SECTION 09 29 00

GYPSUM BOARD

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Gypsum board is indicated as drywall on the Drawings.

1.2 REFERENCES

A. Comply with the latest edition of the following statues, codes and standards and all amendments thereto.
   1. CAN/CSA A82.27 Gypsum Board Products
   2. CAN/CSA A82.31 Gypsum Board Application

1.3 SYSTEM DESCRIPTION

A. Design Requirement: Design fire rated assemblies to comply with ULC test designs for ratings indicated and shown on Drawings.

1.4 SUBMITTALS

A. Certificate: Confirm in writing, if requested by Electrical Inspector, that furring/framing has been designed and constructed to support additional weight of fixtures.

B. Samples: Two samples 300 mm long expansion joint.

C. Submit copy of listed fire rated assemblies for review.

PART 2 PRODUCTS

2.1 MATERIALS

A. Gypsum Board System: By CGC Inc., Domtar Construction Materials Ltd. or Westroc Industries Ltd.
   1. Gypsum Board: CAN/CSA A82.27, maximum practical size, tapered edge for finishing, square edge for unfinished joints. Thickness 12.7 mm.
   2. Gypsum Board for Fire-Rated Assemblies Type X: Firecode C Gypsum Panel.
   3. Gypsum Board for Other Interior Application: CGC Sheetrock SW.

B. Cement Board:
   1. Cement Board: Base for tile or stone tile application, glass fiber reinforced cement panel 13 mm thick Durock Exterior Cement Board supplied by CGC Inc.

2. Fire-Rated Cement Board Cladding: ULC listed, 1 hour fire resistance rated, calcium silicate fibre cement board, density of 870 kg/m³, minimum 15.9 mm thick, Promat-H by Promat Inc. distributed by ABS Fibre Reinforced Products.
3. Cement Board Cladding: Smooth faced fiber cement panels by Finex, 12 mm thick, 1220 mm by 2440 mm.

C. Gypsum Board Accessories:
1. Fasteners: Drywall screws, sized to suit gypsum board thickness.
2. Adhesive and Joint Filler: As recommended by manufacturer of gypsum board.
3. Joint Reinforcement: 50 mm wide Kraft Paper Sheetrock Joint Tape by CGC Inc.
4. Water: Clear, potable.
5. Insulation: Refer to Section 07 21 00, Thermal Insulation.
6. Air and Vapour Barrier: Refer to Section 07 21 00, Thermal Insulation.

D. Cement Board Accessories:
1. Fasteners: 32 mm long minimum, countersunk, rust resistant screws.
2. Furring: 1.0 mm thick stainless steel furring channels or Z member.
3. Joint Reinforcement and Filler: As recommended by manufacturer of cement board to suit applicable conditions.
4. Cement Board Cladding Joint Filler: Glue based compound.
5. Water: Clear, potable.
6. Insulation: Refer to Section 07 21 00, Thermal Insulation.
7. Air and Vapour Barrier: Refer to Section 07 21 00, Thermal Insulation.
8. Sealant: Refer to Section 07 92 00, Joint Sealants.

E. Components - Framing and Furring/Strapping:
1. Metal Studs and Track: 0.89 mm thick galvanized or zinc bonderized steel, for self-drilling screws, and complete with accessories, by Domtar Construction Materials Ltd., 0.87 mm CGC Inc., 0.89 mm Bailey Metal Products Ltd. Width as indicated.
2. Runner Channels: 38 mm deep cold rolled steel channels weighing minimum 0.70 kg/m, galvanized after fabrication.
3. Furring Channels: Screw type, 22 mm deep cold rolled steel, weight minimum 0.45 kg/m, galvanized after fabrication.
4. Hangers: 6 mm dia. galvanized mild steel pencil rods.
5. Tie Wire: 1.6 mm annealed and galvanized steel.
6. Miscellaneous Steel: Galvanized after fabrication of shapes and strength required.
7. Trim Accessories: Cornerbead and j-moulding of galvanized or zinc bonderized steel.

PART 3 EXECUTION

3.1 GENERAL

A. Provide gypsum board system in compliance with CAN/CSA A82.31 except as otherwise specified.

3.2 ERECTION - METAL STUDS

A. Install studs in accordance with manufacturer's printed instructions.

B. Install accessories required to complete installation including extensions, reinforcing channels and anchors.

C. Adequately frame and reinforce to support additional weight of gypsum board and cement board cladding.

D. Provide double studs at each side of openings and at corners. Reinforce at 600 mm o.c. with horizontal reinforcing channels.

E. Reinforce walls by adding supplementary framing to receive wall hung fixtures, including vanity supports, hangers, flush valves, vacuum breakers, shelving, washroom accessories, mechanical and electrical equipment.

F. Where fixture carriers are built into stud wall provide minimum 13 mm clearance from inside of gypsum board or cement board.

G. Provide clearance required for expansion, contraction and deflection of building structure and frame.

3.3 INSTALLATION – AIR AND VAPOUR BARRIER AND INSULATION

A. Refer to Section 07 21 00, Thermal Insulation.

3.4 INSTALLATION - METAL FURRING AND STRAPPING AND SUSPENSION

A. Frame work to effect rigid, secure, square, level and plumb installation. Make allowance for thermal and structural movement.

B. Do not regard furring and strapping indicated as exact or complete. Place and secure pieces required to maintain dimensions and contours indicated.

C. Frame around openings with suitable members.

D. Adequately frame and reinforce to support additional weight of cement board.

E. Do not fasten to ducts, pipes, conduit, door frames, or inserts of other trades not specifically intended for fastening metal framing.

F. Locate main runners maximum 1200 mm o.c. to suit layouts and to frame and support superimposed weights of lighting fixtures, ceiling diffusers and related appurtenances.

G. Space furring channels at right angles to main runners at 300 mm o.c. maximum.

H. Space furring channels at approximately 400 mm o.c. to suit installation of insulation in between.

I. Brace bulkhead laterally.

J. Install miscellaneous steel shapes of adequate strength required to frame work of this Section.

K. Install free-standing self-supporting furring around columns. Maintain overall sizes of facing as indicated.

3.5 SOUND ATTENUATION INSULATION

A. Provide insulation blankets at gypsum board cement board work where shown and as required to attain sound attenuation indicated or specified.

B. Provide continuous insulation blankets between studs and run continuously from floor to ceiling, or to structure for full height partitions, over door frames and openings and around corners.

C. Pack insulation around cut openings in gypsum board cement board, behind outlet boxes around plumbing, heating or structural items passing through the system and at abutting walls.

D. Secure insulation to one interior face of gypsum board with adhesive or mechanical fasteners or by other approved means unless friction fitting glass fiber batts are provided.

3.6 INSTALLATION - GYPSUM BOARD ON FRAMING AND FURRING

A. Apply gypsum board with screws driven slightly below surface leaving shallow dimple.

B. Install corner bead to protect external corners. Install j-moulding at expansion joints and at junction of gypsum board and other finishes and on exposed edges.

C. Install trim accessories in one length up to 3000 mm and no shorter than 1800 mm. Mitre and fit corners and junctions accurately and free from rough edges. Secure at 300 mm o.c. maximum.

D. Cut openings neatly and in manner that will result in square edges.

3.7 APPLICATION - GYPSUM BOARD TO MASONRY SUBSTRATE

A. Ensure masonry and concrete surfaces are clean, smooth and dry prior to application.

B. Install gypsum board with continuous clearance of 6 mm at floor.

C. Apply adhesive to gypsum board panels. Press panels into place to ensure full adhesive contact. Brace panels until adhesive has dried.

D. Sheet air/vapour barrier: Refer to Section 07 21 00, Thermal Insulation.

3.8 INSTALLATION - FINISHING

A. Tape and fill exposed joints. Slight camber maximum 1 mm at finished joints is acceptable. Apply successive coats mechanically 250 mm wide on both sides of butt joint. Apply three coats over fasteners.

B. Sand slightly with No. 200 min. sandpaper when dry.

C. Make the finished work smooth, seamless, plumb, true, flush and with square, straight corners and edges.

D. Install shadow mould or metal trim at ceilings and walls where indicated.

3.9 INSTALLATION - FIRE RATED GYPSUM BOARD ASSEMBLIES

A. Provide fire rated assemblies to comply with ULC test designs for rating shown on Drawings.

B. Where fire rated back blocking in ceiling construction is required, float gypsum board ends between furring channels and fasten a 1500 mm length of furring channel with 150 mm overlapping adjacent gypsum board panels to gypsum board end. Fasten gypsum board at 300 mm o.c. Install mating end joint panel and fasten 1500 mm length of furring channel at 300 mm o.c.

3.10 INSTALLATION - CEMENT BOARD

A. Install cement board on metal studs with mechanical fasteners in accordance with printed instructions of board manufacturer.

B. Predrill and countersink fasteners heads.

C. Cut openings neatly and in manner that will result in square edges.

D. Tape and fill exposed joints. Leave ready for application of tile.

E. For fire rated enclosures use fire rated cement board assembly listed by ULC.
   1. Apply fire rated cement board cladding system to wood studs to ULC design W431 (1 hour); and steel studs: ULC design W430 U477 2h.

3.11 INSTALLATION - INSULATION AND CEMENT BOARD CLADDING

A. Install furring at 400 mm o.c., secure to the structure. Secure insulation fasteners to substrate at 300 mm o.c. in both directions. Apply a continuous coat of adhesive 1.6 mm thick. Install insulation and secure with retaining washer. Tape fasteners and joints of insulation. Prime substrate adjacent to insulation perimeter and tape perimeter of insulation to adjacent substrate with 150 mm wide tape. Tape foil facing to ensure a continuous vapour barrier.

B. Secure cement board cladding with mechanical fasteners in accordance with printed instructions of board manufacturer. Predrill and countersink fastener heads.

C. Cut openings neatly and in manner that will result in square edges.

D. Install panels with 12 mm gap between panels along width of panels and 6 mm gap between panels along length of panels.

E. For exterior application over exterior perimeter insulation: install cement board cladding vertically, 1220 mm wide by height required. Maintain 12 mm wide vertical joint between panels.

F. Finish exposed screw heads with glue-based finishing compound.

G. Seal joints between panels with polyurethane based sealant.

3.12 TOLERANCES

A. Provide the following Tolerances: For painted walls 1:500; for wall ceramic tiles 1:1000; for ceilings 1:1200.

3.13 INSTALLATION - CONTROL JOINTS

A. Provide control joints in straights run of walls at 9100 mm o.c. max.

B. Install control joints in gypsum board system where applied to concrete or masonry, either on furring or by direct adhesion, in the following locations: At masonry control joints and at junction of dissimilar wall materials.

C. Where application is on studs, double up studs at control and expansion joints, place one stud on each side of joint. Terminate runners at each side of joint.

D. Install double casing beads, back to back, fitted tightly together, on gypsum board edges at control and expansion joints. Finish casing beads but not joint between them.

E. At expansion joints provide 0.63 mm sheet metal cover as indicated fastened to one side only.

3.14 CUTTING AND PATCHING

A. Do cutting, patching and making good as required by installation of work of other trades and co-operate closely with these trades to assure a satisfactory finish. Remove and make good any work which, in the opinion of the Contract Administrator is defective and unacceptable, at no additional cost to the City.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Abrasive Nosing Inserts: Refer to Section 05 50 01, Metal Fabrication (Architectural).

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM C144 Standard Specification for Aggregate for Maosnry Mortar.
   2. CAN/CSA 3000, Cementitious Materials.
   3. ANSI A118.4 Specifications for Latex Portland Cement Mortar.
   4. ANSI A118.6 Specifications for Ceramic Tile Grouts.
   5. ANSI A118.3 Specifications for Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive.
   6. CAN/CGSB-75.1-M Tile, Ceramic.
   7. CSA G30.5-M Welded Steel Wire Fabric for Concrete Reinforcement.
   8. Terrazo, Tile and Marble Association of Canada.

1.3 SUBMITTALS

A. Submit two samples of each type of tile.

B. Submit manufacturer's maintenance and installation instructions.

1.4 QUALITY ASSURANCE

A. Membership in good standing of the Terrazzo, Tile and Marble Association of Canada.

1.5 SITE CONDITIONS

A. Maintain substrate and ambient temperature above 10 degrees C for 24 hours before, during and 24 hours after installation.

1.6 MAINTENANCE

A. Extra Materials: Supply to the Contract Administrator and store at location directed, on Site, minimum 2 percent of each type and colour of tile.

PART 2 PRODUCTS

2.1 GENERAL

A. Tile specified are representative of standard of quality.
   1. Acceptable suppliers: Daltile Canada Inc., Olympia Floor & Wall Tile Co.

B. Tile for Exterior Application: Frost resistant with absorption rate maximum 3 percent water by weight.

2.2 MATERIALS

A. Ceramic Tiles:
   1. Glazed Ceramic Wall Tiles: CAN/CGSB 75.1 type 3 Class MR2 cushion edges with spacer lugs, nominal face size 200 by 200 Designer Series by Daltile Canada Inc. Colour to later selection.
   2. Glazed Ceramic Floor Tiles: CAN/CGSB 75.1 type 2 Class MR2 porcelain type cushion edge, nominal face size 200 by 200 thick. Premier Series by Daltile Canada Inc. Colour to later selection.
   3. Provide polished tiles where indicated.
   4. Provide special shapes as indicated and as required.
   5. Use dot mount tiles. Paper backed are not acceptable.

B. Cement: CAN/CSA-A3000, GU.

C. Sand: ASTM C144.

D. Water: Clean, fresh, potable.

E. Mortar Bed and Levelling Coat by Volume:
   1. 1 part Portland cement
   2. 4 parts sand (clean, washed, sharp)
   3. 1/10 part polymer additive
   4. 1 part water

F. Thin-set Mortar: ANSI A118.4, full strength adhesive, Kerabond/Keralastic by Mapei Inc., 4237/211 by Laticrete International.

G. Epoxy Mortar and Grout: ANSI A118.3, 100% solids, Kerapoxy Grout by Mapei, SP100 Epoxy Grout by Laticrete.

H. Polymer Additive: CGSB 71 GP 30M, Type 2, Laticrete 3701 by Laticrete International Inc., Keralastic by Mapei.

I. Grout for Joints 3 mm and Less, Unsanded: ANSI A118.6, standard colours, Kercolour U by Mapei Inc., 600 Series by laticrete.

J. Grout for Joints 3 mm and over, Sanded: ANSI A118.6, standard colours, Kercolour S by Mapei Inc.; 500 Series by Laticrete.

K. Marble Threshold: One piece full width of door, bevelled, 40 mm wide

L. Ceramic Tile/Membrane Waterproofing System:
   1. Latex Levelling Coat: Polymer/sand/cement.
   2. Waterproofing Membrane Paste: Laticrete 9235 by Laticrete Inc.; Mapelastic by Mapei Inc.
   3. Fiberglass Reinforcing: Woven glass fabric weighing 2.9 kg/sq.m.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive tile and report conditions which would adversely affect installation.

B. Condition of Concrete Substrate: Structurally sound, clean, dry.

C. Finish on Structural Concrete Slab for Application of Cement Mortar Bed: Wood float.

D. Finish on Structural Concrete Slab for Thin-Set Tile Application: Smooth trowel with slab tolerance maximum 3 mm in 3000 mm.

E. Wall Substrate Tolerance for Thin-Set Tile Application: Maximum 3 mm in 3000 mm .

3.2 PREPARATION

A. Commence installation only after unacceptable surface conditions are corrected.

B. Apply levelling coat on concrete block substrate using mortar bed where required.

C. Prepare base surface as required to produce specified bond strength. A bonding agent suitable for conditions of service and which will provide specified bond strength with base concrete may be required. Follow the manufacturer's printed instructions for use of bonding agent.

D. Prepare materials and set tiles in accordance with the current Terrazzo, Tile and Marble Association of Canada specifications and installation manual.

3.3 INSTALLATION - WATERPROOF MEMBRANE

A. Provide waterproof membrane under tile finish at Shower and Dressing Area and Washrooms. Do not commence waterproofing work until concrete has cured for 28 days minimum.

B. Remove coatings, sealers, curing compounds and other materials which may be detrimental to bond of fillers, levelling coat and membrane.

C. Examine surfaces to be waterproofed and fill cracks with latex levelling coat.

D. Apply latex levelling coat as required to provide level and plumb surfaces to receive membrane and ceramic tile, and to provide slope to drains.

E. Comply with manufacturer's instructions for installation of waterproofing system. Have work supervised during complete installation by a qualified representative of the manufacturer supplying the waterproofing materials.

F. Extend waterproof membrane up walls to 100 mm above floor.

G. Over levelling coat, apply waterproofing paste and imbed glass fiber reinforcing mat with joints lapped 100 mm. Apply a second application of waterproofing paste to cover the mat.

H. Reinforce corners and changes in plane with a second membrane application consisting of 100 mm wide strip of glass fiber mat and additional coat of waterproofing paste. Allow to dry overnight.

I. Recoat membrane with third application of waterproofing paste where required to cover pinholes and any uncovered areas of glass fiber mat.

J. Work membrane carefully around fixtures, drains and other openings and recesses to provide a complete waterproof seal.

K. Protect finished work from traffic and damage.

3.4 INSTALLATION - MORTAR BED

A. Provide slurry bond coat consisting of cement, polymer additive and water mixed to creamy paste.

B. Install cement mortar bed to slopes indicated. Leave ready for thin-set installation.

C. Bond strength of cured mortar bed with base concrete: Minimum 1.5 MPa.

D. Before application of tile, test mortar bed by tapping with 1000 mm long 15 m dia. reinforcing bar. Core hollow sounding areas and test for adhesion. Replace delaminated mortar bed.

E. For setting bed greater than 50 mm thick, reinforce setting bed with reinforcing mesh. Lap sheets 75 mm min.

F. Fill metal pan stair treads with mortar setting bed and place inserts as indicated.

3.5 INSTALLATION - TILE

A. Install tiles on walls in accordance with TTMAC using thin-set system and in accordance with manufacturer's printed instructions.

B. Install tiles on floors in accordance with TTMAC using thin-set system with minimum of 95 percent mortar coverage.

C. Patch and make good existing tile where disturbed by new work.

D. Extend tile full height vertically and across top of equipment bases and curbs as detailed.

E. Set tile flat and level with uniform joints throughout, properly aligned. Provide uniform slopes to floor drains.

F. Maintain 3 6 mm joints for tile.

G. Provide 10 mm control joints at 5000 mm o.c. maximum, where tile abuts other hard materials, around periphery walls, columns, bases and directly over concrete slab expansion joints. Leave control joints ready for sealing.

H. Lay out tile work so tiles less than half dimension do not occur.

I. Back up tile bases, curb and other vertical application solid with mortar.

J. Keep face of tile and joints clean of setting compound.

K. Sound tiles after setting and replace hollow sounding units to obtain full bond. Replace cracked or damaged tile.

L. Do necessary cutting and drilling at fixtures, fittings and built in units without marring the tile. Do necessary cutting required for decorative pattern.

3.6 INSTALLATION - NOSING AND INSERTS

A. Install abrasive nosing inserts level and flush with stair tread finish. Install units in recesses provided in unfinished concrete stairs. Provide mortar bed under insert and back butter insert with mortar bed. Set insert without air gaps. Install inserts with screws and metal plugs 300 mm o.c. staggered and 75 mm from each end. Do not leave protective tape on treads over 90 days.

3.7 APPLICATION - GROUTING

A. Mix grout with polymer additive. Apply grout in accordance with manufacturer's printed instructions.

B. Force maximum grout into joints for full depth, level with surface of tile. Scrape surplus grout from surface of tile. After grout has attained slight initial set, promptly clean grout and polish surfaces of tile.

C. Clean up epoxy grout with minimum amount of water. Bar traffic until full cure of epoxy grout.

3.8 PROTECTION

A. Barricade floors from traffic for 48 hours.

B. Protect exterior tile from freezing for 14 days minimum.

3.9 ALTERATIONS AND MAKING GOOD

A. Do alterations to existing ceramic tile where indicated.

B. Remove sufficient tile to accommodate new equipment bases. Provide control joint around each base with edges of tile cut clean and straight. Extend new tile full height of base vertically and across top of base.

C. After removal of existing wall make good edge of tile to match existing condition.

3.10 FIELD QUALITY CONTROL

A. Inspection and Acceptance:
   1. At least 60 days after floor tile work has been completed it will be thoroughly inspected to ensure a continuous bond between base concrete and tile system has been achieved.
   2. Initial inspection: A hollow sound, in the opinion of the Contract Administrator, in any area will require verification of bond by testing. Core each such area as requested by the Contract Administrator to determine bonding adequacy.
   3. If delamination of tile has taken place remove tile over entire affected area and replace with thoroughly bonded tile. Pay for remedial work required to replace detective tile.
   4. Bond strength between base concrete and mortar bed including extent of delaminated areas will be determined by tests. Locate calibrated jack over centre of tile.
   5. Tests that meet specified strength requirement: Paid for by the City. Pay for tests that do not meet specified strength requirement.

3.11 WATER TEST OF WATERPROOFING MEMBRANE

A. After waterproofing membrane has been applied and cured and before applying tile, perform water test by flooding membrane installation with water to a depth of 13 mm. Leave for 48 hours and check for leakage. Propose and obtain acceptance of methods of remedial work, as required. Repeat above procedure until membrane is watertight.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM C635 Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
   2. ASTM C636 Practice for Installation of Metal Ceiling Suspension System for Acoustical Tile and Lay-in Panels.

1.3 DESIGN REQUIREMENTS

A. Design suspension system for maximum mid-span deflection 1/360 of span.

B. If requested, submit test results indicating that completed ceiling system will not deflect more than 1/360 of span.

C. Design ceiling capable of supporting a lateral partition load of 117 N/m for heavy duty, 88 N/m for intermediate duty system.

D. Obtain approval of the electric utility authorities having jurisdiction for the ceiling grid and supports as related to the support of the light fixtures. Adjust grid, fixing devices and support hangers as required to obtain acceptance. Submit copy of approval in triplicate.

E. Obtain and submit anchor manufacturer's certification for hanger anchors to be used, stating that anchors are suitable for hanger loading, spacing and other conditions relating to use intended. Submit anchor manufacturer's printed instructions for anchor installation.

1.4 SUBMITTALS

A. Samples: Submit two samples of each component of ceiling system.

B. Submit written certification from Professional Structural Engineer Licensed in Province of Manitoba stating that suspended ceiling system is capable of supporting its own weight and the weight of lighting fixtures, grilles, and other mechanical and electrical fixtures required by Division 26, Electrical, and Division 40, Process Integration.

C. Submit written certification from Professional Structural Engineer licensed in the Province of Manitoba, stating that support system, anchorage and equipment have been designed

according to requirements of the National Building Code of Canada (NBC), Division B, Part 4, article 4.1.8.17 for post-disaster structures.

D. Manufacturer's instructions: Submit manufacturer's installation instructions for system materials.

E. Submit copy of ULC assembly design for fire rated assemblies showing design numbers, components and rating.

1.5 QUALITY ASSURANCE

A. Perform work by skilled mechanics.

B. Submit Shop Drawings showing details of fastening splicing and edge conditions and other pertinent details.

C. Field Sample
1. Erect in area designated, a nominally 3000 by 3000 mm typical sample installation. Modify sample installation as required to obtain approval.
2. Do not begin erection of remainder of the ceiling system until sample installation has been inspected and accepted.
3. Accepted sample installation will represent the standard of quality required for remainder of acoustic ceiling work.
4. When directed, remove and dispose of sample installation except where approval has been obtained for sample installation to become a part of the final work.

1.6 WARRANTY

A. Submit a 1-year warranty against defects in materials and workmanship for panels and 10-year warranty against defects in materials and workmanship for grid system.

1.7 SEQUENCING AND SCHEDULING

A. Commence installation after glazing has been completed, exterior openings closed in and wet work has dried out.

B. Commence installation after work above suspension system has been completed.

1.8 MAINTENANCE

A. Supply 2 percent extra material for maintenance in sealed cartons from same production run, for the City's use.

PART 2 PRODUCTS

2.1 MATERIALS

A. Panels: Humiguard Plus, fire guard square lay-in edge profile, by Armstrong World Industries Inc. For size refer to Drawings.

B. Suspension system: Prelude Plus XL Fire Guard by Armstrong World Industries Inc., Donn DX System, CGC Inc.; Bailey Metal Products Ltd. exposed grid fire rated components formed from cold-rolled steel, hot dipped galvanized coated. Heavy duty system, spaced to suit lay in panels.

C. Edge moulding: Manufacturer's standard 19 mm face width wall angle shadow moulding manufacturers standard with 13 by 9.5 mm reveal.

D. Hanger anchor: Dynabolt anchor by ITW Construction Products, sized to suit hangers, installed as per manufacturer’s recommendations.

E. Hangers: 2.6 mm galvanized wire of size recommended by manufacturer of suspension system.

F. Tie wire: 1.6 mm, galvanized, soft annealed steel wire.

G. Accessories: Hold down clips, stabilizer bars, splices and clips of manufacturer's standard type to suit applicable conditions.

H. Finish for exposed metal: Baked-on non-yellowing, low-sheen, satin white baked enamel, standard white.

PART 3 EXECUTION

3.1 INSTALLATION

A. Do not commence installation until mechanical and electrical work above ceiling is complete.

B. Install lay-in panels and suspension system in accordance with manufacturer's printed instructions.

C. Frame work to effect rigid, secure, square, level and plumb installation. Make allowance for thermal and structural movement.

D. Suspend ceilings from structure above on hangers, independent of walls, columns, facing, ducts, pipes and conduit.

E. Provide ceiling level to a tolerance of 1:1000. Maximum difference between adjacent members 0.25 mm. Tolerances are not cumulative.

F. Support fixtures, diffusers, and similar heavy items independently of suspension system. Where this is not practical, provide framing members designed to carry superimposed loads and provide additional hangers to adequately support the load without sag.

G. Coordinate installation of suspension system to accommodate lighting fixtures and diffuser grilles.

H. Fit tile in place. Broken edges are not acceptable.

I. Within 3000 mm of exterior door provide hold down clips.

3.2 ALTERATIONS AND MAKING GOOD

A. Do alterations to existing acoustical ceiling(s) as indicated and as required.

END OF SECTION

SECTION 09 62 00

SPECIAL FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 DEFINITIONS

A. Special flooring indicated as seamless flooring. (SMLS) on Drawings.

1.3 SUBMITTALS

A. Submit Shop Drawings showing layout of divider strips and metal angles at junction with different material, access openings and control joints.

B. Submit 300 mm by 300 mm samples in triplicate on representative substrate showing successive stages of application.

C. Submit to the Contract Administrator with copies of inspection and testing reports prepared by an accepted independent testing authority indicating that materials are stain resistant to common acids, hydroxides and salts tested in accordance with ASTM D1308.

D. Submit manufacturer's certificate attesting that the materials, the methods and the authorized applicator can provide an installation meeting the materials tests listed under each special flooring type.

E. Submit 3 copies of housekeeping maintenance procedures. Include in maintenance manual provisions warning against specific maintenance practice and materials which may damage the special flooring.

1.4 QUALITY ASSURANCE

A. Execute work using applicators accepted in writing by the manufacturer of the products.

B. Apply Site sample 1200 mm by 1200 mm on substrate in locations designated. Remove and replace samples as required to gain approval at no cost to the City. Accepted sample will serve as the standard for material and workmanship for the remainder of the installation.

C. Before commencing the work of this Section arrange a Site meeting to be attended by representatives of the Contractor, the applicator for work of this Section, the Contract Administrator and the material manufacturer. Discuss surface conditions, application procedures, suitability of flooring for use intended and alternative recommendations.

D. Arrange for periodic Site visits by the special flooring manufacturer's representative while work is in progress, to verify that specified materials are used in procedures agreed upon at the initial Site meeting are followed.

E. Verify cured special flooring thickness at random locations chosen by and in the presence of the Contract Administrator.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials:
1. in original undamaged condition
2. at temperatures between 10 degrees C and 30 degrees C
3. in dry location
4. with manufacturer's labels and seals intact

1.6 SITE CONDITIONS

A. Erect barriers to prevent traffic until special flooring is cured.

B. Post legible signs at points of entry to work areas warning against smoking and use of open flame.

1.7 WARRANTY

A. Submit a two-year warranty for the work of this Section against defects in materials and workmanship including but not limited to crazing, cracking, spalling, chipping and discolouration.

B. Consider cracks arising from normal shrinkage and/or expansion of concrete normal without affecting the warranty.

PART 2 PRODUCTS

2.1 GENERAL

A. DecoFlex 6mm Products specified are based on products by Sika Canada. Approved equal in accordance with B8 products may be submitted for Contract Administrator’s approval providing the submitted products meet or exceed criteria of the products specified.

2.2 MATERIALS

A. Materials: Freshly compounded, colours and textures selected and not containing ingredients or toxic materials injurious to public health; initial cure within 24 hours under 50 percent relative humidity and 15 degrees C temperature conditions.

B. Base screed and metal angles: 1.6 mm by 13 mm wide by depth of special flooring, zinc angle strips.

C. Underlayment: Sika Albitol Admixture manufactured by Sika Canada.

D. Waterproofing membrane: Fluid applied, elastomeric membrane by the manufacturer of the special flooring which is to be applied over the membrane: Sika MRW System by Sika Canada.

2.3 SPECIAL FLOORING THICKNESS AND FINISH

CURED THICKNESS	FINISH	TOPCOAT
4.9 mm	Satin	0.3 mm; 0.076 mm with slip-resistant finish

PART 3 EXECUTION

3.1 EXAMINATION

A. Ensure that surfaces to receive special flooring and related waterproofing membrane are sound, fully cured, clean, uniform and free from substances that would cause discolouration or be detrimental to adhesion.

B. Ensure concrete surface is clean and sound. Remove any dust, laitance, grease, oil, dirt, curing agents, impregnations, wax, foreign matters, and deleterious coatings by appropriate mechanical means, in order to achieve a profile equivalent to ICRI-CSP 3–9.

C. Ensure concrete compressive strength of at least 25 MPa at 28 days and at least 1.5 MPa in tension at time of application of primer.

D. Ensure that moisture content of substrate does not exceed 4 percent surface moisture.

E. Ensure that surface and ambient temperatures are within the range acceptable to the special flooring manufacturer, before, during, and for 24 hours after application of flooring.

F. For installation over existing Seamless Flooring in the Control Room, Administration Building, Provide surface preparation as recommended by the manufacturer of flooring system. Ensure surface is adequate ready for the application.

3.2 PREPARATION

A. Mask adjacent surfaces.

B. Mix underlayment with cement, water and sand in proportions recommended by manufacturer. Build up depressions in substrate surface with trowel-applied underlayment to provide true planes to plus/minus 1.6 mm in 3000 mm measured in any direction. Where indicated slope to drains.

3.3 INSTALLATION

A. Perform application of waterproofing membrane binder, special flooring and topcoat in accordance with manufacturer's written recommendations.

B. Provide waterproofing membrane locations indicated in accordance with manufacturer's recommendations. Apply to a dry thickness of 0.76 mm.

C. Match appearance of accepted samples. The Contract Administrator will select colour, gloss and texture from manufacturer's standard colour range. Match aggregate size of accepted sample. Make finished work uniform in texture, free from defects in appearance and performance.

D. Provide special flooring level to plus/minus 1.6 mm in 3000 mm in any direction.

E. Set divider strips base screed and metal angles with adhesive. Provide a base screed at top of base and divider strips 50 mm from bottom of base, at doorways at exposed edges of the special flooring, over control joints and at access openings.

F. Trowel apply special flooring. Carry special flooring under thresholds and over equipment bases. Where special flooring abuts other floor finishes, feather out flooring or build up to meet adjacent floor finish flush.

G. Apply topcoat to provide a non-porous surface.

H. Apply cove base to a height of 100 mm on vertical surfaces unless shown otherwise, providing a continuous and even radius. Apply special flooring up to base screed or provide, where exposed, bullnosed top edge. Where base screed is used fill gap between it and back-up with underlayment.

I. Where access panels, grates, floor drains or plates occur in floors, provide metal angle at junction with such items. Where special flooring extends over access panels or floor plates apply metal angles back to back, one on the floor and one on the panel or plate. Where the opening is for a floor drain or grating, trim opening with metal angles.

J. Finish special flooring to metal angle with a neat, clean line at the top edge of the angle.

K. Form external and internal corners plumb and true.

L. Provide slip-resistant finish using slip-resistant particles in surface finish.

M. Ensure optimum cure of special flooring.

N. Ensure that special flooring does not span expansion and control joints.

3.4 CLEANING

A. Clean and make good surfaces soiled or otherwise damaged in connection with the work of this Section. Pay the cost of replacing finishes or materials that cannot be satisfactorily cleaned.

B. Upon completion of the work, remove debris, equipment and excess material resulting from the work of this Section from the Site. Remove protection, clean special flooring.

END OF SECTION

SECTION 09 62 02

SEAMLESS FLOORING (QUARTZ)

PART 1 GENERAL

1.1 DEFINITIONS

A. Special flooring indicated on Drawings as Seamless Flooring Quartz (SMFQ)

1.2 SUBMITTALS

A. Samples: Submit two 300mm by 300mm samples of floor material and two 300mm by 300mm samples of floor material with slip-resistant finish, on cement board.

B. Manufacturer's Instructions: Submit three copies of maintenance manual.

1.3 QUALITY ASSURANCE

A. Execute work using applicators accepted in writing by the manufacturer of the products.

B. Apply site sample 1200mm by 1200mm on substrate in locations designated. Remove and replace samples as required to gain approval at no cost to the City. Accepted sample will serve as the standard for material and workmanship for the remainder of the installation.

C. Before commencing the work of this Section arrange a Site meeting to be attended by representatives of the Contractor, the applicator for work of this Section, the Contract Administrator and the material manufacturer. Discuss surface conditions, application procedures, suitability of flooring for use intended and alternative recommendations.

D. Arrange for periodic Site visits by the special flooring manufacturer's representative while work is in progress, to verify that specified materials are used in procedures agreed upon at the initial Site meeting are followed.

E. Verify cured special flooring thickness at random locations chosen by and in the presence of the Contract Administrator.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle materials:
   1. in original undamaged condition
   2. at temperatures between 10 degrees C and 30 degrees C
   3. in dry location
   4. with manufacturer's labels and seals intact.

1.5 SITE CONDITIONS

A. Erect barriers to prevent traffic until special flooring is cured.

B. Post legible signs at points of entry to work areas warning against smoking and use of open flame.

1.6 WARRANTY

A. Submit a two-year warranty for the work of this Section against defects in materials and workmanship including but not limited to crazing, cracking, spalling, chipping and discolouration.

B. Consider cracks arising from normal shrinkage and/or expansion of concrete normal without affecting the warranty.

PART 2 PRODUCTS

2.1 MATERIALS

A. Special flooring (SMFQ): Decorative, epoxy mortar coated with epoxy groutcoat and alphatic polyurethane sealer with quartz aggregates with non-reflective finish, 5mm thick, Stonblend GSI by Stonhard.

B. Flooring System Components:
   1. Primer: two-component, penetrating, moisture tolerant epoxy primer.
   2. Base coat: Three-component, troweled mortar consisting of epoxy resin, curing agent and colored quartz silica aggregates.
   3. Grout coat: Two-component, clear, UV resistant epoxy sealer.
   4. Top coat: Two-component, non-reflective, alphatic polyurethane coating.

C. Colour(s): to later selection from manufacturer standard color.

D. Non-slip aggregate: colored quartz silica aggregates, to match sample.

E. Edging Material: Trims and divider strips, continuous L-shaped stops supplied by flooring manufacturer, and to the Contract Administrator's review and approval.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive flooring and report conditions which would adversely affect installation.

B. Commence installation after unsatisfactory conditions are corrected.

C. Quality of concrete substrate: 28 days old, structurally sound, steel trowel finish, clean, dry.

3.2 PREPARATION

A. Prepare surfaces to receive flooring by steel shot blasting, or other method recommended by manufacturer of flooring. Patch cracks and openings. Apply primer designed for system.

B. Neatly mask adjacent surfaces.

C. Set stops where flooring abuts other finishes, non-finished areas, at top of bases and at both sides of expansion/control joints.

D. Provide 10mm wide control joints directly over concrete slab at control and expansion joints locations.

E. Provide aluminum markers the thickness of flooring and insert in floor surface wherever drain and cleanout covers occur.

3.3 INSTALLATION

A. Install minimum 5mm thick flooring in extent indicated.

B. Install 100mm high cove floor base in extent indicated.

C. Apply minimum two clear finish coats to flooring.

D. Terminate flooring using edging trims, angles and other accessories as recommended by the manufacturer of flooring system.

3.4 PROTECTION

A. Protect finished surfaces from liquids, traffic, welding sparks and other defacements until building is turned over to the City.

END OF SECTION

SECTION 09 80 00

ACOUSTICAL TREATMENT (METAL)

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. ASTM C423 -90a Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

B. ASTM D568-77 (1985) Test Method for Rate of Burning and/or Extent and Time of Burning of Flexible Plastics in a Vertical Position.

C. CAN/CGSB-92.1-M90 Sound Absorptive Prefabricated Acoustic Units.

1.3 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating panel layout and locations of fastenings.

B. Manufacturer's instructions: Submit manufacturer's printed instructions for panel installation and maintenance.

C. Submit coordination drawings for ceiling supports.

PART 2 PRODUCTS

2.1 MATERIALS

A. Acoustic panels: Eckoustic Functional panels manufactured by Eckel Industries of Canada Limited, supplied by Acoustical Sales & Service, one-piece full height units.

B. Panels sizes: 762 mm wide, 50 mm thick, V-ridged on 150 mm centres to depth 20 mm.

C. Facing: 0.85 mm zinc coated steel, perforated with 2.4 mm holes on 4.0 mm staggered centres.

D. Framing: Minimum two 1.0 mm galvanized steel transverse framing members with stainless steel inserts for attachment to mounting brackets.

E. Acoustic insulation: 50 mm thick fiberglass density 24 kg/m³, wrapped in 0.025 mm thick flame guard polyethylene and Globeglas glass fibre mat sheeting on exterior side. Flammability test for polyethylene wrap and sheeting per ASTM-D568: Self-extinguishing in 3-5 sec.

F. Sound absorption characteristics in sabins, tested per ASTM-C-423:

125	250	500	1000	2000	4000	Hz
7.8	20.5	35.2	34.5	31.5	33.1	sabins

G. Finish: 38 micron DFT primer, 50 micron DFT baked-on, polyurethane enamel applied in factory,

H. Colour: To later selection. Finish panel end closures to match panel face finish.

I. Mounting: Four 3 mm thick galvanized steel, support brackets minimum per panel supplied by manufacturer. For lengths over 2400 mm add two support brackets per each additional 1200 mm length galvanized steel fasteners.

J. Ceiling suspension: galvanized steel channels 38 mm cold rolled steel, 0.70 kg/m.

K. Ceiling anchors: Red Head TW 1614 by Phillips Anchors Canada Inc.

L. Hangers: 7.9 mm dia. minimum galvanized mild steel.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces to receive acoustic panels and report conditions which would adversely affect installation.

B. Do not commence installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panels in accordance with manufacturer's printed instructions.

B. Lay out panels according to reviewed layout.

C. Replace defective panels.

D. Align facing surfaces of panels uniformly true, plumb and straight to line.

3.3 CEILING INSTALLATION

A. Drill in anchors at 1200 mm o.c. both directions.

B. Coordinate ceiling supports with pipes, ducts and other ceiling hung items. Install ceiling panels to a tolerance of 1:1000.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

B. Refer to Colour Schedule in this Section for items to be painted.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM D523Standard Test Method for Specular Gloss.
   2. Steel Structures Painting Manual Vol. 2 - Systems and Specifications.
   3. Occupational Health and Safety Act, O.Reg. 213/91 and 692.
   4. National Fire Code of Canada.
   5. NSF International (NSF): 61 Drinking Water System Components – Health Effects.
   6. SMAQMD (South Coast Air Quality Management District) Rule 1113 Architectural Coatings.

1.3 SUBMITTALS

A. List of materials: Prior to commencement of work, submit three copies of list with name of manufacturer, number, grade and quality of materials proposed for use on this project.

B. Product and safety data sheets: Submit WHIMIS MSDS – Material Safety Data Sheets for each paint system. Submit 3 copies of paint system data sheet and three copies of each data sheets.

C. Samples:
   1. Before painting work is started, prepare minimum 200 by 300 mm sample with type of paint and application specified on similar substrate to which paint is to be applied.
   2. Furnish additional samples as required until colours, finishes, and textures are approved.
   3. Approved samples to be the quality standard for final finishes.

1.4 QUALITY ASSURANCE

A. Prior to commencement of painting operations meet at Site with material supplier's representative and with the Contract Administrator to review these Specifications, painting work to be done and following related items:
   1. Equipment use and servicing
   2. Material storage and application techniques
   3. Surface preparation and ambient temperature
   4. Inspection requirements

5. Inspection reports
6. Hold points or check points
7. Safety requirements during application
8. Mock ups or samples of coatings in highly corrosive environment

B. Submit report of alternative recommendations for adverse conditions encountered.

C. Arrange with the paint manufacturer to visit the Site at intervals during the surface preparation and painting operations to insure that the proper surface preparation has been completed, the specified paint products are being used, the proper number of coats and thickness are being applied and the agreed finishing procedures are being used, and that the paint manufacturer regularly submits written reports.

D. Field Sample:
1. A sample area located in the building will be designated by the Contract Administrator.
2. Apply samples of finishes in the sample area in the presence of the Contract Administrator, Contractor and paint manufacturer. Apply the samples with the correct material, number of coats, colour, texture and degree of gloss required. Refinish if required, until acceptance is obtained.
3. Leave test areas undisturbed until completion of the work. Accepted work in the test area will serve as a standard for similar work throughout the Project.

E. Regulatory Requirements:
1. Meet SCAQMD Rule 1113 Architectural Coatings and regulatory requirements limiting the emission of volatile organic compounds.
2. Perform surface preparation and painting in accordance with recommendations of the following:
   a. Paint manufacturer’s instructions.
   b. SSPC PA 3, Guide to Safety in Paint Applications.
   c. Federal, provincial, and local agencies having jurisdiction.

1.5 SITE CONDITIONS

A. Do not paint exterior surfaces at temperatures below 3 degrees C above dewpoint nor in rainy or high humidity weather. Avoid painting surfaces exposed to direct sun. Follow manufacturer’s product data for application conditions.

B. Do not paint interior surfaces at temperatures below 3 degrees C above dewpoint or on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.

C. Follow manufacturer’s product data for application conditions.

D. Only materials conforming to SCAQMD Rule 1113 Architectural Coatings are allowed to be applied on Site.

PART 2 PRODUCTS

2.1 MATERIALS

A. Paint and related materials: Akzo Nobel Coatings Ltd. (Canada).

B. Protective coating system is based on materials manufactured by Akzo Nobel Coatings Ltd. (Canada) and represents standard of quality. Comparable systems by PPG Canada Inc., Sherwin-Williams Company are acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine surfaces which are to be finished including existing surfaces that require refinishing.

B. Report surfaces which are defective, or which cannot be prepared by usual sanding and cleaning. Report unsatisfactory Site and environmental conditions.

C. Commence work after corrective work has been completed.

3.2 PREPARATION

A. Commencement of work means acceptance of Job Site and substrate conditions.

B. Protect work performed under separate Sections from paint splatter, overspray and accidental spill.

C. Remove soiled and used rags, waste and empty containers from the building daily.

D. Take precautions to prevent fire.

E. Exercise special precautions for safety of workmen applying coating in enclosed areas by meeting requirements outlined in Occupational Health and Safety Act and Regulations for Construction Projects.

F. Comply with instructions on paint manufacturer's Safety Data Sheets.

G. Related Work: Surface preparation and prime coat of metal surfaces are specified to form part of the permanent protective coating in Division 5 - Metals, Division 8 – Openings, Division 10 - Specialties, Division 11 - Equipment, Division 40 – Process Integration, Division 41 – Material process and Handling Equipment, Division 22 – Plumbing, Division 23 – Heating, Ventilating, and Air-Conditioning (HVAC), Division 26 – Electrical, including responsibility for surface preparation, shop painting, and field touch-ups after erection. Be responsible for field painting of steel items which will remain exposed, after completion of erection and touch-up of shop primer, including items shop finished with a protective coating, unless specified otherwise.

H. Provide surface preparation in accordance with SSPC Manual Volume 2 "Systems and Specifications", Chapter 2.

I. Apply primer within time recommended after surface preparation. Comply with SSPC-PA-1 for application techniques, requirements and precautions.

J. Comply with CGSB 85-GP Series.

K. Remove cover plates of service devices, surface hardware, frames of lighting fixtures and other obstructions and reinstall them after painting work is completed. Replace units damaged while performing work under this contract.

L. Clean surfaces to be finished from machine, tool or sanding marks, dust, grease, soiling, or any extraneous matter.

M. Test surfaces for moisture content. Do not apply materials to substrate when moisture content, exceeds 12 percent as determined by accepted moisture testing device.

N. Ferrous metal surfaces Prepare in accordance with surface preparation specifications outlined by the "Steel Structures Painting Council". Use method indicated in appropriate Protective Coating System.

O. Manufacturer's bituminous protective coating: Abrasive Blast Clean to SSPC SP 6 and shop prime with same primer specified for coating system.

P. Shop welds: Grind smooth and rounded and abrasive blast in accordance with SSPC commercial type blasting SP 6. Remove weld flux and other surface contaminants.

Q. Field welds: Use hand wire brush followed by cleaning with solvent swab in accordance with SSPC SP 1.

R. Unpassivated galvanized metal and plain aluminum surfaces: Wash thoroughly with Trisodium Phosphate or Oakite 31 by Oakite Corp., Oakville, Ont., solution mixed in accordance with manufacturers printed instructions. Rinse thoroughly. Follow instructions on Product Data sheets.

S. Galvanized surfaces that have been passivated: On small areas use abrasive buffing with bronze wool pad SP 2 or power wire brush SP 3 and clean with solvent. On large areas use brush off blast SP 7 and clean with solvent.

T. Concrete surfaces: Remove mold release oil with Xylol. If smooth etch for better adhesion. Follow instructions on manufacturer’s Product Data sheets.

U. Concrete surfaces treated with capillary waterproofing: Do not commence application until capillary waterproofing is minimum two weeks old. Rinse thoroughly with water and spray with solution one part muriatic acid to eight parts of potable water. Allow ten minutes of contact and rinse thoroughly with water.

V. Concrete block surfaces: Remove dirt, grease, dust and other contaminants. Fill holes and cracks with patching plaster.

W. Wood surfaces: Carefully sand before finishing.

X. Surfaces primed by item manufacturer: Prepare according to recommendations on Product Data sheets.

Y. Factory finished surfaces: Sand down for adhesion in accordance with SSPC SP 2.

Z. Copper surfaces: Solvent clean and buff in accordance with SSPC SP-2.

AA. Fabric jacketted surfaces: Clean of dust. Follow instructions on Product Data sheets.

3.3 APPLICATION

A. Apply paint materials free from defects.

B. Mask surfaces where necessary, to prevent contamination or marring of adjacent material, or different protective coating system.

C. Prevent overspray onto adjacent surfaces or properties.

D. Do not apply paint over sealant.

E. Verify that fabric jacketted pipes and ducts have been sized prior to painting.

F. Confirm piping and ducting systems have successfully passed tests specified, prior to painting.

3.4 APPLICATION OVER SHOP PAINTED METAL SURFACES AND TOUCH UP

A. Check existing paint coatings for compatibility with paint with which they are to be overcoated.

B. Clean areas to be painted using appropriate method.

C. Minimum coating requirements for touch-up painting:
   1. No rusting but prime coat exposed: Sand lightly and feather edges. Apply 1 to 2 finish coats to regain specified minimum dry film thickness.
   2. No rusting but prime coat damaged: Clean area to base material, sand lightly and feather edges. Apply prime and finish coats. Sand and feather edges between coats.
   3. Rust areas: Clean to original standard of surface preparation. Apply coats as per 2. above. Apply spot finish coat(s) to uniform appearance.

3.5 APPLICATION - MISCELLANEOUS EXISTING SURFACES

A. Paint or repaint existing surfaces of rooms where noted on the Room Finish Schedule including new work which has been incorporated into the existing work and existing work which has been damaged, altered or otherwise disturbed during renovation operations.

B. Repaint surfaces or rooms adjacent to rooms where alterations or renovations have been carried out and which have been damaged or otherwise disturbed by the alterations or renovations. Where such damage occurs, repaint completely.

C. Remove oil, grease, mildew, chemicals and other foreign matter from existing surfaces to be coated.

D. If coatings on existing surfaces have failed so as to affect the performance or appearance of coatings to be applied, or if such coatings can be scraped off, remove them and prepare their substrates correctly. Dull hard or glossy surfaces by sanding, or other abrasive methods prior to painting.

E. Repaint surfaces entirely between changes of plane which have been incorporated into the existing work and existing work which has been damaged, altered or otherwise disturbed during renovation operations. Apply two coats of paint or enamel over the existing finish to match the previous finish.

3.6 ITEMS TO BE PAINTED

A. Building Items:
   1. Paint items not prefinished with complete protective coating system.
   2. Paint shop-primed items.
   3. Do not paint stainless steel and aluminum surfaces unless called for in Colour Schedule.

B. Equipment Items:
   1. Paint shop-primed items.
   2. Do not paint PVC, rubber, copper, bronze or brass surfaces.
   3. Do not paint stainless steel and aluminum surfaces unless called for in Colour Schedule.

C. Piping (Process and Service):
   1. Paint piping, pipe supports, valves, valve operator and appurtenances except:
      a. Aluminum jacket
      b. PVC piping or jacket
      c. Stainless steel
   2. Paint FRP ducts.

D. Ducting (HVAC):
   1. Paint following ducting and appurtenances only where exposed:
      a. galvanized steel ducting
      b. fabric-jacketted surfaces of ducting

E. Paint miscellaneous items listed in Colour Schedule in this Section.

F. Touch up field-painted building items, equipment, piping and ducting damaged during construction.

G. Apply protective treatment to surfaces indicated.

3.7 APPLICATION – GENERAL

A. Apply finish coats of paint in thickness per coat specified.

B. If minimum dry film thickness (DFT) in micrometres (microns) is not achieved, apply additional coat(s) until required thickness is obtained.

C. Apply paint in accordance with SSPC Manual Volume 2 – “Systems and Specifications”, Chapter 5.1.

D. Sand semi gloss, medium and high gloss finishes lightly between coats, unless otherwise approved by the coating manufacturer.

E. Gloss terms of following values when tested in accordance with ASTM D523 Test for Specular Gloss:

Gloss Term	Gloss Value
Flat	5 to 20
Eggshell	20 to 40
Semi-gloss	40 to 60
Gloss, medium	60 to 80
Gloss, high	80 to 90

F. Finish work uniformly as to sheen, gloss, colour and texture free from sags, runs and other defects and under adequate illumination.

G. Apply materials in accordance with directions and instructions of manufacturers of materials. Do not use adulterants.

H. Do not paint sprinkler heads, over ULC or other fire rating labels on doors and frames, nor over identification labels on mechanical and electrical equipment.

3.8 SCHEDULE - PROTECTIVE COATING SYSTEMS
By Akzo Nobel Coatings Ltd. (Canada)

A. CONCRETE BLOCK & CONCRETE: INTERIOR

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
1. Low chemical, moisture and sulfide fume exposure	PRIME: (Concrete Block) U-36250 Block Filler Primer	See Art. 3.2	1	150 min.
	PRIME: (Concrete) U-36600 Latex Sealer Primer	See Art. 3.2	1	38
	FINISH: Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel		2	38-50
2. High humidity, moisture, condensation, spray exposure	PRIME: Devran 203 Waterborne Epoxy Primer	See Art. 3.2	1	50-75
	FINISH: Truglaze WB 4428 Waterborne Epoxy Gloss Coating		2	50-75
3. Containment area (ALUM)	PRIME: Devran 203 Waterborne Epoxy Primer	See Art. 3.2	1	50-75
	FINISH: Truglaze WB 4428 Waterborne Epoxy Gloss Coating		2	50-75

B. CONCRETE BLOCK - EXTERIOR

1. Concrete Block	PRIME: U-36250 Block Filler	See Art. 3.2	2	38
	FINISH: Devflex 4216L Waterborne Acrylic Semi Gloss Enamel		2	38-50

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
2. Concrete	PRIME: Devflex 4020 PF Waterborne Acrylic FINISH: Devflex 4216L Waterborne Acrylic Semi Gloss Enamel	See Art. 3.2	1 2	50-75 38-50

C. GYPSUM BOARD

1. Low chemical, moisture and sulfide fume exposure	PRIME: Ultra 36600 Latex Sealer FINISH: Devflex 4216L Waterborne Acrylic Semi Gloss Enamel	See Art. 3.2	1 2	38 38-50

D. STRUCTURAL STEEL

1. Not receiving full protective coating system, concealed exposure	PRIME: Devguard 4360 Low VOC Universal Primer FINISH: Devgard 4360 Low VOC Universal Primer	SP-6	1 1	50 50

E. STEEL & CAST IRON - EXTERIOR

1. Exterior exposure	PRIME: Devflex 4360 Low VOC University Primer FINISH: Devflex 4216L Waterborne Acrylic Semi Gloss Enamel	SP-6	1 2	50-75 38-50

F. STEEL & CAST IRON

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
1. Low chemical, moisture and sulfide fume exposure	PRIME: Devguard 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 High Build Epoxy Coating	SP-6	1 2	50-60 50
2. High humidity, moisture, condensation, spray exposure	PRIME: Devguard 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 High Build Epoxy Coating	SP-6	1 2	50-60 50
3. Chemically corrosive exposure	PRIME: Devguard 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 High Build Epoxy Coating	SP-10	1 1	125-175 75-100
4. Ground conditions - buried	COAT: Devran 224 HS High Build Epoxy Coating	SP-6	2	150-200

G. STEEL & CAST IRON - HIGH TEMPERATURE

1. Service temperature up to 233°C	PRIME: Devoe HT-10 Heat Resistant Modified Silicone Zinc FINISH: Devoe HT-10 Heat Resistant Modified Silicone Zinc	SP-5	1 1	38-50 38-50
2. Service temperature 150°C to 495°C	COAT: Devoe HT-10 Heat Resistant Modified Silicone Zinc	SP-10	2	25

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
3. Steel, cast iron pipe under insulation - up to 83°C	COAT: Catha-Coat 302H Reinforced Inorganic Zinc	SP-6	1	75-100
4. Steel, cast iron up to 150°C	COAT: Catha-Coat 302H Reinforced Inorganic Zinc FINISH: Devoe HT-4H Heat Resistant Modified Silicone Zinc	SP-6	1 1	75 38-50

H. STEEL & CAST IRON & DUCTILE IRON - SUBMERGED

1. Totally or partially submerged in wastewater	SHOP PRIME: Bar-Rust 233 H Multi-Purpose Epoxy Coating FINISH: Bar-Rust 233 H Multi-Purpose Epoxy Coating	SP-10 SP-10	1 1	150-200 150-200
2. Totally or partially submerged in potable water	PRIME: Bar-Rust 233H Multi-Purpose FINISH: Bar-Rust 233 H Multi-Purpose Epoxy Coating	SP-10	1 1	150-200 150-200

I. DUCTILE IRON

1. Low chemical, moisture and sulfide fume exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-6	1 2	50-60 50
2. High humidity, moisture, condensation, spray exposure	PRIME: Devran 203 Waterborne Epoxy Primer	SP-2/SP-3	1	50-60

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
	FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating		2	50
3. Ground conditions - buried	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-10	1	150-200
4. Chemically corrosive atmosphere, fumes, and spills exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-10	1 1	125-175 75-100

J. GALVANIZED STEEL - INTERIOR

1. Low chemical, moisture and sulfide fume exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devthane 379 H Aliphatic Urethane Gloss-Enamel or Devthane 349 QC Aliphatic urethane Gloss	SP-7	1 2 2	75-100 50-75 50-75
2. High humidity, moisture, condensation, spray exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-7	1 2	75-100 50-75

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
3. Chemically corrosive exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-7	1 1	125-150 75-100

K. GALVANIZED STEEL - EXTERIOR

1. Exterior conditions	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devthane 379 H Aliphatic Urethane Gloss-Enamel	SP-7	1 2	75-100 50-75
	or Devthane 349 QC Aliphatic urethane Gloss		2	50-75
2. Chemically corrosive exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Truglaze 4428 Waterborne Epoxy Gloss Coating	SP-7	 2	75-100 75-100

L. GALVANIZED STEEL - SUBMERGED

1. Totally or partially submerged in wastewater	PRIME: Bar-Rust 235 H Multi-Purpose Epoxy Coating FINISH: Bar-Rust 233 H Multi-Purpose Epoxy Coating	SP-7	1 1	150-200 150-200
2. Totally or partially submerged in potable water	PRIME: Bar-Rust 235 H Multi-Purpose Epoxy Coating	SP-7	1	150-200

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
	FINISH: Bar-Rust 233 H Multi-Purpose Epoxy Coating		1	150-200

M. BITUMINOUS COATED SURFACES

1. Non-submerged and non-severe service exposure	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel	SP-2/SP-3	2 2	25 50
2. Non-submerged, high humidity, moisture, condensation, spray	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel	SP-2/SP-3	2 2	25 50
3. Submerged service in wastewater	PRIME: Bar-Rust 233 H Multi-Purpose Epoxy Coating FINISH: Bar-Rust 233 H Multi-Purpose Epoxy Coating	SP-10	1 1	150-200 150-200

N. MISCELLANEOUS SURFACES

1. Wood - natural finish	FINISH: Woodpride Acrylic Urethane Varnish 1840 Satin 1830 Gloss	See Art. 3.2	2	38

SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
2. Aluminum sheet and aluminum closures and trim	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel	SP-2	1 2	50-60 50
3. FRP ducts	FINISH: Devran 203 Epoxy 45% Solids Waterborne Epoxy Primer	SP-2	1	75-100
4. PVC Piping	PRIME: Devran 203 Waterborne Epoxy Primer FINISH: Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel	SP-2	1 2	75-100 50
5. Roadway markings	Devflex 4216L Waterborne Acrylic Semi-Gloss Enamel		Number of coats as required to achieve even colour, maximum coverage 3 m^2/litre	

3.9 COLOUR SCHEDULE - GENERAL

A. Colour numbers shown are from current brochures of manufacturers of materials.

B. Unless otherwise indicated, colour for:
1. exposed steel lintels, exposed concrete and concrete block surfaces at head of openings: Match colour of wall.
2. metal rain water leaders, drains, vents, metal pipe, duct supports and similar items. Match colour of wall/ceiling.
3. galvanized electrical conduits including hanger and brackets where suspended in finished areas except where seamless coating occurs and outdoors: Match colour of wall/ceiling.
4. aluminum electrical cable trays including hangers and brackets in finished areas and outdoors: Match colour of wall/ceiling and/or to acceptance of the Contract Administrator.
5. exposed surfaces of fans and dampers: Match colour of wall/ceiling.
6. fans and dampers mounted within prefinished aluminum panel: Match colour of panel.
7. items subjected to elevated temperatures in service (valves, expansion joints, exposed parts of insulated piping, exposed parts of insulated equipment and similar items): Standard colour in appropriate protective coating system.
8. items totally or partially submerged: Standard colour in appropriate protective coating system.
9. items buried: Standard colour in appropriate protective coating system.
10. parking space markings: White.

3.10 COLOUR SCHEDULE - BUILDING ITEMS

A. Steel Doors and Frames Interior: To later selection.

B. Steel Doors and Frames Exterior: To later selection.

C. Exposed Structural Steel: To later selection.

D. Cement Board: To later selection.

E. Steel Stair Stringer, Riser, Underside: To later selection.

F. Monorail: To later selection.

G. CMU and Concrete Walls (including columns) and Ceilings: To later selection.

3.11 COLOUR SCHEDULE - ELECRICAL

A. Aluminum Cable Trays: Unfinished.

B. Electrical Panels: Prefinished ANSI/ASA #61 Grey. For painting refer to Colour Schedule - General.

C. Galvanized Steel Conduit: Prefinished ANSI/ASA #61 Grey. For painting refer to Colour Schedule - General.

3.12 COLOUR SCHEDULE - PIPING (PROCESS AND SERVICE)

A. Comply with Pipe Identification System identified in Section 40 05 53, Identification Labels for Equipment, Fabricated Tanks, Valves and Piping Systems. Existing piping colour code.

B. Stainless Steel, PVC and Aluminum Surfaces: Do not paint full surface. Paint only ferrous accessories such as flanges, valves, couplings and similar items to match classification colour of labels. Exceptions are:

C. Gas piping - paint full surface of pipe classification colour "Yellow"

D. Fire protection piping - paint full surface of pipe classification colour "Red"

3.13 COLOUR SCHEDULE - DUCTING (HVAC)

A. Galvanized Steel and Fabric-jacketted Surfaces Exposed to View: Paint full surface of duct.

B. Galvanized Steel and Fabric-jacketted Surfaces not Exposed to View: Do not paint.

END OF SECTION

SECTION 09 96 35

CHEMICAL RESISTANT COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 SUBMITTALS

A. Samples: Submit two 50 mm by 100 mm samples of each type of coating with slip resistant texture, mounted on cement board.

B. Shop Drawings and Product Data:
1. Supply product data for engineered system.
2. Manufacturer's product specification.
3. Chemical resistance test results for exposure to service conditions.
4. Application instructions.
5. Configuration details of materials at terminations, construction joints, floor drains, and trenches.

C. Quality Control Submittals:
1. Letter from manufacturer stating applicator is qualified to do the Work and meets the quality assurance minimum experience requirements.
2. Sample of warranty, prior to starting Work.
3. Installation instructions.
4. Field inspection and test reports.
5. Manufacturer's Certificate of Proper Installation.

D. Contract Closeout Submittals: Special guarantee.

1.3 QUALITY ASSURANCE

A. Manufacturer's Experience: Minimum 5 years manufacturing and installing engineered systems.

B. Applicator's Experience: Minimum 5 years applying specific systems and must be approved by the manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers.

B. Storage: Maintain materials in clean and dry condition. Follow manufacturer's instructions.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Temperature: Apply coating only when substrate, ambient air, and coating material are 19 degrees C or above.

B. Substrate: Not wet or have standing water.

C. Ventilation: Provide during and after application to meet all applicable safety and health regulations.

1.6 EXTRA MATERIALS

A. Furnish minimum 10 litres of unopened topcoating material for future use by the City.

1.7 SPECIAL WARRANTY

A. Furnish manufacturer's extended warranty, with the City named as beneficiary, in writing. Provide special warranty for correction, or at the option of the City, removal and replacement of Work specified in this Specification section found defective during a period of 2 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Ceilcote

B. Stonhard

C. Duochem Inc.

D. Chemrex Inc.

2.2 SERVICE CONDITIONS

A. Location: Covered, ambient temperature conditions outdoors, exposed to weather.

B. Surface: Concrete floors and concrete masonry unit walls for secondary chemical storage.

C. Traffic: Foot, light hand truck.

D. Protection: Protect against immersion of chemical for up to 48 hours.

E. Chemicals Stored in Containment Areas:
1. Sodium Bisulphite; 38 percent solution; pH 3.7-5.3; ambient temperature.
2. Sodium Hypochlorite 12 percent solution; pH 3.7-5.3; ambient temperature
3. Ferric Chloride 47 percent solution; pH 3.7-5.3; ambient temperature

4. Polymer

2.3 COATING SYSTEMS

A. Chemical-resistant Coatings: Mat reinforced mixture of liquid resin-based material, setting agent, and filler designed to be troweled into place to cure to a hard state. Min. 60 mil thick.

Item	Description	No. of Coats	Colour	Nominal Thickness (mils/microns)
Vapour Retarder	As required to suit Site conditions.			
Primer	Resin Primer	1	Translucent	Varies
Fill Coat	Resin Mortar	1	Grey	Varies
Reinforcing Layer	Fiberglass Mat + Resin Saturant	1	Translucent	25/625
Topcoat	Flake Filled Resin Coating	2	Grey	35/875
Nominal Coating System Thickness (excluding vapour retarder, primer and fill coat): 60 mils (1.5 mm)				

B. Non-skid Surface: Furnish silica aggregate, which has been approved by coating manufacturer, for non-skid finish surface. Apply silica aggregate in accordance with manufacturer's recommendations.

C. Individual components must be engineered and tested by the manufacturer as a proven system with its own product data sheet.

D. Vapor Retarder: As recommended by coating manufacturer. Provide vapour retarder to suit specific Site conditions. Provide vapour retarder on slabs on grade and surfaces adjacent to water containing structures.

E. Subfloor Filler and Grout: Compatible to floor coating and as recommended by coating manufacturer.

2.4 MIXING

A. All resin materials to be pre-packaged at factory in individual pre-measured mixes. No on-Site measuring of resin materials will be allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Surface Preparation:
   1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of the system manufacturer whose product is to be applied.

2. Provide Contract Administrator minimum 3 days' advance notice of start of surface preparation and system application Work.
3. Perform Work only in the presence of Contract Administrator, unless Contract Administrator grants prior approval to perform Work in Contract Administrator's absence.

B. Schedule inspection with Contract Administrator in advance for cleaned surfaces and system application Work.

3.2 PREPARATION

A. Follow manufacturer's current printed directions and recommendations.

B. Fill holes and cracks with manufacturer's recommended materials to produce even surface for application of systems.

C. Surface Preparation:
1. Do not begin until 30 days after concrete has been placed.
2. Remove grease, oil, dirt, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods.
3. Brushoff blast clean to remove loose particles and provide a tooth for binding.
4. Apply fill coat to remove surface irregularities such as concrete masonry unit grout joints, bugholes or rough areas created by abrasive blast preparation. Thickness as required to achieve continuous uniform surface for coating system overlay. Apply fill coat comprising of mixture catalyzed resin and filler powder or 2 component resin mortar. Ensure resin is chemically compatible with primer and coating system.
5. Secure coating manufacturer's recommendations for additional preparation if required for proper adhesion. Ensure surfaces are dry prior to coating application.

3.3 APPLICATION

A. Install coating systems in accordance with manufacturer's printed instructions.

B. Unless otherwise specified or shown, install coating systems to vertical and horizontal surfaces of containment area for storage tanks, pumps, and piping. Extend coating to horizontal tops of containment area walls.

C. Extend surfacing completely under structures and equipment located within the containment area. Install at construction joints in substrate and floor drains, trenches, sumps, and other components within the containment area.

3.4 FINISH

A. Horizontal and Vertical Surfaces: Smooth and even, free of brush, trowel or other application tool marks.

3.5 FIELD QUALITY CONTROL

A. Inspection:
   1. Inspect finished work for complete, uniform coverage of specified systems. Evidence of defects includes improper thickness, hardness, and appearance.
   2. Contract Administrator may require destructive test or other tests to be performed by an independent agent upon completion of installation.

3.6 MANUFACTURER'S SERVICES

A. Provide manufacturer's representative at Site for installation assistance, inspection, and Manufacturer's Certificate of Proper Installation.

3.7 PROTECTION

A. Remove, as work progresses, excess or foreign materials which would set up or become difficult to remove from finished surfaces.

B. Protect finished surfaces from liquids, traffic, welding sparks and other defacements until building is turned over to the Contract Administrator.

END OF SECTION

SECTION 09 97 00

SPECIAL COATINGS

PART 1 GENERAL

1.1 SUMMARY

A. Comply with Division 1, General Requirements.

1.2 REFERENCES

A. Comply with the latest edition of the following statutes codes and standards and all amendments thereto.
   1. ASTM D1308 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E96 Test Methods for Water Vapour Transmission of Materials.

1.3 DEFINITIONS

A. Special coatings indicated as:
   1. Coloured Sealer (CS)

1.4 QUALITY ASSURANCE

A. Apply materials using applicators accepted by the manufacturer of the materials.

B. If requested by Contract Administrator, apply Site sample 1200 mm wide and full height of wall for each special coating type and on each type of substrate in locations designated. Accepted sample installations will the standard for the job.

C. Before commencing the work arrange Site meeting between Contractor, special coatings applicator, Contract Administrator and material manufacturer's qualified representative. Discuss surface conditions, application procedures, environmental condition, suitability of coating for use intended and alternative recommendations.

1.5 SUBMITTALS

A. Submit three 300 by 300 mm samples of each type of coating system on hardboard or plywood.

B. Submit three copies of complete maintenance instructions.

C. Submit three copies of manufacturer's application instructions.

1.6 DELIVERY, STORAGE AND HANDLING

A. Store materials in original undamaged condition at temperatures between 10 degrees C to 30 degrees C in dry location with manufacturer's labels and seals intact.

B. Handle and store in accordance with manufacturer's and supplier's directions.

C. Store "red label" materials in locations accepted by local fire authorities.

1.7 SITE CONDITIONS

A. Ensure surface and ambient temperatures are within the range acceptable to the coating manufacturer.

B. Ensure that surface temperatures are not less than 10 degrees C during and for 24 hours after application of coating.

C. Post legible signs at points of entry to areas in which the work of this Section is being applied. Warning against smoking and use of open flame.

D. Erect barriers to prevent traffic and other trades from working in affected areas during application of coatings.

1.8 WARRANTY

A. Submit a two-year warranty for the work of this Section against defects in materials, products and workmanship including but not limited to fading, cracking, spalling, chipping, discoloration and other failure of special coating.

PART 2 PRODUCTS

2.1 MATERIALS

A. Special Coating (Coloured Sealer): Water-base, two component epoxy emulsion coating, Duochem 6001, by Sika Canada.

B. Colours: To later selection, not limited to standard colours.

C. Accessories: Primers, thinner, fill coat, cleaning agents, masking tape and spraying equipment: Type recommended by coating manufacturer.

D. Levelling Coat: Modified acrylic cement plaster as recommended by coating manufacturer.

2.2 COATING THICKNESS

A. Fill Coat on Porous Surfaces: 1.0 mm maximum.

B. Special Coating (Coloured Sealer): Minimum 2 coats at manufacturers coverage rate for substrate.

C. Apply additional coats as directed by Contract Administrator to make coating uniform in appearance and to the acceptance of the Contract Administrator.

D. Verify dry film thickness at random locations chosen by and in presence of Contract Administrator.

PART 3 EXECUTION

3.1 EXAMINATION

A. Ensure that surfaces to receive coatings are sound, clean, uniform and free from substances that would cause bleeding or be detrimental to adhesion.

B. Ensure that surfaces are free from efflorescence and frost.

C. Accept only surfaces which are free from voids greater than normal texture of materials to be coated.

D. Quality of substrate: Structurally sound, hard, non-dusting, smooth, free of extraneous matter which would affect adhesion of coating. Maximum 15 percent moisture contents and 10 degrees C temperature at time of application and cure.

3.2 PREPARATION

A. Mask surfaces adjacent to surfaces being coated.

B. Before commencement of work remove cover plates of service devices, frames of lighting fixtures and other obstructions. Replace them to original condition when work of this Section is completed.

C. Remove substrate surface irregularities as required to make the appearance uniform. Build up depressions in substrate surface using trowel-applied underlayment as required to provide true planes to plus or minus 2 mm in 3600 mm measured in any direction.

D. Mix materials according to manufacturer's written instructions.

E. Do not exceed pot life limits.

3.3 APPLICATION

A. Apply coating in accordance with manufacturer's instructions, using factory trained licensed applicators and under the supervision of the manufacturer.

B. Match appearance of final reviewed samples.

C. Provide filler for porous surfaces with coarser texture than permitted on accepted sample. On porous surfaces, apply filler to produce a uniform texture, free from pits and voids. On metal surfaces apply correct primer to suit type of metal.

D. Allow sufficient time related to ambient conditions to ensure optimum cure between successive coating applications.

E. Extend wall coatings a distance of 50 mm above finished ceiling face, into reveals and recesses at metal frames.

F. Form external and internal corners plumb and true. Where coating abuts other finishes provide straight, plumb junction.

G. Make finished work uniform in texture, thickness, colour, gloss and appearance, free from marks, sags, and other defects in appearance and performance.

H. Ensure that coating does not span control or expansion joints.

I. Gloss value: Comply with values specified under Section 09 90 00, Painting and Coating.

3.4 CLEANING

A. Clean and make good to Contract Administrator's acceptance surfaces soiled or otherwise damaged in connection with the work. Pay cost of replacing finishes or materials that cannot be satisfactorily cleaned.

END OF SECTION

SECTION 09 98 00

FERMENTER AND BIOFILTER COATINGS

PART 1 GENERAL

1.1 DESCRIPTION

A. This Section specifies surface preparation, coating and inspection for required chemical-resistant coatings for the fermenter and biofilter tanks and additional locations as indicated in this specification and on the drawings.

1.2 REFERENCES

A. The following is a list of standards which may be referenced in this section:
   1. ASTM International (ASTM):
      a. D4138, Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means.
      b. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
      c. F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
      d. F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes.
   2. International Concrete Restoration Institute (ICRI): Guideline 03732, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymers.
   3. The Society for Protective Coatings (SSPC):
      a. PA Guide 10, Guide to Safety and Health Requirements for Industrial Painting Projects.
      b. SP-13/NACE 6, Surface Preparation of Concrete

1.3 ABBREVIATIONS

A. CRC: Chemical-Resistant Coating.

B. MDFT: Minimum Dry Film Thickness.

C. Mil: One thousandth of an inch.

D. SDS: Safety Data Sheet.

E. SSPC SP: Surface Preparation Standard for Protective Coatings.

F. CSP: Concrete Surface Profile.

1.4 SUBMITTALS

A. Submittals shall be provided in accordance with Section 01 33 00, Submittal Procedures, and shall include the following information:
   1. Action Submittals:
      a. Shop Drawings:
         1) Furnish a CRC System Data Sheet (CRCSDS) and a CRC Product Data Sheet (CRCPDS) for each CRC system. The CRCSDS and CRCPDS forms are appended to the end of this section.
         2) Indiscriminate submittal of manufacturer's literature only is not acceptable.
         3) The following information shall be appended to each CRCSDS:
            a) Manufacturer's technical data sheets.
            b) Manufacturer's application specification.
            c) Chemical-resistance test results for exposure to service conditions.
            d) Configuration details for the following:
               (1) Expansion joints and structural isolation joints.
               (2) Construction joints.
               (3) Cracks.
               (4) Wall base details.
               (5) Benching.
               (6) Gate frames.
               (7) Equipment bolts (when installed before or after CRC application).
               (8) Metal angle frames at trenches, gratings, or hatches.
               (9) Transition and termination detail at edge of CRC system.
               (10) Pipe penetrations (vertical and horizontal).
               (11) Other details specific to the structure being coated.
         4) Repair system for existing concrete
            a) Product data sheets for each material supplied
      b. Coordinate submittal for painting metal surfaces with Section 09 90 00, Painting and Coating.
      c. Samples: 100 mm square complete system proposed for use showing thickness and finish.
   2. Informational Submittals:
      a. Letter from manufacturer stating that:
         1) Applicator has notified manufacturer of proposed installation.
         2) Manufacturer is in agreement with the intended application.
         3) Manufacturer is in agreement with the proposed methods of removal and repair of unsound concrete
         4) Applicator is qualified to do the Work and meets the quality assurance minimum experience requirements.
      b. Applicator Qualifications:
         1) List of references substantiating experience. Include projects with at least three years of successful service history, including project name and location, names of the City and Contract Administrator, and description of product used, substrates coated, and application procedures.
         2) Certification from coating manufacturer showing current status as an approved applicator.

c. Manufacturer's Product Qualifications:
   1) List of projects substantiating successful application and performance of the proposed products to the specific exposure and process conditions. Include project name and location, application dates, and names of the City, Contract Administrator, and Applicator.
d. Written description of equipment and methods proposed for removal of unsound concrete.
e. Written description of equipment and methods proposed for hydro demolition for surface preparation.
f. Field inspection and test reports.
g. Manufacturer's Certificate of Proper Installation.
h. Safety Data Sheets (SDS).
i. MSDS

1.5 QUALITY ASSURANCE

A. Manufacturer's Experience: Minimum 5 years' manufacturing proposed products.

B. Applicator's Experience: Minimum 3 years' applying proposed products.

C. Provide each component of repair material and protective coating produced by a single manufacturer, including recommended underlayment, filler compounds, base coat and top coat materials.

D. Subcontractor is responsible for quality control inspection and testing. Subcontractor shall monitor and be responsible for all environmental surface preparation, application and quality control testing compliance at the locations where coating work is undertaken.

E. An independent inspection agency will be retained by the City to review submittals, quality control plan, oversee inspection and testing, and conduct additional inspection and testing as required.

F. Applicator Quality Control Plan: Applicator shall maintain an in-house quality assurance program that monitors surface preparation, coating application, and quality control testing for coating and lining operations. Level of experience, quality assurance program, and quality control testing by the applicator shall meet the minimum requirements specified herein, the coating manufacturer's instructions, and related government regulations.

G. Mockups:
   1. Required for coating systems over 100 m^2 in area or exposed to view in service.
   2. Before proceeding with Work under this section, finish one complete space or item of each color scheme required showing selected colors, finish texture, materials, quality of work, and special details.
   3. Provide one mockup for each CRC system and for each surface type (floor, wall and ceiling).
   4. Mockup components will vary, depending on the CRC system. All components of the CRC system, including surface preparation, must be exposed in the mockup.

5. Example Mockup Procedure:
   a. Prepare, prime, and coat one section of concrete, 3 m by 3 m, at a location mutually agreed upon by the Subcontractor and Contract Administrator. Use a “step” down mockup as follows:
      1) Leave one-quarter of the surface exposed to allow observation of the surface preparation.
      2) Remove unsound concrete. Clean and prepare in accordance with procedures specified in this section.
      3) Apply resurfacing mortar three-quarters of remaining surface.
      4) Apply filler/surfacer and primer to one-half of the surface, over the resurfacing mortar, leaving one-quarter of the surface exposed with resurfacing mortar.
      5) Apply finish coat to filler/surfacer with primer, leaving one-quarter of the surface exposed with surfacer/filler/primer.
   b. Mockup shall include concrete cuts for coating terminations and one example of a penetration.
6. After Contract Administrator review and approval, sample spaces or items shall serve as a standard for similar work throughout the Project.
7. Leave mockup in place to serve as a reference and standard for the remaining work.
8. At completion of Project, clean and prepare all surfaces that are not complete and finish coat the mockup area for incorporation into the Work.

1.6 PREINSTALLATION MEETING

A. Prior to beginning coating Work, schedule a meeting and be prepared to discuss the following subjects, as a minimum:
   1. Required schedule.
   2. Sequence of critical path work items.
   3. Use of Site, access, office and storage areas, security, and temporary facilities.
   4. Major product delivery and priorities.
   5. Safety plan.

B. Attendees shall include:
   1. The City’s representatives.
   2. Contractor’s office representative.
   3. Contractor’s resident superintendent.
   4. Contractor’s quality control representative.
   5. Subcontractors’ representatives whom Contractor may desire or Contract Administrator may request to attend.
   6. Contract Administrator’s representative.
   7. Coating manufacturer’s technical representative.
   8. Third party inspection agency representative.
   9. Others as appropriate.

1.7 REGULATORY REQUIREMENTS

A. Meet applicable federal, provincial, and local requirements for coating product selection, surface preparation and painting activities.

1.8 SURFACE PREPARATION AND COATING APPLICATION

A. Perform surface preparation and coating in accordance with recommendations of the following:
   1. These specifications.
   2. Coating manufacturer's instructions.
   3. SSPC PA 10.
   4. In the event of a discrepancy, the most stringent requirement applies.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers.

B. Storage:
   1. Maintain materials in clean and dry condition. Follow manufacturer's instructions.
   2. Maintain storage temperatures within the manufacturer's requirements.
   3. Follow manufacturer's instructions.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Temperature:
   1. Apply resurfacing materials, surfacer/filler and protective coating only when substrate, ambient air, and coating material are within the manufacturer's recommended range.
   2. Provide temporary facilities that may be required for proper installation of the complete chemical resistant coating system, such as covers, enclosures, air heating or cooling and dehumidification.

B. Substrate: Moisture content shall be within the manufacturer's recommended range for product application.

C. Ventilation: Provide during and after application to meet all applicable safety and health regulations.

1.11 EXTRA MATERIALS

A. Furnish minimum 2 gallons of unopened topcoating material for future use by the City.

1.12 SPECIAL GUARANTEE

A. Furnish extended guarantee or warranty. Special guarantee shall provide for correction, or at the option of the City, removal and replacement of Work specified in this Specification section found defective during a period of 2 years after the date of Total Performance. Duties and obligations for correction or removal and replacement of defective Work as specified in the General Conditions.
   1. 24-Month Warranty Period Inspection: the City will conduct inspection of coated surfaces prior to the end of warranty period. the City will notify Contractor in advance of inspection and Contractor may attend at its option. the City will prepare list of coating defects and failures identified during inspection and transmit to Contractor. List shall serve as notice of repairs required under warranty.

2. Repairs:
   a. If repairs are required, requirements of Contract shall apply including, but not limited to, requirements to remove standing water, cleaning, and perform repair work.
   b. Repair defective coatings using coating materials, equipment, and methods similar to those used in original work. Materials shall be of fresh manufacture and within manufacturer's stated shelf life at time of application.
      1) Provide extended warranty of 1 year for repairs.
      2) Complete repairs within 30 calendar days of Warranty Period Inspection, unless an alternate schedule has been accepted by the City.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sauereisen; Pittsburgh, PA.

B. Sherwin Williams Company, Strongsville, OH

C. Raven Linings; Tulsa, OK.

D. Atlas Minerals and Chemicals; Mertztown, PA.

E. No other manufacturers will be accepted.

2.2 SERVICE CONDITIONS

A. Location and Exposure:
   1. New and existing structures in the new fermenter and biofilter buildings and other indicated locations exposed to wastewater sludge immersion and process atmosphere, subject to hydrogen sulfide, dilute sulphuric acid with a pH of 1 to 3, organic acids generated by microbial sources, and salt. Buried tanks have groundwater pressure on the exterior walls.
   2. New structures in pump and screen building, grit tanks 3 and 4, grit tanks 1 and 2, and HRC influent channel as indicated in drawings. Exposure to be same as per above. Buried tanks and channels have ground water pressure on the exterior walls.

B. Surface: Concrete floors, walls, and ceilings.

2.3 COATING SYSTEMS

A. Resurfacing and Barrier Lining System – Existing Concrete (CRC-1):
   1. Composite system consisting of resurfacing material and barrier lining designed specifically for deteriorated concrete surfaces exposed to a wastewater environment with high levels of hydrogen sulfide, dilute sulphuric acid with a pH of 1 to 3, organic acids generated by microbial sources, and salt.
   2. Removal of 50 mm depth on average of unsound concrete is expected. Select repair system that is compatible with coating system.

3. Hydraulic Cement Mortar: Fast-setting mortar for control of leaks through cracks and holes, Sauereisen Instaplug F180 or approved equal in accordance with B8 from listed manufacturers, or as recommended by the coating manufacturer.
4. Resurfacing Mortar: Low shrinkage, high strength sprayable cement mortar, Sauereisen F121, or approved equal in accordance with B8 from listed manufacturers. Provide anchors and mesh reinforcement as required for installation.
5. Corrosion Barrier Lining: 100 percent solids, fiber reinforced chemical resistant epoxy lining material, Sauereisen 210S, or approved equal in accordance with B8 from listed manufacturers, 100 mils dry film thickness.
6. Glaze Coat: 100 percent solids, chemical resistant epoxy topcoat, Sauereisen 210G, or approved equal in accordance with B8 from listed manufacturers, 25 mils dry film thickness.
7. Epoxy Filler: Moldable epoxy filler compound, Sauereisen Filler Compound No. 209HB, or approved equal in accordance with B8 from listed manufacturers.

B. Chemical Resistant Coating System – New Concrete (CRC-4):
1. Composite system consisting of surfacer/filler and barrier lining designed for new concrete surfaces exposed to a wastewater environment with exposure to high levels of hydrogen sulfide, dilute sulphuric acid with a pH of 1 to 3, organic acids generated by microbial sources, and salt.
2. Surfacer/Filler: 100 percent solids, trowel applied epoxy surfacer, Sauereisen 209, or approved equal in accordance with B8 from listed manufacturers.
3. Corrosion Barrier Lining: 100 percent solids, fiber reinforced chemical resistant epoxy lining material, Sauereisen 210S, or approved equal in accordance with B8 from listed manufacturers, 100 mils dry film thickness.
4. Glaze Coat: 100 percent solids, chemical resistant epoxy topcoat, Sauereisen 210G, or approved equal in accordance with B8 from listed manufacturers, 25 mils dry film thickness.

C. Joints:
1. Provide joint filler material of type, size and composition as recommended by the CRC manufacturer for the particular joint condition.
2. Joint materials shall maintain a liquid tight joint for the life of the coating system.
3. Chemical resistance of the joint material shall be the same or better than the coating system.
4. Provide joint backing material per CRC manufacturer’s recommendation.

2.4 MIXING

A. Thoroughly mix until homogeneous following manufacturer’s instructions.

B. Mix only components furnished by coating manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Surface Preparation:
   1. Inspect and provide substrate surfaces prepared in accordance with these Specifications and the printed directions and recommendations of the system manufacturer whose product is to be applied.
   2. Provide Contract Administrator minimum 7 days' advance notice of start of surface preparation and system application Work.
   3. Perform Work only in presence of Contract Administrator, unless Contract Administrator grants prior approval to perform Work in Contract Administrator's absence.

B. Schedule inspection with Contract Administrator in advance for cleaned surfaces and system application Work. Provide adequate lighting, scaffolding, ladders and other safety/accessibility requirements to allow for inspection of all elements.

3.2 PRECLEANING FOR INSPECTION

A. Remove loose, deteriorated and unsound concrete by high pressure water wash or abrasive blasting to allow observation and inspection of cleaned concrete surface by the Contract Administrator. Do not begin final cleaning and coating until Contract Administrator has inspected surfaces and determined if additional work is required.

3.3 PREPARATION

A. Do not begin surface preparation activities until 30 days after new concrete has been placed, or longer if required for low moisture in the concrete.

B. Concrete Surfaces:
   1. Existing:
      a. Clean surfaces by water blasting (35 MPa or 5,000 psi minimum) or abrasive blasting to remove all unsound concrete, contaminants, dirt, debris, oil, grease, existing coating, and deteriorated reinforcing steel.
      b. pH of cleaned concrete shall be greater than 9. Test using pH papers and/or phenolphthalein indicating solution.
      c. Inspect cleaned surfaces to identify corroded reinforcing steel, cracks, leaks, and joints.
      d. Repair cracks, leaks, and joints in accordance with the coating manufacturer's recommendations.
         1) Seal visible hydrostatic leaks with hydraulic cement mortar.
         2) Flowing leaks or cracks shall be sealed using a suitable polymer gel or foam in accordance with Section 03 64 24 Crack Repair Polyurethane Injection Grouting, as approved by Contract Administrator. Remove excess crack filling material from the concrete surface prior to application of the resurfacing mortar.
      e. For deteriorated concrete surfaces, inspect all surfaces for soundness. Remove all material that is not intact. Apply resurfacing mortar. Secure coating manufacturer's

recommendations for special situations that become apparent after deteriorated concrete is removed.

2. New:
   a. Brush blast, SSPC SP-13, to remove loose concrete and provide a tooth for binding. Minimum surface profile shall meet ICRI CSP 3 to 5, or higher if required by coating manufacturer.
   b. Fill holes and cracks with manufacturer's recommended materials to produce an even surface for application of the epoxy barrier lining. Apply surfacer/filler to 100 percent of concrete surface. Secure coating manufacturer's recommendations for additional preparation if required for excessive bug holes exposed after blasting.
3. Provide saturated dry surface, as required by the manufacturer. Use only clean water to obtain a saturated dry surface condition.

C. Reinforcing Steel:
   1. If reinforcing steel is corroded to the extent that it must be replaced, request disposition from the Contract Administrator.
   2. For reinforcing steel that has some corrosion, but does not require replacement, abrasive blast (SSPC SP-10) remove all rust and contaminants and apply one coat of manufacturer's recommended epoxy.

3.4 APPLICATION

A. General:
   1. This specification section is intended for coating and lining concrete with special chemical resistant coatings.
   2. Surfacer/Filler: Apply surfacer/filler to concrete with methods recommended by the coating manufacturer as required to provide a surface that is continuous, smooth, void-free surface. Force material into voids and irregularities, and remove excess filler before the material sets.
   3. Resurfacing Mortar: Apply resurfacing mortar to concrete with methods recommended by the coating manufacturer as required to provide a surface that is continuous, smooth, void-free surface. Provide wire mesh reinforcing for mortar thickness greater than 25 mm.
   4. Provide and apply manufacturer's recommended vapor barrier primer if required based on the results of vapor transmission tests.
   5. Spray or trowel apply lining system components in accordance with manufacturer's written instructions.
   6. Cove corners at vertical and horizontal intersections, and reinforce as specified in paragraph Joints, this section.
   7. Lightly backroll epoxy barrier lining as recommended by CRC manufacturer to eliminate pinholes.
   8. Provide minimum number of coats required for each coating system, regardless of application method. Do not apply succeeding coats until previous coat has cured in accordance with coating manufacturer's recommendations.
   9. Observe manufacturer's published recoat windows. If recoat window is exceeded, mechanically abrade and solvent wipe the surface before recoating in accordance with manufacturer's directions and as approved by Contract Administrator.

B. Priming and Holiday Prevention on Concrete and Substrates: Follow manufacturer's written instructions related to application during decreasing substrate temperature conditions, adequate surface preparation and other application techniques that may be necessary to reduce the potential for outgassing and formation of pinholes during coating application and cure. If required by the coating manufacturer, apply manufacturer's recommended epoxy penetrating primer to minimize the effects of vapor transmission from the concrete.

C. Product Mixing:
   1. Thoroughly mix until homogeneous following manufacturer's instructions.
   2. Mix only components furnished by coating manufacturer.

D. Film Thickness: Provide specified thickness of material. Use screeds or wet film gauges to monitor thickness during application.

E. Joints:
   1. Provide continuous sealant, backing material, and joint-lining treatment recommended by the coating manufacturer at all expansion, isolation, and construction joints.
   2. Provide continuous sealant bead at joints between different coating systems.
   3. Provide fiberglass or synthetic fabric reinforcement at construction joints and large substrate cracks to maintain liquid-tight requirements under the specified service conditions.

F. Penetrations: Coat over or around equipment anchors, base plates, pipes, and similar items installed in areas receiving CRC to maintain continuous liquid tight seal.

G. Terminations:
   1. Confirm to manufacturer's details.
   2. For coatings exposed to wastewater or vapor space above wastewater liquid levels, terminate leading edges in beveled saw cuts 6 mm-wide by 6 mm-deep, or as required by manufacturer. Prime and extend coating into the saw cut. Do not fill saw cut with epoxy surfacer. Saw cut shall be provided by CRC subcontractors.

H. Install coating systems on the surfaces specified herein and where shown on Drawings.

3.5 FIELD QUALITY CONTROL

A. Inspection: Inspect finished system for complete, uniform coverage of specified area. Evidence of defects include improper thickness, hardness, and appearance.

B. Holiday Testing:
   1. All surfaces lined with epoxy shall be electrically checked with high voltage holiday test equipment to determine the location of discontinuities:
      a. Provide suitable electrical contact to reinforcing steel. Verify conductivity of electrical contact by touching the second, ungrounded electrode to another metallic ground connected to the concrete structure.
         1) Do not perform electrical inspection until the epoxy lining is sufficiently cured, as determined by the manufacturer.
      b. All electrical inspection testing shall be performed in accordance with NACE SP0188.

c. Perform all electrical tests at 100 volts/mil for the minimum approved thickness of the lining material.

2. Repair all lining defects in accordance with the manufacturer's written instructions.
3. After repaired and recoated areas have cured sufficiently, retest each.

C. Film Thickness:
1. Perform destructive dry film thickness measurements in accordance with ASTM D4138.
2. Perform one film thickness measurement per 50 square meters of lined surface.
3. Perform additional testing if any one measurement does not meet the specified thickness requirement.
   a. Perform an additional four measurements in the area where inadequate thickness is found. No single measurement shall be less than 100 mils.
4. Provide additional coats of barrier lining as required to meet the specified film thickness. Abrade the surface by brush blasting if the manufacture's recommended recoat window is exceeded.
5. Repair all damaged coatings associated with film thickness testing in accordance with the manufacture's written instructions.

3.6 MANUFACTURER'S SERVICES

A. Provide manufacturer's representative at Site in accordance with Section 01 43 33, Contractor's Services, for installation assistance, inspection, and Manufacturer's Certificate of Proper Installation.

B. Manufacturer's representative shall visit the Project Site at the following intervals:
1. At preconstruction conference.
2. During preparation and installation of mockup panels as required by this specification.
3. As necessary during surface preparation and application to ensure installations are made in accordance with the manufacture's recommendations.
4. As required to resolve field problems attributed to or associated with manufacturer's product.
5. Minimum number of Site visits:
   a. Four Site visits, each for a minimum of 6 hours.
   b. Travel time is not included as part of duration listed above.

3.7 APPLICATION SCHEDULE

A. Unless otherwise shown or specified, apply coatings as shown on Drawings. In the event of discrepancies or omissions in the following, request clarification from Contract Administrator before starting Work in question.

B. Coating System CRC-1: Use in the following areas:
1. Existing concrete inside the fermenter and biofilter tanks including floors, walls and ceilings and as indicated on drawings.

C. Coating System CRC-4: Use in the following areas:
1. New concrete surfaces inside the fermenter and biofilter tanks and additional locations including floors, benching, walls and ceilings as indicated on drawings.

3.8 MEASUREMENT AND PAYMENT

A. The cost of the work covered in this specification shall not be paid for directly, but shall be considered incidental and included in the lump sum bids for the respective line items in the Proposal Schedule.

B. Provide a unit rate for CRC-1 for areas not identified herein. Quantities as noted in the Proposal Schedule.

C. Provide a unit rate for repairs beyond 50 mm in depth.

D. Provide a unit rate for cleaning and coating of corroded reinforcement.

E. Provide a unit rate for crack injection.

3.9 SUPPLEMENTS

A. The supplements listed below, following “End of Section,” are a part of this Specification.
   1. Chemical Resistant Coating System Data Sheet (CRCSDS).
   2. Chemical Resistant Coating Product Data Sheet (CRCPDS).

END OF SECTION

CHEMICAL RESISTANT COATING SYSTEM DATA SHEET (CRCSDS)

Complete this CRCSDS for each coating system, include all components of the system (surface preparation, primer, intermediate coats, and finish coats). Include all components of a given coating system on a single CRCSDS.

Paint System Number (from Spec.):		
Paint System Title (from Spec.):		
Coating Supplier:		
Representative:		
Surface Preparation:		
Paint Material (Generic)	**Product Name/Number (Proprietary)**	**Min. Coats, Coverage**

CHEMICAL RESISTANT COATING PRODUCT DATA SHEET (CRCPDS)

Product:_____

Complete and attach manufacturer's Technical Data Sheet to this CRCPDS for each product submitted. Provide manufacturer's recommendations for the following parameters at temperature (deg C)/relative humidity:

Temperature/RH	**10/50**	**20/30**	**32/25**
Induction Time			
Pot Life			
Shelf Life			
Drying Time			
Curing Time			
Min. Recoat Time			
Max. Recoat Time			

Provide manufacturer's recommendations for the following:

Mixing Ratio: _____

Maximum Permissible Thinning:_____

Ambient Temperature Limitations: min.:_____ max.:_____

Surface Temperature Limitations: min.:_____ max.:_____

Surface Profile Requirements: min.:_____ max.:_____

Relative Humidity Requirements: min.:_____ max.:_____