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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 The standards listed form part of this Specification to the extent of reference. The publications are in the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C473-15, Test Methods for Physical Testing of Gypsum Panel Products
  - .2 ASTM C475/ C475M-15, Joint Compound and Joint Tape for Finishing Gypsum Board
  - .3 ASTM C754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw- Attached Gypsum Panel Products
  - .4 ASTM C840-13, Application and Finishing of Gypsum Board
  - .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, Glass Mat Gypsum Substrate for Use as Sheathing
  - .8 ASTM C1178/C1178M-13 Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel
  - .9 ASTM C1280-13a, Application of Exterior Gypsum Panel Products for Use as Sheathing
  - .10 ASTM C1396/C1396M-14a, Standard Specification for Gypsum Board
  - .11 ASTM C1658/C1658M-13, Glass Mat Gypsum Panels
  - .12 ASTM D3273-12, Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
  - .13 ASTM E136-12, Standard Test Method for Behaviour of Materials in a Vertical Tube Furnace at 750 degrees Celsius
- .3 Gypsum Association:
  - .1 GA-214-15 Recommended Levels of Gypsum Board Finish
  - .2 GA-216-13 Application and Finishing Of Gypsum Panel Products
  - .3 GA-600-12 Fire Resistance Design Manual
  - .4 GA-801-07 Handling and Storage of Gypsum Panel Products: A Guide for Distributors, Retailers, and Contractors
- .4 Underwriters Laboratories of Canada (ULC)
- .5 National Building Code of Canada, 2010.

### 1.2 SUBMITTALS

- .1 Product Data:
    - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Section 01 33 00 Submittal Procedures.
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### 1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
- .2 Maintain temperature minimum 10°C, maximum 21°C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .3 Apply board and joint treatment to dry, frost free surfaces.

### 1.4 WASTE MANAGEMENT

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

### 1.5 PERFORMANCE CRITERIA

- .1 Conform to applicable code for fire rated assemblies in conjunction with Sections 05 41 00 Structural Metal Stud Framing and 09 22 16 Non Structural Metal Stud Framing.

### 1.6 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Section 01 61 00 Common Product Requirements.
- .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
- .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
- .4 Label packages to include material name, production date and/or product code.

### 1.7 QUALITY ASSURANCE/QUALITY CONTROL

- .1 Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the province where the Work is being done.
  - .2 Perform Work in accordance with ASTM C840, GA-214, GA-216, and GA-600.
  - .3 Perform Work in accordance with ASTM C1658 for shaft walls and exterior sheathing applications.
  - .4 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience.
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- .5 Handling and Storage of Gypsum Board: Comply with GA-801.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Fire Rated Gypsum Board:
  - .1 ULC rated board, ratings as required on drawings.
  - .2 Fire resistive
  - .3 Thickness: as indicated on drawings.
  - .4 Edges: tapered
  - .5 Regionally manufactured
  - .6 Recycled Content: 20%
  - .7 Approved Manufacturer:
    - .1 Certainteed
    - .2 CGC
    - .3 Georgia Pacific
    - .4 Cabot Gypsum
- .2 Abuse Resistant Board: Medium to Heavy Duty Applications- For Soft Body Impact, Indentations and Abraision.
  - .1 To ASTM C1629
  - .2 Thickness: as indicated on drawings
  - .3 Edges: tapered
  - .4 Fiberglass Facing/Reinforcing or treated paper face
  - .5 Primer and finishing products per manufacturer recommendations.
  - .6 Use 20 gauge steel studs as recommended by Panel Manufacturer
  - .7 75% recycled content or 20% recycled content
  - .8 Approved Manufacturers:
    - .1 CGC Sheetrock Mold Tough Firecode Core Gypsum Panels
    - .2 Certainteed AirRenew Extreme Abuse Resistant Gypsum Board
    - .3 Cabot Gypsum Protec M+M+AR
- .3 Tile Backer Board: tile walls TO ASTM C1178:
  - .1 Thickness: as indicated on drawings
  - .2 Fiberglass Facing/Reinforcing
  - .3 Edges: tapered
  - .4 Water resistant treated core
  - .5 75% recycled content or 20% recycled content
  - .6 Approved Manufacturers:
    - .1 Georgia Pacific DensShield tile backer
    - .2 CGC Fiberock AquaTough Interior Panel
    - .3 CertainTeed Diamondback GlasRoc Tile Backer
- .4 Mould and Moisture Resistant Gypsum Board: (For use in wet areas-washrooms):
  - .1 Per ASTM C473, the average water absorption for panels is not greater than 5 percent by weight
  - .2 Mould and Moisture resistance per ASTM D3273 with score of 10.
  - .3 ULC for fire resistance 16 mm thickness

- .4 Prime paint to manufacturer's recommendations. Refer to Section 09 91 00 Painting.
- .5 Thickness: as indicated on drawings
- .6 Edges: tapered
- .7 75% recycled content or 20% recycled content and meets LEED regional criteria.
- .8 Approved Manufacturers:
  - .1 CGC Sheetrock mold tough Gypsum Panels
  - .2 Certaineed ProRoc Moisture and Mould Resistant Gypsum Board with M2 Tech.
  - .3 Cabot Protec M+M

## 2.2 ACCESSORIES

- .1 Gypsum Board Fasteners: ASTM C1002, type S12. Corrosion Resistant in exterior applications.
- .2 Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.
- .3 Drywall furring channels: 0.5 mm core thickness (or thickness size to weight of supporting panels) galvanized steel channels for screw attachment of gypsum board.
- .4 Acoustic Sealant and Firestop Sealant: See Section 07 92 00 Joint Sealants
- .5 Corner Beads: GA-216, metal corner bead.
- .6 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, Zinc metal, 0.5 mm base thickness, perforated flanges, one piece length per location. Use paper faced metal corner bead and trim with VHI panels.
- .7 Stud adhesive: as per manufacturer's recommendations
- .8 Edge Trim: GA-216
- .9 Joint Materials: ASTM C475.
  - .1 Reinforcing tape, adhesive, and water.
  - .2 Joint compound for interior gypsum board:
  - .3 Prefilling: At open joints, panel edges, and damaged surface areas, use setting-type taping compound.
  - .4 Embedding and first coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
  - .5 Fill coat: For second coat, use setting-type, sandable topping compound.
  - .6 Finish coat: For third coat, use setting-type, sandable topping compound.
  - .7 Joint compound for exterior applications:
  - .8 Use setting-type taping compound and setting-type, sandable topping compound.
  - .9 Joint compound for tile backing panels:
  - .10 Use setting-type taping compound and setting-type, sandable topping compound.
  - .11 Mesh tape only where required by ULC design.

- .10 Compressible Foam Gasket: sill plate gasket; polyethylene foam, minimum thickness 1/4 inch x full width of sill plate.
- .11 Control Joint:
  - .1 Zinc control joint No. 093 by CGC
- .12 Ceiling Hanger System Anchoring Devices:
  - .1 Red Head Concrete Anchoring System T32, self-drilling for use in concrete deck
  - .2 Red Head Concrete Anchoring System WS-3822 wedge anchors with tie wire insert for use in composite concrete and steel deck.
- .13 Access Panels: installed by this Section, supplied by mechanical.
- .14 Wall Protection: Reference Section 05 50 00 Metal Fabrications for Stainless steel corner guards, end guards, and sheet wall protection.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- .1 Verify that site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.
- .2 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are reviewed and accepted by Consultant.

#### 3.2 WALL FURRING INSTALLATION

- .1 Install furring attachment to concrete masonry and concrete walls.
- .2 Install furring channels; space maximum 405 mm o.c., not more than 1020 mm o.c. from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 610 mm o.c.
- .3 Furr for gypsum board faced vertical bulkheads as indicated. Bulkhead gypsum board to extend minimum of 50 mm above ceiling
- .4 Install wall furring for gypsum board wall finishes in accordance with ASTM C754 and ASTM C840.
- .5 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .6 Install resilient channels at maximum 610 mm o.c. Locate joints over framing members.

#### 3.3 CONTROL JOINTS

- .1 Provide controls at max. 9144 mm max o.c. for all gypsum board partitions.

- .2 Control joint is covered with a roll-formed zinc trim member with a 6 mm slot, protected by a plastic membrane, set in gypsum board facing and supported independently on both sides of joint.
- .3 Provide continuous polyethylene dust barrier behind and across control joints.
- .4 Install control joints straight and true.
- .5 Place control joints consistent with lines of building spaces or as directed.

### 3.4 CEILING FRAMING INSTALLATION

- .1 Install to ASTM C754 and ASTM C840 and manufacturer's instructions.
- .2 Coordinate location of hangers with other work and Section 09 51 00 Acoustical Ceilings.
- .3 Install ceiling framing independent of walls, columns, and above ceiling work.
- .4 Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing. Extend bracing minimum 600 mm past each end of openings.
- .5 Laterally brace entire suspension system.
- .6 Install casing beads around perimeter of suspended ceilings.
- .7 Furr for gypsum board faced vertical bulkheads. Bulkhead gypsum board to extend minimum of 150 mm above ceiling.
- .8 Install work level to tolerance of 1:1200.
- .9 Support light fixtures within GWB ceiling by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .10 Where smoke detectors are to be installed, install 16 mm thick x 405 mm x 405 mm fire-retardant plywood backing above suspended gypsum board ceiling and directly above the smoke detector.

### 3.5 GYPSUM BOARD INSTALLATION

- .1 Do not apply gypsum board until anchors, wood blocking, electrical and mechanical work are approved.
  - .2 Install gypsum board in accordance with ASTM C840, GA-216 and GA-600 and manufacturer's written instructions.
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- .3 Apply single and/or double layer gypsum board to metal furring or framing using screw fasteners for first layer, screw fasteners for second layer. Maximum spacing of screws 300 mm o.c.
  - .4 Remove all debris from partition cavities and clean dust from bottom tracks with Hepa vacuum prior to installation of board.
  - .5 Install single layer board in most economical direction, with ends and edges occurring over firm bearing.
  - .6 Install single layer fire rated gypsum board vertically, with edges and ends occurring over firm bearing.
  - .7 Use screws when fastening gypsum board to metal furring or framing. Use wafer-head screws for attachment of backer board.
  - .8 Provide acoustic sealant and sound batts at all mechanical and electrical penetrations or partitions required to have STC rating.
  - .9 Provide fire stopping sealant at all fire resistant rated fire separations. Coordinate with Section 07 84 00.
  - .10 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm o.c.
  - .11 Apply 12.7 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board / structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, and similar penetrations, in partitions where perimeter sealed with acoustic sealant.
  - .12 Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.
  - .13 Bottom of boards to be 12.7 mm above floor.
  - .14 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
  - .15 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
  - .16 Splice corners and intersections together and secure to each member with three screws.
  - .17 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
  - .18 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
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- .19 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
- .20 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
- .21 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.

### 3.6 APPLICATION FOR FIRE RATED ASSEMBLIES

- .1 Construct assembly in strict accordance with ULC and NBCC recommendations for fire rated assemblies.
- .2 Label fire rated assemblies with sign consisting of the following information:
  - .1 Hour Rating (ie; 1 hour)
  - .2 ULC listing
  - .3 Partition Type (Fire or Smoke)
  - .4 "Protect All Openings and Penetrations"
- .3 Sign to be painted on wall or vinyl sign permanently adhered to wall, locate above ceiling. Minimum size: 280 mm x 380 mm with brightly colored letters.
- .4 Construct fire-rated protection overall all steel columns supporting floor assemblies.
- .5 Floor and supporting assemblies require a one-hour fire rated separation. Refer to drawings for fire separation and details.

### 3.7 APPLICATION FOR SOUND RATED ASSEMBLIES

- .1 Construct sound rated assemblies as indicated in compliance with NBCC 2010 Table A-9.10.3.1.A. See partition schedule for locations of sound rated partitions and partition types required.
- .2 Install insulation to full thickness of framing or as indicated on partition schedule.
- .3 Install rigid insulation by pinning to u/s of gypsum board acoustic membrane and exposed ductwork as recommended by manufacturer. Ensure finished edge where exposed to view.
- .4 Place sound attenuation 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.
- .5 Apply 12.7 mm diameter bead of acoustic sealant continuously around periphery of each board face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where designated with STC ratings.
- .6 Install access panels to locations required for access.



- .7 Install access doors to electrical and mechanical fixtures specified in respective Sections.
- .8 Where supply and return air ducts penetrate walls, ensure ductwork does not touch the gypsum board. Maintain a minimum 6 mm gap, and subsequently caulk with acoustical sealant

### 3.8 JOINT TREATMENT

- .1 Finish in accordance with GA-214, Level as directed in Schedule of this Section.
- .2 Mix joint compound slightly thinner than for joint taping.
- .3 Control Joints: refer to paragraph 3.3.
- .4 Finish in accordance with GA-214 and as follows.
  - .1 Level 1: Above Ceilings (non-fire rated partitions): Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
  - .2 Level 2: Above Ceilings (1 HR fire rated partitions): Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fasteners heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
  - .3 NOTE: For fire separations greater than 1 HR, apply two coats of joint compound over, joints, angles, fastener heads and accessories.
  - .4 Level 4: All Finished Areas below Ceilings: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.

### 3.9 TOLERANCES

- .1 Maximum Variation of Finished Gypsum Board Surface from True Flatness: 3mm in 3m in any direction.
- .2 Feather coats on to adjoining surfaces so that camber is maximum 0.03 inches.

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 The standards listed form part of this Specification to the extent of reference. The publications are in the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C645-14, Non Structural Steel Framing Members.
  - .2 ASTM C754-15, Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products.
  - .3 ASTM C1002-14, Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS)
- .4 Gypsum Association:
  - .1 GA-216-13, Application and Finishing of Gypsum Panel Products

### 1.2 SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Section 01 33 00 Submittal Procedures.
  - .2 Provide data describing standard framing member materials and finish, product criteria, load charts, limitations, and recycled content.
- .2 Shop Drawings:
  - .1 Indicate prefabricated work component details, stud layout, framed openings, anchorage to structure, type and location of fasteners and accessories or items required of other related work.
  - .2 Describe method for securing studs to tracks, splicing and for blocking and reinforcement to framing connections.

### 1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
  - .2 Follow Indoor Air Quality (IAQ) Plan requirements in accordance with Section 01 35 44 Indoor Environmental Protection.
    - .1 Work scheduling requirements must be followed for compliance
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#### 1.4 WASTE MANAGEMENT

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 Construction Waste Management and Disposal.
- .2 Divert steel scraps from landfill by disposal into the on-site metal recycling bin at nearest metal recycling facility.

#### 1.5 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Section 01 61 00 Common Product Requirements.
- .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
- .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
- .4 Label packages to include material name, production date and/or product code.

#### 1.6 QUALITY ASSURANCE/QUALITY CONTROL

- .1 Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the province where the Work is being done.
- .2 Perform Work to ASTM C754.
- .3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this Section with minimum three (3) years experience.
- .4 Installer Qualifications: Company specializing in performing the work of this Section with minimum three (3) years experience.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- .1 Non-load bearing channel stud framing, to ASTM C645, galvanized sheet steel:
    - .1 25 gauge thick unless noted otherwise.
    - .2 Abuse resistant and tile backer board: 20 gauge, as required by panel manufacturer
    - .3 20 gauge required at door openings larger than 1067 mm
    - .4 20 gauge required for all support framing
    - .5 Knock-out service holes at 460 mm centers
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- .6 Top tracks with 50 mm extended legs
- .7 Minimum 40% recycled content
- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener: size to suit framing, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, width of track, with self-sticking adhesive on one face, lengths as required.
- .5 Furring, framing and accessories: ASTM C645 and GA-216.
- .6 Blocking: refer to Section 06 10 00 Rough Carpentry.
- .7 Fasteners: ASTM C1002 exterior finish to be corrosion resistant.
- .8 Anchorage to substrate: tie wire, nails, screws and other metal supports, of type and size to suit application, to rigidly secure materials in place.
- .9 Recycled content-framing materials minimum post-consumer recycled content of 50%.

### PART 3 - EXECUTION

#### 3.1 FRAMING INSTALLATION

- .1 Install studs in accordance with ASTM C754 and manufacturer's instructions.
  - .2 Align partition tracks at floor and ceiling and secure at 600 mm o.c. maximum.
  - .3 Install insulating strip under stud shoe tracks of partitions on slabs on grade.
  - .4 Place studs vertically at 405mm and 610mm o.c. and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
  - .5 Erect metal studding to tolerance of 1:1000.
  - .6 Coordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
  - .7 Coordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
  - .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centers specified. Secure studs together, 50mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
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- .9 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .10 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .11 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .12 Extend partitions to underside of steel deck except where noted otherwise on drawings.
- .13 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use double track slip joint using a 50 mm leg or ensure studs are of correct length to allow for deflection if not screw fastened to tracks. Track to have minimum 50 mm leg.
- .14 Provide 38 mm stiffener channels at one third segments in height from floor to u/s deck.

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 American National Standards Institute (ANSI):
  - .1 ANSI A108/A118/A136.1 - 2014, Installation of Ceramic Tile (Includes all of 108 and 118 decimal numbered standards)
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C373-16e1, Standard Test Methods for Determination of Water Absorption and Associated Properties by Vacuum Method for Pressed Ceramic Tiles and Glass Tiles and Boil Method for Extruded Ceramic Tiles and Non-tile Fired Ceramic Whiteware Products.
  - .2 ASTM C1028-07e1, Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
  - .3 ASTM F710-11, Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
- .3 Terrazzo, Tile and Marble Association of Canada (TTMAC), latest edition of Standards.
- .4 National Building Code of Canada (NBC), 2010.

### 1.2 SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Section 01 33 00 Submittal Procedures.
  - .2 Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes.
- .2 Samples:
  - .1 Submit duplicate samples of each colour, texture, size, and pattern of tile.
  - .2 Submit sample of transition strips
  - .3 Submit sample of tile expansion joint, control joint, if requested.
- .3 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.

### 1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
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- .2 Maintain air temperature and structural base temperature at ceramic tile installation area at 15°C to 18°C for forty-eight (48) hours before, during, and forty-eight (48) hours after, installation.

#### 1.4 MOCK-UP

- .1 Refer to Section 01 45 00 Quality Control for requirements of mock-up.
- .2 Locate where directed by Consultant. Allow for porcelain tile and ceramic tile samples of each type.
- .3 Allow 48 hours for field review of mock-up by Consultant.
- .4 Contractor to proceed once the testing is complete and written approval has been received by the Consultant.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Approved mock-up may remain as part of the Work.
- .6 Minimum size of mock-up: 3 m x 3 m each for floor mock-ups. 3m x full wall height for wall mock-ups.

#### 1.5 WASTE MANAGEMENT

- .1 Contractor to separate and recycle waste materials in accordance with Section 01 74 19 Waste Management and Disposal.
- .2 Use trigger operated spray nozzles for water hoses.
- .3 Close and seal tightly all partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- .4 Place used sealant and adhesive tubes and containers in areas designated for hazardous waste.

#### 1.6 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Section 01 61 00 Common Product Requirements.
  - .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
  - .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
  - .4 Label packages to include material name, production date and/or product code.
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## 1.7 QUALITY ASSURANCE/QUALITY CONTROL

- .1 Conform work to TTMAC Manual, maintain copy of this document on site.
- .2 Installer: Company specializing in performing the work of this section to have minimum five years documented experience with application of similar tile and similar project type.
- .3 The products specified are premium select tile and not second grade.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Porcelain Floor Tile (PT):
    - .1 Commercial grade 12"x24" unglazed through-body porcelain tile, rectified edges
    - .2 Base tiles to be 4" x 24"
    - .3 Slip resistance: conforms to ASTM C1028, DCOF min. 0.42
    - .4 Textured surface for additional slip resisted where indicated (SRPT)
    - .5 Stain Resistance: conforms to ISO 10545-14 (> Class 3)
    - .6 Water absorption in accordance with ISO 10545-3 (<0.5%)
    - .7 Frost Resistance in accordance with ISO 10545-12
    - .8 Refer to drawings for pattern layouts and wall base.
    - .9 Refer to Accessories for metal edge caps, corners, etc.
    - .10 Standard of Acceptance: Olympia Tile, Regal Series
    - .11 **(PT1)** Matte finish, 'Grey' colourway
    - .12 **(SRPT1)** Flammed texture finish, 'Grey colourway'
    - .13 **(PT2)** Matte finish, 'Shell White' colourway
    - .14 **(SRPT2)** Flammed texture finish, 'Shell White' colourway
    - .15 Acceptable Alternate Manufacturers: Samples of requested alternates must be supplied to Consultant for review and approval.
    - .16 Ceragres Tile
    - .17 Centura Tile
    - .18 Elegant Flooring
    - .19 Stone Tile
  - .2 Ceramic Wall Tile (**CT1**):
    - .1 Commercial grade 20cm x 60cm glazed ceramic wall tile.
    - .2 Stain Resistance: conforms to ISO 10545-14 (> Class 3)
    - .3 Water absorption in accordance with ISO 10545-3 (<0.5%)
    - .4 Light grey in colour
    - .5 Standard of Acceptance: Stone-Tile Murmansk tile, 'Grey' colourway, Matte finish
    - .6 Stack Bond installation, field colour. Full wall height.
    - .7 Acceptable Alternate Manufacturers: Samples of requested alternates to be supplied to Consultant for review and approval.
      - .1 Ceragres Tile
      - .2 Centura Tile
      - .3 Elegant Flooring
      - .4 Olympia Tile
-



- 
- .3 Ceramic Wall Tile (**CT2**):
- .1 Commercial grade glazed ceramic wall tile.
  - .2 Acceptable size range:  
Height: 4-8"  
Width: 12-16"  
20cm x 60 cm and 8" x 16" are acceptable formats
  - .3 Stain Resistance: conforms to ISO 10545-14 (> Class 3)
  - .4 Water absorption in accordance with ISO 10545-3 (<0.5%)
  - .5 Dark Blue in colour
  - .6 Standard of Acceptance: Ceragres Miro, Dark Blue
  - .7 Stack Bond installation, field colour. Full wall height.
  - .8 Acceptable Alternate Manufacturers: Samples of requested alternates to be supplied to Consultant for review and approval.
    - .1 Stone Tile
    - .2 Centura Tile
    - .3 Elegant Flooring
    - .4 Olympia Tile
- .4 Ceramic Wall Tile (**CT3**):
- .1 Commercial grade 20cm x 60cm glazed ceramic wall tile. Tile width to match width of CT1 tile.
  - .2 Stain Resistance: conforms to ISO 10545-14 (> Class 3)
  - .3 Water absorption in accordance with ISO 10545-3 (<0.5%)
  - .4 Light beige in colour, bubble-like textured finish
  - .5 Standard of Acceptance: Stone-Tile Murmansk tile, 'Beige' colourway, 'Medium Texture' finish
  - .6 Accent tile installation. Install 1 coursing at height as shown on drawings. Offset horizontally 1/3<sup>rd</sup> tile from adjacent stack bond field tile.
  - .7 Acceptable Alternate Manufacturers: Samples of requested alternates to be supplied to Consultant for review and approval.
    - .1 Ceragres Tile
    - .2 Centura Tile
    - .3 Elegant Flooring
    - .4 Olympia Tile
- .5 Ceramic Wall Tile (**CT4**):
- .1 Commercial grade glazed ceramic wall tile.
  - .2 Acceptable size range:  
Height: 4-8"  
Width: 12-16"  
20cm x 60 cm and 4" x 12" are acceptable formats
  - .3 Stain Resistance: conforms to ISO 10545-14 (> Class 3)
  - .4 Water absorption in accordance with ISO 10545-3 (<0.5%)
  - .5 Frost Resistance in accordance with ISO 10545-12
  - .6 dark yellow-green in colour
  - .7 Stack Bond installation, field colour. Full wall height.
  - .8 Standard of Acceptance: Ceragres Scenio Lacatti, Verde Muchio
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- .9 Acceptable Alternate Manufacturers: Samples of requested alternates to be supplied to Consultant for review and approval.
  - .1 Stone Tile
  - .2 Centura Tile
  - .3 Elegant Flooring
  - .4 Olympia Tile

## 2.2 EXTRA MATERIAL

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

## 2.3 MORTARS, AND GROUTS

- .1 Water: potable and free of minerals which are detrimental to mixes.
- .2 Mortar - Typical
  - .1 One Step Polymer fortified thin set mortar
  - .2 Bond Strength Requirements: exceeds ANSI A118.4 & A118.11
  - .3 Acceptable Manufacturers:
  - .4 Laticrete 254 Platinum
  - .5 Mapei
  - .6 Kiesel
- .3 Grout – Walls: Epoxy Wall Grout:
  - .1 Highly Chemical Resistant Industrial Grade epoxy grout.
  - .2 Supplied as factory proportioned kits of epoxy resin, hardener, and chemical resistant silica filler.
  - .3 Exceeds ANSI A118.3 and A118.5 performance requirements.
  - .4 Colours to be chosen by Consultant from standard range, allow for three colours.
  - .5 Approved Alternate Manufacturers:
  - .6 Laticrete SpectraLOCK 2000 IG Grout
  - .7 Mapei
  - .8 Kiesel
- .4 Grout – Floors: Epoxy Floor Grout:
  - .1 High Performance Epoxy Grout
  - .2 Stain proof with Microban anti-microbial protection
  - .3 Uniform Colour
  - .4 80 minutes working time
  - .5 Meets ANSI A118.3
    - .1 Colours to be chosen by Consultant from standard range, allow for two colours.

- .2 Approved Alternate Manufacturers:
- .3 Laticrete Spectra LOCK PRO Premium Grout
- .4 Mapei
- .5 Kiesel

## 2.4 ACCESSORIES

- .1 Cleavage plane: polyethylene film to CGSB 51.34 Amend.
- .2 Sealant: in accordance with Section 07 92 00 Joint Sealants.
- .3 Levelling Wedges for floor tiles: 10-99701 Roberts Lash.
- .4 Tile wall base cap: at 100 mm tile base:
  - .1 Standard of acceptance: Schluter SHIENE
- .5 Wall outside corner detail strip:
  - .1 Standard of Acceptance: Schluter QUADDEC.
  - .2 Stainless Steel square corner trim component.
  - .3 Provide at all vertical outside corners with tile cladding.
- .6 Floor tile control joint:
  - .1 Standard of Acceptance: Schluter DILEX BT
  - .2 Colour from standard range as chosen by Consultant to match floor grout.
  - .3 Align at control joints as required.
- .7 Floor tile to resilient sheet flooring:
  - .1 Standard of Acceptance: Schluter Reno-U
  - .2 Stainless Steel.
- .8 Floor tile to carpet:
  - .1 Standard of Acceptance: Schluter Reno-TK
  - .2 Anodized Aluminum.
- .9 Stainless Steel Wall End Guards. Reference Section 05 50 00, Section 2.6.8
  - .1 Coordinate with wall protection installation. Tile up to end guard. Do not install end guard over tile.
- .10 Floor Corner Base Cove Trim
  - .1 Standard of Acceptance: Schluter Dilex HKS Cove Trim Component
  - .2 Anodized Aluminum
- .11 Stair Nosings:
  - .1 Standard of Acceptance: Schluter TREP E
  - .2 Stainless Steel, slip resistant wear surface.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verify that surfaces are ready to receive work. Notify General Contractor of conditions detrimental to installation.

### 3.2 PREPARATION OF SUBFLOOR

- .1 Subfloors to be free of dust, solvent, paint, wax, oil, grease, residual asphalt cut back adhesive, adhesive removers, curing, sealing, hardening, or parting compounds, alkaline salts, excessive carbonation or laitance, mould, mildew, and other foreign materials that might prevent adhesive bond.
- .2 Shot-blast entire floor and wash entire floor area.
- .3 Comply with ASTM F710 for surface preparation of concrete to receive linoleum.
- .4 Subfloors to be dry, clean, smooth, and structurally sound.
- .5 Surface cracks, grooves, depressions, or other non-moving joints, and other irregularities to be filled or smoothed with levelling compound recommended.
- .6 Bond Test Waterproofing Membrane: Perform adhesive bond test on both new and existing concrete substrates and certify to Consultant that results of bond test are acceptable. Arrange for the attendance of Departmental Representative, Consultant and Manufacturer's Representative for the tests.

### 3.3 TILE INSTALLATION GENERAL

- .1 Do tile work in accordance with Installation Manual TTMAC, latest Edition.
  - .2 Apply tile to clean and sound surfaces.
  - .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even.
  - .4 Maximum surface tolerance 1:800.
  - .5 Make joints between tile uniform, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation.
  - .6 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
  - .7 Install divider strips at junction of tile flooring and dissimilar materials.
  - .8 Allow minimum twenty-four (24) hours after installation of tiles, before grouting.
-

- .9 Clean installed tile surfaces after installation of grout.
- .10 Align control joints at tile with subfloor control joints.
- .11 Keep building expansion joints free of mortar and grout.
  - .1 Align control joints with existing expansion and control joints.
- .12 Install tiles with finished face flush with adjacent tiles. Maintain lippage tolerances no greater than 1mm. Back-butter tiles as required.
- .13 Install specified leveling wedges tile spacers for floor tile as required.
- .14 Provide expansion joints, control joints and pressure relieving joints of widths and locations as specified by TTMAC. Do not saw cut joints after installation.
- .15 Lay tile from center so tile at opposing edges of area are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at edge perimeters.
- .16 Match tiles for colour and pattern by using tile from cartons in same sequence as manufactured and packaged.
- .17 Broken, cracked, chipped, or deformed tile are not acceptable.
- .18 Perform cutting and drilling of tile without marring visible surfaces.

### 3.4 FLOOR TILE INSTALLATION

- .1 Install in accordance with TTMAC Large Format Tile Installation.
- .2 Conform to requirements of NBC for accessibility. Max floor threshold difference 12.7 mm.
  - .1 Contractor, by commencement of Work of this section, assumes overall responsibility that assemblies and components identified comply with the contract documents and are compatible with each other's conditions and expected use.
- .3 Apply sub-floor self-leveling underlayment and patching compound where required to achieve tolerances required.
- .4 Set tiles in specified bond coat, using leveling wedges and tile spacers as required.

### 3.5 WALL TILE INSTALLATION

- .1 Install in accordance with TTMAC recommended wall tile installation.
- .2 Set tiles in full bed of mastic.
- .3 Provide tile trims at unfinished edges and external corners of wall tile as indicated.

### 3.6 TRANSITION STRIP AND TRIM INSTALLATION

- .1 Install in continuous lengths, to level straight lines by pressing the perforated leg solidly into the tile setting adhesive.
- .2 Use maximum lengths available.
- .3 c/w end cap accessories at exposed edges.
  - .1 Butt ends of units tightly together with hairline joint.
  - .2 Install termination trim where tile meets dissimilar flooring.
  - .3 Remove mortar or grout residue immediately from visible surfaces.

### 3.7 CONTROL JOINT INSTALLATION

- .1 Install in accordance with TTMAC recommendations.
- .2 Apply control joint profiles above existing joints in the substrate and where indicated on drawings.
- .3 Press profile securely into adhesive bed and align. Ensure profile aligns directly with expansion and movement joints in substrate below.

### 3.8 PROTECTION OF FINISHED WORK

- .1 Do not permit traffic over finished floor surface for four (4) days after installation.

### 3.9 CLEANING

- .1 Clean tile and grout surfaces.

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 The standards listed form part of this Specification to the extent of reference. The publications are in the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C635/C635M-13a, Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
  - .2 ASTM C636/C636M-13, Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
  - .3 ASTM E84-15a: Standard Test Method for Surface Burning Characteristics of Building Materials.
  - .4 ASTM E1264-14: Classification of Acoustical Ceiling Products.
- .3 Underwriters Laboratories of Canada (CAN/ULC):
  - .1 ULC 102: Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies
- .4 Ceilings and Interior Systems Contractors Association (CISCA) - Acoustical Ceilings, Use and Practice.

### 1.2 SUBMITTALS

- .1 Product Data:
    - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Section 01 33 00 Submittal Procedures.
  - .2 Samples:
    - .1 Provide samples in accordance with Section 01 33 00 Submittal Procedures.
    - .2 Submit one representative model of the ceiling suspension system if requested.
    - .3 Submit duplicate samples of each type of acoustical panel indicated.
  - .3 Shop Drawings:
    - .1 Submit shop drawings in accordance with Section 01 33 00 Submittal Procedures.
    - .2 Submit reflected ceiling plans for special grid patterns as indicated.
    - .3 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture lateral bracing and accessories.
  - .4 Mockups:
    - .1 Provide mockup of intersection of adjacent tile types ACT 3 and ACT4
-

### 1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
- .2 Ceiling panels are sized and designed for use within the standard occupancy range of temperature and humidity of 18-29 °C and no more than 70% RH (relative humidity). Maintain uniform temperature of minimum 18°C and maximum humidity of 70% RH prior to, during, and after acoustic unit installation.
- .3 Sequence work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, RH is within acceptable range and overhead work is completed, tested, and approved.
- .4 Install acoustic units after interior wet work is dry.
- .5 Store materials in Work area 48 hours prior to installation.

### 1.4 WASTE MANAGEMENT

- .1 Refer to acoustic ceiling tile manufacturers recycling processes in place for any existing ceiling tiles that can be collected by the manufacturer for recycle or reuse.
- .2 Separate and recycle waste materials in accordance with Section 01 74 21 Construction Waste Management and Disposal.

### 1.5 PERFORMANCE CRITERIA

- .1 Provide fire resistance rated ceiling systems to Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Maximum deflection: 1/360th of span to ASTM C635 deflection test.
- .3 Design components to ensure light fixtures and installed accessories will not induce eccentric loads. Where components may induce rotation of ceiling system components, provide stabilizing reinforcing.

### 1.6 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Section 01 61 00 Common Product Requirements.
  - .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
  - .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
-



- .4 Label packages to include material name, production date and/or product code.
- .5 Protect prefinished steel during fabrication transportation, site storage, and installation in accordance with CISCA Standards.
- .6 Immediately before installation, store ceiling panels at site where temperature and humidity conditions duplicate installation area.

#### 1.7 QUALITY ASSURANCE/QUALITY CONTROL

- .1 If requested submit proof of installer's work that they have successfully completed projects of this size and requirements in the past five (5) years, and that they are certified by the manufacturer to install acoustic ceiling systems as supplied by the manufacturer.
- .2 Conform to CISCA requirements.
- .3 Ceiling panel cartons must contain ULC label for acoustical compliance.
- .4 Suspension system cartons must contain ULC label for load compliance as per ASTM C635.

#### 1.8 EXTENDED WARRANTY

- .1 Acoustic tile: 30 Year Limited System Warranty against visible sag, mold/mildew, and bacterial growth. Exposed Tee System: 10 year limited Systems Warranty.

### PART 2 - PRODUCTS

#### 2.1 ACOUSTIC CEILING PANELS

- .1 (ACT1) Acoustic Tile, Non-Rated: complying with ASTM E1264 for Class A products
  - .1 Size: 610 x 1220 mm x 16 mm thick
  - .2 Material: mineral board
  - .3 Colour: white
  - .4 Edge type: square lay-in
  - .5 NRC (noise reduction coefficient): 0.55
  - .6 Light reflectance range: 0.82
  - .7 Recycled Content: Min. 31%
  - .8 Sag resistant in humid conditions
  - .9 Standards of Acceptance
    - .1 CGC Radar ClimaPlus #2410
    - .2 Armstrong Fine Fissured #1729
    - .3 CertainTeed Performa Fine Fissured HHF-197
- .2 (ACT2) Acoustic Tile, Non-Rated complying with ASTM E1264 for Class "A" products

- .1 Size: 610 x 610 mm x 16 mm thick
- .2 Material: mineral board
- .3 Colour: white
- .4 Edge type: square lay-in
- .5 NRC (noise reduction coefficient): 0.55
- .6 Light reflectance range: 0.82
- .7 Recycled Content: Min. 31%
- .8 Sag resistant in humid conditions
- .9 Standards of Acceptance:
  - .1 CGC Radar ClimaPlus #2415
  - .2 Armstrong Fine Fissured #1729
  - .3 CertainTeed Performa Fine Fissured PFF-197
- .3 (ACT3) Specialty Wood Veneer Non-Rated Acoustic Tile:
  - .1 Size 610 x 1290 mm x 19 mm thick
  - .2 Real wood veneer perforated acoustic panel
  - .3 9/16" Square Tegular edge tile
  - .4 NRC min. .65, CAC min. 42
  - .5 Complete system with all accessories to complete system
  - .6 Standard of Acceptance: Armstrong Woodworks Tegular 6486W3
    - .1 Perforation Pattern: W3 Rd 6006, Round Diagonal
    - .2 Wood grain veneer colour & species to be selected from manufacturer's full range
      - .1 Includes Armstrong Woodworks 'Natural Variations' colour range and 'Constants' colour range
    - .3 1713BL Infill Panel
  - .7 Acceptable Alternate Manufacturers:
    - .1 Hunter Douglas
    - .2 CGC
    - .3 9 Wood
- .4 (ACT4) Specialty Oversized Non-Rated Acoustic Tile:
  - .1 Size 610 x 2440 x 22 mm
  - .2 Material: mineral board
  - .3 Colour: white
  - .4 Sag resistant in humid conditions
  - .5 Tegular hidden reveal edge
  - .6 NRC .90
  - .7 Smooth clean durable finish
  - .9 Non directional visual
  - .9 Standard of Acceptance:
    - .1 Armstrong 3907 Optima Vector
  - .10 Acceptable Alternate Manufacturers:
    - .1 CGC
    - .2 CertainTeed

- .5 (ACT5) Clean Room Acoustic Tile:
  - .1 Size: 610 mm x 610 mm (2' x 2')
  - .2 Material: mineral board core with vinyl faced membrane
  - .3 NRC (noise reduction coefficient): 0.55
  - .4 Light reflectance range: 0.78
  - .5 Edge type: square lay-in
  - .6 Colour: white
  - .7 Recycled Content: Min. 36%
  - .8 Sag Resistant in humid conditions
  - .9 Anti-Mold & Mildew
  - .10 Scrubbable and water repellant finish
  - .11 Standard of Acceptance: Armstrong Clean Room VL Unperforated
  - .12 Acceptable Alternate Manufacturers:
    - .1 CGC Clean Room 50699
    - .2 Certaineed

## 2.2 SUSPENSION MATERIALS

- .1 Suspension System for Acoustical Panel types ACT1, ACT2, and ACT4, and ACT5 (NON-RATED System):
  - .1 Intermediate Duty System, Non- rated system to ASTM C635.
  - .2 Basic materials for suspension system: 24 mm exposed Tee system, commercial quality cold rolled steel, hot-dipped galvanized. Exposed surfaces prefinished in manufacturer's standard corrosion resistant enamel paint finish.
    - .1 Colour: (Standard) Satin sheen white.
  - .3 Recycled content: 30% min.
  - .4 Hanger wire: galvanized soft annealed steel wire, pre-stretched; yield stress load at least three times the design load but not less than 12-gauge
  - .5 Accessories: splices, clips, wire ties and retainers to complement suspension system components, as recommended by system manufacturer.
  - .6 Standard of Acceptance: based on CGC: DONN Brand DX Non-Rated Suspension System
  - .7 Acceptable Alternate:
    - .1 Prelude XL Non-Rated Suspension System by Armstrong.
    - .2 Certaineed
- .2 Suspension System for Wood Acoustical Panels (type ACT3)
  - .1 Non- rated system to ASTM C635.
  - .2 Basic materials for suspension system: commercial quality cold rolled steel, hot-dipped galvanized. Exposed surfaces prefinished in manufacturer's standard corrosion resistant enamel paint finish.
  - .3 Colour: (Standard) Satin sheen white.
  - .4 1 11/16" web height

- .5 Recycled content: 30% min.
- .6 Hanger wire: galvanized soft annealed steel wire, pre-stretched; yield stress load at least three times the design load but not less than 12-guage
- .7 Accessories: splices, clips, wire ties and retainers to complement suspension system components, as recommended by system manufacturer.
- .8 9/16" Square tegular; recessed reveal profile.
- .9 Standard of Acceptance: Armstrong Suprafine XL 9/16" Exposed Tee suspension system.

### 2.3 INSTALLATION ACCESSORIES

- .1 Trim Pieces, as indicated on drawings.
- .2 Edge Mouldings and Trims: metal or extruded aluminum of types and profiles indicated if not indicated. Manufacturer's standard mouldings for edges and penetrations including light fixtures that fit type of edge detail and suspension system indicated; provide mouldings of the same width as exposed runner.
- .3 Accessories: Stabilizer bars, clips, splices, perimeter mouldings, hold down clips, required for suspended grid system.
- .4 Support Channels, Furring and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

### 2.4 EXTRA MATERIALS

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

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verify that field dimensions.
  - .2 Verify that layout of hangers will not interfere with other work.
-

- .3 Examine substrates and structural framing to which ceilings attach or abut, with installer present, for compliance with requirements specified in this and other sections that affect ceiling installation and anchorage.
- .4 Examine areas to receive ceiling panels for conditions that will adversely affect installation. Provide written report of discrepancies.
- .5 Do not install acoustical panels and tiles until work above ceiling has been inspected by Consultant.
- .6 Beginning of installation signifies acceptance of conditions in areas to receive ceiling panels.

### 3.2 PREPARATION OF SUBSTRATE

- .1 Coordination: Furnish layouts for cast-in-place anchors, clips, and other ceiling anchors.

### 3.3 INSTALLATION - SUSPENDED CEILING

- .1 Install suspension system in accordance with ASTM C636, manufacturer's written instructions and as supplemented in this section.
- .2 Locate system according to reflected ceiling plan.
- .3 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.
- .4 Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
  - .1 Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 150 mm of each corner; or support components independently.
- .5 Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border areas and vertical surfaces.
- .6 Coordinate Work with Section 09 21 16 Gypsum Board Assemblies.
- .7 Form expansion joints to accommodate  $\pm 25$  mm movement. Maintain visual closure.

### 3.4 INSTALLATION - ACOUSTIC CEILING PANELS

- .1 Install acoustic units in accordance with manufacturer's instructions.
-

- .2 In fire rated ceiling systems, follow the manufacturer's recommended installation; in particular provide proper cover of light fixtures to meet ULC standards indicated.
  - .1 Hold down clips must be used at all rated tile installation areas.
- .3 Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting surfaces. Support edges by wall moldings. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
- .4 Install units after above ceiling work is complete.
- .5 Cutting Acoustic Units:
  - .1 Cut to fit irregular grid and perimeter edge trim.
  - .2 Cut square reveal edges to field cut units.
  - .3 Seal edges of cut fibreglass tiles with clear tape.

### 3.5 INSTALLATION TOLERANCES

- .1 Maximum Variation from Flat and Level Surface: 3 mm in 3 m.
- .2 Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 deg.

### 3.6 PROTECTION AFTER WORK COMPLETED

- .1 Existing completed work: Protect completed work above suspension system from damage during installation of suspension system components.

### 3.7 CLEANING

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .2 Remove and replace work that cannot be successfully cleaned and repair to permanently eliminate evidence of damage.
- .3 Suspension System: Remove panel material and perform any necessary cleaning maintenance with non-solvent based commercial cleaner.

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
  - .1 ASTM D638-14, Standard Test Method for Tensile Properties of Plastics
  - .2 ASTM D2047-11, Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine
  - .3 ASTM E662-15a, Test Methods for Specific Optical Density of Smoke Generated by Solid Materials
  - .4 ASTM E648-15e1, Test Methods for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
  - .5 ASTM F710-11, Practice for Preparing Concrete Floors Receive Resilient Flooring.
  - .6 ASTM F970-15, Test Method for Static Load Limit
  - .7 ASTM F1066-04 (2014)e1, Vinyl Composition Floor Tile
  - .8 ASTM F1303-04 (2014), Standard Specification for Sheet Vinyl Floor Covering with Backing
  - .9 ASTM F1344-15, Standard Specification for Rubber Floor Tile
  - .10 ASTM F1861-08(2012)E1, Standard Specification for Resilient Wall Base
  - .11 ASTM F1869-16, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
  - .12 ASTM F2169-15e1, Standard Specification for Resilient Stair Treads
  - .13 ASTM F2170-16a, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

### 1.2 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base, nosing, feature strips, treads, edge strips.

### 1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for resilient flooring for incorporation into manual in accordance with Section 01 78 00 Closeout Submittals.

### 1.4 EXTRA MATERIALS

- .1 Provide extra materials of resilient tile flooring and adhesives in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Extra materials to be in one piece and from same production run as installed materials.
-

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### 1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Package flooring materials and identify contents of each package.
- .2 Store materials for a minimum of 24 hours immediately before installation at no less than 18 deg. C.

### 1.6 JOB CONDITIONS

- .1 Environmental Requirements:
  - .1 Install resilient flooring only when surfaces and air temperatures have been maintained between 18 deg.C and 32 deg.C for 24 hours preceding installation, and will be so maintained during installation and for 48 hours thereafter. Maintain a minimum temperature of 13 deg.C after above period.
  - .2 Ensure that adequate ventilation is provided during installation of flooring and curing of adhesive.
  - .3 Ensure the flooring substrate is checked for moisture content and is within the recommendations of the manufacturer.
- .2 Protection:
  - .1 Prevent traffic and work on newly laid floors by barricading until work has set.
  - .2 At completion of flooring installation, install floor protection in areas where finishing work, repairs and installation of equipment, and floor traffic will occur. Lap joints of material by 150mm and seal with non-asphaltic tape.
  - .3 After materials have set, and until project completion, coordinate with General Contractor to ensure that floors are not damaged by traffic. Ensure that flooring is not subjected to any static loading during the week following installation.
  - .4 Ensure that spark-proof electrical equipment is provided, and smoking is prohibited in areas where flammable adhesives are used. Store materials to prevent spontaneous combustion.

### 1.7 ENVIRONMENTAL CONDITIONS

- .1 Install flooring when the temperature is between 18C and 25C, and is required for at least 24 hours prior to the laying period, during and 24 hours after

## PART 2 - PRODUCTS

### 2.1 SHEET VINYL

- .1 Monolayer Homogenous Vinyl Sheet (**VS**):
    - .1 2.0 mm minimum thickness sheet vinyl flooring to ASTM F1913-04
    - .2 Static coefficient of friction in excess of 0.7 when tested in accordance with ASTM D2047-04.
    - .3 Flexibility: will not crack or break when bent over a 6.4 mm diameter mandrel.
-



- .4 Static Load Limit: to ASTM F970-00.
- .5 No-wax cleaning.
- .6 Fire Resistance: ASTM E648/NFPA 253 Class 1, and tested in accordance to CAN/ULC S102.2
- .7 Floor Score Certified
- .8 Seams: heat weld.
- .9 Standard of Acceptance: Gerflor Mipolam Esprit
  - .1 (VS1) 5312 'White Pepper'
  - .2 (VS2) 5320 'Mix Grey'
- .10 Acceptable Alternate vendors:
  - .1 Polyflor
  - .2 Altro
- .2 Slip Resistant Homogenous Vinyl Sheet (**SRVS**):
  - .1 Thickness: 2.5 mm
  - .2 Slip Resistance: R10 on DIN51130 ramp test
  - .3 Floor Score Certified.
  - .4 Seams: heat weld.
  - .5 Floor Score Certified
  - .6 Standard of Acceptance: Altro Reliance 25, UB12505 'Streetlight'
  - .7 Acceptable Alternate vendors:
    - .1 Polyflor
    - .2 Gerflor

## 2.2 RESILIENT RUBBER FLOORING AT LANDINGS, STAIRS/TREADS

- .1 Rubber tile: to ASTM F1344, 900 x 900 x 3.5 mm, integral 25 mm dia. studs, 30 mm o.c., projecting 0.64 mm. Pattern and colour as selected by Departmental Representative from manufacturer's standard range.
- .2 Rubber stair tread and integral riser: to ASTM F2169, 3.5 mm, integral 25 mm dia. studs on tread, 30 mm o.c., projecting 0.64 mm, 50 mm grit strip in contrasting colour. Pattern and colour as selected by Departmental Representative from manufacturer's standard range.
- .3 Adhesive for rubber stair tread: solvent-free, two component epoxy.
- .4 Primer, cement, and seam adhesive: type recommended by flooring and base manufacturer to suit substrate and installation, Ecologo certified.
- .5 Concrete floor sealer: Type 1.
- .6 Reducing strip: same material as flooring.

## 2.3 RESILIENT BASE

- .1 Resilient Rubber Base (**RES1, RES2**):

- .1 3.2 mm thick, 100 mm high x coil length.
- .2 Base profile; toe for resilient flooring
- .3 Pre-manufactured inside and outside corners
- .4 Standard of Acceptance: Johnsonite, or approved alternate.
- .5 Colour: allow for 2 colours selected from Departmental Representative

### PART 3 - EXECUTION

#### 3.1 INSPECTION

- .1 Examine all substrate and floor thoroughly cleaned.
- .2 Review all floor surfaces with Departmental Representative to ensure they are smooth and flat with a maximum variation of 3 mm in 3 m and are ready to receive work.
- .3 Check and if necessary, pay for testing of floor surfaces for evidence of carbonation, dusting, excessive moisture or other defects affecting bond of adhesive. Ascertain nature of curing and/or sealing compound use on concrete and its compatibility with flooring adhesive. Take all required remedial measures. Remove compounds if necessary to ensure that adhesive bonds to concrete.
- .4 Beginning of installation means acceptance of existing substrate and site conditions.
- .5 Prior to installation of floor finishes, the General Contractor is to verify and confirm that there is positive drainage to all floor and trench drains without ponding. Failure to comply with this requirement will result in the removal and replacement of the floor slab at his cost.
- .6 Field review by the flooring manufacturer representative is mandatory prior to installing any flooring material to ensure the following:
  - .1 Preparation of surface removing the existing flooring material including all adhesive residue
  - .2 Moisture content
  - .3 Leveling.
- .7 Contractor to repair, re-level or remove any areas noted by the flooring manufacturer's representative.

#### 3.2 PREPARATION OF SUBSTRATE

- .1 Concrete Moisture Testing: Conduct moisture tests on all concrete floors regardless of the age, grade level or the presence of existing flooring. Conduct calcium chloride tests in accordance with ASTM F1869. Measure the internal relative humidity of the concrete slab in accordance with ASTM F2170. One test of each type should be conducted for every 1,000 square feet of flooring (minimum of 3). The tests should be conducted around the perimeter of the room, at columns, and anywhere moisture may be evident. A

diagram of the area showing the location and results of each test should be submitted to the Departmental Representative.

- .1 Concrete moisture vapor emissions must not exceed adhesive manufacturer's requirements. If the test results exceed these limitations, the installation must not proceed until the problem has been corrected.
- .2 Perform test for alkalinity and certify to Departmental Representative that pH levels are within manufacturer's range prior to installation of floor coverings.
- .3 Perform adhesive bond test and certify to Departmental Representative that results of bond test are acceptable.
- .4 Subfloor Treatment:
  - .1 Comply with ASTM F710 for surface preparation.
  - .2 Subfloors to be permanently dry, clean, smooth and structurally sound.
  - .3 Subfloors to be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, curing, sealing, hardening, or parting compounds, alkaline salts, excessive carbonation or laitance, mould, mildew, and other foreign materials that might prevent adhesive bond.
  - .4 Shot-blast all subfloors and wash entire floor areas.
  - .5 Surface cracks, grooves, depressions, control joints or other non-moving joints, and other irregularities to be filled or smoothed with patching and/or underlayment compound.
  - .6 Smooth subfloor to prevent irregularities, roughness, or other defects from telegraphing through the new resilient flooring.
  - .7 Level the surface of concrete sub-floor within the equivalent of 2 mm in 3 m.
  - .8 Build up beveled underlay "roll over" transitions.

### 3.3 SUBSTRATE TREATMENT

- .1 Fully grind concrete floors and ensure all asphaltic glues and adhesives have been removed.
- .2 Liquid wash and scrub substrate to remove any residue and to create a clean substrate to achieve a proper bond as specified.
- .3 Where required apply Mapei Novo/Pan 2 self-leveling cementitious underlayment, skim coat only, over required infill areas. Ensure the transition of this new underlayment feathers into the existing concrete. Upon completion of grind, vacuum thoroughly to ensure all loose particles are removed.
- .4 Refer to documents for the location of the overall areas receiving resilient flooring.

### 3.4 INSTALLATION - GENERAL

- .1 General
  - .1 Do not start installation of resilient flooring until all other trades have completed their work and just prior to completion of building.

- .2 Maintain temperature of 70 Deg F for 48 hours before installation and 48 hours after.
- .3 Arrange for controlled ventilation during this period to avoid high humidity and cold drafts.
- .2 Preparation
  - .1 On concrete floors, level depressions and cracks with non-shrinking latex joint filler. Report large cracks to General Contractor. Do not proceed until remedied. Prime surface with approved primer.

### 3.5 INSTALLATION - SHEET FLOORING

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside.
  - .2 Install resilient flooring in accordance with manufacturer's printed installation instructions.
  - .3 Dry lay resilient flooring to provide equal size at perimeter. Adjust layout to eliminate resilient flooring cut to less than half full width.
  - .4 Apply adhesive uniformly using conventional full spread adhesive. Do not spread more adhesive than can be covered by flooring before initial set takes place.
  - .5 Lay flooring in direction of traffic and in accordance with reviewed cut diagrams. Minimize number of seams.
  - .6 Roll Flooring:
    - .1 As installation progresses, and after installation, roll flooring to ensure full adhesion.
    - .2 Roll flooring using a 45 kg roller. Repeat.
  - .7 Install resilient flooring without cracks or voids at seams. Lay seams together without stress.
  - .8 Penetrations at Subfloor:
    - .1 Make penetrations through flooring materials watertight, including floor drains and clean-outs, in accordance with manufacturer's written installation instructions.
    - .2 Fill voids between sheet flooring and other surfaces with urethane sealant recommended by sheet flooring manufacturer.
  - .9 Terminate flooring at door threshold in openings where adjacent floor finish or colour is dissimilar.
  - .10 Extend resilient flooring into closets, alcoves, and similar openings.
  - .11 Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Do not install resilient flooring over concrete slabs until
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the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by the resilient flooring manufacturer's recommended bond and moisture test. Do not take tests later than ten days prior to scheduled installation. Notify Departmental Representative immediately of unsatisfactory conditions.

### 3.6 INSTALLATION - VINYL COMPOSITE FLOORING

- .1 Apply adhesive uniformly with an approved notch-tooth spreader at the recommended rate. Do not spread more adhesive than can be covered before initial set takes place.
- .2 Lay out each area to be tiled symmetrically from its axis. Adjust starting line so width of border tile shall be at least one half tile. Distribute tiles having varying tones or texture evenly over entire floor area to avoid patches or streaks, and to produce homogeneous blend. Reject tiles having undue variations in colour, shade and texture. Make tile joints flush, uniform, in straight lines and as inconspicuous as possible. Lay tile so that directional patterns of tiles are parallel to each other, in a staggered offset.
- .3 Lay out tiles so that joints parallel to axis of room are continuous.
- .4 Cut tile around excessively heavy or fixed objects.
- .5 Roll tile with 68 kg (150 lb.) roller immediately after laying.
- .6 Lay tile so that it is flush with adjacent floor surfaces.
- .7 Where tile abuts a raised finished floor surface, provide a feathered ramp to marry two levels to produce an imperceptible level change (min 1525mm for 12.7mm difference).
- .8 Install a minimum of three coats of a high-quality commercial floor polish as recommended by VCT flooring manufacturer to temporarily protect the typical VCT floor areas unless otherwise noted until regular maintenance procedures can begin.
  - .1 Install five coats of high-quality commercial floor polish at high traffic areas and areas with high stain potential including: corridors, waiting areas, janitor rooms.

### 3.7 INSTALLATION - RUBBER BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 2.5 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions.

- .7 Outside Corners:
  - .1 Use straight pieces of maximum lengths possible.
  - .2 Wrap base minimum 305 mm beyond corners.
  - .3 No joint at corners permitted.
  - .4 Form without producing discoloration (whitening) at bends.
  - .5 Scribe back of base at bend locations and remove strips perpendicular to length of base that are only deep enough to produce snug fit, without removing more than half wall base thickness.
- .8 Inside Corners:
  - .1 Use straight pieces of maximum lengths possible.
  - .2 Wrap base minimum 305 mm beyond corners.
  - .3 No joint at corners permitted.
  - .4 Form by cutting inverted V-shape notch in toe of wall base at point where corner is formed.
  - .5 Scribe back of base where necessary to produce snug tie to substrate.

### 3.8 MAINTENANCE MATERIALS

- .1 Supply to Departmental Representative min 2% of each colour, pattern and type of flooring material (min 1 full box) labeled by colour and area of use.
- .2 Submit as per Specification Section 01 33 00 Submittal Procedures.

### 3.9 GUARANTEE

- .1 Provide the Departmental Representative with a written Guarantee covering all work in this section. Guarantee shall state that any defects in materials or workmanship occur within a period of twelve (12) months from the date of acceptance of the building will be corrected/replaced at Departmental Representative's discretion and at no additional cost to the Departmental Representative.

END

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## PART 1 - GENERAL

### 1.1 SUMMARY OF SECTION

- .1 As summarized and described but not restricted to the following:
  - .1 Provide slip resistant Seamless Quartz Epoxy Flooring Systems and cove base as indicated.
  - .1 Prepare existing floor to receive new Epoxy flooring

### 1.2 REFERENCES

- .1 The standards listed form part of this Specification to the extent of reference. The publications are in the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM C307-03(2012), Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing
  - .2 ASTM C531-00(2012), Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
  - .3 ASTM C580-02(2012), Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes
  - .4 ASTM D2240-05(2010), Test Method for Rubber Property-Durometer Hardness
  - .5 ASTM D4060-14, Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
  - .6 ASTM D4794-94(2009), Standard Test Method for Determination of Ethoxyl or Hydroxyethoxyl Substitution in Cellulose Ether Products by Gas Chromatography.

### 1.3 SUBMITTALS

- .1 Product Data:
    - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Division 01, Submittal Procedures.
  - .2 Samples:
    - .1 Submit samples in accordance with Division 01, Submittal Procedures.
    - .2 Submit full colour range brochure for Epoxy flooring system for colour selection.
    - .3 Submit two (2) 100 mm x 100 mm (4" x 4") samples of 5 mm thick epoxy coating on backer for colour chosen.
      - .1 Provide one sample each standard and medium grit flooring for review by Consultant
  - .3 Shop Drawings:
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- .1 Submit shop drawings in accordance with Division 01, Submittal Procedures.

#### 1.4 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
- .2 Do not attempt to install material if the temperatures of the Epoxy components are not within 60 to 85°F/16 to 30°C.
- .3 Ventilation:
  - .1 Provided continuous ventilation during and after installation. Run ventilation system 24 hours per day during installation. Provide continuous ventilation for seven (7) days after completion of installation.
- .4 Substrate Condition:
  - .1 Do not apply flooring over materials that contain over 14% moisture.
  - .2 Coat surfaces only:
    - .1 With surface temperatures at a minimum of 16°C for 24 hours before, during and for 48 hours following application, or until cured.
    - .2 When no dust is being raised.
    - .3 On broom clean substrate areas.
    - .4 Free of wax, grease, oils, fats, soil loose or foreign materials and laitance.
    - .5 Unbonded cement particles must be removed by mechanical methods.
  - .3 Manufacturer's representative to review and confirm substrate is acceptable in writing to Consultant and General Contractor.
- .5 Post "No Smoking" signs and ensure that spark-proof electrical equipment is used in areas where inflammable materials are being applied.
- .6 Erect barriers to prevent the entry and presence of personnel not performing Work of this Section during application of coatings, and for forty-eight (48) hours following completion of application.

#### 1.5 MOCK-UP

- .1 Refer to Division 01, Quality Control for requirements of mock-up.
  - .2 Locate where directed by Consultant.
  - .3 Allow 48 hours for field review of mock-up by Consultant.
  - .4 Contractor to proceed once the testing is complete and written approval has been received by the Consultant.
  - .5 When accepted, mock-up will demonstrate minimum standard for this work. Approved mock-up may remain as part of the Work.
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## 1.6 WASTE MANAGEMENT

- .1 Separate and recycle waste materials in accordance with Division 01, Waste Management and Disposal

## 1.7 PERFORMANCE CRITERIA

- .1 Provide a Quartz Epoxy flooring that, when cured, produces the following typical properties: (Based on Standard of Acceptance in Part 2)
  - .1 Water Absorption: 0.1% (ASTM C413)
  - .2 Tensile Strength: 2000 psi (ASTM C307)
  - .3 Hardness: 85-90 (ASTM D2240, Shore D)
  - .4 Impact Resistance: >160 in./lb. (ASTM D4794)
  - .5 Abrasion Resistance (ASTM D4060, CS-17) (sealed) 0.06 gm max. weight loss
  - .6 Cure Rate: 12 hour foot traffic 24 hr pull strength
  - .7 Flexural Strength: 4300 psi (ASTM C580)
  - .8 Flexural Modulus of Elasticity:  $2.0 \times 10^6$  psi (ASTM C580)
  - .9 Thermal Coefficient of Linear Expansion (ASTM C531)  $1.8 \times 10^{-5}$  mm/mm °C
  - .10 Compressive Strength: 10,000 psi (68.94 MPa) (ASTM C579)
  - .11 Curing Shrinkage:  $5.0 \times 10^{-4}$  in/in (ASTM D531)

## 1.8 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Division 01, Common Product Requirements.
- .2 Comply with manufacturer's recommendations for handling, storage and protection during installation.
- .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
- .4 Label packages to include material name, production date and/or product code.
- .5 Deliver materials to job site just prior to installation.
- .6 Store all components of epoxy flooring between 16 to 25°C in a dry area. Avoid excessive heat, sunlight and do not freeze. Maintain materials in original wrapping and containers until used.

## 1.9 QUALITY ASSURANCE

- .1 Contractor to be an established firm regularly engaged in satisfactory installation of similar materials and shall provide if requested to the Consultant a list of three (3) projects of similar nature and complexity completed in the last five (5) years and have five years of experience of installing same in the Atlantic area. Contractor shall provide a letter of certification by manufacturer that Contractor is a current qualified installer.
-

- .2 Single Source Responsibility: Provide all quartz epoxy flooring system components by the same manufacturers and as recommended by Manufacturer.
- .3 Epoxy Manufacturer to have no less than ten (10) years of experience in the manufacture and supply of principal materials for work in this Section.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 **(EPXY) Epoxy Seamless Floor Material:**
  - .1 100% solids, 0VOC, 6mm (1/4") thick system with a two-component epoxy primer, a high performance, three-component troweled mortar consisting of epoxy resin, curing agent and selected, graded aggregates blended with inorganic pigments, 2 coats of a two-component, 100% solids epoxy coating.
  - .2 Slip resistant finish: Consultant to select from standard and medium texture samples submitted.
  - .3 Colour: As selected by Departmental Representative.
  - .4 Flooring Components (must be by one Manufacturer and recommended by Manufacturer):
    - .1 Base: A three component, troweled mortar base consisting of epoxy resin, curing agent and finely graded silica aggregate.
    - .2 Undercoat: A three component, free flowing epoxy formulation consisting of resin curing agent and fine aggregate.
    - .3 Aggregate: brightly coloured, quartz broadcast aggregate.
    - .4 Sealer: a two-component, high performance, UV resistant, clear epoxy sealer.
  - .5 Standard of Acceptance: Stonhard STONCLAD GS with STONKOTE GS4.
  - .6 Approved Alternate Manufacturers:
    - .1 Stonhard STONCLAD GS with STONKOTE GS4,
    - .2 Sika Floor Quarzite, Dex O Tex

### 2.2 ACCESSORIES

- .1 Primer: as recommended by Epoxy Flooring Manufacturer for substrate.
- .2 Leveling compound: refer to Section 09 30 00 Tiling for products, if required.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Floors must be structurally sound and prepared to manufacturer's recommendations.

- .2 Inspect surfaces for acceptability of levelness, moisture content, pitch to drains, etc.
- .3 Report in writing to Consultant, with copy to manufacturer, of deficiencies that could impair Work. Surfaces must be approved by the Certified Epoxy Contractor prior to application of flooring.

### 3.2 PREPARATION OF SUBSTRATE

- .1 Proper preparation is critical to ensure an adequate bond. The substrate must be dry and free of all wax, grease, oils, fats, soil, loose or foreign materials and laitance. Laitance and unbounded cement particles must be removed by mechanical methods. i.e., abrasive blasting or scarifying. Other contaminants may be removed by scrubbing with a heavy duty industrial detergent approved by manufacturer and rinsing with clean water.
- .2 Shot blast entire floor area and wash entire floor to remove all remaining laitance.
- .3 Perform all chemical cleaning in strict accordance with federal, provincial and municipal regulations, which prohibit introduction of certain chemicals and contaminants into sewers, open bodies of water and into ground.
- .4 The surface must show open pores through and have a sandpaper texture.
- .5 Contact manufacturer for additional information regarding substrate preparation.
- .6 For priming, use manufacturer's guideline for different application.
- .7 Apply levelling compound, if required, in accordance with manufacturer's product.
- .8 Cover or mask surfaces adjacent to those receiving flooring to protect work of others and property from damage
- .9 All concrete cracks greater than 3mm (1/8") wide shall be routed by mechanical means, primed and filled with trowelled epoxy.

### 3.3 APPLICATION

- .1 General: Apply each component of epoxy flooring system in compliance with manufacturer's directions to produce a uniform monolithic wearing surface of thickness indicated, uninterrupted except at divider strips, sawed joints or other types of joints (if any), indicated or required.
  - .2 Primer: Mix and apply primer over properly prepared substrate with strict adherence to manufacturer's installation procedures and coverage rates. Coordinate timing of primer application with application of troweled mortar to ensure optimum adhesion between epoxy flooring materials and substrate.
  - .3 Trowelled Mortar: Mix mortar material according to manufacturer's recommended procedures. Uniformly spread mortar over substrate using manufacturer's specially designed screed box adjusted to manufacturer's recommended height. Trowel apply
-

mixed material over freshly primed substrate using stainless steel finishing trowels and mechanical power trowel.

- .4 Coating: Remove any surface imperfections by lightly abrading and vacuuming the floor surface. Mix coating and apply first coat of Stonkote GS4 according to manufacturer's recommended procedures. Broadcast texture #3 aggregate into wet coating. After curing, remove any excess aggregate and sweep clean. Squeegee apply and backroll second coat of Stonkote GS4 with strict adherence to manufacturer's installation procedures and coverage.
- .5 Terminate floors that do not abut against a vertical surface with a 13 – 19mm wide x 6mm deep chase.
- .6 Cove Base: Install cove integral with the floor 10cm (4") in height at all epoxy floor locations. All coves capped with manufacturer's specialty designed cove strip, as per drawings

### 3.4 RECOMMENDATIONS

- .1 Do not install if temperature of the components and substrate are not within 60-85°F/16-30°C.
- .2 Do not use water or steam in the vicinity of the application. Moisture can seriously affect the working time and other properties.
- .3 The use of NIOSH/MSHA approval respirator and safety glasses are recommended.
- .4 Use only with adequate ventilation.

### 3.5 PROTECTION AFTER WORK COMPLETED

- .1 Protect the completed work from water, airborne particles or other surface contaminants until cured as recommended by Manufacturer.
- .2 Protect completed system from traffic and physical abuse for approximately seventy-two (72) hours. Protect completed system from immersion and chemical exposure until thoroughly cured, approximately seven (7) days at 70 °F.

### 3.6 ADJUSTMENT

- .1 Materials soiled by epoxy flooring installation during application to be replaced under Work of this Section.

### 3.7 CLEANING

- .1 Remove waste materials, rubbish and debris and dispose of them in accordance with local regulations. Leave work areas in a clean condition.
-

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 The standards listed form part of this Specification to the extent of reference. The publications are in the text by the basic designation only.
- .2 American Society for Testing and Materials International (ASTM):
  - .1 ASTM E648-15, Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.

### 1.2 SUBMITTALS

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, including installation instructions, MSDS sheets, specifications and data sheets in accordance with Division 01.
  - .2 Submit maintenance instructions for incorporation in O & M Manual.
- .2 Samples:
  - .1 Submit samples in accordance with Division 01.
  - .2 Submit two (2) samples of each specified carpet tile.
  - .3 Submit samples of transition strip.
- .3 Extra Stock: Deliver to Departmental Representative on completion of Work, minimum 5% of carpeting tile installed for each specified carpet of each colour, labelled and in packages.
- .4 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.

### 1.3 ENVIRONMENTAL REQUIREMENTS

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials.
- .2 Temperature:
  - .1 Apply carpeting on surfaces of 10C minimum temperature.
  - .2 Install carpeting in areas maintained at a minimum temperature of 21C during installation and for 48 hours before and after installation.

### 1.4 WASTE MANAGEMENT

- .1 Separate and recycle waste materials in accordance with Division 01.
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## 1.5 DELIVERY, STORAGE AND PROTECTION OF PRODUCT

- .1 Deliver and store materials in compliance with Division 01.
- .2 Comply with manufacturer's recommendations for handling, storage and \ protection during installation.
- .3 Protect and store materials off the ground, away from physical damage and from becoming wet, soiled or covered with ice or snow before, during and after installation.
- .4 Label packages to include material name, production date and/or product code.
- .5 Deliver carpeting materials to the site only immediately before installation, but allow time for complete acclimatization.
- .6 Store materials in protected, dry area. Store adhesive materials at a min. 4C and in accordance with manufacturer's recommendations.
- .7 Protection:
  - .1 Protect carpeting during storage and handling to ensure that it is not damaged or soiled.
  - .2 Cover or mask surfaces adjacent to those receiving application of adhesive to protect them from soil.
  - .3 Prevent traffic and Work on newly laid carpet by barricading these areas. area to ensure that carpeting is not damaged by traffic or by subsequent Work. Provide temporary protection as required.
  - .4 Ensure that adequate ventilation and spark-proof electrical equipment are provided, and smoking is prohibited, in areas where flammable liquids are used.
  - .5 Store materials to prevent spontaneous combustion.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Carpet Tile:
    - .1 Square tile dimension. Acceptable range of tile size: 19" min 36" maximum. Use same size throughout.
    - .2 Monolithic installation
    - .3 Pattern design to be such that the carpet tile looks similar to broadloom when installed in Monolithic layout.
    - .4 100% Solution Dyed
    - .5 Non-woven synthetic fiber backing
    - .6 Smoke Generation Less than 450 (ASTM E-662)
    - .7 Warranty: Lifetime Commercial Limited
    - .8 Two colourways to be selected from standard range
    - .9 Standards of Acceptance:
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- .1 Shaw Contract Group, Space Worx Collection, 'Surround' 5T125 pattern
  - .2 Interface Flooring, First Options collection, 'Meet' pattern
  - .3 Tandus Flooring, 11018 'Stamp' pattern.
- .10 Transition Strip: refer to Section 09 65 00 Resilient Flooring and 09 30 00 Tiling.
- .11 Carpet Adhesive: as recommended by Carpet Manufacturer for concrete substrates.
- .12 Patching and Underlayment Compound: as recommended by Carpet Manufacturer.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- .1 Before commencement of installation of the carpet, ensure that:
  - .1 Work of others in areas where carpet is installed has been completed and are satisfactory for installation of carpet.
  - .2 Floors are level, and free from cracks, ridges, dust, oil, grease, debris and other soil which would harm installation.
  - .3 Concrete floors are cured and free of dusting.
  - .4 Moisture and pH content of concrete slabs and compatibility of sealer meets requirements of flooring and adhesive manufacturer.
  - .5 Environmental conditions meet specified requirements

#### 3.2 PREPARATION

- .1 Grind or sand concrete ridges and high spots level and smooth.
- .2 Remove soil, oil, grease, paint and similar foreign materials from surfaces to receive carpeting.
- .3 Shot-blast entire floor area. Wash and clean entire floor to remove all laitance.
- .4 Vacuum clean surfaces to receive carpeting with an industrial Hepa vacuum.

#### 3.3 INSTALLATION

- .1 Installation in accordance with the manufacturer's recommendations:
  - .1 Lay Pattern: monolithic
  - .2 Install carpet with maximum installation waste of 2%.



3.4 ADJUSTMENT AND CLEANING

- .1 Remove soil and spots; and excessive adhesive, from carpet surfaces with compatible solvent that will not damage carpeting.
- .2 Vacuum clean carpets at completion of installation.
- .3 Final cleaning is specified in Division 01.

END

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## PART 1 - GENERAL

### 1.1 SUMMARY OF SECTION

- .1 As summarized and described herein but not restricted to:
  - .1 Surface preparation.
  - .2 Wall covering.

### 1.2 REFERENCES

- .1 CAN/ULC-S102-10, Test for Surface Burning Characteristics of Building Materials and Assemblies.

### 1.3 SUBMITTALS

- .1 Refer to Section 01 33 00 Submittal Procedures.
- .2 Product Data: Provide data on wall covering and adhesive.
- .3 Digital Layout Proof: Provide full colour elevations of graphic in place on elevation for each location.
- .4 Shop Drawings: Indicate wall elevations with seaming layout.
- .5 Samples: Submit one (1) sample of wall covering, 12" x 36" in size illustrating colour, finish, and texture.
- .6 Test Reports: Submit reports verifying flame and smoke ratings, when tested by ULC.

### 1.4 MAINTENANCE MATERIAL SUBMITTALS

- . 1 Provide cleaning instructions from manufacturer.

### 1.5 WARRANTY

- .1 Submit manufacturer's written warranty for five (5) years against manufacturing defects.

### 1.6 MOCK-UP

- .1 Refer to Section 01 45 00 Quality Control for requirements for mock-up.
-

- .2 Provide mock-up, full height, illustrating installed wall covering, and joint seaming technique. Coordinate with specialty composite panel overlay.
- .3 Locate where directed by Consultant.
- .4 Approved mock-up may remain as part of the Work.

#### 1.7 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Inspect roll materials on site to verify acceptance.
- .3 Protect packaged adhesive from temperature cycling [and cold temperatures].
- .4 Do not store roll goods on end.

#### 1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Refer to Section 01 61 00 Common Product Requirements.
- .2 Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or vinyl covering product manufacturer.
- .3 Maintain these conditions 24 hours before, during, and after installation of adhesive wall covering.

### PART 2 – PRODUCTS

#### 2.1 MATERIAL

- .1 (WC1) Wallcovering
    - .1 Standard of Acceptance: Koroseal Digital Type II Wallcovering.
      - .1 Substrate: Koroseal Enigma Aluminum
      - .2 Scale: Customized to fit wall, no pattern repeat.
      - .3 Overall size as indicated on drawings.
      - .4 Graphic Asset:
        - .1 Getty Images 496838815, highest available resolution
        - .2 To be purchased by wallcovering manufacturer for use in production.
        - .3 Coordinate final graphic layout with TV monitor obstructions to be mounted on wall.
        - .4 Coordinate final graphic colours and saturations with translucent specialty composite panel (SCP2) to be mounted over graphic to ensure graphic detail remains visible. (Refer to Section 10 20 00 Misc. Specialties.) Provide mock-up.
  - .2 (WC2) Wallcovering
-

- .1 Standard of Acceptance: Koroseal Digital Type II Wallcovering.
  - .1 Substrate: Matte finish to be selected from Manufacturer's standard range
  - .2 Scale: Customized to fit wall, no pattern repeat.
  - .3 Graphic Asset:
    - .1 To be provided by airline and car rental entities. Coordinate with airlines and car rental companies to obtain required appropriate high resolution or vectorized branding artwork.
    - .2 Allow one graphic per airline and car rental entity.

## 2.2 ACCESSORIES

- .1 Adhesive: Type recommended by wall covering manufacturer to suit application to substrate
- .2 Substrate Filler: As recommended by adhesive and wall covering manufacturers
- .3 Substrate Primer and Sealer: white pigmented acrylic/latex base primer formulated for use with vinyl wall coverings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Before cutting, examine image and colour and determine that they are the correct image and colour as specified for the correct location.
- .2 Verify existing conditions before starting work.
- .3 Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wall covering manufacturer.
- .4 Measure moisture content of surfaces using an electronic moisture meter. Do not apply coverings unless moisture content of surfaces are below the following maximums:  
  
Plaster and Gypsum Wallboard: 4 percent.
- .5 Notify Consultant in writing of detrimental conditions prior to commencing work beginning installation means acceptance of surface conditions.

### 3.2 PREPARATION

- .1 Allow digitally printed vinyl wallcovering mural to acclimatize to the area of installation a minimum of 24 hours before installation.
  - .2 Refer to Section 09 21 16 Gypsum Board Surfaces.
-

- .3 Vacuum clean surfaces free of loose particles.

### 3.3 INSTALLATION

- .1 Install adhesive and wall covering to manufacturer instructions.
- .2 Install each panel in sequence as indicated on drawings.
- .3 Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.
- .4 Apply wall covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Smooth wall coverings by using a stiff bristled sweep brush to eliminate air bubbles, wrinkles, gaps and overlaps. Butt edges tight.
- .5 Install wall covering before installation of bases or items attached to or spaced slightly from wall surface.
- .6 Do not install wall covering more than 6 mm below top of resilient base.
- .7 Cover spaces above and below windows, above doors, in pattern sequence from roll.
- .8 Remove excess wet adhesive from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

### 3.4 CLEANING

- .1 Refer to Section 01 74 00 Cleaning.
- .2 Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.
- .3 Reinstall wall plates and accessories removed prior to work of this Section.

### 3.5 PROTECTION OF FINISHED WORK

- .1 Protect installed work.
- .2 Do not permit work at or near finished wall covered areas.

### 3.6 SCHEDULES

- .1 Pay Point back wall.
- .2 Events Room north wall.
- .3 ATU north wall.
-

END

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## PART 1 - GENERAL

### 1.1 REFERENCES

- .1 Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2 Green Seal Standard GS-11 VOC and Chemical Components Limits.
- .3 SCAQMD Rule #1113 VOC and Chemical Component Limits.

### 1.2 QUALITY ASSURANCE

- .1 Conform to latest MPI requirements for interior and exterior painting work including preparation priming and application.
- .2 Materials shall be in accordance with MPI Painting Specification Manual 'X-Green MPI Approved Product'- Latest edition listing and shall be from a single manufacturer for each system used.
- .3 Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.
- .4 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Departmental Representative.
- .5 Standard of Acceptance:
  - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
  - .2 Ceilings: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
  - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

### 1.3 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

- .1 Provide paint products meeting MPI "Green Performance Standard" GPS-2 ratings based on VOC EPA Method 24 content levels.
- .2 Contractor to use products having a minimum GPS-2 rating.
- .3 All paints and coatings to meet the VOC and Chemical Component Limits set in Green Seal Standards GS-11 and the SCAQMD Rule #1113.

### 1.4 SCHEDULING OF WORK

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

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#### 1.5 SUBMITTALS

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- .1 Submit product data and manufacturer's installation/application instructions for each paint and coating product to be used in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit WHMIS MSDS Data Sheets as per Section 01 35 29.06 Health and Safety Requirements.
- .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 Green Performance classification system rating.
  - .5 MPI X-Green Product listing
  - .6 Manufacturer's Material Safety Data Sheets (MSDS).

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#### 1.6 SAMPLES

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- .1 Submit duplicate full range colour swatches in accordance with Section 01 33 00 - Submittal Procedures. Indicate where colour availability is restricted.
- .2 Submit duplicate 200 x 300 mm swatches 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 13 mm birch plywood for finishes over wood surfaces.
  - .2 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.
- .3 When approved, sample panels shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

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#### 1.7 QUALITY CONTROL

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- .1 Provide mock-up in accordance with Section 01 45 00 – Testing and Quality Control.
  - .2 When requested by Departmental Representative, prepare and paint designated surface, area, room or item (in each colour scheme) to requirements specified herein, with specified paint or coating showing selected colours, gloss/sheen, textures and workmanship to MPI Painting Specification Manual standards for review and approval.
-



When approved, surface, area, room and/or items shall become acceptable standard of finish quality and workmanship for similar on-site work.

#### 1.8 EXTRA MATERIALS

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 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.
- .3 Deliver to Departmental Representative and store where directed.

#### 1.9 DELIVERY, HANDLING AND STORAGE

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Labels shall clearly indicate:
    - .1 Manufacturer's name and address.
    - .2 Type of paint or coating.
    - .3 Compliance with applicable standard.
    - .4 Colour number in accordance with established colour schedule.
  - .3 Remove damaged, opened and rejected materials from site.
  - .4 Provide and maintain dry, temperature controlled, secure storage.
  - .5 Observe manufacturer's recommendations for storage and handling.
  - .6 Store materials and supplies away from heat generating devices.
  - .7 Store materials and equipment in a well ventilated area with temperature range 7C to 30C.
  - .8 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
  - .9 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Departmental Representative. After completion of operations, return areas to clean condition to approval of Departmental Representative.
  - .10 Remove paint materials from storage only in quantities required for same day use.
  - .11 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.
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- .12 Fire Safety Requirements:
  - .1 Provide one 9 kg dry chemical fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

#### 1.10 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces in accordance with Section 01 50 00.
  - .2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10 C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .4 Coordinate use of existing ventilation system with General Contractor and ensure its operation during and after application of paint as required.
  - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Perform no painting when:
    - .1 Ambient air and substrate temperatures are below 10C.
    - .2 Substrate temperature is over 32C unless paint is specifically formulated for application at high temperatures.
    - .3 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
    - .4 The relative humidity is above 85% or when the dew point is less than 3C variance between the air/surface temperatures.
    - .5 Rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
  - .2 Perform no painting work when the maximum moisture content of the substrate exceeds:
    - .1 12% for concrete and masonry.
    - .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 surfaces for alkalinity as required.

- .5 Surface and Environmental Conditions:
  - .1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint only when previous coat of paint is dry or adequately cured.
- .6 Additional Interior Application Requirements:
  - .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
  - .2 Apply paint in occupied facilities during silent hours only. Schedule operations to approval of the Departmental Representative such that painted surfaces will have dried and cured sufficiently before occupants are affected.

#### 1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 21 – Construction / Demolition Waste Management and Disposal.
  - .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc..) are regarded as hazardous products and are subject to regulations for disposal.
  - .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 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.
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## PART 2 - PRODUCTS

### 2.1 MATERIALS

- .1 Paint materials listed in the "X-Green" MPI Approved Products List (APL) are acceptable for use on this project.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Only qualified products with GPS-2 rating and listed in the X-Green approved product listing by MPI 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 biodegradable.
  - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .4 do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.

### 2.2 MIXING AND TINTING

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Departmental Representative's written permission.
- .2 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .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.

### 2.3 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 @ 60</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 <u>gloss finish</u>	> 85	

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

#### 2.4 INTERIOR PAINTING SYSTEMS (PREMIUM GRADE TO MPI)

- .1 Paint Type #1
- .1 INT 4.2F Epoxy ('Tile Like') for dry environments
  - .2 INT 4.2G Epoxy ('Tile Like') for wet environments
  - .3 Concrete masonry units
- .2 Paint Type #2
- .1 INT 5.1K Epoxy Modified Latex
  - .2 G4 Satin finish.
  - .3 Miscellaneous Metal components
- .3 Paint Type #3
- .1 INT 5.1C Wall Based Dry Fall Finish
  - .2 G3 Eggshell Finish.
  - .3 Colour to be selected by Departmental Representative from Manufacturer's standard colour range.
  - .4 Expand ceiling structure columns, beams, joists deck, mechanical and electrical
- .4 Paint Type #4
- .1 INT 5.1L Epoxy Finish
  - .2 (tile like finish) Gloss Level 4 for ceilings and walls
  - .3 Colour to be selected by Departmental Representative from Manufacturer's standard colour range. (Accent Colour)
  - .4 Interior doors and frames
- .5 Paint Type #5
- .1 INT 9.2M Institutional Low Odor/VOC in accordance with MPI Standards
  - .2 Gloss Level 1 Finish for ceilings, Gloss Level 3 for walls
  - .3 Colour to be selected by Departmental Representative from Manufacturer's standard colour range.
  - .4 Gypsum Board walls in typical access
- .6 Paint Type #6
- .1 INT 9.2F Epoxy Modified Latex in accordance with MPI Standards
  - .2 G5 Semi-Gloss Finish
  - .3 Colour to be selected by Departmental Representative from Manufacturer's standard colour range.
  - .4 Gypsum Board walls in wet areas

## 2.5 INTERIOR PAINT COLOURS

- .1 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.
- .2 Paint Colours: Refer to finish schedule and drawings for colour locations.
  - .1 **(P1)** Wall Field Paint; colour-match Benjamin Moore PM1 Super White
  - .2 **(P2)** Accent Paint, Benjamin Moore 2017-40, Grape Green
  - .3 **(P3)** Accent Paint, Benjamin Moore 2028-30, Tequila Lime
  - .4 **(P4)** Trim Paint, Benjamin Moore CSP-60, City Shadow
  - .5 **(P5)** Colour-match plastic laminate PL4 as specified in Section 06 41 00

## 2.6 INTUMESCENT PAINT

- .1 Intumescent Paint:
  - .1 Interior Intumescent Paint:
    - .1 ULC certified, Class A, low VOC intumescent fire protection coating qualified for use in fire resistant ratings specified.
    - .2 Provide Intumescent paint system appropriate for structural member being protected.
    - .3 Decorative thin film smooth finish, spray water-based intumescent coating designed for the fire protection of interior structural steel.
    - .4 System qualified for use in ULC Designs as specified.
    - .5 Colour to be selected from full range.
    - .6 Acceptable Products:
      - .1 A/D Fire Film III
      - .2 Cafco Spray Film WB-3
      - .3 Approved alternate.

## 2.7 EXTERIOR PAINTING SYSTEMS

- .1 Exterior steel doors and frames:
  - .1 EXT 5.3B - Alkyd G4 gloss level finish.
- .2 Structural Steel columns and Metal Fabrications:
  - .1 EXT 5.1D - Alkyd G4 gloss level finish (over alkyd primer).
- .3 Galvanized metal:
  - .1 EXT 5.3G - Water based light industrial G1 gloss level coating

## 2.8 EXTERIOR PAINT COLOURS

- .1 Colour-match existing when abutting adjacent existing finishes.

- .2 Colors shall be selected from a manufacturer's full range of colors by Consultant. Allow 2 colours for each substrate type.

### PART 3 - EXECUTION

#### 3.1 GENERAL

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

#### 3.2 PROTECTION

- .1 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .2 Protect factory finished products and equipment.
- .3 Removal of electrical cover plates, light fixtures, surface hardware on doors, bath accessories and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking any painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.
- .4 Move and cover furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .5 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Departmental Representative.

#### 3.3 CLEANING AND PREPARATION

- .1 Clean and prepare surfaces in accordance with MPI Painting Specification Manual requirements. Refer to MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent and bleach where applicable and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.

- .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .4 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.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by brushing with clean brushes blowing with clean dry compressed air, or vacuum cleaning.
- .6 Touch up of shop primers with primer as specified in applicable section. Major touch-up including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

### 3.4 APPLICATION

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



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

### 3.5 MECHANICAL/ELECTRICAL EQUIPMENT

- .1 Unless otherwise specified, paint finished area exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.
  - .2 Boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
  - .3 Other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
  - .4 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
  - .5 Do not paint over nameplates.
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- .6 Keep sprinkler heads free of paint.
- .7 Paint inside of ductwork where visible behind grilles, registers and diffusers with primer and one coat of matt black paint.
- .8 Paint fire protection piping red.
- .9 Paint disconnect switches for fire alarm system and exit light systems in red enamel.
- .10 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.
- .11 Do not paint interior electrical equipment.

### 3.6 EXTERIOR PAINTING

- .1 Moisture and environmental conditions as per the manufacturer's recommendations must be strictly adhered to for all preparation, application and curing times.

### 3.7 INTUMESCENT PAINTING

- .1 The intent is to provide a protective layer of intumescent paint to all horizontal structural members, beams, joists, channels, supporting members and metal decking to provide sufficient protection for a 1 hour fire resistant requirement.

END

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