

## 1. GENERAL

### 1.1. SECTION INCLUDES

- .1 Gypsum board.
- .2 Gypsum backer board.
- .3 Cementitious back board
- .4 Acoustic insulation.

### 1.2. REFERENCES

- .1 American National Standards Institute (ANSI)
  - .1 ANSI A118.9 – Specifications for Test Methods and Specifications for Cementitious Backer Units
- .2 ASTM International (ASTM)
  - .1 ASTM C475/C475M-15 – Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board
  - .2 ASTM C665-12 – Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing
  - .3 ASTM C840-13 – Standard Specification for Application and Finishing of Gypsum Board
  - .4 ASTM C954-15 – 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
  - .5 ASTM C1002-14 – 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
  - .6 ASTM C1047-14a – Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base
  - .7 ASTM C1177/C1177M-13 – Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing
  - .8 ASTM C1325-14 – Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units
  - .9 ASTM C1396-C1396M-14a – Standard Specification for Gypsum Board
  - .10 ASTM D3273-16 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- .3 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet for Use in Building Construction
- .4 ECD Energy & Environment Canada
  - .1 Green Globes Canada, Design for New Construction and Major Retrofits v.2 2014
- .5 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S101-07, Fire Endurance Tests of Building Construction and Materials
  - .2 CAN/ULC-S-102-10 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
  - .3 CAN/ULC-S702-14 – Standard for Mineral Fibre Thermal Insulation for Buildings

### 1.3. SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data:
  - .1 Provide data on each type of gypsum board and cementitious backer board.

### 1.4. QUALITY ASSURANCE

- .1 Products of This Section: Shall have Environmental Product Declaration (EPD) certification.

### 1.5. WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 20 – Waste Management and Disposal

## 2. PRODUCTS

### 2.1. PERFORMANCE REQUIREMENTS

- .1 Acoustic Attenuation for Identified Interior Partitions: STC rating indicated.

### 2.2. REGULATORY REQUIREMENTS

- .1 Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to CAN/ULC-S101 by an independent testing agency. Refer to Drawings for design assemblies.

### 2.3. GYPSUM BOARD MATERIALS

- .1 Interior Standard Gypsum Board: STM C1396/C1396M, paper-faced; 1220mm wide, maximum available length in place; tapered edged, ends square cut
  - .1 Regular core, 13 mm thick.
  - .2 Regular and fire rated core, 16 mm thick.
- .2 Moisture-Resistant Interior Gypsum Board: to ASTM C1396M, moisture-resistant, treated core, mold resistance rating 10 to ASTM D 3273. Type X, 16 mm thick for walls, 12 mm thick for ceilings by 1200 mm wide b maximum practical length, ends square cut, long edges beveled. Location: for use behind ceramic tile in dry areas, janitor rooms, and where indicated.
  - .1 Manufacturer/Model:
    - .1 Georgia-Pacific; TouchRock Mold-Guard.
    - .2 CGC; Sheetrock Brand Panels Mold Though.
    - .3 CertainTeed; M2Tech

### 2.4. ACCESSORIES

- .1 Acoustic Insulation: CAN/ULC-S702 or ASTM C665 Type I; preformed mineral fibre, in batt form; friction fit type, unfaced, minimum 40 kg/m3 density, thickness indicated. Flame/Smoke Properties: 0/0 to CAN/ULC-S102, non-combustible to CAN/ULC S114.
  - .1 Manufacturer/Model:
    - .1 Roxul; AFB.
    - .2 Thermafiber; SAFB.
- .2 Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- .3 Insulating Strip: rubberized, moisture-resistant, 3mm thick closed cell neoprene strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as require.
- .4 Polyethylene: to CAN/CGSB-51.34, 0.15 mm thick
- .5 Steel Drill Screws:
  - .1 For metal framing less than 0.91 mm thick: to ASTM C 1002.
  - .2 For metal framing 0.31 mm and thicker: to ASTM C 954.
- .6 Casing Beads, Corner Beads, Control Joints and Edge Trim: to ASTM C1047, zinc-coated by hot-dip process, 0.46 mm base thickness, laminated to paper tape, one piece length per location.
- .7 Cornice Cap: 12 mm deep by partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted. Include splice plates for joints.
- .8 Joint Materials: ASTM C475/C475M.
  - .1 Reinforcing tape, adhesive, and water.
  - .2 Joint compound: Asbestos-free.
- .9 Cementitious Board Fasteners: Board manufacturer's purpose made screws, corrosion, resistant steel, self-drilling points, counter-sink head to prevent strip-out, for steel substrate
- .10 Framing and Furring for Suspended Gypsum Board Ceilings: 0.455 mm thick metal furring, or purpose-made grid suspension system to ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - .1 Manufacturer/Model:
    - .1 Armstrong; Drywall Grid Systems.
    - .2 CertainTeed; 1-1/2" Drywall System.
    - .3 Chicago metallic; Drywall Grid System.
    - .4 USG; Corporation Drywall Suspension System.

### **3. EXECUTION**

#### **3.1. EXAMINATION**

- .1 Section 01 70 00: Verify existing conditions before starting Work.
- .2 Verify that Site conditions are ready to receive Work.
- .3 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical Work is reviewed.

#### **3.2. ACOUSTIC ACCESSORIES INSTALLATION**

- .1 Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions.
- .2 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
- .3 Seal full perimeter of cut-outs around electrical boxes, ducts, and all penetrations in partitions where perimeter sealed with acoustic sealant.

#### **3.3. GYPSUM BOARD INSTALLATION**

- .1 Install gypsum board to ASTM C840 and manufacturer's written instructions.
- .2 Erect gypsum board with ends and edges occurring over firm bearing.
- .3 Apply gypsum board to metal furring or framing using screw fasteners. For double layer application, use screw fasteners for both layers. Maximum spacing of screws 200 mm on centre.
  - .1 Single-Layer Application:
    - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C 840.
    - .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
  - .2 Double-layer Application:
    - .1 Install gypsum backing board for base layer and exposed gypsum board for face layer.
    - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
    - .3 Apply base layers at right angles to supports unless otherwise indicated
    - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .4 Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.
- .5 Treat cut edges and holes in moisture resistant gypsum board with sealant.
- .6 Install backing board over metal studs to manufacturer's written instructions.

#### **3.4. INSTALLATION – ACCESSORIES**

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure using joint compound for full length.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frame, to provide thermal break.
- .5 Control Joints:
  - .1 Construct of preformed units in ceilings, and of preformed units or two back-to-back casing beads set in gypsum board facing and supported independently on both sides of joint elsewhere.
  - .2 Provide continuous polyethylene dust barrier behind and across control joints.
  - .3 Locate control joints at 6 metres o.c. maximum or at changes in substrate construction . Where control joints occur at door frames, align control joint with outside edge of door frame.
  - .4 Install control joints straight and true.

- .6 Expansion Joints:
  - .1 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
  - .2 Install expansion joint straight and true.
  - .3 Splice corners and intersections together and secure to each member with three screws
- .7 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .8 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre
- .9 Splice corners and intersections together and secure to each member with three screws.
- .10 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .11 Where gypsum board is installed above finished ceilings, fir Work tight to items penetrating gypsum board Work. Seal around full perimeter of items with caulking. Use fire retardant caulking at fire rated enclosure, acoustical caulking elsewhere.

### **3.5. JOINT TREATMENT**

- .1 Finish to ASTM C840. Refer to article "Schedule" for levels of finishing.
- .2 Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finished.
- .3 Feather coats on to adjoining surfaces so that camber is maximum 0.8 mm
- .4 Taping, filling, and sanding is not required at surfaces behind ceramic tile.

### **3.6. SCHEDULES**

- .1 Gypsum Finishing Levels:
  - .1 Level 2: Behind ceramic tile
  - .2 Level 4 Walls and ceilings exposed to view.

**END OF SECTION**

## 1. GENERAL

### 1.1. SECTION INCLUDES

- .1 Formed metal framing of studs and furring, at interior locations.
- .2 Framing accessories.

### 1.2. REFERENCES

- .1 ASTM International (ASTM)
  - .1 ASTM A123/A123M-15 – Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
  - .2 ASTM A 653/A653M-13 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - .3 ASTM C645-14 – Standard Specification for Nonstructural Steel Framing Members
  - .4 ASTM C754-15 – Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panels Products
  - .5 ASTM C951-15 – 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 C1002-14 – 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

### 1.3. ADMINISTRATIVE REQUIREMENTS

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination:
  - .1 Coordinate with other Work having a direct bearing on Work of this section.
  - .2 Coordinate the placement of components recessed within the stud framing assemblies including but not limited to access doors and frames, recessed washroom, accessories, fire extinguisher cabinets.
  - .3 Coordinate simultaneous erection of studs with installation of services lines

### 1.4. WASTE MANAGEMENT

- .1 Separate waste materials for recycling.

## 2. PRODUCTS

### 2.1. PERFORMANCE REQUIREMENTS

- .1 Maximum Allowable Deflection: L/360 for walls with ceramic tile; L/240 elsewhere at a lateral force of 240 Pa for maximum heights indicated.
- .2 Design stud and track connections to accommodate vertical deflection movement of structure without imposing axial loads onto framing.

### 2.2. MANUFACTURERS

- .1 Clark Detrich.
- .2 Bailey.

### 2.3. STUD FRAMING MATERIALS

- .1 Framing Assembly Components: ASTM C 645.
- .2 Studs: ASTM A653/A653M, non-load bearing rolled steel, channel shaped, punched for utility access at 460 mm on centre, and as follows:
  - .1 Depth: indicated
  - .2 Thickness: 0.836 mm where required for unrestrained heights, for jamb studs and where cementitious backer board is scheduled; 0.53 mm elsewhere, unless indicated other.
- .3 Floor Tracks and Header: Same material and thickness as studs, bent leg retainer notched to receive studs; 50 mm flange height.
- .4 Ceiling Track: Single leg track consisting of 50 mm deep leg ceiling track, 38 mm x 1.6 mm thick U-channel, and 38 x 38 mm x 1.6 mm thick U-channel support clips. U channel installed continuous through top knock-out service hole, maximum 300 mm for top track, with support clip

- .5 Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- .6 Fasteners:
  - .1 Framing less than 0.84 mm: ASTM C 1002, self-drilling, self-tapping screws.
  - .2 Framing 0.84 mm thick or thicker: to ASTM C 954 screws
- .7 Sheet Metal Backing: 0.91 mm thick, galvanized steel for reinforcement.
- .8 Anchorage Devices: Drilled expansion bolts.
- .9 Acoustic Sealant: As specified in Section 09 21 16.
- .10 Insulating Strip: 3 mm thick by 12 mm side rubberized, moisture-resistant self-adhesive foam strip or strip of self-adhesive air/vapour barrier.
- .11 Resilient furring channels: 13-mm-deep, steel sheet members designed to reduce sounds transmission.
  - .1 Configuration: Asymmetrical.

#### **2.4. FINISHES**

- .1 Framing Materials: Galvanize to Z180 zinc coating designation.
- .2 Accessories: Same finish as framing members.

### **3. EXECUTION**

#### **3.1. EXAMINATION**

- .1 Verify that rough-in utilities are in proper location.

#### **3.2. ERECTION**

- .1 Install framing in accordance with ASTM C754.
- .2 Align and secure bottom and bottom tracks at 600 mm on centre.
- .3 Place insulating strip under floor tracks, and to isolate studs from uninsulated surfaces.
- .4 Place two beads of acoustic sealant between tracks and substrate to achieve an acoustic seal.
- .5 Place two beads of acoustic sealant between studs and adjacent vertical surfaces to achieve an acoustic seal.
- .6 Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- .7 Install studs vertically at 400 mm on centre where cementitious backerboard is used; 600 mm on centre elsewhere, unless otherwise indicated.
- .8 Align stud web openings horizontally.
- .9 Secure studs to tracks using fastener method. Do not weld. Screw penetration beyond joined material: minimum three exposed threads.
- .10 Stud Splicing: not permissible.
- .11 Fabricate corners using minimum three studs.
- .12 Provide double studs extending from floor to ceiling at wall openings wider than stud centres specified, not more than 50 mm from each side of openings. Secure studs together.
- .13 Brace stud framing assembly rigid.
- .14 Frame openings and around built-in equipment, cabinets, access panels on four sides. Extend framing into reveals. Coordinate clearances with equipment suppliers.
- .15 Install steel studs or furring channels between stud for attaching electrical and other boxes
- .16 Coordinate erection of studs with requirements of door and window frames; install supports and attachments.
- .17 Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, and opening frames.
  - .1 Secure steel channels to studs.
- .18 Refer to Drawings for indication of partitions extending stud framing through the ceiling to the structure above or to height above ceiling indicated. Maintain clearance under structural building members to avoid deflection transfer to studs. Provide extended leg ceiling runners.
- .19 Coordinate placement of insulation in stud spaces after stud frame erection

#### **3.3. CEILINGS AND BULKHEADS**

- .1 Erect hangers and runner channels or use purpose-made grid suspension system for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .2 Install Work level to tolerance of 1:1200
- .3 Do not support light fixtures on suspension system
- .4 Frame perimeter of openings for access panels, light fixtures, diffusers, grilles and other openings with furring channels
- .5 Install 19 by 64 mm furring channels parallel to, and at exact locations of steel stud partitions header track
- .6 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .7 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated. Extend gypsum board to underside of structure except where indicated otherwise. Allow for deflection.

**3.4. ERECTION TOLERANCES**

- .1 Section 01 73 00: Tolerances.
- .2 Erect metal studding to tolerance of 1:1000.

**END OF SECTION**

## **1. GENERAL**

### **1.1. SECTION INCLUDES**

- .1 Ceramic tiling
- .2 Waterproofing membrane
- .3 Tile accessories
- .4 Mortar and grout

### **1.2. REFERENCES**

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
  - .1 ANSI A108/A118/A136.1-2009, Specification for the Installation of Ceramic Tile
  - .2 ANSI A118.10-1993, Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone Installations
- .2 International Standards Organization (ISO)
  - .1 ISO 10545, Ceramic Tiles
  - .2 ISO 13007-1:2010 Ceramic tiles – Grouts and adhesives – Part 1: Terms, definitions and specifications for adhesives
- .3 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09 30 00 Tile Installation Manual, 2012-2014
  - .2 Tile Maintenance Guide, latest edition

### **1.3. SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Submit manufacturer's product data for each type of product specified.

### **1.4. CLOSEOUT SUBMITTALS**

- .1 Section 01 78 00: Submission procedures.
- .2 Operation and Maintenance Data: Submit TTMAC Maintenance Guide and additional information as follows.
  - .1 Manufacturer's maintenance data sheets for floor sealers and other non-tile maintenance materials and accessories.
  - .2 Warning of maintenance practices or materials that may damage or disfigure finished Work.

### **1.5. MAINTENANCE MATERIAL SUBMITTALS**

- .1 Section 01 78 00: Maintenance and extra material requirements.
- .2 Extra Stock Materials: Provide 2% of each size, color, and surface finish of tile specified.
  - .1 Store in original containers, clearly marked to identify the following:
    - .1 Manufacturer and distributor's name
    - .2 Material series name and stocking number.
    - .3 Material description, including color and pattern.

### **1.6. QUALITY ASSURANCE**

- .1 Installer Qualifications: Company specializing in performing the Work of this section with minimum three years documents experience and having completed tile installations similar in material ,design and extent to this Project.
- .2 Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer

### **1.7. DELIVERY, STORAGE, AND PROTECTION**

- .1 Section 01 61 00: Transport, handle, store and protect products.
- .2 Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- .3 Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- .4 Store liquid materials in unopened containers and protected from freezing.
- .5 Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces



### 1.8. WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 20 – Waste Management and Disposal.

### 1.9. AMBIENT CONDITIONS

- .1 Apply tile after completion of Work by other sections, to dry, clean, firm, level and plumb surfaces, free from oil or wax or any other material detrimental to tile adhesion.
- .2 Maintain tile materials and substrate temperature between manufacturer's recommended minimum and maximum temperature range.
- .3 Maintain temperature range for minimum 48 hours before and during installation and until materials are fully set and cured to manufacturer's recommendations.
- .4 Maintain adequate ventilation where Work generates toxic gases or where there is a risk of raising relative humidity to levels detrimental to building finishes and assemblies.

## 2. PRODUCTS

### 2.1. PRODUCTS, GENERAL

- .1 ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A 108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TTMAC installation methods specified in tile installation schedules, and other requirements specified
- .2 Factory Blending: For tile exhibiting colour variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colours as those taken from other packages and match accepted samples.

### 2.2. CERAMIC TILE MATERIALS

- .1 Wall Tile
  - .1 Size: 7.3 x 30 cm (3 x 12)
  - .2 Surface Finish: Glazed
  - .3 Colour: Selected by Contract Administrator from manufacturer's standard range. Allow for one colour.
  - .4 Product:
    - .1 Olympia Tile: Stone, Shadebrick series – Glazed Wall – Dark Anthracite

### 2.3. TRIMS AND EDGING

- .1 Purpose-made stainless tile trim, including wall tile edge trim, profiles to suit application, finishes and colours to be selected by the Contract Administrator from the manufacturer's complete finish/colour range. Acceptable manufacturers:
  - .1 Acceptance Manufacturers: Schluter, Wedi, Haogin, Blanke.

### 2.4. MORTAR AND GROUT MATERIALS

- .1 Mortar and grout materials: product of a single manufacturer.
- .2 Self-Leveling Underlayment: Latex-modified, Portland cement-based, as recommended by tile-setting manufacturer.
- .3 Wall Tile Mortar: Modified non-sagging dry-set lightweight cement mortar complying with ANSI A118.4, A118.11, ISO 13007 C2TES1P1.
  - .1 Manufacturer/Product:
    - .1 Mapei Ultralite Mortar.
    - .2 Laticrete 4 XLT.
    - .3 Flextile 66 Flexlite Mortar
- .4 Tile Grout:
  - .1 Polymer-Modified Grout: Fast-setting, sanded polymer-modified grout, complying with ANSI A118.6, ANSI A118.7 and ISO 13007 CG2WAF.
    - .1 Colour: selected by Contract Administrator from manufacturer's standard range.
    - .2 Location: Kitchen
    - .3 Manufacturer/Product:

- .1 Mapei Ultracolor Plus.
- .2 Laticrete Permacolor Select.
- .3 Flextile 1600 RSG.

## **2.5. MIXING MORTARS AND GROUT**

- .1 Mix mortars and grouts to comply with reference standards and mortar and grout manufacturers' written instructions.
- .2 Add materials, water, and additives in accurate proportions.
- .3 Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## **3. EXECUTION**

### **3.1. EXAMINATION**

- .1 Examine substrates, areas, and conditions where tile will be installed, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
  - .1 Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - .2 Verify that concrete substrates for tile floors comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - .1 Verify that surfaces that received a steel trowel finish have been mechanically scarified
    - .2 Very that protrusions, bumps, and ridges have been removed by sanding or grinding
  - .3 Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of Work and similar items located in or behind tile has been completed.
  - .4 Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Contract Administrator
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2. PREPARATION**

- .1 Prepare substrate in accordance with manufacturer's recommendations, and as follows
  - .1 Apply thin leveling coat of leveling compounds as required to provide installation tolerances as required by manufacturer.
  - .2 Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
  - .3 Prime gypsum board surface with manufacturer's recommended multi-purpose acrylic latex primer. Allow to dry completely before apply mortar.
  - .4 Prepare substrates to receive waterproofing by apply a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1:50 towards drain.
- .2 Blending: For tile exhibiting colour variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colours as those taken from other packages and match approved samples if not factory blended, either return to manufacturer or blend tiles at Project Site before installing.
- .3 Before installation ensure back o tile is free of contaminants.

### **3.3. WATERPROOFING MEMBRANE INSTALLATION**

- .1 Install waterproofing membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.
- .2 Do not install tile or setting materials over crack isolation membrane until membrane has cured.

### **3.4. TILE INSTALLATION**

- .1 Comply with TTMAC's "Specification Guide 09 30 00 Tile Installation Manual" for TTMAC installation methods specified in tile installation schedules. Comply with parts of the ANSI A108

Series "Specifications for Installation of Ceramic Tile", that are referenced in TTMAC installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

- .2 Tile Installation Method:
  - .1 Ceramic Wall Tile:
    - .1 Kitchen Backsplash Area
- .3 Extend tile Work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate Work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- .4 Jointing Pattern: Lay tile in pattern indicated. Lay out tile Work and centre tile fields in both directions in each space or on each wall area. Lay out tile Work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  - .1 Wall – Running Bond. See Drawing.
- .5 Joint Widths: 1.6 mm, unless otherwise indicated
- .6 Grouting:
  - .1 Allow proper setting time before grouting.
  - .2 Grout joints solidly with grout mixed to proper consistency to flow into and fill joints.
  - .3 Apply grout in dust free environment. Protect for minimum seven days.
  - .4 Ensure that grout is free of pits or voids. When sufficiently set tool surface to a slightly concave profile. Repoint as necessary.
  - .5 Maintain uniform colour throughout.
  - .6 As Work progresses, remove excess grout and polish with clean cloths.
  - .7 Do not grout joint around fixtures, pipes or other fittings. Fill joints with mildew resistant silicone sealant.
  - .8 Grout Sealer: Apply grout sealer to grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.
- .7 Metal Edge and Transition Strips: install where exposed edge of tile flooring meets carper, wood, or other flooring that finished flush with or below top of tile and no threshold is indicated, and at edges of exposed wall tile

### **3.5. MOVEMENT JOINTS**

- .1 Expansion Joints: Provide sealant-filled joints, including control contraction and isolation joints. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - .1 Provide movement joints in accordance with TTMAC detail 301MJ.
  - .2 Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - .3 Provide control joints around perimeter of large areas, around columns, in locations where area changes direction and where tile abuts other hard material.
- .2 Fill non-prefabricated movement joints with sealant.

### **3.6. LIPPAGE TOLERANCES**

- .1 Field Verification of Finished installation: To TTMAC Manual

### **3.7. CLEANING**

- .1 Section 01 74 00: Cleaning installed Work.
- .2 Clean tile and grout surfaces with manufacturer's recommended cleaning methods.

### **3.8. PROTECTION OF FINISHED WORK**

- .1 Protect finished areas from traffic until setting materials have sufficiently cured to TTMAC requirements.
- .2 Protect finished floor areas from foot and wheel traffic from floors for a minimum 72 hours after completion of grouting.

**END OF SECTION**

## **1. GENERAL**

### **1.1. SECTION INCLUDES**

- .1 Suspended metal grid ceiling system and perimeter trim.
- .2 Acoustic panels

### **1.2. REFERENCES**

- .1 ASTM International (ASTM)
  - .1 ASTM C635/C635M-13a – Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - .2 ASTM E1264-14 – Standard Classification of Acoustical Ceiling Products
- .2 ECD Energy & Environment Canada
  - .1 Green Globes Canada, Design for New Construction and Major Retrofits v.2 2014

### **1.3. ADMINISTRATIVE REQUIREMENTS**

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Sequencing:
  - .1 Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead Work is completed, tested, and approved.
  - .2 Stall acoustic units after interior wet Work is dry

### **1.4. SUBMITTALS FOR REVIEW**

- .1 Section 01 33 00: Submission procedures
- .2 Product data: Provide data on metal grid system components, and acoustic tiles
- .3 Samples:
  - .1 Submit two samples, manufacturer's standard sample size, illustrating material and finish of acoustic units.

### **1.5. MAINTENANCE MATERIAL SUBMITTALS**

- .1 Section 01 78 00: Maintenance and extra material requirements.
- .2 Extra Stock Materials: Provide 5% of total acoustic unit area of extra panels to Contract Administrator.

### **1.6. QUALITY ASSURANCE**

- .1 Products of This Section: Shall have Environmental Product Declaration (EPD) certification.

### **1.7. DELIVERY, STORAGE AND HANDLING**

- .1 Deliver acoustical panels, suspension-system components, and accessories to Project Site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- .2 Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.
- .3 Handle acoustical panels carefully to avoid chipping edges or damaging units

### **1.8. AMBIENT CONDITIONS**

- .1 Do not install acoustical panel ceiling until spaces are enclosed and weatherproof, wet Work in spaces is complete and dry, Work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

## **2. PRODUCTS**

### **2.1. SUSPENSION GRID MATERIALS & PERIMETER TRIMS**

- .1 Non-fire-rated, two-directional, wide-face, capped, double-web, steel suspension system. Main and cross runners roll formed from cold-rolled steel sheet; pre-painted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than Z90 coating designation; with prefinished 24-mm wide metal caps on flanges.
  - .1 Structural Classification: Intermediate-duty system
  - .2 Face Design: Non-directional
  - .3 Cap Material: Steel cold-rolled sheet.
  - .4 Cap Finish: Painted white.
  - .5 Manufacturer/Model:
    - .1 CGC DX/DXL
- .2 Hanger Wire:
  - .1 Galvanized soft annealed steel wire
  - .2 Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635/C 635M, Table 1, "Direct Hung") will be less than yield stress of wire, but no less than 2.6 mm diameter wire.
- .3 Hanger Inserts: purpose made. Provide hangers and fasteners for independent suspension of light boxes
- .4 Perimeter Trims: USG Compasso Standard Suspension Trim Profile 150 mmH.
- .5 Metal Edge Moldings and Trim: Roll-formed, sheet-metal of type and profile indicated or, if not indicated, manufacturer's standard mouldings for edges and penetrations; formed from sheet metal of same material, finish, and colour as that used for exposed flanges of suspension-system runners.

## 2.2. ACOUSTIC PANEL MATERIALS

- .1 Acoustic Panels: to ASTM E1264, conforming to the following:
  - .1 Size: 2" x 4" x 3/4"
  - .2 Thickness: 19 mm.
  - .3 Composition: Wet-formed mineral fibre.
  - .4 Light Reflectance: minimum 84%
  - .5 NRC: minimum 0.55
  - .6 CAC: minimum 35
  - .7 Edge: Angled reveal.
  - .8 Surface Color: White
  - .9 Surface Finish: Non-directional fissured with factory applied latex paint.
  - .10 Manufacturer/Model:
    - .1 CGC; RADAR Illusion 2842

## 2.3. ACCESSORIES

- .1 Acoustical Sealant: Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - .1 Exposed Joints: Non-sag, paintable, non-staining latex sealant
  - .2 Concealed Joints: Non-drying, non-hardening, non-skinning, non-staining, gunnable, synthetic-rubber sealant.
- .2 Touch-up Paint: Type and colour to match acoustic and grid units

## 3. EXECUTION

### 3.1. EXAMINATION

- .1 Do not erect ceiling suspension system until Work above ceiling including anchors, blockings, sound and fire barriers, mechanical and electrical Work has been reviewed by Contract Administrator
- .2 Verify that layout of hangers will not interfere with other Work.

### 3.2. PREPARATION

- .1 Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply

**3.3. INSTALLATION – LAY-IN GRID SUSPENSION SYSTEM**

- .1 Install suspension system to ASTM C636/C636M, and manufacturer's written instructions, and as supplemented in this section.
- .2 Install system capable of supporting imposed loads to deflection of 1/360 maximum.
- .3 Install after major above ceiling Work is complete. Coordinate the location of hangers with other Work.
- .4 Provide hanger clips during steel deck erection. Provide additional hangers and inserts as required.
- .5 Hang suspension system independent of walls, columns, ducts, pipes, and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- .6 Where width of ducts and other construction with ceiling plenum produces hanger spacings that interfere with location of hangers at spacing required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
- .7 Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads independent of suspension grid .
- .8 Do not eccentrically load system, or produce rotation runners
- .9 Do not kink, or bend hanger wires to level system
- .10 Perimeter Moulding:
  - .1 Install edge moulding at intersection of ceiling and vertical surfaces.
  - .2 At sound rated partitions, install edge moulding into bed of acoustic sealant or gasket. Ensure sealant or sealant are no exposed below perimeter moulding
  - .3 Use longest practical lengths.
  - .4 Mitre corners
  - .5 Provide moulding at junctions with other interruptions
  - .6 Do not use exposed fasteners, including pop rivets, on mouldings and trim

**3.4. INSTALLATION – ACOUSTIC UNITS**

- .1 Fit acoustics units in place, free from damaged edges or other defects detrimental to appearance and function.
- .2 Install units after above ceiling Work is complete
- .3 Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
- .4 Cutting Acoustic Units:
  - .1 Cut to fit irregular grid and perimeter edge trim.
  - .2 Double cut and field paint exposed edges of reveal edge units.
- .5 Where round obstructions occur, provide preformed closures to match perimeter molding.
- .6 Install hold-down clips to retain panels right to grid system within 6 m of an exterior door.
- .7 Do not use scratched, damaged or broken panels. Replace scratched, damaged and broken panels.

**3.5. ERECTION TOLERANCES**

- .1 Section 01 73 00: Tolerances
- .2 Maximum variation from Flat and Level Surface: 3 mm in 3650 mm.
- .3 Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees

**3.6. CLEANING**

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .2 Clean down materials, leave free of grime, dirt, finger prints, other evidence of Work

**END OF SECTION**

## **1. GENERAL**

### **1.1. REFERENCES**

- .1 ASTM International:
  - .1 ASTM C423 – Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
  - .2 ASTM C635 – Standard Specification for Metal Suspension Systems for Acoustic Tile and Lay-in Panel Ceilings
  - .3 ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials
  - .4 ASTM E119 – Fire Test of Building Construction and Materials
  - .5 ASTM E1264 – Classification for Acoustic Ceiling Products
  - .6 ASTM E1414 – Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
- .2 Canadian General Standards Board (CGSB):
  - .1 CAN/CGSB-92.1, Sound Absorptive Prefabricated Acoustical Units.
- .3 Ceilings and Interior Systems Construction Association (CISCA):
  - .1 CISCA Code of Practices.
- .4 Canada Green Building Council (CaGBC)
  - .1 LEED Canada NC 2009, LEED: Green Building Rating System Reference Package for New Construction and Major Renovations (including Addendum).

### **1.2. SUBMITTALS**

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Product Data: Submit manufacturer's product data, maintenance and installation instructions.
- .3 Shop Drawing Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Indicate details of Construction, profiles, fastening, panel layout, and other related details.

### **1.3. QUALITY ASSURANCE**

- .1 Installer must have performed installations of the same scale in the last three (3) years.

### **1.4. MOCK-UPS**

- .1 Mock-ups: Construct mock-ups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution in accordance with Section 01 45 00 Quality Control for mock-ups and as follows:
  - .1 Build mock-up of typical panel within irregular truss space, incorporating the panel and finish along with fastening method.
  - .2 Notify Contract Administrator a minimum seven days prior to mock-up construction.
  - .3 Review and acceptance of mock-ups does not constitute approval of deviations from the Contract Documents contained in mock-ups unless Contract Administrator specifically notes such deviations in writing.
  - .4 Once reviewed by Contract Administrator, acceptable mock-up can form a permanent part of the Work, and will form the basis for acceptance for the remainder of the project.
  - .5 Remove and replace materials found not acceptable at no additional cost to the contract.

### **1.5. AMBIENT CONDITIONS**

- .1 Maintain a uniform air temperature above 15 degrees C and humidity of 20-40% for 48 hours before, during, and 48 hours after, installation.
- .2 Permit wet Work to dry before commencement of installation.

**1.6. WARRANTY**

- .1 Provide manufacturer's warranty against defects in materials.
  - .1 Warranty shall provide material and labour to repair or replace defective materials.
- .2 Manufacturer's warranty shall cover a period of one (1) year from date of substantial completion.

**1.7. WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.
- .3 Divert unused metal materials from landfill to metal recycling facility approved by Contract Administrator.

**1.8. 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. Packages or materials showing evidence of water or other damage will be rejected.

**1.9. MAINTENANCE**

- .1 Extra materials:
  - .1 Provide acoustical units amounting to 5% of gross ceiling area for each pattern and type required for project.
  - .2 Extra materials to be from same production run as installed materials.
  - .3 Clearly identify each type of acoustic unit, including colour and texture.
  - .4 Deliver to Contract Administrator, upon completion of the Work of this section.
  - .5 Store where directed by Contract Administrator.

**2. PRODUCTS**

**2.1. ACOUSTIC FABRIC-FACED PANELS**

- .1 Decoustics – Air Renew
- .2 610 x 2440 Type 10
- .3 Colour: Harmony Collection

**3. EXECUTION**



**3.1. MANUFACTURER'S INSTRUCTIONS**

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

**3.2. EXAMINATION**

- .1 Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of Work.
- .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Contract Administrator.
- .4 Coordinate Work with other sections to ensure installation as per specifications and drawings.
- .5 All spaces in truss to be filled with panels to be templated on Site to suit openings.

**3.3. INSTALLATION**

- .1 Install acoustical system as per manufacturer's instructions.
- .2 Lay out system according to architectural drawings.
- .3 Ensure acoustical system is co-ordinated with location of related components.
- .4 Install components rigid in place tight to space frame members in accordance with approved shop drawings, product data and mockup.

**3.4. CLEANING**

- .1 Upon completion of installation proceed in accordance with 01 74 00 – Cleaning
- .2 Clean exposed surfaces of acoustical system to comply with manufacturer's instructions for cleaning.
- .3 Touch up any minor finish damage and to be approved by Contract Administrator.
- .4 Remove and replace Work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**3.5. PROTECTION**

- .1 Protect installed Work from damage due to subsequent construction activity, including temperature and humidity limitations and dust control, so that the Work will be without damage and deterioration at the completion of construction.
- .2 Replace any and all damaged panel system components.

**END OF SECTION**

## 1. GENERAL

### 1.1. REFERENCES

- .1 American Society for Testing and Materials International (ASTM)
  - .1 ASTM F 1303-[04], Standard Specification for Sheet Vinyl Floor Covering with Backing.
  - .2 ASTM D 2047: Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
  - .3 ASTM D 5116: Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/Products.
  - .4 ASTM E 1745: Standard Specification for Water Vapor Retarders Used in Contact with Soil Or Granular Fill under Concrete Slabs.
  - .5 ASTM F 710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
  - .6 ASTM F 1869: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
  - .7 ASTM F 1344: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHIMIS)
  - .1 Material Safety Data Sheets (MSDS)
- .3 GreenGuard Environmental Institute (GEI)
  - .1 GreenGuard Indoor Air Quality Certified.
  - .2 GreenGuard Children and Schools Certified.
- .4 National Fire Protection Association
  - .1 NFPA 101: Life Safety Code.
- .5 International Organization for Standardization (ISO)
  - .1 ISO 9001: Quality Management Systems – Requirements.
  - .2 ISO 14001: Environmental Management Systems – Requirements with Guidance for Use.

### 1.2. SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 – Submittal Procedures.
  - .1 Submit 300mm x 300mm sample pieces of sheet material, 300mm long cover former and capping strip.
- .2 Submit WHIMIS MSDS – Material Safety Data Sheets in accordance with Section 01 33 Shop Drawings, Product Data, and Samples, with the VOC levels highlighted

### 1.3. QUALITY ASSURANCE

- .1 Manufacturer must have experience in the manufacturing of specified flooring.
- .2 Installer must have performed installations of the same scale in the last three (3) years and possess valid compliance with ISO 9001.
- .3 Installation of mock-up is highly recommended and must be deemed acceptable by

Contract Administrator. Mock-up is to be installed following the same procedures and utilizing the same specified materials that will be used for the actual project.

**1.4. AMBIENT CONDITIONS**

- .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees C for seven days before, during, and seven days after, installation.

**1.5. WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.

**1.6. MAINTENANCE**

- .1 Extra Materials
  - .1 Provide 2% extra of each colour required for project for maintenance use.
  - .2 Extra materials to be one piece and from same run as installed materials.
  - .3 Store where directed by Contract Administrator.

**1.7. ENVIRONMENTAL REQUIREMENTS**

- .1 The VOC content of the adhesives, sealants, and sealant primers used must be less than the VOC content limits of the State of California's South Coast Air Quality Management District (SCAQMD) Rule #1168 (effective date of January 2007).

**2. PRODUCTS**

**2.1. SHEET MATERIAL**

- .1 Sheet vinyl to ASTM F 1913-04, commercial.
  - .1 Manufacturer: Johnsonite – Tarkett Commercial
  - .2 Type: Mipolam Symbioz
    - .1 Size: 200 cm wide rolls
    - .2 Thickness: 2.0 mm
    - .3 Weight: 3.1 kg/sq. m.
    - .4 Joints: Welded
    - .5 Colour: 651 Aria Cotton Blossom & 656 Aria Ferris Wheel

**2.2. RESILIENT BASE**

- .1 Johnsonite Vinyl Wall Base
  - .1 Thickness: 0.080" (2mm)
  - .2 Height: 6"
  - .3 Colour: 40-Black & 63 Burnt Umber
  - .4 Outside/Inside corners: preformed
  - .5 Adhesive: Use water-resistant type recommended by manufacturer to suit product and substrate.

### **3. EXECUTION**

#### **3.1. MANUFACTURER'S INSTRUCTIONS**

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

#### **3.2. PREPARATION**

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.
- .2 Prime concrete slab to resilient flooring manufacturer's printed instructions.

#### **3.3. APPLICATION: FLOORING**

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Run sheets in direction of traffic. Heat weld according to manufacturer's printed instructions.
- .5 Heat weld seams of vinyl sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring around fixed objects.
- .8 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .9 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.

#### **3.4. APPLICATION: BASE**

- .1 Comply with manufacturer's written instructions for installing resilient base.
- .2 Apply resilient base to walls, columns, pilasters, caseWork and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- .3 Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- .4 Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- .5 Do not stretch resilient base during installation.
- .6 On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- .7 Preformed Corners: Install preformed corners before installing straight pieces.
- .8 Job-Formed Corners:
  - .1 Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
  - .2 Inside Corners: Use straight pieces of maximum lengths possible.

#### **3.5. CLEANING**

- .1 Upon completion of installation proceed in accordance with 01 74 00 – Cleaning
- .2 Comply with manufacturer's written instructions for cleaning and protection of resilient
- .3 products.
- .4 Perform the following operations immediately after completing resilient product installation:
  - .1 Remove adhesive and other blemishes from exposed surfaces.
  - .2 Sweep and vacuum surfaces thoroughly.
  - .3 Damp-mop surfaces to remove marks and soil.
- .5 Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- .6 Cover resilient products until Substantial Completion.

**END OF SECTION**

## 1. GENERAL

### 1.1. RELATED REQUIREMENTS

- .1 Section 04 22 00 – Concrete Unit Masonry
- .2 Section 05 12 23 – Structural Steel for Buildings
- .3 Section 05 31 00 – Steel Decking
- .4 Section 05 50 00 – Metal Fabrications
- .5 Section 05 51 29 – Metal Stairs & Ladders
- .6 Section 08 11 00 – Metal Doors and Frames
- .7 Section 09 21 16 – Gypsum Board Assemblies

### 1.2. REFERENCES

- .1 Environmental Protection Agency (EPA)
  - .1 Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings).
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).
- .3 The Master Painters Institute (MPI)
  - .1 Architectural Painting Specification Manual - [February 2004].
  - .2 Standard GPS-1-[05], MPI Green Performance Standard for Painting and Coatings.
- .4 National Fire Code of Canada.
- .5 Society for Protective Coatings (SSPC)
  - .1 Systems and Specifications, SSPC Painting Manual [2005].
- .6 Canada Green Building Council (CaGBC)

### 1.3. QUALITY ASSURANCE

- .1 Qualifications:
  - .1 Contractor: to have a minimum of five years proven satisfactory experience. When requested, provide list of last three comparable jobs including, job name and location, specifying authority, and project manager.
  - .2 Qualified journeypersons as defined by local jurisdiction to be engaged in painting Work
  - .3 Apprentices: may be employed provided they Work under direct supervision of qualified journeyperson in accordance with trade regulations.
  - .4 Conform to latest MPI requirements for exterior painting Work including preparation and priming.
  - .5 Materials: in accordance with MPI Painting Specification Manual "Approved Product" listing and from a single manufacturer for each system used.
  - .6 Paint materials such as linseed oil, shellac, and turpentine to be highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and to be compatible with other coating materials as required.
  - .7 Retain purchase orders, invoices and documents to prove conformance with noted MPI requirements when requested by the Contract Administrator.
- .8 Standard of Acceptance:
  - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Soffits: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

**1.4. PERFORMANCE REQUIREMENTS**

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

**1.5. SCHEDULING**

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

**1.6. ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .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 numbers.
  - .4 MPI Environmentally Friendly classification system rating.
  - .5 Manufacturer's Material Safety Data Sheets (MSDS).
- .5 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Submit 200 x 300 mm sample panels of each paint, stain, clear coating, special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:
    - .1 3 mm plate steel for finishes over metal surfaces.
    - .2
    - .3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.
    - .4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
  - .2 When approved, samples shall become acceptable standard of quality for appropriate on-Site surface with one of each sample retained on-Site.
  - .3 Submit full range of available colours where colour availability is restricted.

**1.7. MAINTENANCE**

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

**1.8. DELIVERY, STORAGE AND HANDLING**

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

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Labels: to indicate:
  - .1 Manufacturer's name and address.
  - .2 Type of paint or coating.
  - .3 Compliance with applicable standard.
  - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from Site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store materials and equipment in well-ventilated area with temperature range 7 degrees C to 30 degrees C.
- .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Contract Administrator. After completion of operations, return areas to clean condition to approval of Contract Administrator.
- .10 Remove paint materials from storage only in quantities required for same day use.
- .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
- .12 Fire Safety Requirements:
  - .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from Site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.
- .2 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling.
  - .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
  - .3 Material, which cannot be reused, must be treated as hazardous waste and disposed of in an appropriate manner.
  - .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.
  - .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
    - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
    - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
    - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
    - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
    - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
  - .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
  - .7 Close and seal tightly partly used sealant and adhesive containers and store protected



in well-ventilated fire-safe area at moderate temperature.

### 1.9. AMBIENT CONDITIONS

- .1 Heating, Ventilation and Lighting:
  - .1 Do not perform painting Work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 degrees C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .2 Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .3 Co-ordinate use of existing ventilation system with General Contractor and ensure its operation during and after application of paint as required.
  - .4 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .5 Perform no painting Work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities to be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting Work when:
    - .1 Ambient air and substrate temperatures are below 10 degrees C.
    - .2 Substrate temperature is over 32 degrees C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
    - .4 Relative humidity is above 85 % or when dew point is less than 3 degrees C variance between air/surface temperature.
    - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at Site.
  - .2 Perform no painting Work when maximum moisture content of substrate exceeds:
    - .1 12% for concrete and masonry (clay and concrete brick/block).
    - .2 15% for wood.
    - .3 12% for plaster and gypsum board.
  - .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
  - .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
  - .1 Apply paint finish in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint when previous coat of paint is dry or adequately cured.
  - .4 Apply paint finishes when conditions forecast for entire period of application fall within manufacturer's recommendations.
  - .5 Do not apply paint when:
    - .1 Temperature is expected to drop below 10 degrees C before paint has thoroughly cured.
    - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
    - .3 Surface to be painted is wet, damp or frosted.

- .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
- .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
- .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of Contract Administrator such that painted surfaces will have dried and cured sufficiently before occupants are affected.

#### **1.10. WASTE MANAGEMENT AND DISPOSAL**

- .1 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .2 Collect and separate for disposal paper, plastic, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.

### **2. PRODUCTS**

#### **2.1. MANUFACTURERS – PAINT**

- .1 Standard of Acceptance: Benjamin Moore
- .2 Substitutions: Refer to Section 01 25 00

#### **2.2. MATERIALS**

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
  - .1 be water-based, water soluble, water clean-up.
  - .2 be non-flammable
  - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .4 be manufactured without compounds which contribute to smog in the lower atmosphere.
  - .5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .5 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne surface coatings must have a flash point of 61.0°C or greater.
- .8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:

- .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

### 2.3. COLOURS

- .1 Colours are to be (final colours to be confirmed by Contract Administrator prior to ordering. Selection of colours will be from manufacturer's full range of colours).
  - .1 Paint Colour 1 (Main floor): CC-40 Cloud White
  - .2 Paint Colour 2 (Basement): CC-456 Dufferin Terrace
- .2 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

### 2.4. MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to Site. On-Site tinting of painting materials is allowed only with Contract Administrator's written permission. See Drawing A3.0 For Stairway Colour
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Contract Administrator.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

### 2.5. GLOSS/SHEEN RATINGS

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

<b>Gloss Level /Category</b>	<b>Units @ 60E/</b>	<b>Units @ 85°</b>
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces shall be as specified herein.

### 2.6. INTERIOR PAINTING SYSTEMS

- .1 Concrete Masonry Units.
  - .1 Cloverdale – As specified, #43700 Aquaseal, Waterborne Clear, Acrylic Sealer
- .2 Structural Steel and Metal Fabrications: columns, beams, joists, spaceframe.
  - .1 INT 5.1E Alkyd G5 finish.
- .3 Moisture Resistant Interior Gypsum Board – Janitor/Laundry/Mud & Change Rooms
  - .1 INT 5.1Alkyd G5 Finish

### **3. EXECUTION**

#### **3.1. MANUFACTURER'S INSTRUCTIONS**

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

#### **3.2. PREPARATION**

- .1 Perform preparation and operations for exterior painting in accordance with MPI Maintenance Repainting Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.
- .3 Clean and prepare exterior surfaces to be repainted in accordance with MPI Maintenance Repainting Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and 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.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly. Allow sufficient drying time and test surfaces using electronic moisture meter before commencing Work.
  - .5 Use water-based cleaners in place of organic solvents where surfaces will be repainted using water based paints.
  - .6 Many water-based paints cannot be removed with water once dried. Minimize use of kerosene or such organic solvents to clean up water-based paints.
- .4 Clean metal surfaces to be repainted by removing rust, dirt, oil, grease and foreign substances in accordance with MPI requirements. Remove such contaminants from surfaces, pockets and corners to be repainted by brushing with clean brushes, blowing with clean dry compressed air, or brushing/vacuum cleaning as required.
- .5 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before priming and between applications of remaining coats. Touch-up, spot prime, and apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .6 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.

#### **3.3. PROTECTION**

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

### **3.4. APPLICATION**

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

### **3.5. MECHANICAL/ELECTRICAL EQUIPMENT**

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

### **3.6. STRUCTURAL STEEL, JOISTS, SPACE FRAME, DECKING**

- .1 Paint all structural steel, steel joists, steel space frame and steel decking with colour and finish as noted.

### **3.7. FIELD QUALITY CONTROL**

- .1 Inspection:
  - .1 Field inspection of exterior painting operations to be carried out be independent

- inspection firm as designated by Contract Administrator.
- .2 Advise Contract Administrator when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
  - .3 Co-operate with inspection firm and provide access to areas of Work.
- .2 Manufacturer's Field Services:
- .1 Provide manufacturer's field services consisting of product use recommendations and periodic Site visits for inspection of product installation in accordance with manufacturer's instructions.

**3.8. CLEANING**

- .1 Proceed in accordance with Section 01 74 11 -Cleaning.
  - .1 Remove paint where spilled, splashed, splattered or sprayed as Work progresses using means and materials that are not detrimental to affected surfaces.

**3.9. EXTERIOR SURFACES**

- .1 See Section 09 97 19 – Painting Exterior Metal Surfaces

**END OF SECTION**

## **1. GENERAL**

### **1.1. RELATED REQUIREMENTS**

- .1 Section 05 12 23 – Structural Steel for Buildings
- .2 Section 05 31 00 – Steel Decking
- .3 Section 05 50 00 – Metal Fabrications
- .4 Section 05 51 29 – Metal Stairs & Ladders
- .5 Section 08 11 00 – Metal Doors and Frames

### **1.2. REFERENCES**

- .1 The Master Painters Institute (MPI)
  - .1 Exterior Structural Steel and Metal Fabrications, [07].
    - .1 EXT 5.1D, Alkyd.
    - .2 EXT 5.1G, Polyurethane, Pigmented (over epoxy zinc rich primer and high build epoxy).
    - .3 EXT 5.4, Aluminum.
  - .2 Environmental Choice Program (ECP)
    - .1 CCD-047-[98(R2005)], Architectural Surface Coatings.
    - .2 CCD-048-[98(R2006)], Surface Coatings - Recycled Water-borne.
  - .3 Federal Standard (FS)
    - .1 FED-STD-595B-[89], Colours Used in Government Procurement.
  - .4 The Society for Protective Coatings (SSPC)
    - .1 SSPC-SP 1-[82(R2004)], Solvent Cleaning.
    - .2 SSPC-SP 2-[82(R2004)], Hand Tool Cleaning.
    - .3 SSPC-SP 3-[82(R2004)], Power Tool Cleaning.
    - .4 SSPC-SP 6/NACE No. 3-[07], Commercial Blast Cleaning.
    - .5 SSPC-SP 7/NACE No. 4-[07], Brush-off Blast Cleaning.
    - .6 SSPC-Vis-1-[89], Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1, 2000 (Steel Structures Painting Manual, Chapter 2 - Surface Preparation Specs.).
    - .7 SSPC-SP 10/NACE No. 2-[07], Near White Blast Cleaning.
    - .8 SSPC-PA 2[04], Measurement of Dry Coat Thickness with Magnetic Gauges.
    - .9 SSPC Good Painting Practices, Volume 1, 4th Edition.

### **1.3. ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for painting exterior metal surfaces and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
  - .1 Submit for review and acceptance of each unit.
  - .2 Samples will be returned for inclusion into Work.
  - .3 Upon request, Contract Administrator will furnish qualified products list of paints.
  - .4 Enable Contract Administrator to take 1 L samples of each paint delivered to Site, one sample from manufacturer's containers and one sample from

- .5 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.4. QUALITY ASSURANCE**

- .1 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.5. DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to Site in original factory packaging, labelled with manufacturer's name and address.

#### **1.6. WASTE MANAGEMENT AND DISPOSAL**

- .4 Remove from Site and dispose of packaging materials at appropriate recycling facilities.
- .5 Collect and separate for disposal paper, plastic, corrugated cardboard, packaging material for recycling in accordance with Waste Management Plan.

### **2. PRODUCTS**

#### **2.1. MANUFACTURERS – PAINT**

- .1 Standard of Acceptance: Benjamin Moore
- .2 Substitutions: Refer to Section 01 25 00

#### **2.2. MATERIALS**

- .1 Paint materials listed in the MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Provide paint materials for paint systems from single manufacturer.
- .3 Low odour products: whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour. Only qualified products with E2 or E3 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
  - .1 be water-based, water soluble, water clean-up.
  - .2 be non-flammable
  - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .4 be manufactured without compounds which contribute to smog in the lower atmosphere.
  - .5 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .5 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).



- .6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne surface coatings must have a flash point of 61.0°C or greater.
- .8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
  - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
  - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .9 Water-borne paints and stains, and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.

### 2.3. COLOURS

- .1 Colours are to be (final colours to be confirmed by Contract Administrator prior to ordering. Selection of colours will be from manufacturer's full range of colours).
- .2 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

### 2.4. MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to Site. On-Site tinting of painting materials is allowed only with Contract Administrator's written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Contract Administrator.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

### 2.5. GLOSS/SHEEN RATINGS

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

<u>Gloss Level /Category</u>	<u>Units @ 60E/</u>	<u>Units @ 85°</u>
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 – gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces shall be as specified herein.

## **2.6. EXTERIOR PAINTING SYSTEMS**

- .1 Structural Steel and Metal Fabrications: columns, beams, joists and miscellaneous metal.
  - .1 EXT 5.1D Alkyd G3 finish.
- .2 Galvanized Metal: high contact/high traffic areas (doors, frames, exterior canopy)
  - .1 EXT 5.3B Alkyd G3 finish on HSS gate.
  - .2 EXT 5.3C Epoxy G5 finish on exterior canopy steel decking.
  - .3 Exterior canopy columns, beams to be powder coated over galvanized.

## **3. EXECUTION**

### **3.1. EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for painting exterior metal surfaces installation in accordance with manufacturer's written instructions.
  - .1 Carry out tests to determine existence of lead base paint on existing exterior metal surfaces.
  - .2 If lead exists stop Work and report findings to Contract Administrator.
  - .3 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
  - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Administrator.

### **3.2. PREPARATION**

- .1 Remove existing loose and rusted paint from exterior metal surfaces.
- .2 New metal surfaces:
  - .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following:
    - .1 Solvent cleaning: to SSPC-SP 1.
  - .2 Commercial blast clean rusted and bare metal surfaces where existing paint system has failed.
  - .3 Brush-off blast clean remaining metal surfaces to be painted.
  - .4 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.
- .3 Compressed air to be free of water and oil before reaching nozzle.
- .4 Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes, by blowing with clean dry compressed air, or by vacuum cleaning.
- .5 Prior to starting paint application ensure degree of cleanliness of surfaces is to SSPC-Vis 1.
  - .1 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.
  - .2 Clean surfaces again if rusting occurs after completion of surface preparation.
- .6 Mixing paint:
  - .1 Do not dilute or thin paint for brush application.
  - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
  - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
  - .4 Thin paint for spraying according to manufacturer's written instructions. If directions are not on container, obtain instructions in writing from

manufacturer and provide copy of instructions to Contract Administrator.

- .7 Number of paint coats: 2.
  - .1 New metal surfaces.
    - .1 Shop: 2 primer coats to minimum dry film thickness of 35 microns per coat.
    - .2 Field: 2 alkyd enamel coats to minimum dry film thickness of 25 microns per coat.

### 3.3. APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
- .2 Apply paint by spraying, brushing, or combination of both. Use sheepskins or daubers when no other method is practical in places of difficult access.
- .3 Use dipping or roller coating method of application when specifically authorized by Contract Administrator in writing.
- .4 Caulk open seams at contact surfaces of built up members with material approved by Contract Administrator, before second undercoat of primer is applied.
- .5 Where surface to be painted is not under cover, do not apply paint when:
  - .1 Air temperature is below 5 degrees C or when temperature is expected to drop to 0 degrees C before paint has dried.
  - .2 Temperature of surface is over 50 degrees C unless paint is specifically formulated for application at high temperatures.
  - .3 Fog or mist occur at Site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.
  - .4 Surface to be painted is wet, damp or frosted.
  - .5 Previous coat is not dry.
- .6 Supply cover when paint must be applied in damp or cold weather. Supply, shelter, or heat surface and surrounding air to comply with temperature and humidity conditions specified. Protect until paint is dry or until weather conditions are suitable.
- .7 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .8 Apply each coat of paint as continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .9 Brush application:
  - .1 Work paint into cracks, crevices and corners and paint surfaces not accessible to brushes by spray, daubers or sheepskins.
  - .2 Brush out runs and sags.
  - .3 Remove runs, sags and brush marks from finished Work and repaint.
- .10 Spray application:
  - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.
  - .3 Keep paint ingredients properly mixed in spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
  - .4 Apply paint in uniform layer, with overlapping at edges of spray pattern.
  - .5 Brush out immediately runs and sags.
  - .6 Use brushes to Work paint into cracks, crevices and places, which are not adequately painted by spray. In areas not accessible to spray gun, use

brushes, daubers or sheepskins.

.7 Remove runs, sags and brush marks from finished Work and repaint.

.11 Shop painting:

.1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.2 Spray paint contact surfaces of field assembled, bolted, friction type joints with primer coat only. Do not brush primer after spraying.

.3 Do not paint metal surfaces, which are to be embedded in concrete.

.4 Paint metal surfaces to be in contact with wood with either full paint coats specified or three shop coats of specified primer.

.5 Do not paint metal within 50 mm of edge to be welded. Give unprotected steel one coat of boiled linseed oil or other approved primer after shop fabrication is completed.

.6 Remove weld spatter before painting. Remove weld slag and flux by methods as specified in paragraph 3.2.3 Metal Surfaces to be Repainted.

.7 Protect machine finished or similar surfaces that are not to be painted but that do require protection, with coating of rust inhibitive petroleum, molybdenum disulphide, or other coating approved by Contract Administrator.

.8 Copy previous erection marks and weight marks on areas that have been shop painted.

.12 Field painting:

.1 Paint steel structures as soon as practical after erection.

.2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.3 Field paint surfaces (other than joint contact surfaces), which are accessible before erection but which are not to be accessible after erection.

.4 Apply final coat of paint after concrete Work is completed or as directed by Contract Administrator. If concreting or other operations damage paint, clean and repaint damaged area. Remove concrete spatter and droppings before paint is applied.

.5 Where painting does not meet with requirements of specifications, and when so directed by Contract Administrator remove defective paint, thoroughly clean affected surfaces and repaint in accordance with these specifications.

.13 Handling painted metal:

.1 Handle painted metal after paint has dried, or when necessary for handling for painting or stacking for drying.

.2 Scrape off and touch up paint, which is damaged in handling, with same number of coats and kinds of paint as were previously applied to metal.

**3.4. FIELD QUALITY CONTROL**

.1 Site Tests, Inspections:

.1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC-PA 2.

**3.5. CLEANING**

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

**3.6. PROTECTION**

- .1 Protect painted surfaces from damage during construction.
- .2 Protection of surfaces:
  - .1 Protect surfaces not to receive paint.
  - .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
- .3 Repair damage to adjacent materials caused by painting exterior metal surface application installation.

**3.7. SCHEDULE – SHOP PRIMED/COATED ITEMS FOR SITE FINISHING**

- .1 Structural Steel (Section 05 12 23): Exposed surface of steel lintels, beams and columns. Exterior canopy steel to be duplex system of hot dipped galvanized and powder coated.
- .2 Steel Decking (Section 05 31 00): Exposed surface of steel decking to be duplex system of hot dipped galvanized and painted.

**END OF SECTION**