated:
 - .1 Compressive Strength (ASTM C579): 10,000 psi after 7 days.
 - .2 Tensile Strength (ASTM C3070): 2000 psi.
 - .3 Flexural Strength (ASTM C580): 4,300 psi.
 - .4 Water Absorption (ASTM C413): 0.1%.
 - .5 Impact Resistance (ASTM D2794): > 160 in. lbs.
 - .6 Flammability (ASTM E648): Class 1.
 - .7 Hardness (ASTM D2240): 85 to 90, Shore D.
 - .8 Slip resistance (ASTM F1679): 0.93 (wet).
- .2 Waterproofing membrane:
 - .1 Two-component, 100% solids, liquid applied, urethane waterproofing membrane; designed for use on horizontal applications as a positive-side moisture barrier; compatible with remainder of epoxy flooring system.
 - .2 Properties:
 - .1 Water vapour transmission (ASTM E96): < 1 g.
 - .2 Tensile strength (ASTM D412): 1200 psi.
 - .3 Elongation (ASTM D412): 200%.
 - .4 Hardness: ASTM D2240): 70, Shore A.
 - .5 VOC content (ASTM D2369): 8 g/L
 - .3 Standard of acceptance: Stonproof ME7 by Stonhard.
- .3 Trowelable epoxy grout:
 - .1 Three-component, heavy-duty, fast-setting, high temperature resistant grout; compatible with remainder of epoxy flooring system.
 - .2 Properties:
 - .1 Compressive strength (ASTM C579): 7400 psi after 7 days.
 - .2 Tensile strength (ASTM C307): 1800 psi.
 - .3 Flexural strength (ASTM C580): 2800 psi.
 - .4 Flexural modulus of elasticity (ASTM C580): 8.5×10^5 psi.
 - .5 Hardness: ASTM D2240): 86 - 88, Shore D.
 - .6 VOC content (ASTM D2369): 50 g/L
 - .3 Standard of acceptance: StonSet HG5 by Stonhard.
- .4 Accessory Materials:
 - .1 Patching and Fill Material: Resinous product as per resinous flooring manufacturer written recommendation to suit application.
 - .2 Primers: type as recommended by manufacturer for applicable substrate.
 - .3 Joint Sealant: Type recommended or produced by resinous flooring manufacturer for type of service and joint condition indicated, including but not limited to joint fill material and concrete crack treatment.

2.2 MIXES

- .1 Mix coatings in accordance with manufacturer's instructions.
- .2 Mortar bed for floors: 1-part Portland cement, 4 parts sand, and latex additive where required by TTMAC Detail; when mixed with water mortar bed shall be of consistency and workability that will allow maximum compaction during tamping of mortar bed, and achieve minimum compressive strength of 15 MPa after 28 days. Stronger mix can be achieved by adding latex to water.

Part 3 - Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section.
- .2 Examine substrate surfaces to receive epoxy coatings.
 - .1 Visually inspect substrate before starting Work of this Section.
 - .2 Examine site conditions and areas for defects of work prepared by other trades in which the work of this section is to be applied.
 - .3 Report to the Departmental Representative in writing, defects of work which may adversely affect the quality of workmanship of this section.
 - .4 Commencement of work shall imply acceptance of surfaces.
- .3 Verification of conditions:
 - .1 Verify that:
 - .1 Surfaces are clean, dimensionally stable, cured and free of contaminants such as oil, sealers and curing compounds.
 - .2 Ensure new concrete is cured for minimum 28 days with moisture content no greater than 14%.

3.3 PREPARATION

- .1 Prepare surfaces in accordance with manufacturer's written instructions.
- .2 Substrate shall be sound, non-dusting, and free of grease, oil, dirt and other matter detrimental to adhesion and appearance of coating. Provide clean, dry, and neutral Ph. substrate for epoxy flooring application.
- .3 Where epoxy flooring is applied over existing floor surfaces, remove existing coatings / finishes and prepare substrates in accordance with manufacturer's written recommendations.
- .4 Mechanically prepare concrete substrates as follows:
 - .1 Repair damaged and deteriorated concrete according to epoxy flooring manufacturer's written recommendations.
 - .2 Clean concrete slab free from foreign matter. Remove laitance by shot blasting or other method approved by flooring manufacturer and acceptable to Departmental Representative.
- .5 Epoxy Materials: Mix components and prepare materials according to epoxy flooring manufacturer's written instructions.
- .6 Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.
- .7 Treat control joints and other non-moving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.
- .8 Mask/cover adjacent surfaces, fixtures, equipment by suitable means to protect them from damage from the operations of this trade. Make good damage by this trade at own expense and to Departmental Representative's satisfaction.
- .9 Coordinate height of integral cove base with ceramic wall tile installation/ wall panelling. Top of cove base to be set a consistent height throughout entire building.

3.4 APPLICATION

- .1 General: Apply epoxy flooring system in accordance with manufacturer's written instructions, and where possible under direction of manufacturer's representative, to produce a uniform, monolithic wearing surface.
 - .1 Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum inter-coat adhesion.
 - .2 Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
 - .3 Texture:
 - .1 Standard Anti-slip:
 - .2 Moderate Anti-slip: anti-slip coating selection to be coordinated with Departmental Representative.
 - .4 Infill areas in existing where no mortar bed is present to maintain continuity of floor level as indicated in the Drawings.
- .2 Epoxy cove base:
 - .1 Integral Cove Base: affix metal cove strip cap at elevation noted. Apply cove base mix mortar to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, of cove base. Round internal and external corners.
 - .1 Size: minimum 127 mm high - maximum 152 mm high with 25 mm radius.
 - .2 Top of cove base shall be set to a consistent height throughout entire building regardless of floor level.
 - .2 Colour of base differs from general floor area in some locations. Coordinate extents and colour selections with Departmental Representative.
- .3 Terminations:
 - .1 Chase edges to 'lock' the flooring system into the concrete substrate along lines of termination.
 - .2 Penetration Treatment: Lap and seal resinous system onto the perimeter of the penetrating item by bridging over compatible elastomer at the interface to compensate for possible movement.
 - .3 Trenches: Continue flooring system into trenches to maintain monolithic protection. Treat cold joints to assure bridging of potential cracks.
 - .4 Treat floor drains by chasing the flooring system to lock in place at point of termination.
- .4 Joints and Cracks:
 - .1 Treat control joints to bridge potential cracks and to maintain monolithic protection.
 - .2 Treat cold joints and construction joints to bridge potential cracks and to maintain monolithic protection on horizontal and vertical surfaces as well as horizontal and vertical interfaces.
 - .3 Discontinue floor coating system at vertical and horizontal contraction and expansion joints by installing backer rod and compatible sealant after coating installation is completed. Provide sealant type recommended by manufacturer for traffic conditions and chemical exposures to be encountered.
- .5 Curing:
 - .1 Cure epoxy flooring materials in compliance with manufacturer's directions, taking care to prevent contamination during stages of application and prior to completion of curing process. Close area of application for a minimum of 18 hours.
- .6 Moisture reduction barrier:
 - .1 Patch and prime substrate using manufacturer recommended products.
 - .2 Mix components, taking care to avoid entrapping air. Apply immediately after mixing using V-notched rake to obtain 3 mm applied thickness; back roll with spiked roller.

- .7 Waterproofing membrane:
 - .1 Patch and prime substrate using manufacturer recommended products.
 - .2 Mix components, taking care to avoid entrapping air. Apply immediately after mixing using 30 mil notched squeegee; back roll with spiked roller.

3.5 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in Article **[1.2]** - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in Article **[1.3]** - QUALITY ASSURANCE.

3.6 CLEANING AND PROTECTION

- .1 Clean uncured flooring materials from surfaces with solvent. Removal of cured materials requires scraping, chipping or grinding.
- .2 Protect flooring materials from wear and damage during construction operations. Where temporary covering is required for this purpose, comply with manufacturer's recommendations for protective materials and method of application
- .3 Remove temporary covering and clean flooring just prior to final acceptance using materials and procedures recommended by flooring manufacturer.

3.7 SCHEDULE

- .1 Refer to Finish Schedule for extent of epoxy flooring.
- .2 Use waterproofing membrane with epoxy flooring systems on Second Floor.

END OF SECTION

Part 1 - General

1.1 RELATED REQUIREMENTS

- .1 Section 06 20 00 - Finish Carpentry.
- .2 Section 08 11 00 - Metal Doors and Frames.
- .3 Section 08 14 16 - Flush Wood Doors.
- .4 Section 09 03 81 - Historic - Painting Exterior Surfaces.
- .5 Section 09 21 16 - Gypsum Board Assemblies.

1.2 REFERENCE STANDARDS

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

1.3 PRE-JOB CONFERENCE

- .1 Pre-Installation Meeting:
 - .1 Convene pre-installation meeting prior to beginning work of this Section.
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Coordination with other building subtrades.
 - .4 Review manufacturer's and MPI installation instructions, procedures and warranty requirements.
- .2 Painting subcontractor, paint manufacturer's technical representative, general contractor and Departmental Representative shall be present to confirm materials, methods, etc.
- .3 Ensure the following items are present.
 - .1 Specifications.
 - .2 Finish schedule.
 - .3 Colour schedule.
 - .4 Product data sheets.
 - .5 Material safety data sheets (MSDS).

1.4 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.

1.5 SUBMITTALS

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit product data and instructions for each paint and coating product to be used.
 - .2 Submit product data for the use and application of paint thinner.
 - .3 Mark each product data sheet with the following:
 - .1 Specification paragraph cross-reference.
 - .2 MPI System number.
 - .3 Indicate whether product is primer or top coat.
- .3 Submit Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS). Indicate VOCs during application and curing.

- .4 Samples:
 - .1 Submit full range colour sample chips to indicate where colour availability is restricted.
- .5 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.
- .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation and application instructions.
- .7 Closeout Submittals: submit maintenance data for incorporation into maintenance manual include following:
 - .1 Product name, type and use.
 - .2 Manufacturer's product number.
 - .3 Colour numbers.
 - .4 MPI Environmentally Friendly classification system rating.
 - .5 Manufacturer's Material Safety Data Sheets (MSDS).

1.6 JOB CONDITIONS

- .1 Examine surfaces to be finished and ensure that surfaces can be put in proper condition for finishing by customary cleaning, sanding and puttying operations.
- .2 Report to the Departmental Representative in writing, defects of work which may adversely affect the quality of workmanship of this section.
- .3 Commencement of work shall imply acceptance of surfaces.

1.7 PROTECTION

- .1 Protect surrounding and adjoining work by adequately covering with tarpaulins, masking or other necessary protective covering.
- .2 Remove or protect hardware, lighting fixtures and similar items. Restore and reinstall when painting is completed.
- .3 Make good, any damage caused by failure to provide suitable protection.
- .4 Replace items that cannot be restored to "like-new" condition with new at no increase in Contract Price.

1.8 MAINTENANCE MATERIALS

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

1.9 QUALITY ASSURANCE

- .1 Conform to latest MPI requirements for painting work including preparation and priming.

- .2 Have paint manufacturer's technical representative do a minimum total of three (3) inspections, one (1) for mock-up room and minimum two (2) during application of this work, to ensure proper application.
- .3 Paint manufacturer's technical representative shall provide a written report to Departmental Representative within seven (7) days after each inspection, and shall submit copies of report to general contractor and painting subcontractor.
- .4 Retain purchase orders, invoices and other documents to prove that materials utilized meet requirements of specifications. Produce documents when requested by Departmental Representative.

1.10 MOCK-UP ROOM

- .1 Departmental Representative will select a room to be a mock-up. More than one room may be selected so that each different paint system is covered.
- .2 Paint mock-up room in accordance with specification, using products and procedures that will be used for actual painting operations, and to Consultants approval.
- .3 Have paint manufacturer's technical representative present during application of materials in mock-up room.
- .4 No further painting, including block filling and priming, shall take place until, full approval of mock-up room is received from Departmental Representative.
- .5 Mock-up room will be the standard used throughout the project. Any work which does not comply with mock-up room will be rejected. Bring rejected work up to standard of mock-up room at no additional expense.
- .6 Departmental Representative's decision as to compliance with mock-up room shall be final.

1.11 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Labels shall clearly indicate:
 - .1 Manufacturer's name and address.
 - .2 Type of paint or coating.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in a well-ventilated area with temperature range 7°C to 30°C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
 - .1 Provide fire extinguisher adjacent to storage area.

- .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
- .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.12 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
 - .1 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
 - .2 Where required, provide continuous ventilation for seven (7) days after completion of application of paint.
 - .3 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
 - .1 Perform no painting work when:
 - .1 Ambient air and substrate temperatures are below 10°C.
 - .2 Substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
 - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
 - .4 The relative humidity is above 85% or when the dew point is less than 3°C variance between the air/surface temperature.
 - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
 - .2 Perform no painting work when the maximum moisture content of the substrate exceeds:
 - .1 12% for concrete and masonry (clay and concrete brick/block).
 - .2 15% for wood.
 - .3 12% for gypsum board.
 - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
 - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
 - .1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
 - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
 - .3 Apply paint only when previous coat of paint is dry or adequately cured.
 - .4 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.

1.13 WASTE MANAGEMENT AND DISPOSAL

- .1 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .2 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .3 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

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

Part 2 - Products

2.1 PAINT MATERIALS

- .1 Paints, primers, coatings, varnishes, stains, lacquers etc. shall conform to Green Seal Standard GS-11, Green Seal Standard GC-03, or the California South Coast Air Quality Management District (SCAQMD) Rule #1113.
- .2 Materials (primers, paints, coatings, varnishes, stains, lacquers) shall be listed in the MPI Approved Products List (APL).
- .3 Other paint materials shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .4 Linseed Oil paint for exterior surfaces shall meet the requirements of Section 09 03 61 - Historic - Painting Exterior Surfaces.
- .5 Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .6 Where possible, provide paint materials for paint systems from single manufacturer.

2.2 COLOURS

- .1 Departmental Representative will provide Colour Schedule after Contract award.
- .2 Selection of colours will be from manufacturers complete range of colours.
- .3 Second coat in a three-coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. Obtain written approval from Departmental Representative for tinting of painting materials.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Use and add thinner in accordance with paint manufacturer's recommendations. Do not use kerosene or similar organic solvents to thin water-based paints.
- .4 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 RATING

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

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

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

2.5 INTERIOR PAINTING SYSTEMS

- .1 Unless otherwise noted, all painting work shall be in accordance with MPI Premium Grade finish requirements.
- .2 Painting systems:
- .1 Systems specified are for new surfaces.
 - .2 For repaint work, use same paint system as for new surfaces; with the following exceptions for priming:
 - .1 Omitting primer is acceptable only on sound surfaces.
 - .2 Touch-up priming, or spot priming is acceptable on slight to moderately deteriorated surfaces.
 - .3 Use full coat of primer on severely deteriorate surfaces.
- .3 Galvanized Metal:
- .1 INT 5.3B W.B. Light Industrial Coating G5 - semi-gloss finish. ~~Use~~ pre-catalyzed epoxy.
 - .1 Primer: as recommended by Top coat manufacturer.
 - .2 Top coats: MPI#153, pre-catalyzed epoxy.
 - .3 Location/items: Door frames.
- .4 Dressed Lumber:
- .1 INT 6.3P - W.B. Light Industrial Coating G5 semi-gloss finish). Use pre-catalyzed epoxy.
 - .1 Primer: MPI#45.
 - .2 Top coats: MPI#153.
 - .3 Location/items: Doors, door and window frames, casings, mouldings, etc.
 - .2 INT 6.3Q - W.B Varnish, Clear - G6 gloss finish.
 - .1 Top coats: MPI#130.
 - .2 Location/items: benches.
- .5 Wood Plywood Panelling:
- .1 INT 6.4M - W.B. Varnish, Clear.
 - .1 Top coats: sheen as selected by Departmental Representative.
 - .2 Wall panels.
 - .2 INT 6.4UU - W.B. Varnish, Clear (over w.b. stain).
 - .1 Stain: to MPI#186.
 - .2 Top coats: sheen as selected by Departmental Representative.
 - .3 Location/items: Wall panels.
 - .4 Colour: to be selected from manufacturers special colours/ custom colours.
 - .1 INT 6.4PP - Fire Retardant, Pigmented, W.B.
 - .1 MPI#64.
 - .2 Electrical panel backboards.

- .6 Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc.
 - .1 INT 9.2L - W.B. Light Industrial Coating - G5 - semi-gloss finish. Use pre-catalyzed epoxy.
 - .1 Primer: MPI#50.
 - .2 Topcoats: MPI#153; pre-catalyzed epoxy.
 - .3 Location/items: wall in higher abuse areas.
 - .4 Colour: to be selected by Departmental Representative.

2.6 EXTERIOR PAINTING SYSTEMS

- .1 All painting works shall be in accordance with the requirements of Section 09 03 61 - Historic - Painting Exterior Surfaces.

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.

Part 3 - Execution

3.1 GENERAL

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

3.2 EXAMINATION

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

3.3 PREPARATION

- .1 Protection:
 - .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore surfaces as directed by Departmental Representative.
 - .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
 - .3 Protect factory finished products and equipment.
- .2 Preparation:
 - .1 Remove electrical cover plates, light fixtures, surface hardware on doors, washroom accessories and other surface mounted equipment, fittings and

- fastenings prior to undertaking painting operations. Identify and store items in secure location and re-installed after painting is completed.
- .2 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .3 Place "WET PAINT" signs in occupied areas as painting operations progress. Signs to approval of Departmental Representative.
- .3 Clean and prepare surfaces in accordance with MPI Architectural Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
 - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloth or other method acceptable to Departmental Representative.
 - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. Minimize use of mineral spirits or organic solvents to clean up water-based paints.
- .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pre-treatment as soon as possible after cleaning and before deterioration occurs.
- .5 Where possible, prime non-exposed surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
 - .1 Apply MPI #36 vinyl sealer over knots, pitch, sap and resinous areas.
 - .2 Apply wood filler to nail holes and cracks.
 - .3 Tint filler to match stains for stained woodwork.
- .6 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, blowing with clean dry compressed air or vacuum cleaning.
- .7 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

3.4 WORKMANSHIP

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

3.5 APPLICATION

- .1 Brush paint trim work. Brush or roller paint other work. Use of spray equipment only when approved by Departmental Representative.
- .2 Apply materials in strict accordance with manufacturer's application instructions.
- .3 Brush and Roller Application:
 - .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
 - .2 Work paint into cracks, crevices and corners.
 - .3 Paint surfaces and corners not accessible to brush or roller using spray, daubers and/or sheepskins. Use sheepskins or daubers only when specifically authorized by Departmental Representative.
 - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Departmental Representative.
 - .5 Remove runs, sags and brush marks from finished work and repaint.
- .4 Spray application:
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as tops of interior cupboards and cabinets and projecting ledges.
- .9 Finish closets and alcoves as specified for adjoining rooms.
- .10 Finish top, bottom, edges and cutouts of doors after fitting with enamel undercoater for painted finish; gloss varnish for stain or varnish finish.

3.6 MATERIALS AND EQUIPMENT NOT PAINTED

- .1 Do not paint the following unless noted otherwise:
 - .1 Floor, wall and ceiling finishes such as tile, resilient flooring, vinyl wall covering, acoustic and decorative ceilings.
 - .2 Aluminum, stainless steel, chrome, nickel and brass products.
 - .3 Finished hardware, except hardware that is factory primed.
 - .4 Factory-finished toilet partitions, plastic laminate, glass, porcelain enamel, baked enamel, face brick, and washroom fixtures.
 - .5 Fire labels, equipment name and identification plates.
 - .6 Products with complete factory finish, except primed items.

3.7 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Banding, stencilling or stickers for pipe identification in exposed and concealed areas shall be as specified in mechanical and electrical sections of the specifications.

- .2 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.
- .3 Mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment when wall/ceiling that item is attached to or suspended from, is scheduled to be painted.
- .4 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .5 Where required by code, paint exposed mechanical and electrical items whether or not room is painted.
- .6 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .7 Do not paint over nameplates.
- .8 Keep sprinkler heads free of paint.
- .9 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matte black paint.

3.8 REPAINTING

- .1 All interior and exterior repainting shall match and be fully compatible with existing finishes.
- .2 Remove dirt, dust, oil, grease, rust stains, mould, mildew and other contaminants. Remove loose and flaking paint to expose sound surface. Sand glossy surfaces to promote better adhesion of new paint system.
- .3 Compatibility testing:
 - .1 If incompatibility between new paint system and existing paint system is suspected, test for compatibility before undertaking full scale painting process.
 - .1 Notify Departmental Representative if incompatibility is observed and await direction.
 - .2 If full scale painting has been undertaken before testing for compatibility:
 - .1 Remove new incompatible paint system in its entirety, take corrective action necessary, and reapply topcoats specified; all at no increase in contract price.
- .4 Take care not to disturb or damage existing interior heritage wall and ceiling finishes and character defining elements identified in Heritage Recording Report.
- .5 Unless noted otherwise, repainting shall be limited to surfaces of walls, ceilings, floors, etc., where renovation or alteration has taken place.
- .6 Repaint entire interior surfaces of walls, ceilings, floors, etc. Patch/spot painting will not be accepted unless approved by Departmental Representative.
- .7 Paint new surface run/exposed pipes, ducts and conduits where existing wall/ceiling is painted.
- .8 Repaint surfaces damaged during or after painting, at no increase in Contract price. Cost, including material and labour, shall be borne by trade responsible for damage.
- .9 Apply sufficient coats paint to properly hide old colour and produce a solid, uniform appearance satisfactory to the Departmental Representative.

3.9 FIELD QUALITY CONTROL

- .1 Standard of Acceptance:
 - .1 Walls: no defects visible from a distance of 1000 mm at 90° to surface.
 - .2 Ceilings: no defects visible from floor at 45° to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.
- .2 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.

3.10 CLEANUP

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

END OF SECTION