

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 09 91 23 - Painting.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM C475/C475M-12. Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .2 ASTM C557-03(2009)e1. Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - .3 ASTM C840-11. Standard Specification for Application and Finishing of Gypsum Board.
  - .4 ASTM C954-11. Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
  - .5 ASTM C1002-07, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .6 ASTM C1047-10a. Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .7 ASTM C1177/C1177M-08. Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - .8 ASTM C1178/C1178M-11. Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel.
  - .9 ASTM C1280-13. Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing.
  - .10 ASTM C1288-99(2010). Standard Specification for Discrete Non-Asbestos Fiber-Cement Interior Substrate Sheets.
  - .11 ASTM C1396/C1396M-13. Standard Specification for Gypsum Board.
- .2 Association of the Wall and Ceilings Industry (AWCI).
  - .1 AWCI 101a-1997. Recommended Levels of Gypsum Board Finish - Matrix Edition.
- .3 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-51.34-M86(R1988). Vapour Barrier, Polyethylene Sheet for Use in Building Construction.

**1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from other elements and damage from construction operations and other causes.

**GYPSUM BOARD ASSEMBLIES**

- .3 Handle gypsum board panels to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

**1.4 SITE ENVIRONMENTAL REQUIREMENTS**

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

**1.5 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures. Submit 300 mm long samples of corner bead, casing bead, vinyl mouldings, shadow mould, cornice cap and insulating strip.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Waste Management and Disposal plan as specified in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities. Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site containers for recycling in accordance with Waste Management Plan.
- .3 Divert unused gypsum, metal and wood components from landfill to appropriate recycling facility for disposal approved by Departmental Representative.

**Part 2 Products****2.1 MATERIALS**

- .1 Standard board: to ASTM C1396/C1396M. Type X, minimum 12.7 and 15.9 mm thick, 1200 mm wide x maximum practical length see details for thickness. Ends square cut, edges bevelled.
- .2 Interior glass mat water-resistant gypsum backing board: to ASTM C1178/C1178M. Water resistant core with the face covered with a glass mat partially or completely embedded in the core and a water-resistant coating on the back. 12.5 mm thick, 1200 mm wide x maximum practical length.
- .3 Exterior glass mat gypsum sheathing board: to ASTM C1177/C1177M. 15.9 mm thick. 1200 mm wide x maximum practical length. Water resistant, non-combustible, treated gypsum core with water and weather resistant, glass matt facing both sides. Weight: 12.21 kg/square meter.

**GYPSUM BOARD ASSEMBLIES**

- .4 Cement board: to ASTM C1288. Mixture of portland cement, aggregate, sand, selected filler and polymer coated glass fibre reinforcing mesh. 15.9 mm thick, 1200 mm wide x maximum practical length.
- .5 Metal furring runners, hangers, tie wires, inserts, anchors: manufacturer's standard profiles to suit specific requirements.
- .6 Drywall furring channels: 0.5 mm core thickness, galvanized steel channels for screw attachment of gypsum board.
- .7 Steel drill screws: to ASTM C1002. For application of gypsum board into heavier gauge steel studs: to ASTM C954.
- .8 Cementitious Board Fasteners: board manufacturer's purpose made screws, corrosion resistant steel, self-drilling points, counter-sink heads to prevent strip-out. Designed for application to steel stud construction.
- .9 Stud adhesive: to ASTM C557. For attachment of gypsum board panels to steel studs without mechanical fasteners.
- .10 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, zinc coated by electrolytic process. 0.5 mm base thickness, perforated flanges, one piece length per location.
- .11 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .12 Acoustic sealant: as specified in Section 07 92 00 - Joint Sealants.
- .13 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .14 Joint compound: to ASTM C475, asbestos-free. Manufacturer's premixed commercial grade compound.

**Part 3 Execution****3.1 ERECTION**

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Do application of gypsum sheathing in accordance with ASTM C1280.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.

**GYP SUM BOARD ASSEMBLIES**

- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers and grilles. 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 in accordance with ASTM C840, 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, open web steel joists, pipes and exposed services where indicated.
- .12 Erect drywall resilient furring transversely across studs, between the layers of gypsum board, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.

**3.2 APPLICATION**

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
- .2 Apply single gypsum board to metal furring or framing using screw fasteners. Maximum spacing of screws 300 mm on centre.
- .3 Single-Layer Application:
  - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
  - .2 Apply gypsum board to walls vertically or horizontally, providing sheet lengths that will minimize end joints.
- .4 Multiple-Layer Application:
  - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.
  - .2 Apply gypsum board to walls staggering joints in each successive layer and rotating panels from vertical to horizontal, providing sheet lengths that will minimize end joints.
  - .3 Apply compound and tape to joints on each successive layer prior to proceeding to board the next.
- .5 Cement Board Application. Apply cement board to steel stud framing where indicated in the drawings and wherever Ceramic Tile wall finishes are to be applied. Use manufacturer's proprietary screw fasteners, purpose made for attachment of cement board to steel framing. Apply multiple layers where indicated.

**GYPSUM BOARD ASSEMBLIES**

- .6 Interior Water Resistant Board Application. Apply Interior glass mat water-resistant gypsum backing board in washrooms for ceilings and for walls that are not scheduled to receive ceramic tile and where indicated. Install adjacent to slop sinks and in janitors closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads.
- .7 Exterior Sheathing Application. Apply exterior glass mat gypsum sheathing board to exterior of heavy gauge steel studs in accordance with ASTM C1280. Apply sheets with vertical joints to minimize joints. Butt panels tightly and seal joints as recommended by manufacturer.
- .8 Apply 2 rows of 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning at each successive layer 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.
- .9 Custom cut boards to match steel deck profile Apply 2 rows of 12 mm diameter bead of sealant continuously around profile of each face of partitioning at each successive layer to seal gypsum board
- .10 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .11 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.
- .12 Install gypsum board with face side out. Do not install damaged or damp boards.
- .13 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.
- .14 Where indicated, apply gypsum board using adhesive to furring or framing.

**3.3 INSTALLATION**

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm 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 window and exterior door frames, to provide thermal break.
- .5 Install access doors as specified in Section 08 31 00 - Access Doors - Mechanical to provide service access to electrical and mechanical fixtures specified in respective sections. Rigidly secure frames to furring or framing systems.

**GYPSUM BOARD ASSEMBLIES****3.4 BUILDING JOINTS**

- .1 Control Joints. Construct control joints consisting of two back-to-back casing beads set in joint compound and supported independently on both sides of joint. Provide continuous polyethylene dust barrier behind and across control joints.
- .2 Locate vertical control joints where indicated or at changes in substrate construction, at maximum 10 m spacing on long corridor runs. Locate horizontal control joints in ceilings at maximum 15 m spacing. Install control joints straight, plumb and true.
- .3 Expansion Joints. Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous polyethylene dust barrier spanning across the joint. Install expansion joint straight plumb and true.

**3.5 FINISHING**

- .1 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.
- .2 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
  - .1 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories. Surfaces free of excess joint compound. Tool marks and ridges are acceptable. For use in plenum areas above finished ceilings.
  - .2 Level 5: 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. Apply a thin skim coat of joint compound to entire surface as follows: Mix joint compound slightly thinner than for joint taping. Apply thin coat to entire surface using trowel or drywall broadknife to fill surface texture differences, variations or tool marks. Tool entire surface smooth and free of tool marks and ridges. Allow skim coat to dry completely. Remove final ridges by light sanding or wiping with damp cloth.
- .3 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.
- .4 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.
- .5 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .6 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .7 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

**3.6 FIRE RATED ASSEMBLIES**

- .1 Construct fire rated assemblies where indicated. Construct to details and designations as indicated in the drawings.

**END OF SECTION**





**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 09 21 16 - Gypsum Board Assemblies.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials International, (ASTM).
  - .1 ASTM C645-11a. Standard Specification for Nonstructural Steel Framing Members.
  - .2 ASTM C754-11. Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.

**1.3 QUALITY ASSURANCE**

- .1 Submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic and corrugated cardboard packaging material in appropriate on-site containers for recycling in accordance with Waste Management Plan.
- .4 Divert unused metal materials from landfill to metal recycling facility approved by Departmental Representative.
- .5 Divert unused gypsum materials from landfill to recycling facility approved by Departmental Representative.

**NON-STRUCTURAL METAL FRAMING****Part 2 Products****2.1 MATERIALS**

- .1 Non-load bearing channel stud framing: to ASTM C645, 42, 64, 91 and 152 mm stud size, roll formed from 0.91 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.
- .2 Secure wall stud framing: 152 mm stud size, roll formed from 1.22 mm thickness hot dipped galvanized steel sheet. Knock-out service holes at 305 mm centre.
- .3 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .4 Metal channel stiffener: manufacturer's standard sizes, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .5 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 19 mm wide, with self sticking adhesive on one face.

**Part 3 Execution****3.1 ERECTION**

- .1 Install steel stud systems in accordance with ASTM C754 and manufacturers written instructions.
- .2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .3 Extend partitions to ceiling height except where noted otherwise on drawings.
- .4 Construct full height partitions where indicated on drawings of heavy gauge steel studs as specified in Section 05 41 00 - Structural Metal Stud Framing.
- .5 Place studs vertically at 400 mm on centre 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.
- .6 Place secure wall studs vertically at 305 mm on centre 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. Fabrication and installation of secure room wall plating to ASTM A33 refer to Section 05 50 00 - Metal Fabrications.
- .7 Install double studs at the door frame opening. Install anti-spread bracing approximately 1200 mm from the bottom of the wall between door frame double stud and the adjacent stud on both sides of the frame.
- .8 Secure wall:
  - .1 Support all edges by anti-spread bracing, studs or corners.

**NON-STRUCTURAL METAL FRAMING**

- .2 Align the sheet edges at every vertical and horizontal seam on the centre line of the steel stud or anti-spread bracing and secure all sheet.
- .3 All perimeter edges of each sheet must be attached to stud or horizontal member.
- .4 1.5mm fillet weld 15mm long at 200mm oc or 8mm plug weld at every 200mm).
- .9 Erect metal studding to tolerance of 1:1000.
- .10 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .11 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .12 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.
- .13 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.
- .14 Provide solid wooden blocking secured between studs for attachment of handrails, washroom fixtures, behind lavatory basins, toilet and washroom accessories, kitchen cabinets, attached millwork, other fixtures including grab bars and towel rails and as indicated. Secure between studs through webs and through face flange of stud.
- .15 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .16 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .17 Install two continuous beads of acoustical sealant or insulating strip under studs and tracks around perimeter of sound control partitions.

**3.2 CLEANING**

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

**END OF SECTION**



**ACOUSTICAL SUSPENSION****Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 09 21 16 - Gypsum Board Assemblies.
- .2 Section 09 51 13 - Acoustical Panel Ceilings.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International)
  - .1 ASTM C635/C635M-13. Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - .2 ASTM C636/C636M-13. Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

**1.3 DESIGN REQUIREMENTS**

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

**1.4 SUBMITTALS**

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

**1.5 REGULATORY REQUIREMENTS**

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

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials as specified in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**1.7 MAINTENANCE MATERIALS**

- .1 Provide additional materials for Maintenance use in accordance with Section 01 78 00 - Closeout Submittals. Deliver to Departmental Representative and store where directed.

**ACOUSTICAL SUSPENSION****Part 2 Products****2.1 MATERIALS**

- .1 TYPE AT. Intermediate duty system to ASTM C635. Basic materials for suspension system: commercial quality cold rolled steel, zinc coated, prefinished. Suspension system: non fire rated, two directional exposed tee bar.
  - .1 610 x 610 mm exposed grid, two directional system. Exposed and concealed tee bar grid, Components die cut. Main tee with double web, rectangular bulb and 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.
  - .2 40 mm high main tee with 12.5 mm high top web and 24 mm exposed face. Shop painted. Colour: flat sheen white. Maximum 1200 mm hanger spacing. Provide matching perimeter wall angle.
  - .3 Perimeter trim, recessed shadow-profile providing a 12.7 mm x 12.7 mm reveal at the wall intersection.
- .2 Accessories:
  - .1 Hanger wire: galvanized soft annealed steel wire. 3.6 mm diameter.
  - .2 Hanger inserts: purpose made.
  - .3 Carrying channels: 38 x 65 mm channel, of 1.6 mm thick galvanized steel.
  - .4 Accessories: splices, clips, wire ties and retainers to complement new suspension system components, as recommended by system manufacturer.

**Part 3 Execution****3.1 EXISTING SUSPENSION SYSTEM**

- .1 Completely demolish existing suspended ceiling system from locations and to extent indicated.
- .2 Remove existing ceiling panels, perimeter mouldings, main runners, cross T's, hanger wire and accessories leaving existing structure above clean and free.
- .3 Carefully salvage existing components for reuse in new ceilings as indicated in the drawings. Use salvaged components for all new ceilings unless components cannot be reused. Obtain written approval of Departmental Representative for the use of any new components. Do not reuse hanger wire.
- .4 Salvage for re-use only components that are clean, unmarked and undamaged.
- .5 Ceiling components that are not required for the new ceilings are to be handled as identified in the Waste Management Plan as specified in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**3.2 INSTALLATION**

- .1 Install new ceiling suspension system from salvaged components in accordance with ASTM C636 except where specified otherwise.

**ACOUSTICAL SUSPENSION**

- .2 Install ceiling suspension system in accordance with typical manufacturer's written instructions. Install suspension system in accordance with Certification Organizations tested design requirements.
- .3 Do not erect ceiling suspension system until work above ceiling has been inspected by Departmental Representative.
- .4 Secure hangers to overhead structure using attachment methods acceptable to Departmental Representative.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees. Provide new hanger wire throughout.
- .6 Lay out system in accordance with reflected ceiling plan. Lay out centre line of ceiling both ways, to provide balanced borders at room perimeter, with border units not less than 50% of standard unit width.
- .7 Ensure suspension system is co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures, diffusers, grilles and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .14 Expansion joints. Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, painted black, 25% narrower than space between 2 'T' bars.

**3.3 CLEANING**

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

**END OF SECTION**





**CERAMIC TILING****Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 07 92 00 - Joint Sealants.

**1.2 REFERENCES**

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI).
  - .1 ANSI A108.1-2013. American National Standard Specifications for the Installation of Ceramic Tile. Includes: ANSI A108.01, .02, .1A, .1B, .1C, .4, .5, .6, .8, .9, .10, .11, .12, .13, .14, .15, .16, and .17 Installation Standards.
  - .2 ANSI A118.4-1999(R2005). Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
  - .3 ANSI A118.6-2010 (R). American National Standard Specifications for Standard Cement Grouts for Tile Installation.
  - .4 ANSI A118.10-2008 (R). American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation.
- .2 American Society for Testing and Materials (ASTM International) International.
  - .1 ASTM C144-11. Standard Specification for Aggregate for Masonry Mortar.
  - .2 ASTM C207-06(2011). Standard Specification for Hydrated Lime for Masonry Purposes.
  - .3 ASTM C979/C979M-10. Standard Specification for Pigments for Integrally Colored Concrete.
- .3 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-51.34-M86(R1988). Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CAN/CGSB-75.1-M88. Tile, Ceramic.
  - .3 CAN/CGSB-25.20-95. Surface Sealer for Floors.
- .4 Canadian Standards Association (CSA International).
  - .1 CAN/CSA-A3000-08. Cementitious materials compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC).
  - .1 TTMAC Specification Guide 09300 - Tile Installation Manual 2012/2014.

**1.3 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
  - .1 Ceramic tile, marked to show each type, size, and shape required.
  - .2 Cementitious tile backer board.

**CERAMIC TILING**

- .3 Divider strip.
- .4 Elastomeric membrane and bond coat.
- .5 Reinforcing tape.
- .6 Levelling compound.
- .7 Latex-Portland cement mortar.
- .8 Commercial Portland cement grout.
- .9 Waterproofing membrane.
- .10 Fasteners.

**1.4 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Wall tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit duplicate, 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile. Submit duplicate full size samples of cove baseboard including interior and exterior preformed pieces.
- .4 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.
- .5 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

**1.5 QUALITY ASSURANCE**

- .1 Employ skilled workers trained and experienced in tile work, and registered as members of the Terrazzo Tile and Marble Association of Canada.
- .2 Install work in accordance with requirements of TTMAC Tile Manual - Specification Guide 09300.

**1.6 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.
- .4 Store cementitious materials on a dry surface.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**CERAMIC TILING**

- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.
- .4 Unused adhesive, sealant and coating materials must be disposed of at an official hazardous material collections site as approved by the Departmental Representative.
- .5 Unused adhesive, sealant and coating materials must not be disposed of into the sewer system, into streams, lakes, onto the ground or in other location where it will pose a health or environmental hazard.

**1.8 ENVIRONMENTAL CONDITIONS**

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

**1.9 EXTRA MATERIAL**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide a minimum of 1 unopened carton and no less than 5 % of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

**Part 2 Products****2.1 FLOOR TILE**

- .1 Floor Tile PT: Porcelain mosaic tile: 50 x 50 x 5 mm thick, rounded edges. Unglazed, mesh mounted and paper faced.
  - .1 Two different floor tile types, patterns, styles and colours will be selected by Departmental Representative after award. Selection will be from full, custom and extended range of tiles including premium products.

**2.2 WALL TILE**

- .1 Wall Tile CT1&2: Size: 75 x 150 x 6 mm thick nominal. For installation as wall tile, main field as indicated. Install with 3 mm wide joints CT1 field, CT2 accent. Grout colour to match tiles.
  - .1 One field wall tile and one accent wall tile will be selected by Departmental Representative after award. Selection will be from full, custom and extended range of finishes and patterns of tiles including premium products.

**CERAMIC TILING****2.3 BASE TILE**

- .1 Base: 100 mm high base comprised of floor tile CT1: Porcelain mosaic tile: 50 x 50 x 5 mm thick, rounded edges. Unglazed, mesh mounted and paper faced.
  - .1 One porcelain tile type, pattern, style and colour will be selected by Departmental Representative after award. Selection will be from full, custom and extended range of tiles including premium products.
  - .2 Finish top edge with 3mm thick square edge stainless steel trim, angle type with knock outs embedded beneath tile to form a clean line and separate porcelain tile base from glazed wall tile.

**2.4 TRIM SHAPES**

- .1 Conform to applicable requirements of adjoining floor and wall tile.
- .2 Use trim shapes sizes conforming to size of adjoining field wall tile, including existing spaces, unless specified otherwise.

**2.5 MORTAR AND GROUT**

- .1 Latex portland cement mortar: to ANSI A118.4. Two component, commercially prepared, composed of portland cement, selected inert fillers and specially formulated latex additives for increased bond strength and impact resistance. Minimum shear strength 2.6 MPa. Prepare mortar to manufacturer's instructions.
- .2 Grout: Non-Shower Areas. Floor and Wall grout. Commercially prepared, latex-portland cement grout: to ANSI A118.6. Fast curing, high early strength, polymer-modified, stain resistant grout. Sanded mix for floors. Prepare grout to manufacturer's instructions. Colour selected by Departmental Representative from full range of standard available colours.
  - .1 Colouring pigments to be added to grout by manufacturer.
  - .2 Pure mineral pigments, limeproof and nonfading, complying with ASTM C979.
  - .3 Job coloured grout are not acceptable.

**2.6 MORTAR AND ADHESIVE MATERIALS**

- .1 Portland cement: to CSA-A5, type 10.
- .2 Sand: to ASTM C144, passing 16 mesh.
- .3 Hydrated lime: to ASTM C207, Type N, NA, S or SA.
- .4 Water: potable and free of minerals and chemicals which are detrimental to mortar and grout mixes.

**2.7 ACCESSORIES**

- .1 Divider strips: purpose made, roll formed, solid stainless steel. Height to match thickness of tile. Horizontal leg minimum 25 mm. Complete with anchors, both sides spaced at 150 mm on centre.

**CERAMIC TILING**

- .2 Edge strips at doorway: purpose made, roll formed, solid stainless steel. Height to match thickness of tile. Horizontal leg minimum 25 mm.
- .3 Reducer Strips: purpose made metal extrusion; stainless steel or brass type; maximum slope of 1:2.
- .4 Vertical Wall corner edge strips: purpose made extruded, continuous, solid stainless steel bullnosed edge trim for all exposed tiled vertical and horizontal edges and corners. Bullnose to be 6mm radius. Height minimum 10 mm. Horizontal leg minimum 25 mm. Colour, pattern and texture to be selected from multiple manufacturers standard and custom range of products.
- .5 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .6 Cleavage plane: polyethylene film to CGSB 51-34 minimum 0.152 mm thick.
- .7 Waterproofing membrane: to ANSI A118.10. Premixed ready to use trowel applied, flexible loadbearing membrane. For use in either mortar bed or thin set systems. Two component system consisting of an elastomeric, latex compound and reinforcing fabric. System to obtain the following physical properties when tested to ANSI A118.10.
  - .1 Tensile Strength: 7 day dry / 21 days wet: 3.9 MPa.
  - .2 Elongation: 7 day dry / 21 days wet: 657 %.
  - .3 Permeability: 0.013.
  - .4 Water vapour transfer: 0.085.
  - .5 Hydrostatic resistance: passes.
  - .6 Shear strength (28 days): 2.4 MPa.
  - .7 Dimensional Stability: 0.70% length change.
- .8 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .9 Floor sealer and protective coating: to CAN/CGSB-25.20, Type 1 or 2 and to tile and grout manufacturer's recommendations.

**2.8 PATCHING AND LEVELLING COMPOUND**

- .1 Portland cement base, acrylic polymer compound, manufactured specifically for resurfacing and levelling concrete floors. Products containing gypsum are not acceptable. To have not less than the following physical properties:
  - .1 Compressive strength: 25 MPa.
  - .2 Tensile strength: 7 MPa.
  - .3 Flexural strength: 7 MPa.
  - .4 Density: 1.9.
  - .5 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
  - .6 Ready for use 48 hours after application.

**CERAMIC TILING****2.9 CLEANING COMPOUNDS**

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and levelling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

**Part 3 Execution****3.1 GENERAL**

- .1 Perform all operations in accordance with manufacturers written application instructions except where specified otherwise. Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.
- .2 Perform all tile work in accordance with TTMAC Specification Guide 09300 - Tile Installation Manual except where specified otherwise. Where TTMAC details vary from manufacturers written instructions, obtain clarification from Departmental Representative prior to commencing installations.
- .3 Install Tile in accordance with ANSI A108.1

**3.2 PREPARATION**

- .1 Prepare floor surfaces as free as possible from surface obstacles.
- .2 Protect surfaces as well as all mechanical and electrical services in areas of work from damage. If damaged, clean and restore such surfaces as approved by Departmental Representative.
- .3 Protect floors and adjacent spaces from damage caused by cleaning and preparation operations.

**3.3 EXISTING CONDITIONS**

- .1 Verify existing conditions are ready to receive work. Notify Departmental Representative in writing of unacceptable substrate conditions.
- .2 Thoroughly clean existing surfaces that are to receive tile finish to ensure the removal of all grease, oil or dust film. Ensure substrate surfaces are clean, dimensionally stable and free of contaminants such as oil, sealers and curing compounds. Ensure concrete floors have not been treated with curing compounds.

**3.4 WATERPROOFING MEMBRANE**

- .1 Install waterproofing membrane in accordance with manufacturers printed instructions.
- .2 Install waterproofing membrane below all floor tiles in washrooms. Install waterproofing membrane behind all wall tiles in showers and other "Wet" areas.

**CERAMIC TILING**

- .3 Extend membrane up wall surfaces a minimum of 300 mm unless indicated otherwise. Extend membrane over curbs and seal to all penetrations as recommended by manufacturer.

**3.5 WORKMANSHIP**

- .1 Do tile work in accordance with TTMAC Specification Guide 09300, Tile Installation Manual, except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 Apply patching and leveling coats to TTMAC details to correct any defects in the substrate.
- .4 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.
- .5 Maximum surface tolerance 1:800.
- .6 Clean backs of tiles and back butter tiles to ensure a 95 % bond coverage. Set tiles in place while bond coat is wet and tacky, prior to skinning over. Slide tile back and forth to ensure a proper bond and level surface. Avoid slippage.
- .7 Clean excess mortar from surface prior to final set. Keep 2/3 of depth of grout joints free of setting material.
- .8 Make joints between tile uniform and approximately 3mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .9 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .10 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .11 Use preformed profiles for internal and external corners.
- .12 Install vertical wall corner edges strips to all locations where edges of wall tile are exposed. Install edge strips level and plumb to completely enclose tile edges.
- .13 Install divider strips at junction of tile flooring and dissimilar materials.
- .14 Allow minimum 24 hours after installation of tiles, before grouting.
- .15 Clean installed tile surfaces after installation and grouting cured.

**3.6 WALL TILE**

- .1 Install ceramic wall tile in accordance with TTMAC Detail 305W-2002. Tile Installed on Cementitious Backer Unit (Cement Board) - Thin Set Method / Walls. Detail A - Interior Wet / Dry areas.
- .2 Install decorative tile band pattern as indicated in typical pattern details in the drawings.

**CERAMIC TILING**

- .3 Apply tape to all joints in cement board. Fill joints with dry set mortar and sand flush with boards.
- .4 Apply slight leveling coat if required to achieve specified surface tolerances and to ensure a plumb, coplanar, flat wall surfaces.
- .5 Apply waterproofing membrane to wall surfaces in shower and other "Wet" areas as indicated. Ensure complete seal with waterproofing membrane in floors.
- .6 Apply tile to prepared wall surface using a latex-portland cement mortar bond coat. Apply tile to bond coat with minimum 95 % surface contact. Install commercial portland cement grout in accordance with TTMAC detail 305W-2002.

**3.7 FLOOR TILE**

- .1 Install Porcelain ceramic floor tile in washrooms in accordance with TTMAC Detail 311F-2002. Tile Bonded to Concrete Slab - Thin Set Method, Detail A - Interior Exterior.
- .2 Install floor tile in accordance with TTMAC Detail 309F-2002. Tile Over Mortar Bed with Cleavage Membrane Interior Only.
- .3 Install cleavage membrane over structural slab. Lay 6 mm thick sand-bed under cleavage membrane when cleavage membrane is installed over rough substrate.
- .4 Install waterproofing membrane below wet areas as per manufacturer's recommendations prior to floor tile installations.
- .5 Apply tile in washrooms and other wet areas over waterproofing membrane.
- .6 Apply tile to prepared surfaces using a latex-portland cement mortar bond coat. Apply tile to bond coat with minimum 95 % surface contact. Install grout in accordance with TTMAC detail 311F-2002.

**3.8 BASE TILE**

- .1 Install in accordance with TTMAC Detail 305W-2002.

**3.9 GROUTING**

- .1 Allow minimum 24 hours after installation of tiles, before grouting. Pre-seal tiles requiring protection from grout staining. Force grout into joints to ensure dense finish.
- .2 Remove excess grout and polish with clean cloths. Clean installed tile surfaces after installation and grouting cured. Apply sealer to grout joints in accordance with manufacturer's instructions.
- .3 Install latex portland grout in non shower areas.
- .4 Install urethane modified grout for shower wall and floor tile installations.



**CERAMIC TILING****3.10 PROTECTION**

- .1 Protect finished areas from traffic until setting materials have sufficiently cured. Refer to TTMAC Tile Specification Guide 09300. Protect grouted areas from traffic for 24 hours after grouting. Provide protective covering in traffic areas until substantial completion of the work. Protect wall tiles and bases from impact, vibration, heavy hammering on adjacent and opposite walls for at least 14 days after installation.

**3.11 FLOOR SEALER AND PROTECTIVE COATING**

- .1 Apply minimum 2 coats of floor sealer compound in accordance with manufacturer's instructions.

**3.12 CLEANING**

- .1 Upon completion of the installation, remove all surplus materials, dirt and debris caused by the work of this section. Leave the premises clean and ready for use.

**END OF SECTION**



**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 09 22 27 - Acoustical Suspension.

**1.2 REFERENCES**

- .1 American Society for Testing and Materials (ASTM).
  - .1 ASTM E1264-08e1. Standard Classification for Acoustical Ceiling Products.

**1.3 WASTE MANAGEMENT AND DISPOSAL**

- .1 Collect and separate for recycling all salvaged ceiling tiles that are not required for reuse in the new ceiling systems in accordance with the Waste Management and Disposal Plan as specified in Section 01 74 21 - Construction / Demolition Waste Management and Disposal.

**1.4 ENVIRONMENTAL REQUIREMENTS**

- .1 Permit wet work to dry before commencement of installation.
- .2 Maintain uniform minimum temperature of 15<sup>0</sup>C and humidity of 20 - 40 % before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

**1.5 MAINTENANCE MATERIALS**

- .1 Provide additional materials for Maintenance use in accordance with Section 01 78 00 - Closeout Submittals. Deliver to Departmental Representative and store where directed.
- .2 AT: Provide 5 % of total amount of new tile used on project in complete full boxed cartons.

**Part 2 Products****2.1 MATERIALS**

- .1 TYPE AT. New acoustic panel units for suspended ceiling system: to ASTM E1264.
  - .1 70%-80% recycled content.
  - .2 Finish: scuff resistant painted scrim
  - .3 Type IV, Form 2, Pattern G.
  - .4 Fire resistance: Class A.
  - .5 Noise reduction coefficient (NRC): designation of 0.65 - 0.75
  - .6 Ceiling plenum sound transmission range: (CAC): 0.35 to 0.40.
  - .7 Light reflectance range: 0.85 to 0.90.

**ACOUSTICAL PANEL CEILINGS**

- .8 Edge type: Square edge.
- .9 Colour: white.
- .10 Shape: flat.
- .11 Surface texture: smooth.
- .12 Size: 610 x 610 x 19 mm thick.

**Part 3 Execution****3.1 INSTALLATION**

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by Departmental Representative.
- .2 Install salvaged acoustical panels in ceiling suspension system. Install acoustical units with directional pattern running in same direction. Refer to reflected ceiling plan.
- .3 Grade and organize salvaged panels so that there is minimal colour variance between panels in any one area. Replace panels that exhibit too much variation to approval of Departmental Representative.
- .4 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

**3.2 INTERFACE WITH OTHER WORK**

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

**END OF SECTION**

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 09 65 19 - Resilient Tile Flooring.

**1.2 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long sections of rubber base.

**1.3 CLOSEOUT SUBMITTALS**

- .1 Submit letter stating that the moisture content of concrete slab and the ph of the surface falls within manufacturer's written guidelines for new flooring.
- .2 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4 EXTRA MATERIALS**

- .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 5 m<sup>2</sup> of each colour of flooring material required for project for maintenance use. Provide in full roll width, single length piece. Extra materials to be in one piece and from same production run as installed materials. Deliver to Departmental Representative upon completion of the work of this section and store where directed.

**1.5 ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20° for 48 hours before, during and 48 hours after installation.
- .2 Provide a high ventilation rate, with maximum outside air, during installation and for a minimum of 72 hours after installation. Where possible, provide additional fans to vent directly to the outside. Maintain extra ventilation for as long as practical and to approval of Departmental Representative.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Departmental Representative.
- .3 Remove from site and dispose of packaging materials at appropriate recycling facilities. Collect and separate for disposal paper, plastic, polystyrene and corrugated

**RESILIENT SHEET FLOORING**

cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

**Part 2 Products****2.1 MATERIALS**

- .1 **TYPE SF:** Linoleum sheet flooring: composed of natural ingredients which are mixed and calendered onto a jute backing:
  - .1 Pattern: solid, uni-coloured and marbleized.
  - .2 Thickness: 3.2 mm.
  - .3 Colours: One colour and pattern will be selected by Departmental Representative from full and extended range of colours, patterns and textures.
  - .4 Finish: factory applied primer and topshield coating to provide permanent protection.
- .2 Linoleum adhesive: water-based, solvent-free, styrene-butadiene-rubber adhesive as recommended by manufacturer. Waterproof after cured.
- .3 Welding rod: by manufacturer of linoleum. To match colour of flooring.
- .4 **BASE B2:** Resilient base. Solid rubber, coved base. Single length per location. 100 mm high x 3.6 mm thick. Including premoulded end stops and external corners. A minimum of 2 colours will be selected by Departmental Representative from full and extended range of colours to match flooring colour.
- .5 Metal edge strips: polished stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .6 Edging to floor penetrations: stainless steel, type recommended by flooring manufacturer.

**Part 3 Execution****3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, catalogue installation instructions, carton installation instructions, and datasheet.

**3.2 SITE VERIFICATION OF CONDITIONS**

- .1 Ensure new floors are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Test sub floor for moisture content in accordance with flooring manufacturer's instructions using the Vaprecision vapour emission test. Perform moisture condition test in each major area. A minimum of 1 test per 93 m<sup>2</sup>, prior to installation. Moisture condition shall not exceed 1.6 kg per 93 m<sup>2</sup> per 24 hour day in accordance with manufacturer's recommendations.

**RESILIENT SHEET FLOORING**

- .3 Do not proceed with work until results of moisture condition tests are acceptable.

**3.3 PREPARATION**

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler to area to receive new flooring. Fill low spots, cracks, joints, holes and other defects with sub-floor filler to achieve floor level to a tolerance of 1:500. Trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Prime or seal concrete slab to resilient flooring manufacturer's printed instructions.
- .4 Clean and prepare all joints in floors to receive new joint sealants. Prepare joints in accordance with manufacturers written instructions. Apply coating of primer to all joints. Mix and apply sealants in accordance with manufacturers written instructions.
- .5 Completely remove, down to bare concrete: all coatings, laitance, paints, oils, grease, dirt, stains and any unsound concrete as required to suit site conditions.
  - .1 Remove all remaining residue, dust, dirt, and other debris by vacuuming.
  - .2 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .3 Allow surface to dry completely prior to application of any primers or surface coatings.
- .6 Do not proceed with application of new flooring until prepared surfaces have been accepted by Departmental Representative.
- .7 Leave concrete slab clean and ready to receive new flooring.

**3.4 APPLICATION: FLOORING**

- .1 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .2 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .3 Run sheets in direction of traffic. Double cut sheet joints and continuously seal according to manufacturer's printed instructions.
- .4 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.
- .5 As installation progresses, and after installation roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion.
- .6 Cut flooring neatly around fixed objects. Install flooring in pan type floor access covers. Maintain floor pattern.

**RESILIENT SHEET FLOORING**

- .7 Continue flooring over areas which will be under built-in furniture. Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .8 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .9 Install metal edge strips at unprotected or exposed edges where flooring terminates.

**3.5 APPLICATION: BASE**

- .1 Install rubber base in accordance with manufacturer's instructions.
- .2 Lay out base to keep number of joints at minimum. Use longest available sections. Clean substrate and prime with one coat of adhesive. Apply adhesive to back of base. Set base against wall and floor surfaces tightly by using 3 kg hand roller. Install straight and level to variation of 1:1000. Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .3 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed toeless base material for external corners of other angles. Wrap around toeless base at external corners.

**3.6 CLEANING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean floor and base surface to flooring manufacturer's printed instructions. Use only water-based coating for linoleum.

**3.7 PROTECTION**

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

**END OF SECTION**



**Part 1 General****1.1 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
  - .1 ASTM F150-06 (2013). Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring.
- .2 Canadian Standards Association. (CSA).
  - .1 CSA A126.2-M1984. Conductive and Static Dissipative Resilient Tile.
- .3 Underwriters Laboratories of Canada (ULC).
  - .1 CAN/ULC-S102.2-10-EN. Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials.

**1.2 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of tile in size specified. Submit 300 mm long sections of baseboard and edge strips.

**1.3 CLOSEOUT SUBMITTALS**

- .1 Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Submit letter stating that the moisture content of concrete slab and the ph of the surface is within manufacturer's written guidelines for new flooring.

**1.4 EXTRA MATERIALS**

- .1 Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide 2.0 m<sup>2</sup> of each colour, pattern and type flooring material required for project for maintenance use. Provide in nearest full cartons only. Provide 4 lineal meters of resilient base.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify floor tile. Deliver to Departmental Representative upon completion of the work of this section. Store where directed by Departmental Representative.

**1.5 ENVIRONMENTAL REQUIREMENTS**

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

**RESILIENT TILE FLOORING**

- .2 Provide a high ventilation rate, with maximum outside air, during installation and for a minimum of 72 hours after installation. Where possible, provide additional fans to vent directly to the outside. Maintain extra ventilation for as long as practical and to approval of Departmental Representative.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance Section 01 74 21 - Construction / Demolition Waste Management and Disposal.
- .2 Do not dispose of unused sealant and adhesive materials into landfill. Divert materials to municipal hazardous materials depot approved by Departmental Representative.
- .3 Divert unused metal from landfill to metal recycling facility approved by Departmental Representative.
- .4 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .5 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material in appropriate on-site for recycling in accordance with Waste Management Plan.

**Part 2 Products****2.1 MATERIALS**

- .1 Static Dissipative Tile Type VCT: to CSA A126.2. Type A, mottled, asbestos free. Thickness: 3 mm. Size: 305 x 305 mm. Colour selected by Departmental Representative from manufacturers full, custom and extended range of colours.
  - .1 Tested in accordance with ASTM F150.
    - .1 Static Propensity: less than 2 kV with conductive footwear per AATCC-134, at 20% relative humidity.
    - .2 Static decay: 5,000 volts to zero in less than 0.01 seconds per US Federal Test Method 101B, Method 4048 at 15% relative humidity.
  - .2 Flame spread: 19 to CAN/ULC-S102.2.
  - .3 Smoke developed: 38 to CAN/ULC- S102.2.
- .2 Rubber Base B1: solid rubber, coved base. Single length per location. 100 mm high x 3.6 mm thick. Including premoulded end stops and external corners. Colour selected by Departmental Representative from full, custom and extended range of colours.
- .3 Primers and adhesives: waterproof, of types recommended by flooring manufacturer for static dissipative tile on concrete substrate, on or below grade. Low VOC.
- .4 High strength sub-floor filler and leveler: 2 part, latex modified, portland cement mortar requiring no water to produce cementitious paste. As recommended by manufacturer for use with their product. Minimum compressive strength of 25 MPa.

**RESILIENT TILE FLOORING**

- .5 Transition strips: polished extruded aluminum with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .6 Edging to floor penetrations: stainless steel, type recommended by flooring manufacturer.
- .7 Ground strip: 12.7 mm wide solid copper foil tape. Manufacturer's standard grounding tape. For installation below conductive floor tiles. Provide fittings for connection to building ground system.
- .8 No Wax symbol: Provide one tile with "no-wax" symbol inside at each entry to room.

**Part 3 Execution****3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.

**3.2 SITE VERIFICATION OF CONDITIONS**

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Test sub floor for moisture content in accordance with flooring manufacturer's instructions using the Vaprecision vapour emission test. Perform moisture condition test in each major area. A minimum of 1 test per 93 m<sup>2</sup>, prior to installation. Moisture condition shall not exceed 1.6 kg per 93 m<sup>2</sup> per 24 hour day in accordance with manufacturer's recommendations.
- .3 Do not proceed with work until results of moisture condition tests are acceptable.

**3.3 PREPARATION**

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler to entire area to receive new flooring. Fill low spots, cracks, joints, holes and other defects with sub-floor filler to achieve floor level to a tolerance of 1:500. Trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Prime or seal concrete slab to flooring manufacturer's printed instructions.
- .4 Clean and prepare all joints in floors to receive new joint sealants. Prepare joints in accordance with manufacturers written instructions. Apply coating of primer to all joints. Mix and apply sealants in accordance with manufacturers written instructions.

**RESILIENT TILE FLOORING****3.4 TILE APPLICATION**

- .1 Apply copper ground tape as recommended by manufacturer to obtain static properties as specified. Spacing of tape and grounding connection to building system as recommended by manufacturer. Co-ordinate installation with Division 26 to ensure connection to building grounding system.
- .2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .4 Install flooring to square grid pattern with all joints aligned. Maintain parallel for all units and parallel to length of room.
- .5 As installation progresses, and after installation roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion.
- .6 Cut tile neatly around fixed objects.
- .7 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .8 Install "no wax" tile at door entry in location approved by the Departmental Representative.
- .9 Install metal edge strips at unprotected or exposed edges where flooring terminates.

**3.5 BASE APPLICATION**

- .1 Lay out base to keep number of joints at minimum. Use longest available sections. Clean substrate and prime with one coat of adhesive. Apply adhesive to back of base. Set base against wall and floor surfaces tightly by using 3 kg hand roller. Install straight and level to variation of 1:1000.
- .2 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .3 Cope internal corners. Use premoulded corner units for right angle external corners.

**3.6 INITIAL CLEANING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Do not wax floor tiles. Clean, floor and base surface to flooring manufacturer's instructions.

**3.7 PROTECTION OF FINISHED WORK**

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

- .2 Prohibit traffic on floor for 48 hours after installation.

**END OF SECTION**



**PAINTING****Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 05 50 00 - Metal Fabrications.
- .2 Section 09 21 16 - Gypsum Board Assemblies.

**1.2 REFERENCES**

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI) 2011.
- .2 National Fire Code of Canada 2005.

**1.3 QUALITY ASSURANCE**

- .1 Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .2 Conform to latest MPI requirements for interior painting work including preparation and priming.
- .3 Materials such as primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .4 Other paint materials such as linseed oil, shellac, turpentine. 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 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
- .6 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.

**1.4 SCHEDULING OF WORK**

- .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.

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- .2 Obtain written authorization from Departmental Representative for any changes in work schedule.

**1.5 SUBMITTALS**

- .1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS - Material Safety Data Sheets.
- .3 Upon completion, submit records of products used. List products in relation to finish system and include the following:
  - .1 Product name, type and use.
  - .2 Manufacturer's product number.
  - .3 Colour number.
  - .4 MPI Environmentally Friendly classification system rating.

**1.6 SAMPLES**

- .1 Submit full range colour sample chips in accordance with Section 01 33 00 - Submittal Procedures. Indicate where colour availability is restricted.
- .2 Submit duplicate 200 x 300 mm sample panels of each paint, clear coating and special finish with specified paint or coating in colours, gloss / sheen and textures required to MPI Painting Specification Manual standards. Submit samples on stiff card stock to approval of Departmental Representative.

**1.7 EXTRA MATERIALS**

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - one litre can of each type and colour of primer and finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Departmental Representative and store where directed.

**1.8 DELIVERY, HANDLING AND STORAGE**

- .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.



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- .4 Observe manufacturer's recommendations for storage and handling.
- .5 Store materials and supplies away from heat generating devices.
- .6 Store materials and equipment in a well ventilated area with temperature range 7 °C to 30 °C. Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .7 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.
- .8 Remove paint materials from storage only in quantities required for same day use.
- .9 Comply with requirements of Workplace Hazardous Materials Information System regarding use, handling storage, and disposal of hazardous materials.
- .10 Fire Safety Requirements:
  - .1 Provide one 9 kg Type ABC dry chemical fire extinguisher adjacent to paint 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.

**1.9 SITE REQUIREMENTS**

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate small or enclosed spaces that are to be painted to approval of Departmental Representative.
  - .2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 °C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Provide continuous ventilation with maximum exhaust for seven days after completion of application of paint to flush out odours and contaminants.
  - .4 Coordinate use of existing ventilation system with Departmental Representative and ensure its operation during and after application of paint as required.
  - .5 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.
  - .6 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:

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- .1 Unless specifically pre-approved by the Departmental Representative and the applied product manufacturer, perform no painting work when:
  - .1 Ambient air and substrate temperatures are below 10 °C.
  - .2 Substrate temperature is over 32 °C unless paint is specifically formulated for application at high temperatures.
  - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
  - .4 The relative humidity is above 85 % or when the dew point is less than 3 °C variance between the air / surface temperature.
  - .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 brick masonry.
  - .2 15 % for wood.
  - .3 12 % for plaster and gypsum board.
- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter.
- .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 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.

**1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 - Construction / Demolition 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. Obtain information on these controls from Provincial Ministries of Environment.
- .3 Treat material which cannot be reused as hazardous waste and dispose 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 Reduce the volume of contaminants as follows:
  - .1 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.

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- .2 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
- .3 Empty paint cans are to be dry prior to disposal or recycling.
- .6 Collect waste paint by type and provide for delivery to recycling or collection facility.

**Part 2 Products****2.1 MATERIALS**

- .1 Only paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Only qualified products with MPI "Environmentally Friendly" E2 or E3 rating are acceptable for use on this project.
- .4 Water-borne paints and stains, water-borne surface coatings and water borne varnishes must meet a minimum E2 rating.

**2.2 COLOURS**

- .1 Departmental Representative will provide Colour Schedule after award.
- .2 Colour schedule will be based upon the selection of 2 base colours and 1 accent colours. No more than 5 colours will be selected for the entire project and no more than 3 colours will be selected in each area.
- .3 Selection of colours will be from manufacturer's full range of colours.
- .4 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .5 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. On-site tinting of painting materials is not allowed.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.

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- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

**2.4 GLOSS / SHEEN RATINGS**

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

Gloss Level Category	Units @ 60E	Units @ 85E
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	

- .2 Gloss level ratings of painted surfaces shall be as specified herein and as noted on Finish Schedule.

**2.5 INTERIOR PAINTING SYSTEMS**

- .1 Apply all paint systems in accordance with MPI Premium grade. Apply one primer coat and two finish coats.
- .2 Metal Fabrications: columns, etc that are subject to incidental contact.
- .1 INT 5.1R High performance architectural latex, eggshell finish.
- .3 Plaster and Gypsum Board: gypsum wallboard, drywall type material and GWB Ceilings.
- .1 INT 9.2B High performance architectural latex, satin finish for walls and flat finish for ceilings.
- .4 Gypsum Board: Gypsum wallboard on interior surface of exterior walls:
- .1 INT 9.2C. Alkyd G5 satin finish over latex sealer.
- .5 Interior plywood back boards for electrical and telecommunications equipment:
- .1 INT 6.4P - Pigmented fire retardant G4 satin finish coating. ULC rated.
- .6 REX 6.3 - Dressed Lumber: (Exterior doors, door and window frames, casings, battens, and smooth fascias and soffits).
- .1 REX 6.3A - High Performance Acrylic. GL-5, Traditional semi-gloss finish. GL-1, Matte finish for soffits.

**2.6 INTUMESCENT COATINGS**

- .1 Structural steel beams and columns that are designated to receive a fire rated paint system.
- .1 Premium quality, thin film, intumescent coating to provide Class "A" ULC rating.

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- .2 Flame spread: 0, Smoke developed: 30 - 35. 65% solids by volume. Wet film thickness to minimum required thickness indicated on tested assembly to achieve rating required. Minimum 2 coats.
- .3 ULC tested system to provide the equivalent minimum fire rating of 1 hour when applied at tested thicknesses.
- .4 Top coat with silicone alkyd paint applied to a minimum dry film thickness of 0.05 mm to 0.10 mm.

**Part 3 Execution****3.1 GENERAL**

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

**3.2 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 approved 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 and the public in and about the building.
- .5 Remove electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings prior to undertaking any painting operations. Store items securely and re-install after painting is completed.
- .6 As painting operations progress, place "WET PAINT" signs to approval of Departmental Representative.

**3.3 CLEANING AND PREPARATION**

- .1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.

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- .4 Allow surfaces to drain completely and allow to dry thoroughly.
- .5 Prepare surfaces for water-based painting, water-based cleaners must be used in place of organic solvents.
- .6 Use trigger operated spray nozzles for water hoses.
- .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .3 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.
- .4 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.
- .5 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.
- .6 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.

**3.4 APPLICATION**

- .1 Method of application to be as approved by Departmental Representative. Apply paint by brush, roller, air sprayer or airless sprayer. 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:

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- .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.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Departmental Representative.
- .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 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.

**3.5 MECHANICAL/ELECTRICAL EQUIPMENT**

- .1 Mechanical and electrical installations: leave exposed ductwork and hangers unpainted. Paint conduits, piping, hangers, and touch up scratches and marks.
- .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 indoor and outdoor natural gas piping yellow.
- .5 Paint disconnect switches for fire alarm system and exit light systems in red enamel. Do not paint conduit.
- .6 Apply minimum 2 coats of fire retardant paint to front and back plus all 4 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.

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- .7 Do not paint interior transformers and substation equipment.

**3.6 FIELD QUALITY CONTROL**

- .1 Advise Departmental Representative when surfaces and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .2 Co-operate with inspection firm and provide access to areas of work.

**3.7 RESTORATION**

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

**END OF SECTION**