

1 GENERAL

1.01 RELATED REQUIREMENTS

- .1 Refer to Division 1, General Requirements.
- .2 All Contract Documents form an integral part of this Section.
- .3 Refer to partition types indicated on the drawings.

1.02 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 AA DAF 45- 03(R2009), Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 475- 02(2015), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 514- 04(2014), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C 557- 03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C 840- 16, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C 954- 15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - .6 ASTM C 1002- 14, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C 1047- 14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C 1177/C 1177M- 13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .9 ASTM C 1178/C 1178M- 13, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
 - .10 ASTM C 1280- 13a, Standard Specification for Application of Gypsum Sheathing.
 - .11 ASTM C1396/C1396M- 14a, Standard Specification for Gypsum board.
- .3 Association of the Wall and Ceilings Industries International (AWCI)
 - .1 AWCI Levels of Gypsum Board Finish- GA-214-2015.
- .5 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34- M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25- M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .6 Green Seal Environmental Standards (GS)
 - .1 GS-11- 2008, 2nd Edition, Paints and Coatings.
- .7 South Coast Air Quality Management District (SCAQMD), California State,

Regulation XI. Source Specific Standards

- .1 SCAQMD Rule 1113- A2007, Architectural Coatings.
- .2 SCAQMD Rule 1168- A2005, Adhesives and Sealants Applications.
- .8 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.03 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.

1.04 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address 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 C 840-16:
 - .1 Store gypsum board assemblies materials level flat indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board 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 strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .8 Replace defective or damaged materials with new.

1.05 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.

2 PRODUCTS

2.01 MATERIALS

- .1 Standard board: to ASTM C1396/C1396M-14 regular, 16 mm thick 1200 mm wide x maximum practical length, ends square cut, edges beveled.
- .2 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .3 Resilient drywall furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .4 Nails: to ASTM C 514-14.
- .5 Steel drill screws: to ASTM C 1002-14.
- .6 Stud adhesive: to CAN/CGSB-71.25 ASTM C 557.
- .7 Laminating compound: as recommended by manufacturer, asbestos-free.
- .8 Corner Beads: Shall be minimum 28 gauge galvanized sheet steel, beaded angle with perforated flanges; flanges 28 mm or 32 mm. Use extended leg bead at external corners of double wallboard application..
- .9 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted. Include splice plates for joints.
- .10 Shadow mould: 35 mm high, snap-on trim, of 0.6 mm base steel thickness galvanized sheet pre-finished in satin enamel extruded PVC plastic extruded rubber, black white colour.
- .11 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
 - .1 VOC limit 250 g/L maximum to SCAQMD Rule 1168.
 - .2 Acoustic sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .12 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .13 Joint compound: to ASTM C 475, asbestos-free.

2.02 FINISHING

- .1 Refer to drawing package. (Room finishes and schedule).

.2 Field joints and internal angles shall be reinforced with a suitable paper embedded in joint filler.

.3 For field joints, corners and exposed screw or nail heads, beads, joint filler shall be mixed and applied in strict accordance with the printed directions of the manufacturer and as follows:

.4 First: embed the tape.

.5 Second: apply fill coat.

.6 Third: apply leveling coat.

.7 Finishing Requirements;

.8 Provide Level 5 finish to walls and bulkheads

.9 Provide level 4 finish for all other areas.

.10 Sand all exposed joints, edges, corners, openings, screws, etc. to provide an acceptable finished surface ready for decoration.

2.03 ACCESSORIES

.1 Corner Beads: Install to all external corners, using longest practical lengths. Fix at maximum 152 mm. o.c. (alternate sides).

.2 Casing Beads and Miscellaneous Trim: Install to all openings and wherever gypsum wallboard abuts a dissimilar material, using longest practical lengths; secure at max. 305 mm. o.c.

.3 At external corners of double layer application, use extended leg beads and anchor through both layers of drywall. Use angle section on external corner of first layer.

.4 Use screws fixing for applying external corner beads.

.5 Install partition closures where detailed on the drawings as "partition closure," in accordance with the manufacturers written instructions.

.6 Special Reveal: Screw fasten reveal to steel studs. Use the longest practical lengths c/w butt joints. Touch-up all joints and lap gypsum board over reveal as detailed

3 EXECUTION

3.01 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assemblies installation in accordance with manufacturer's written instructions:

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.02 ERECTION

- .1 Erect gypsum board vertically or horizontally, whichever results in fewer end joints. Locate end joints over supporting members.
- .2 Arrange end joints to occur on different studs on opposite sides of a partition. Keep end joints away from prominent locations and central portions of ceilings.
- .3 Locate vertical joints at least 305 mm from the jamb lines of openings.
- .4 Hold board firmly against the framing members while installing.
- .5 Perimeter screws shall not be less than 10 mm nor more than 13 mm from edges and ends and shall be opposite the screws of adjacent boards.
- .6 Screws shall be driven with a power screw gun and set with countersunk head slightly below the surface of the gypsum board. Paper face of the gypsum board shall not be broken by the screw.
- .7 Space screws for fire rated gypsum board 203 mm o.c. at gypsum board edges and 305 mm o.c. on gypsum board field on walls, 203 mm o.c. on all ceilings.
- .8 Space screws for other applications at 305 mm o.c. on the field and edges.

3.03 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 metal furring or framing using screw self-tapping fasteners. Maximum spacing of screws 300 mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C 840-16.
 - .2 Apply gypsum board on walls vertically or horizontally, providing sheet lengths that will minimize number of board edges or end joints.
- .3 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.
- .4 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.

- .5 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.
- .6 Install gypsum board with face side out.
- .7 Do not install damaged or damp boards.
- .8 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.04 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
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.
- .6 Provide continuous polyethylene dust barrier behind and across control joints.
- .7 Locate control joints at changes in substrate construction
- .8 Install control joints straight and true.
- .9 Ensure that screws or nails are properly applied in process of attaching gypsum board to framing without damaging of gypsum board edges and ends.
- .10 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .11 Install expansion joint straight and true.
- .12 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .13 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .14 Splice corners and intersections together and secure to each member with 3 screws.
- .15 Install access doors to electrical and mechanical fixtures specified in respective sections.

- .1 Rigidly secure frames to furring or framing systems.
- .16 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.
- .17 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 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; surfaces smooth and free of tool marks and ridges.
- .18 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.
- .19 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.
- .20 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .21 Completed installation smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .22 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .23 Mix joint compound slightly thinner than for joint taping.
- .24 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .25 Allow skim coat to dry completely.
- .26 Remove ridges by light sanding or wiping with damp cloth.

3.05 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.

3.06 PROTECTION

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

installation.

END OF SECTION

1 GENERAL

1.01 GENERAL

.1 GENERAL REQUIREMENTS

- .1 Refer to Division 1, General Requirements.
- .2 All Contract Documents form an integral part of this Section.
- .3 Refer to drawings for the wall types.

1.02 REQUIREMENTS INCLUDED

.1 Furnish all labour, material, services and equipment necessary for the supply and installation of steel studs and furring as indicated on the drawings, schedules and as specified herein, including but not necessarily limited to the following:

- .1 Steel studs and tracks for exterior and interior gypsum wallboard walls, partitions and office cubicles where indicated or scheduled.
- .2 Steel stud furring for interior gypsum wallboard finishes and gypsum wallboard fireproofing enclosures, including 'Z' bars, strapping and Hat channels.
- .3 Ceiling suspension system for interior suspended gypsum wallboard flat ceilings, dropped ceilings, bulkheads, cove light bulkheads, cove light valances, fascias and soffits
- .4 Steel stud blocking, furring, reinforcing channels and sheet steel backing within drywall walls and partitions, and furring for attachment of anchors for fixtures or accessories anchored to such partitions or furring.
- .5 Installation of access doors in suspended gypsum board walls and ceilings.
- .6 Steel backing plates on steel studs for anchoring handrail brackets, wall stops, and grab bars.

.2 Include also the following as work to be done under this Section:

- .1 Unloading, moving into position and installation of pressed steel door frames in interior drywall steel stud partitions.
- .2 Installation of valve and service point access panels in interior steel stud partitions and ceilings.
- .3 Layout of all steel stud partitions and door frames within partitions.
- .4 Installation of hollow metal frames, and interior hollow metal windows in steel stud walls

1.03 RELATED WORK SPECIFIED ELSEWHERE.

.1 Hollow Metal Doors & Frames: Section 08 11 00.

.2 Gypsum Wallboard: Section 09 21 16.

1.04 QUALITY ASSURANCE

.1 All reference to standards published by CSA, CGSB, ASTM, Underwriters associations, trade associations or manufacturers, or to national or local building codes shall be to the latest printed edition of any such standards or codes.

1.05 PRODUCT DELIVERY, STORAGE & HANDLING

.1 Store packaged material in original containers with manufacturer's seals and labels intact.

.2 Prevent damage to materials during handling and storage. Keep materials under cover and free from dampness.

1.06 JOB CONDITIONS

.1 Report any unsatisfactory conditions in writing to the Departmental Representative.

.2 Start no work until conditions are satisfactory. Commencement of work shall imply acceptance of conditions.

.3 Protect work of this Section against damage by other Sections.

.4 Protect work of other Sections against damage resulting from work of this Section. Repair and make good to approval of the Departmental Representative, any damage to other Sections caused by this work.

.5 Carefully co-ordinate this Section of the work with the work of other trades on which it is in any way dependent. Ensure the correct positioning and installation of other work with which steel stud partitions have to align and upon which the work of subsequent trades is dependent.

.6 Ensure that all bottom track fastenings only penetrate the floor slab to a maximum depth of 25 mm

1.07 FIELD DIMENSIONS

.1 Before work is commenced, examine adjoining work on which work of this trade is in any way dependent and make any necessary adjustments to enable work to fit.

.2 Verify measurements on the job site as required so that any preassembled work fits the job conditions.

.3 The steel stud installer shall keep a copy of the AWCC Specification Standards Manual available for reference at the project site.

1.08 SUBMITTALS

.1 Submit shop drawings to the Departmental Representative of load bearing steel studs walls, stud anchorage and ceiling suspension systems only.

.2 Submit cut-sheets and MSDS (Material Data Safety Sheets), for each product used in the building.

.3 Submit Materials Information Tables.

2 PRODUCTS

2.01 INTERIOR STEEL STUDS:

.1 Shall be C-shaped steel studs conforming to CAN/CGSB-7.1- M95 with zinc coating to ASTM 525. Steel studs shall be roll formed from ASTM A446 Grade A steel with minimum yield point of 228 MPa for 1.2 mm material and thinner, and Grade D steel with minimum yield point of 345 MPa for 1.5 mm material and thicker, as follows;

.1 Zinc Coating for 0.49 mm studs to be Z120.

.2 Zinc Coating for 0.88 mm studs to be Z180.

.3 Flange shall be not less than 32 mm wide, edge to be bent back 90 degrees and doubled over to form a minimum 4.8 mm return. Fixing face to be knurled and have pre-punched pass through holes for services. Length to suit, minimum of splicing allowed.

.4 Width: Shall be 63.5, 92 mm & 152 mm as scheduled and indicated.

.2 Gauges shall be as scheduled on the Architectural drawings. Steel studs shall be colour coded for gauge to CSSBI Lightweight Steel Framing Manual Appendix B.

.3 Stud Runner Channel (Tracks): Floor and ceiling runner channels to be fabricated from the same materials as studs; leg design minimum 32 mm high, slightly bent in to hold studs; widths to suit. Use 0.91 mm, 63.5 mm deep leg top track as required for deflection of structure at interior partitions, as detailed.

.4 Stud Fasteners: Manufacturer's standard, suitable for intended application. Ensure that all bottom track fastenings only penetrate the floor slab to a maximum depth of 25 mm.

.5 Drywall Furring Channels: Hat sections shall be roll-formed from 0.53 mm hot-dipped galvanized steel, having a Z180 zinc coating to ASTM 525; dimensions 67 mm. wide by 22 mm. deep; face to knurled. 'Z' bars to be 76 mm. or as detailed on the drawings.

.6 Drywall Ceiling Suspension Framing:

.1 Hangers: Shall be 9 ga. galvanized steel wire or 4.76 mm. diameter zinc or cadmium plated steel rods.

.2 Tie Wire: Shall be 18 ga. galvanized steel wire

.3 Hangers: Ceiling area supported.

<u>Area</u>	<u>Size of Hangers</u>
Up to 1.2 m2	9 ga. (3.7 mm) diameter
galvanized wire Up to 1.48 m2	4.8 mm diameter
rods	

.4 Inserts: shall be able to develop full strength of hangers.

<u>Maximum Spacing</u>	<u>Maximum Spacing</u>	<u>Weight of</u>
<u>of Hangers</u>	<u>of Runners</u>	
<u>Runner Channels</u>		
914 mm	1200 m	
1200 mm	914 mm	38 mm x 12 mm x 1.36 mm.

.5 Channels shall be cold formed or hot rolled steel, rust inhibitor coated for interior work.

.6 Drywall Cross Furring Members: For drywall ceilings shall be drywall furring channels as specified herein.

2.02 STEEL BACKING STRIPS

.1 Steel Strips: Shall be 18 ga. thick galvanized sheet steel; 300mm wide x full length of casework; behind wall stops 0.91 mm galvanized sheet, 300 mm wide x 450 mm long to span between two (2) studs.

3 EXECUTION

3.01 DEFLECTION ALLOWANCES

.1 Deflection spaces between exterior steel studs and interior steel stud wall partitions and the structural floor and roof components are essential to allow for deflection of the steel stud framing components. Such spaces shall be provide at top of exterior and interior steel stud wall and partitions, at junction with structural members, by use of movement joints as detailed or required and as hereinafter specified.

3.02 STEEL STUDS GENERAL

.1 The layout of all drywall steel stud partitions and

furring shall be the responsibility of the Contractor.

.2 The Contractor shall notify the Departmental Representative when partition locations have been located and marked on the floor. The Departmental Representative will review and confirm those locations before proceeding with the erection of walls and partitions.

.3 The sequence of installation of the drywall steel stud partitions and furring shall be closely coordinated with the various trades whose materials and/or services are being installed within the partitions and metal furring. Sequence of installation shall be in accordance with the requirements of the Construction Schedule.

.4 An allowance shall be made in anchoring the floor track to accommodate tolerance in concrete floor slab of 3.2 mm in 3000 mm. Ensure that all bottom track fastenings only penetrate the floor slab to a maximum depth of 25 mm.

3.03 INTERIOR STEEL STUDS

.1 Layout: the steel stud walls and partition types are designated on the drawings. Refer to Schedule of Wall Types on the partition type schedule for details of the various types.

.2 The steel stud drywall partition height requirements shall be as indicated on the wall schedule or drawings.

.3 Install runner channels (track) at floor and ceiling, accurately align according to partition layout;

.1 Secure at centers at maximum 600 mm o.c. using shield screws, or power driven fasteners

.2 At concrete slabs or suitable screws at metal framing. Ensure that all bottom track fastenings only

.3 Penetrate the floor slab to a maximum depth of 25 mm.

.4 Where ceiling track is to be anchored to structure, use special track with extended sides to allow for deflection, as detailed. Cut studs shorter than partition height.

.5 At partition corners, extend one runner to end of corner and butt other runner; allow clearance for wallboard thickness; do not miter runners.

.4 Fix studs to runners by screws, crimping, or welding through each stud.

.5 Install steel studs vertically at 400 mm or 300 mm o.c., to suit size of gypsum wallboard used, unless otherwise indicated or scheduled.

.6 Splice studs where necessary by nesting and lap minimum 200 mm; fix with minimum one screw per stud flange.

.7 Stud height and spacing limitations to be in accordance with stud manufacturer's recommendations.

.8 Additional Framing & Bracing: Install additional studs as detailed, or as required at all partition intersections, openings or termination with dissimilar materials. Place studs not more than 50 mm from abutting walls, opening and each side of corners.

.9 Where horizontal runs of service lines are to be installed, arrange with applicable trades to install lines simultaneously with partition. If standard openings in studs are too small for service lines, splice studs together as necessary, splice piece to be minimum 300 mm longer than height of the cutout; splice as specified above.

.10 Refer to drawings and detail drawings for various conditions at specific locations.

.11 For partitions requiring acoustical separation where indicated on the drawings, apply a bead(s) of acoustical sealant at floor, wall and ceiling locations at junctions with adjacent materials. Refer to the Acoustical Report.

3.04 FRAMED OPENINGS & INSTALLATION OF STEEL FRAMES

.1 Reinforce and frame all openings in steel stud walls and partitions to adequately carry loads, by the use of additional framing members and bracing as specified herein and/or detailed on drawings, and as recommended by manufacturer of steel studs.

.2 Frame openings and reinforce as required for all recessed items in steel stud walls and partitions and ceilings including but not necessarily limited to, mechanical and electrical equipment, electrical cabinets and boxes, fire hose cabinets, light fixtures, diffusers, speakers and other recessed fixtures as indicated or required.

.3 Provide and install two (2) 0.49 mm boxed studs at each side of door openings, pressed steel framed sidelight and interior window openings in interior steel stud partitions and other openings exceeding one stud space. Extend boxed studs on each side of openings from floor to underside of structure over.

.4 Install runner channel at head and/or sill or openings to accommodate intermediate studs. Each end of runner channel, cut out flanges, turn up web and screws to studs. Install intermediate studs above and/or below openings in same manner and spacing as specified above.

.5 Install 1 door frames and pressed steel sidelight and window frames, supplied under Section 08 11 00, plumb and

square, in steel stud walls and partitions. Screw-fix frame anchor clips to jamb, header and/or sill members; fixing to be adequate to prevent movement of frame relative to stud and to manufacturer's directions, shop drawings and ULC requirements. Fix door frame to floor using floor anchor clips, fixing to be as required by structure and to manufacturer's directions, reviewed shop drawings and ULC or WHI requirements, where applicable.

.6 Both sides of door frames to be in contact with substrate.

3.05 VERTICAL & HORIZONTAL FURRING

.1 Provide all vertical and horizontal steel stud furring and furring channels as detailed and as required for gypsum wallboard finish, complete with furring studs and/or furring channels specified. Secure to structure.

.2 Space furring channels at maximum 300 mm o.c. or as detailed. For channels installed horizontally, attach a furring channel not more than 100 mm from both floor and ceiling lines. For channels installed vertically, attach a furring channel not more than 100 mm from abutting walls.

3.06 CEILING SUSPENSION SYSTEM

.1 Support grillage for suspended interior gypsum wallboard ceilings using hangers; suspend independent of walls, columns, pipes and ducts.

.2 Securely anchor all hangers to structural elements.

.3 Install hangers using drilled type anchors.

.4 Space hangers at maximum 1200 mm centers along main carrying channels and not more than 150 mm from ends.

.5 Space main carrying channels at maximum 900 mm o.c. and not more than 150 mm from perimeter walls. Splice main carrying channels by lapping minimum 300 mm and wire tie each end with double loops of 16 gauge diameter galvanized tie wire, 50 mm from each end of overlap.

.6 Fix main carrying channels to wire or rod hangers by saddle-tying or wrapping around main channels so as to prevent turning or twisting of the channels and to develop full strength of the hangers.

.7 Space drywall furring channels as applicable transverse to main carrying channels at maximum 400 mm o.c. Secure at each support with approved clip or saddle tie with minimum 2 loops of 1.51 mm diameter galvanized tie wire, 25 mm from each end of overlap.

.8 At openings, including ceiling access panels, in ceiling suspension system that interrupt the main carrying channels

or furring channels, reinforcing grillage with 19 mm cold rolled channels, wire tie to top and parallel to main runner channels, extend 19 mm channels minimum 300 mm past each end of openings.

3.07 BACKING & REINFORCING

.1 Provide and install all backing plates and/or reinforcing within interior steel stud drywall partitions for items being hung from or anchored to such partitions or furring.

.2 Backing or reinforcing to be provided shall include, but is not necessarily limited to, those for wall mounted millwork, control joints, wall stops and grab bars with required attachment as designated by the manufacturer of washroom accessories.

.3 Backing of reinforcing shall be as specified and/or detailed or as recommended by the manufacturer of steel stud system for each type and weight of item. Prior review of all backing shall be received from the Departmental Representative before gypsum wallboard is installed.

.4 Attachments for securing mechanical, electrical and other service outlets will be supplied and installed under those respective divisions.

3.08 ADJUST & CLEAN

.1 Clean thoroughly and remove all excess materials from other finished surfaces.

.2 Promptly remove all excess and waste material as work proceeds and at completion.

END OF SECTION

1 GENERAL

1.01 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 423-09, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E 580/E 580M-14 Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
 - .3 ASTM C 635/C 635M-13a, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .4 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .5 ASTM E 1264-14, Standard Classification for Acoustical Ceiling Products.
 - .6 ASTM E 1414/E 1414M 11ae1 Standard Test Method for Sound Attenuation between Rooms Sharing a Common Ceiling Plenum.
 - .7 ASTM E 1477-98a(2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - .8 ASTM F 1667-15 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .4 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.02 COORDINATION

- .1 Do not begin erection of ceiling suspension system until work above ceiling has been inspected by Departmental Representative.

1.03 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for acoustical suspension, acoustic panels, acoustic tiles, and system accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
- .5 Samples:

- .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
- .2 Submit duplicate samples of each component proposed for use in each type of ceiling suspension system.
- .3 Submit duplicate 150 mm x 100 mm samples of each type of acoustical unit.

1.04 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit operation and maintenance data for acoustical suspension for incorporation into manual.
- .3 Submit final certificate from design professional responsible for delegated detail design of ceiling indicating conformity with accepted shop drawings.

1.05 MAINTENANCE MATERIALS

- .1 Provide extra acoustical units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type of acoustical panel, suspension system and trim required for project, minimum 1 complete factory-sealed package of each.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Deliver extra materials for each type of acoustical unit in original unopened packages clearly identified, including colour and texture.
- .5 Deliver to Departmental Representative upon completion of the work of this section.

1.06 CERTIFICATIONS

- .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Include certification of sustainable requirements.

1.07 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up 10 m minimum of each type acoustical ceiling assembly including one inside corner and one outside corner. Ceiling system mock-up to show basic construction and assembly, treatment at walls,

recessed fixtures, splicing, interlocking, finishes, acoustical unit installation.

- .3 Construct mock-up where directed.
- .4 Allow 24 hours for inspection of mock-up by Departmental Representative before proceeding with ceiling work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

2 PRODUCTS

2.03 CLEAN ROOM ACOUSTICAL CEILING SUSPENSION

- .1 Suspension System: Provide Manufacturer's standard direct hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable ASTM C635/C635M requirements and as supplied by same materials supplier as acoustic panels for intermediate duty, exposed tee bar and as follows:
 - .1 Tee Bar Grid Face Width: as appropriate for materials specified,
 - .2 Module: Sized as appropriate to acoustic panel size,
 - .3 Hangers, Braces and Ties: Nominal 12 ga. steel wire, galvanized in accordance with ASTM A641,
 - .4 Exposed Finish: Manufacturer's standard satin, white finish,
 - .5 Corrosion Resistance: Hot-dip galvanized or stainless steel components. Provide hold down clips spaced 610 mm O/C on all cross tees for interior ceilings consisting of acoustic panels weighing less than 4.88 kg/m².

2.04 CLEAN ROOM ACOUSTICAL CEILING PANELS

- 1. Clean room grade, vinyl-faced membrane 610 mm. x 610 mm. x 16 mm. thick mineral fiber tile with extruded aluminum suspension system.
 - 1. Suspended Ceiling Fasteners: Provide fasteners having a minimum capacity of 890 N in tension for vertical loading conditions, a minimum capacity of 1960 N in tension and angular and bracing conditions.
 - 2. Structure Fasteners: Provide attachment devices having five (5) times design load indicated in ASTM C635/C635M, Table 1 Direct Hung, having corrosion protection for moderate service conditions, with holes or loops for attaching hangers having capacity to sustain ceiling loads as indicated.
 - 3. Loads: Determine superimposed loads applied to suspension systems by components of the building and verify that adequate hangers are installed to support additional loads in conjunction with normal loads of the ceiling system.
 - 4. Maximum Deflection: L/360 in accordance with ASTM C636/C636M.

5. Materials: Provide manufacturer's standard panels of configuration indicated in accordance with ASTM E1264 classifications, and conforming to:
1. Physical Properties: Type: III, Form: 2,
 2. Surface Pattern: Fine Texture,
 3. Dimensions: 610 mm x 610 mm,
 4. Edge Profile: Square,
 5. Colour: White.
 6. Acoustic and Visual Performance (Minimum Nominal): NRC: 0.75,
CAC: 35, LR: 0.90.

3 EXECUTION

3.01 EXAMINATION

- .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.02 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.

3.03 SUSPENSION SYSTEM INSTALLATION

- .1 Comply with manufacturer's written installation instructions and recommendations, including product technical bulletins, product carton installation instructions, and data sheets.
- .2 Install suspension system in accordance with accepted shop drawings, and ASTM C 636/C 636M except where specified otherwise.
- .3 Lay out system according to reflected ceiling plan.
- .4 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .5 Secure hangers to overhead structure using attachment methods as indicated and acceptable to Departmental Representative
- .6 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .7 Ensure suspension system is coordinated with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above

ceiling.

- .8 Install wall moulding to provide correct ceiling height.
- .9 Attach cross member to main runner to provide rigid assembly.
- .10 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .11 Install access splines to provide 50 % ceiling access.
- .12 Expansion joints:
 - .1 Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, 25% narrower than space between 2 'T' bars.
 - .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.
- .13 Install perimeter trim at floating installations securely anchored to suspension system, in accurate alignment with adjacent assemblies. Install curved trim members in smooth curves to radius indicated.

3.04 ACOUSTICAL CEILING PANEL INSTALLATION

- .1 Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.
- .2 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.05 SITE QUALITY CONTROL

- .1 Arrange for periodic site visits by design professional responsible for delegated ceiling design work to review installed work for conformity to design.
- .2 Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
- .3 Submit written site reports by designer to Departmental Representative 3 days of visit.

3.06 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.
 - .1 Touch up scratches, abrasions, voids and other defects in painted

surfaces.

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Waste Management and Disposal.

3.07 PROTECTION

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

END OF SECTION

1 GENERAL

1.01 GENERAL REQUIREMENTS

- .1 Refer to Division 1, General Requirements.
- .2 Refer to partition types on the drawings
- .3 Refer to Code Compliance Plans for rated fire separations.

1.02 REFERENCES

- .1 American Society for Testing and Materials (ASTM International)
- .1 ASTM F1303, Specification for Sheet Vinyl Floor Covering with Backing.
- .2 ASTM F1913, Standard Specification for Vinyl Sheet Floor Covering Without Backing.

1.03 SUBMITTALS

- .1 Submit samples, and product data submittals.
- .2 Samples:
 - .1 Submit duplicate 300 x 300 mm sample pieces of sheet material, and 300 mm long piece of edge strips.

1.04 QUALITY ASSURANCE

- .1 Installer: company or person specializing in resilient sheet flooring.

1.05 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- .2 Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
- .3 Store rolls in dry locations, stand rolls on end. Protect and secure rolls from falling.

1.06 ENVIRONMENTAL REQUIREMENTS

- .1 Maintain air temperature and structural base temperature at flooring installation area between 18° and 38° C for 48 hours before, during and 72 hours after installation.

1.07 EXTRA MATERIALS

- .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide resilient sheet flooring amounting to 5% of sheet flooring installed on project for each type, color, and pattern of flooring installed for maintenance use. Provide remnants over 1 m2 of each colour for maintenance use.
- .3 Extra materials to be in one piece and from same production run as installed materials.
- .4 Clearly identify each roll of sheet flooring and each container of adhesive.
- .5 Deliver to Departmental Representative, upon completion of the work of this section.
- .6 Store where directed by Departmental Representative.

2 PRODUCTS

2.01 MATERIALS

- .1 SSV-1: Sheet vinyl, homogeneous, single layer vinyl flooring to ASTM F 1913, polyurethane reinforced wearing surface, 2 mm thick, sheet width 1.83 m. Seaming method - heat welded. Surface shall not require sealers, waxes or polishes. Maintenance requirement to be dry buffing, with no polish treatment, sealers, waxes or spray buff solutions. Allow for up to four colours selected by Departmental Representative.
- .1 Primers and adhesives: water-resistant, of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
- .1 Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- .2 Sub-floor filler and leveler: trowelable, non-shrinking, water resistant, alkali mould resistant, cementitious underlayment, two component compound consisting of liquid latex and Portland cement base, both supplied by same manufacturer.
- .3 Heat welding rods: solid strand product for sheet vinyl, manufacturer's standard for specific material joint treatment, colour matched to Departmental Representative approval. Allow for four colours.
- .4 Integral-Flash cove base accessories:
 - .1 Filler cove strips: 20 mm radius, required for specific material installation provided or approved by manufacturer.

.2 Metal edge strips. Aluminum extruded, smooth, mill finish stainless steel with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.

3 EXECUTION

3.01 EXAMINATION

.1 Examine substrates, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance.

.2 Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.

.3 Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

.1 Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.

.2 Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

.3 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

.4 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

.5 Prime concrete slab to resilient flooring manufacturer's printed instructions.

.6 Where flooring of different thickness abut apply filler to build a smooth gradual ramping so top of finished flooring meets top of adjacent material.

.7 Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

.8 Do not install floor coverings until they are same temperature as space where they are to be installed.

3.03 APPLICATION: FLOORING

.1 Unroll sheet vinyl floor coverings and allow them to stabilize

before cutting and fitting.

.2 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air recirculate through a district or whole building air distribution system.

.3 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.

.4 Lay sheet flooring as follows:

.1 With seams parallel to building lines to produce a minimum number of seams. Place seams in inconspicuous and low-traffic areas, at least 150 mm away from parallel joints in flooring covering substrates.

.2 Maintain uniformity of floor covering direction.

.3 Match edges of floor coverings for color shading at seams.

.4 Border widths minimum 1/3 width of full material.

.5 Run sheets in direction of traffic. Double cut sheet joints and heat weld according to manufacturer's printed instructions.

.6 As installation progresses, and after installation roll flooring in two directions with 45 kg minimum roller to ensure full adhesion.

.7 Cut flooring neatly around fixed objects.

.8 Install feature strips and floor markings where indicated. Fit joints tightly.

.9 Install flooring in pan type floor access covers. Maintain floor pattern.

.10 Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

.11 Continue flooring over areas which will be under built-in furniture.

.12 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.

.13 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

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

3.04 INTEGRAL FLASH COVE BASE

- .1 Where flooring and base material are indicated as same material in Room Finish Schedule cove base material up vertical surfaces.
- .2 Support floor coverings at horizontal and vertical junction by cove strip.
- .3 Butt at top against cap strip. Cap strips shall be provided in maximum length as possible to minimize joints.
- .4 Use same adhesive as for floor areas.
- .5 At flush door frames and other projections, taper cove former 300mm back from frame to provide flush cove at face of frame.
- .6 External corners: fit coved outside corners with "butterfly inset" wrapped around corner at 45° angle. Starting from base of corner and joined on each side to flash coved material. Heat weld joints.
- .7 Internal corners: fit coved inside corners with "half butterfly" formed by cutting material at 45° angle from base of coving sharply tucked into inside corner, wrapped and joined to coved material facing non-prominent side wall. Heat weld joints.

3.05 CLEANING

- .1 Perform the following operations immediately after completing floor covering installation:
 - .1 Remove adhesive and other blemishes from floor covering surfaces.
 - .2 Sweep and vacuum floor coverings thoroughly.
 - .3 Damp-mop floor coverings to remove marks and soil.
 - .4 Do not wash floor coverings until after time period recommended by manufacturer.

3.06 PROTECTION

- .1 Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
- .2 Prohibit traffic on floor for 48 hours after installation.

END OF SECTION

1 GENERAL

1.01 GENERAL REQUIREMENTS

- .1 Refer to Division 1, General Requirements.
- .2 Submit cut-sheets and MSDS (Material Data Safety Sheets), for each product used in the building.

1.02 REQUIREMENTS INCLUDED

- .1 Furnish all labour, material, services and equipment necessary for completion of field applied painting work as indicated on the drawings and schedules and as specified herein.
- .2 Examine the specifications for the various other Trades and be thoroughly familiar with all their provisions regarding painting.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- .1 Metal Doors & Frames: Section 08 11 00.
- .2 Gypsum Board: Section 09 22 16.
- .3 The following painting work will be done under Division 22, Mechanical
 - .4 Sealing of insulation covering.
 - .5 Colour code banding.
 - .6 Identification Stenciling

1.04 SURFACES NOT REQUIRED TO BE PAINTED

- .1 The following factory finished items do not require to be painted:
 - .2 Pre-finished sheet metal flashing.
 - .3 Aluminum entrances and curtain wall.
- .4 Pre-finished exterior intake and discharge louvres. Pre-finished interior diffusers.
- .5 The following surfaces are not required to be painted:
 - .1 Surfaces scheduled as unexposed, or unfinished Interior of duct shafts
 - .2 Stainless steel.
 - .3 Surfaces scheduled as being taped, filled and sanded only.

1.05 QUALITY STANDARDS

- .1 Product environmental requirements, preparation of surfaces and application shall be in accordance with the applicable chapters of The Master Painters Institute MPI and MPDA Architectural Painting Specification Manual (2003).
- .2 A copy of The Master Painters Institute and Architectural Painting Specification Manual shall be kept on site during the duration of the painting work.

- .3 Should modifications to these standards occur in this specification, then the modifications shall govern.
- .4 All work, unless otherwise specified, shall be to MPI/MPDA Premium Grade.
- .5 The paint products of the paint manufacturer shall be as listed in the MPI/MPDA Manual (2003), under Paint Product Recommendation section.

1.06 SUBMITTALS

- .1 Furnish the Departmental Representative with full identification of the make of paints selected for this Project from the approved manufacturers. Submit copies of manufacturer's printed trade specifications and installation procedure for each type of paint to be used.
- .2 The Departmental Representative will determine all colours and patterns and issue the Contractor with a minimum of two (2) sets of colour cards and a schedule showing where the various colours and finishes shall be applied. Provide duplicate draw-down cards for all colours selected for the project prior to starting work. On-site work to match selected samples. No extra will be considered for repainting surfaces which do not conform.
- .3 Submit cut-sheets and Material Safety Data Sheet (MSDS) for each paint or coating used in the project, highlighting VOC limits and chemical component limits.

1.07 PRODUCT DELIVERY, STORAGE & HANDLING

- .1 Paint materials shall be delivered to job site in manufacturer's unbroken sealed containers.
- .2 Containers shall be labeled by manufacturers giving name, type of paint, important constituents of the paint (such as alkyd, titanium, zinc, acrylate esters, etc.), colour of paint and instructions for reducing.
- .3 Store and mix materials in adequate storage areas assigned for this purpose and take necessary precautions to prevent fire or spontaneous combustion.
- .4 Paint and materials shall be stored in minimum ambient temperature of 7°C.
- .5 Area to be well ventilated and heated and equipped with fire extinguisher.
- .6 Provide and use suitable metal pans in which mixing pails shall be placed.
- .7 Mixing shall be done in these pans only.
- .8 Take all necessary precautionary measures to prevent fire hazards and spontaneous combustion.
- .9 Where toxic materials and both toxic and explosive solvents are used, appropriate precautions and no smoking must be taken as a regular procedure.

1.08 ENVIRONMENTAL REQUIREMENTS

- .1 Temperatures and moisture content of the surfaces shall conform to the following:
- .2 Moisture of Surfaces: Tests shall be by an electronic moisture meter.
- .3 Wallboard: Maximum moisture content to be 12 percent.
- .4 Temperatures: No painting shall be performed when temperatures on the surfaces or of the air in the vicinity of the painting work are below 7°C.
- .5 The minimum temperatures allowed for latex paints shall be 7°C (interior work) and 10°C (exterior work) UNLESS specifically approved by the specifying body.
- .6 Painting and decorating work shall not proceed unless a minimum of 161.45 candle power per square meter lighting is provided on the surfaces to be painted.
- .7 All areas where painting and decorating work is proceeding require adequate continuous ventilation and sufficient heating facilities to maintain temperatures above 7°C for 24 hours before and after paint application.
- .8 On exterior work, do not paint during temperatures below 7°C or on surfaces where condensation has or is likely to form (unless specifically formulated paints are used).

1.09 GUARANTEE/INSPECTION

- .1 All painting work shall be in accordance with MPI/MPDA Architectural Painting Specification Manual requirements and shall be inspected by the local MPI/MPDA Accredited Quality Assurance Association's Paint Inspection Agency (inspector), using the MPI/MPDA Accredited Quality Assurance Association's guarantee.

2 PRODUCTS

2.01 MATERIALS

- .1 All paints, thinners, solvents, etc. used within this Project shall only be those products and materials with low Volatile Organic Compounds (VOC) content. All paint and coatings shall meet or exceed VOC and chemical component limits of Green Seal Requirements (see www.greenseal.org). All products and materials used must be listed and designated by the manufacturer as low VOC and environmentally friendly and be complete with appropriate "EcoLogo" clarification labeling.
- .2 Paint, varnish, stain, enamel, lacquer and fillers shall be of a brand and type approved in Chapter 5 of the MPI/MPDA Architectural Painting Specification Manual. These will be referred to herein by generic or common name but specifically indicate approved manufacturer's brands as published in Chapter 5 of the Manual.

- .3 Paint materials such as linseed oil, shellac, turpentine, etc. not specifically mentioned by brand name, shall be the highest quality product of an approved manufacturer.
- .4 Undercoats, primers and paint systems shall be of same manufacture as the final finish coat.
- .5 Materials shall be used and applied in strict accordance to manufacturer's directions and shall be compatible to one another within a finishing system.

2.2 GLOSS/SHEEN RATINGS

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

	<u>Gloss @ 60</u> <u>degrees</u>	<u>Sheen @ 85</u> <u>degrees</u>
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	

3 EXECUTION

3.01 INSPECTION

- .1 Examine all surfaces to be painted before commencing work.
- .2 The commencement of work indicates acceptance of the surfaces and job conditions.
- .3 Inspect the exposed fastenings penetrating and visible through the perforated metal roof deck. Snip off all projecting exposed fastenings to a maximum projection depth of 9.5 mm before applying the finish painting coat. Verify that steel deck has been supplied with a pre-painted, factory applied finish.

3.02 PROTECTION

- .1 Protect surrounding or adjoining work by adequately covering with tarpaulins or other necessary protective covering; make good any damage caused by failure to provide suitable protection.
- .2 Before commencement of work, remove all electrical plates, surface hardware, canopies of lighting fixtures, etc. and replace in original condition at completion of painting in each space.
- .3 Do not use solvent or thinners to clean hardware that will remove the permanent lacquer finish.
- .4 Protect work of other trades against damage and soiling. Any damage to work of other caused by this trade shall be immediately made good, cleaned or replaced at no additional expense to the Departmental

Representative and to the acceptance of the Departmental Representative.

- .5 Wrap knobs and remove escutcheons during painting operations. Cover all other hardware such as strikes, butts, door closers, push and pull plates, etc.

3.03 PREPARATION

.1 Preparation of surfaces shall be in accordance with recommendations contained within the MPI/MPDA Architectural Painting Specifications Manual, Chapters 2 & 3, Surface Preparation, as applicable for various surfaces.

3.04 APPLICATION

- .1 Application shall be in accordance with MPI/MPDA Architectural Painting Specifications Manual as applicable and as follows.
- .2 Materials shall be thoroughly mixed before application and applied evenly, free from sags, runs, crawls and other defects.
- .3 Do all cutting-in neatly.
- .4 Thinning shall be done only in accordance with manufacturer's directions as required but no dilution, adulteration or misuses will be allowed.
- .5 Job mixing or tinting will be allowed if specifically approved.
- .6 All finish work shall be uniform in sheen, colour and texture.
- .7 Apply each coat at the proper consistency in accordance with the manufacturer's directions.
- .8 Sand lightly between coats to achieve desired finish.
- .9 Do not apply finishes on surfaces that are not sufficiently dry.
- .10 Each coat of painting shall be slightly darker than preceding coat unless otherwise directed.
- .11 Method of paint application shall be generally by brush or roller.
- .12 The number of coats specified is intended to cover surfaces satisfactorily when applied in strict accordance to manufacturer's recommendations.
- .13 Apply all materials under adequate illumination, evenly spread and smoothly flowed on without runs, sags or other defects.
- .14 Tint all undercoats (i.e. all coats prior to final coat) to the approximate shade of the final coat, and vary the tints of each undercoat to facilitate definite identification of all coats.

3.05 PAINTING & FINISHING SCHEDULE

- 3.05.1 The following titles and code numbers refer to the MPI/MPDA Architectural Painting Specification Manual (2003) edition, unless otherwise indicated, for type of coating, grade, named products and their manufacturers.

- 3.05.2 Range and selection of colours is based on products indicated on the Finish Schedule. Any alternate manufacturer shall have similar range and colour selection.

3.06 EXTERIOR PAINTING & FINISHING SCHEDULE

- .1 Reference MPI/MPDA Manual (2003) Chapter 2. Grade shall be as specified.
- .2 MISCELLANEOUS METAL: Premium Grade
- EXT. 5.1D Alkyd Finish (semi-gloss) Low VOC type.
One (1) coat Alkyd Metal Primer, two (2) coats Alkyd.
- .3 STEEL: Premium Grade, Low VOC type.
- EXT. 5.1H Epoxy Urethane Finish (semi-gloss) two-component.
One (1) coat Epoxy Primer, one (1) coat Epoxy, two (2) coats Polyurethane.
Use this finish on exterior steel canopies etc., where scheduled.
- .4 GALVANIZED METAL: Premium Grade
- EXT. 5.3B Alkyd Finish (semi-gloss) Low VOC type.
One (1) coat Cementitious Primer, two (2) coats Alkyd.
Use this finish on exterior hollow metal doors and pressed steel door frames; roof top HVAC units and ducting, vents and piping; guardrails and handrails, and other exterior galvanized metal indicated.

3.07 INTERIOR PAINTING & FINISHING SCHEDULE

- .1 Reference MPI/MPDA Manual (2003), Chapter 3. Grade shall be as specified below.
- .2 MISCELLANEOUS METAL: Premium Grade
- INT. 5.1E Alkyd Finish (semi-gloss) Low VOC type.
One (1) coat of Alkyd Primer Sealer, two (2) coats Alkyd.
- .3 CONCRETE VERTICAL SURFACES; including horizontal soffits:
- INT 3.1G - Waterborne epoxy (tile-like) finish for smooth concrete.
- .4 CONCRETE HORIZONTAL SURFACES; floors:
- INT 3.2D - Pigmented polyurethane finish.
INT 3.2G - Waterborne concrete floor sealer.
- .5 CONCRETE MASONRY VERTICAL SURFACES; including horizontal soffits:

INT 4.2c - Alkyd Finish (semi-gloss).

One (1) coat LATEX BLOCK FILLER Primer, two (2) coats Alkyd Finish.

.6 GALVANIZED METAL: Premium Grade

INT. 5.3C Alkyd Finish (semi-gloss) Low VOC type.

One (1) coat Cementitious Primer, two (2) coats Alkyd Finish.

Use this finish on hollow metal doors and pressed steel frames, and other exposed interior galvanized metal indicated.

.7 GYPSUM WALLBOARD: Premium Grade

INT. 9.2E Epoxy (tile-like) finish.

One (1) coat Epoxy Primer/Sealer, two (2) coats Epoxy.

Use this finish on gypsum wallboard, where scheduled to be painted with epoxy finish.

.8 GYPSUM WALLBOARD: Premium Grade

INT. 9.2A Latex Finish (Gloss Level 5) Low VOC type.

One (1) coat Latex Primer/Sealer, two (2) coats Latex.

Use this finish on gypsum wallboard, where scheduled to be painted with Latex finish.

.9 GYPSUM WALLBOARD: Premium Grade

INT. 9.2C Alkyd Finish (Eggshell) Low VOC type.

One (1) coat Latex Primer/Sealer, two (2) coats Alkyd.

Use this finish on gypsum wallboard ceilings to washrooms, and elsewhere where scheduled to be painted with alkyd finish.

.10 Paint fire bells, and sprinkler caps where scheduled with INT. 5.1E alkyd finish.

3.08 MECHANICAL SERVICES

- .1 Paint exposed metalwork, including exposed and insulated piping, sprinkler lines, rainwater leaders, conduit, hangers, etc. in connection with plumbing, sprinkler mechanical and electrical trades in public areas, only. Paint as follows:
- .2 One (1) coat red oxide primer (galvanized primer where applicable); two (2) coats enamel (semi-gloss) in accordance with INT. 5.2A Heat Resistant Enamel Finish.

- .3 Paint covered and insulated pipes and ducts three (3) coats: 1 coat PVA sealer; two (2) coats enamel (flat) in accordance with INT. 10.1B Alkyd Enamel finish.
- .4 Prime and finish paint mechanical piping, plumbing piping, sprinkler piping, and equipment in mechanical rooms, in accordance with paint colour schedule specified under Division 23.
- .5 All equipment and materials with factory paint finish shall, after installation, be given a minimum of one coat of compatible finish paint to match the colour scheme scheduled.

3.09 STANDARD OF ACCEPTANCE

- .1 Paint finish shall continue through behind any wall and ceiling mounted items. (i.e, white boards, tack boards, furniture and casework systems, electrical outlets, surface mounted electrical fixtures, plumbing finish escutcheon plates, mechanical devices, heating units, etc. It shall also include any other exposed surfaces such as interiors of cupboards and closets, top of doors, trims, whether in sight line or not.
- .2 Departmental Representative shall have right to make changes in colour tone of finishes prior to final coat to obtain desired results without additional cost to the Departmental Representative.
- .3 Otherwise noted or scheduled, walls shall be same colour within a given area.
- .4 All surfaces, preparation and paint applications shall be inspected by the Departmental Representative.
- .5 Paint finishing interior surfaces shall be considered to lack uniformity and soundness if any of the following defects are apparent to the Departmental Representative:
- .6 Finishing shall be smooth.
- .7 Free of pin-holes and pits.
- .8 Brush or roller marks, streaks, laps, runs, sags, drips, heavy stippling, hiding or shadowing by inefficient application methods, skipped or missed areas, bubbles and pin holes of any size.
- .9 Any foreign materials in paint coatings such as hair, brush bristles, insects, visible screw heads, etc.
- .10 Any type of raised sharp edges that can cause a latex / nitrile glove or cotton batten to tear or puncture.
- .11 Evidence of poor coverage at rivet heads plate edges lap joints, crevices, pockets, corners and re-entrant angles.
- .12 Damage due to touching before paint is sufficiently dry or any other contributory cause.
- .13 Damage due to application on moist surfaces or caused by inadequate protection from weather.

- .14 Damage and / or contamination of paint due to blown contaminants (dust, spray paint, etc.)
- .15 Painted surfaces shall be considered unacceptable if any of the following are evident under natural lighting and final lighting source for interior surfaces:
- .16 Visible defects are evident on vertical surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.
- .17 Visible defects are evident on horizontal surfaces when viewed at normal viewing angles from a distance of not less than 1000 mm.
- .18 Visible defects are evident on ceiling, soffit and other overhead surfaces when viewed at normal viewing angles.
- .19 When final coat on any surface exhibits a lack of uniformity of colour, sheen, texture and hiding across full surface area.
- .20 When final coat on any transition between wall finishes, walls finishes and ceiling systems finishes and wall finishes to floor finish systems is evident and not smooth.
- .21 Small affected areas may be touched up; large affected areas or areas without sufficient dry film thickness of paint shall be repainted. Runs, sags of damaged paint shall be fully removed by scraper and sanding prior to re-application of product.

3.10 ADJUST & CLEAN

- .1 On completion of the work, remove all paint where spilled, splashed or splattered.
- .2 During the progress of the work, keep the premises free from any unnecessary accumulation of tools, equipment, surplus materials and/or debris.
- .3 At the conclusion of the work, leave the premises neat and clean to the satisfaction of the Departmental Representative.

END OF SECTION