Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for asphalt for use as dampproofing.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
- .2 CAN/CGSB 37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
- .3 CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
- .4 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
- .5 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .6 CGSB 37-GP-11M-76(R1984), Application of Cutback Asphalt Plastic Cement.
- .7 CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
- .8 CGSB 37-GP-15M-76(R1984), Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
- .9 CAN/CGSB 37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
- .10 CAN/CGSB 37.28-M89, Reinforced Mineral Colloid Type, Emulsified Asphalt for Roof Coatings and for Waterproofing.
- .11 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
- .12 CGSB 37-GP-37M-77, Application of Hot Asphalt for Dampproofing or Waterproofing.

.2 Canadian Standards Association (CSA International)

- .1 CSA A123.4-98, Bitumen for Use in Construction of Built-Up Roof Coverings and Dampproofing and Waterproofing Systems.

.3 Health Canada

- .1 Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

.4 National Research Council Canada (NRC)/Institute for Research in Construction (IRC)

- .1 Canadian Construction Materials Centre (CCMC)

1.3 PRODUCT DATA

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures .

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Submit product data sheets for bituminous dampproofing products. Including:

.1 Product characteristics.

.2 Performance criteria.

.3 Application methods.

.4 Limitations.

.4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store materials on supports to prevent deformation.

.4 Store at temperatures above 5 degrees C.

.5 Remove only in quantities required for same day use.

.6 Store materials in accordance with manufacturer's written instructions.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Remove from site and dispose of packaging materials at appropriate recycling facilities.

.3 Collect and separate for disposal paper plastic polystyrene corrugated cardboard and wood packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

.4 Ensure emptied containers are sealed and stored safely.

.5 Fold up metal banding, flatten and place in designated area for recycling.

.6 Divert unused bituminous dampproofing, sealing compoundsand asphalt primer materials from landfill to recycling facility approved by Contract Administrator.

1.6 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS

.1 Temperature, relative humidity, moisture content.

.1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

.2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.

.3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.

.4 Do not apply dampproofing in wet weather.

.2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.3 Ventilation:

.1 Ventilate area of Work as directed by Contract Administrator by use of approved portable supply and exhaust fans.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

1.7 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 MATERIALS

.1 Gradebeam dampproofing coating for temperatures above 5 degrees C (40 degrees F):

.1 Dampproof asphalt emulsion primer conforming to the requirements of AN/CGSB-37.2 shall be 700-01 Asphalt Emulsion Dampproofing manufactured by Bakor (or approved equivalent in accordance with B6 Substitutes) diluted 20% with clean water.

.2 Asphalt emulsion dampproofing conforming to the requirements of CAN/CGSB-37.2 shall be 700-01 Asphalt Emulsion Dampproofing manufactured by Bakor or approved equivalent in accordance with B6 Substitutes.

.2 Foundation wall waterproofing membranes:

.1 Primary Waterproofing Membrane shall be Blueskin® WP200 manufactured by Bakor (or approved equivalent in accordance with B6 Substitutes) with the **CCMC 13297-R listing**.

.1 SBS modified bitumen, self-adhering sheet membrane with a cross-laminated polyethylene film, and having the following physical properties:

.1 Thickness: 1.5 mm (60 mils) min.

.2 Flexibility: Pass @ -40 degrees C to ASTM D1970

.3 Vapour permeance: 2.8 ng/Pa.s.m² (0.05 perms) to ASTM E96

.4 Tensile strength (membrane): 2.24 MPa to ASTM D412,

.5 Tensile strength (film): 34.5 MPa to ASTM D882,

.6 Elongation: 300% to ASTM D412,

.7 Puncture resistance: 222 N min. to ASTM E154.

.3 Foundation wall primer:

.1 Primer for self-adhering waterproofing membrane: Aquatac™ Primer manufactured by Bakor or approved equivalent in accordance with B6 Substitutes.

.1 Polymer emulsion based adhesive type, quick setting for temperatures above –4 degrees C, having the following physical properties:

.1 Colour: Aqua

.2 Weight: 1.0 kg/l

.3 Solids by weight: 53%

.4 Water based, no solvent odours

.5 Drying time (initial set): 30 minutes,

Part 3 Execution

.1 Condition of Surface

.1 Before commencing work, ensure environmental and site conditions are suitable for installation in accordance with manufacturer's instructions.

3.2 APPLICATION

.1 Gradebeam Dampproofing:

.1 Do dampproofing in accordance with CAN/CGSB-37.3, CGSB 37-GP-12Ma, CGSB 37-GP-36M, CGSB 37-GP-37M except where specified otherwise.

.2 Do sealing work in accordance with CGSB 37-GP-11M except where specified otherwise.

.3 Do priming of surface in accordance with CGSB 37-GP-15M except where specified otherwise.

.4 Application of Dampproofing Coating for Temperatures Above 5 degrees C.

.1 Apply a coat of asphalt emulsion dampproofing diluted 20% with clean water at the rate of 0.5l/m^2 (1 gal/100ft^2) as a primer and allow to dry.

.2 Apply a second coat of asphalt emulsion dampproofing at rate of 1.0 to 1.5 l/m^2 (2 to 3 gal/100ft^2) and allow to dry.

.2 Foundation Waterproofing:

.1 Preparation

.1 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar, frost or other contaminants. Fill spalled areas in substrate to provide an even plane.

.2 New concrete should be cured for a minimum of 7 days and must be dry before waterproofing membranes are applied. Lightweight structural concrete must be cured a minimum of 14 days.

.3 Use appropriate waterproofing membrane primer as recommended by manufacturer based on air and surface temperature at time of application.

.2 Primer

.1 Apply primer for self-adhered membrane by roller or spray at rate recommended by manufacturer.

.2 Allow minimum 30 minute open time. Primed surfaces not covered by waterproofing membrane during the same working day must be re-primed.

.3 Joint and Crack Treatment

.1 All cracks in concrete 1.5mm to 3mm wide are to be pre-treated with a 1.5 mm (60 mil) coating of liquid membrane 50 mm wide centred on the crack/joint. Alternately, apply a 150-mm wide strip of waterproofing membrane centred over crack. Provide 75 mm end laps.

.2 Horizontal to vertical inside corner transition areas are to be pre-treated with a liquid membrane fillet extending 19 mm vertically and horizontally from the corner. Apply a minimum 225 mm strip of waterproofing membrane centred at the joint.

.3 All outside corners are to be pre-treated with a minimum 225 mm strip of waterproofing membrane centred at the joint.

.4 Where three or more planes come into contact reinforce with cut sections of waterproofing membrane reinforcing sheet as per manufacturers instructions.

.4 Projections

.1 Extend waterproofing membrane tight to projection and seal with liquid membrane extending 65 mm along projection and 65 mm onto waterproofing membrane.

.5 Waterproofing Membrane - Vertical Applications

.1 Apply waterproofing membrane to prepared substrate in lengths of 2400 mm or less.

.2 Provide 65 mm laps at both sides and ends. Position for alignment and remove protective film. Press firmly into place. Promptly roll all laps with a counter top roller to effect seal. If more than one length is required on a vertical surface, apply in a shingle fashion.

.3 Terminate membrane using termination mastic or termination bar, reglet or counter flashing as indicated. Refer to manufacturers standard details.

.4 All laps within 300 mm of a 90 degrees change in plane are to be sealed with termination sealant.

3.3 SCHEDULE

.1 Apply continuous, uniform coating of dampproofing to entire exterior face of grade beams and to new basement walls above grade.

.1 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

.2 Apply waterproofing to new basement walls below grade.

.1 Inspect existing basement walls and notify Contract Administrator if remedial waterproofing work is required.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C208-95(2001), Specification for Cellulosic Fiber Insulating Board.

.2 ASTM C591-01, Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.

.3 ASTM C612-04, Standard Specification for Mineral Fibre Block and Board Thermal Insulation.

.4 ASTM C726-05, Standard Specification for Mineral Fiber Roof Insulation Board.

.5 ASTM C728-05, Standard Specification for Perlite Thermal Insulation Board.

.6 ASTM C1126-04, Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.

.7 ASTM C1289-05a, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.

.8 ASTM E96/E96M-05, Standard Test Methods for Water Vapour Transmission of Materials.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.

.3 Canadian General Standards Board (CGSB)

.1 CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-M91, Standard for Type A Chimneys.

.2 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.

.3 CAN/ULC-S702-97, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.4 CAN/ULC-S704-03, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's insulation products and adhesives.

.2 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

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

.3 Convene pre-installation meeting one week prior to beginning work of this Section.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.6 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

Part 2 Products

2.1 INSULATION

.1 Extruded polystyrene (XPS): to CAN/ULC-S701.

- .1 Type: 3
- .2 Compressive strength: 15psi to ASTM D1621.
- .3 R Value: ≥ R5 per inch to ASTM C518.
- .4 Water Absorption ≤ 0.1% to ASTM C272 and ≤ 0.7% to ASTM D2842.
- .5 Flexural Strength: ≥ 60 psi to ASTM C203.
- .6 Water Vapour Permeance: 1.1 perm max to ASTM E96.
- .7 Thickness: as indicated.
- .8 Edges: shiplapped.
- .9 Product dimensions: Largest sizes available and practicable.
- .10 Recycled Content: ≥ 10% recycled content. (Post consumer plus ½ post-industrial content.)
- .11 Produced without CFCs and HCFCs.
- .12 Ecologo or Greenguard certified.

.2 Below Grade: Extruded polystyrene (XPS): to CAN/ULC-S701.

- .1 Type: 4
- .2 Compressive strength: 25psi to ASTM D1621.
- .3 R Value: ≥ R5 per inch to ASTM C518.
- .4 Water Absorption ≤ 0.1% to ASTM C272 and ≤ 0.7% to ASTM D2842.
- .5 Flexural Strength: ≥ 75 psi to ASTM C203.
- .6 Water Vapour Permeance: 1.1 perm max to ASTM E96.
- .7 Thickness: as indicated.
- .8 Edges: shiplapped.
- .9 Product dimensions: Largest sizes available and practicable.
- .10 Recycled Content: ≥ 10% recycled content. (Post consumer plus ½ post-industrial content.)
- .11 Produced without CFCs and HCFCs.
- .12 Ecologo or Greenguard certified.

.3 Roof insulation: See Section 07 52 00 – Modified Bituminous Membrane Roofing.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 WORKMANSHIP

.1 Install insulation after building substrate materials are dry.

.2 Install insulation to maintain continuity of thermal protection to building elements and spaces.

.3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.

.5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.

.6 Offset both vertical and horizontal joints in multiple layer applications.

.7 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Contract Administrator in writing of defects.

.2 Prior to commencement of work ensure:

.1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

3.4 RIGID INSULATION INSTALLATION

.1 Install in accordance with manufacturer's instructions.

.2 Clamp and mechanically fasten insulation in place with vertical plywood strapping fastened through insulation into studs.

.3 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm modified bituminous membrane over expansion and control joints using compatible adhesive and primer before application of insulation.

3.5 PERIMETER FOUNDATION / GRADE BEAM INSULATION

.1 Exterior application: extend boards full face of grade beam and basement foundation walls with adhesive.

3.6 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C553-02, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.

.2 ASTM C665-01e1, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

.3 ASTM C1320-05, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.

.2 Canadian Gas Association (CGA)

.1 CAN/CGA-B149.1-05, Natural Gas and Propane Installation Code Handbook.

.2 CAN/CGA-B149.2-05, Propane Storage and Handling Code.

.3 Canadian Standards Association (CSA International)

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.4 Underwriters Laboratories of Canada (ULC)

.1 CAN/ULC-S604-M1991, Type A Chimneys.

.2 CAN/ULC-S702-1997, Standard for Mineral Fibre Insulation.

1.2 SUBMITTALS

.1 Product Data:

.1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

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

.3 Convene pre-installation meeting one week prior to beginning work of this Section.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordinate with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.6 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

Part 2 Products

2.1 INSULATION

.1 Batt and blanket mineral fibre: to ASTM C553, ASTM C665 and CAN/ULC S702.

.2 Exterior walls: Thermal batt mineral wool insulation.

.1 R22 to stud spacing required.

.2 Type 1.

.3 Smoke Developed = 0, Flame Spread = 0.

.4 Ecologo or Greenguard certified, Minimum 13% recycled content. (Post consumer plus ½ post-industrial content.)

.5 CFC and HCFC free production, manufacture from natural and recycled materials.

.6 Product: Roxul Comfortbatt R22 or approved equivalent in accordance with B6 Substitutes.

.3 Interior fire rated walls: Non combustible mineral wool insulation.

.1 To depth of wall and stud spacing required.

.2 Type 1.

.3 Smoke Developed = 0, Flame Spread = 0.

.4 Ecologo or Greenguard certified, Minimum 13% recycled content. (Post consumer plus ½ post-industrial content.)

.5 CFC and HCFC free production, manufacture from natural and recycled materials.

.6 Product: Roxul or approved equivalent in accordance with B6 Substitutes.

.4 Interior acoustic batt insulation: Fibreglass insulation.

.1 To depth of wall and stud spacing required.

.2 Type 1.

.3 Smoke Developed ≤ 10, Flame Spread ≤ 10.

.4 Ecologo or Greenguard certified, Minimum 35% recycled content. (Post consumer plus ½ post-industrial content.)

.5 Formaldehyde free.

.6 Product: Owens Corning Quiet Batt or approved equivalent in accordance with B6 Substitutes.

.5 Perforated metal deck flute fillers: Mineral wool flute fillers.

.1 To sizes required.

.2 Type 1.

.3 Smoke Developed = 0, Flame Spread = 0.

.4 Greenguard certified, Minimum 13% recycled content. (Post consumer plus ½ post-industrial content.)

.5 CFC and HCFC free production, manufacture from natural and recycled materials.

.6 Product: Roxul or approved equivalent in accordance with B6 Substitutes.

.7 Coordinate supply and installation with Section 07 52 00 – Modified Bituminous Membrane Roofing and Section 05 31 00 – Steel Decking.

2.2 ACCESSORIES

.1 Insulation clips: Impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

.2 Nails: galvanized steel, length to suit insulation plus 25 mm, to CSA B111.

.3 Staples: 12 mm minimum leg.

.4 Tape: as recommended by manufacturer.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSULATION INSTALLATION

.1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C1320.

.2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.

.3 Do not compress insulation to fit into spaces.

.4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.

.5 Do not enclose insulation until it has been inspected and approved by Contract Administrator.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.2 Canadian Urethane Foam Contractors' Association Inc. (CUFCA)

.3 Green Seal Environmental Standards

.1 Standard GC-03-93, Anti-Corrosive Paints.

.2 Standard GS-11-97, Architectural Paints.

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.5 South Coast Air Quality Management District (SCAQMD), California StateSCAQMD Rule 1113-06, Architectural Coatings.

.6 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S101-04, Fire Endurance Tests of Building Construction and Materials.

.2 CAN/ULC-S102-03, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

.3 CAN/ULC-S705.1-01, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification.

.4 CAN/ULC-S705.2-05, Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 LEED Submittals: in accordance with Section 01 35 21 - LEED Requirements.

.4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: submit certified test reports for insulation from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.2 Submit test reports in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Applicators to conform to CUFCA Quality Assurance Program.

.2 Qualifications:

.1 Installer: person specializing in sprayed insulation installations with 5 years experience and approved by manufacturer.

.2 Manufacturer: company with minimum 3 years experience in producing of material used for work required for this project, with sufficient production capacity to produce and deliver required units without causing delay in work.

.3 Mock-up:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up 10 lineal metres minimum, of sprayed insulation including one inside corner and one outside corner, door, window openings.

.3 Mock-up may be part of finished work.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with sprayed insulation work.

.4 Health and Safety Requirements: worker protection:

.1 Protect workers as recommended by CAN/ULC-S705.2 and manufacturer's recommendations:

.2 Workers must wear protective clothing and equipment in accordance with manufacturer’s instructions when applying foam insulation.

.3 Workers must not eat, drink or smoke while applying foam insulation.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer and material.

.4 Store materials in a dry area protected from precipitation, freezing and overheating, at temperatures not lower than 60 F (16 C) or above 90 F (32 C).

.5 Protect materials during handling and application to prevent damage and contamination.

1.5 SITE CONDITIONS

.1 Ventilate area in accordance with Section 01 51 00 - Temporary Utilities.

.2 Ventilate area to receive insulation by introducing fresh air and exhausting air continuously during and 24 hour after application to maintain non-toxic, unpolluted, safe working conditions.

.3 Provide temporary enclosures to prevent spray and noxious vapours from contaminating air beyond application area.

.4 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of insulation materials.

.5 Apply insulation only when surfaces and ambient temperatures are within manufacturers' prescribed limits.

1.6 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 MATERIALS

.1 Insulation: spray polyurethane to CAN/ULC-S705.1.

.2 Primers: in accordance with manufacturer's recommendations for surface conditions.

.1 Maximum VOC limit 100 g/l to SCAQMD Rule 1113.

2.2 PRODUCT REQUIREMENTS

.1 Products: Closed-cell polyurethane foam insulation.

.1 Biobased 1701

.2 BASF Spraytite.

.3 Approved equivalent in accordance with B6 Substitutes.

.2 Physical and Mechanical Properties:

.1 Greenguard or Ecologo certified.

.2 Zero ozone depleting blowing agent – CFC and HCFC free.

.3 Formaldehyde free.

.4 No VOCs.

.5 Core Density: 1.7-2.4 pcf to ASTM D 1622.

.6 Thermal Resistance (aged): ≥ R5.8 to ASTM C 518.

.7 Closed Cell Content: ≥ 88% percent to ASTM D 2856.

.8 Compressive Strength: ≥ 23 psi to ASTM D 1621.

.9 Tensile Strength: ≥19 psi to ASTM D 1623.

.10 Water Absorption: Less than 4% by volume to ASTM D 2842.

.11 Water Vapor Transmission: 1.3 -2.06 perm/inch to ASTM E 96.

.12 Air Permeability: ≤ 0.02 L/s/m2 per inch to ASTM E 283.

.13 Fungi Resistance: Pass to ASTM C 1338.

.3 Fire performance

.1 Flame Spread: ≤ 25 to ASTM E 84.

.2 Smoke: ≤ 450 to ASTM E 84.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 APPLICATION

.1 Apply insulation to clean surfaces in accordance with CAN/ULC-S705.2 and manufacturer's printed instructions.

.2 Use Low VOC LEED compliant primer where recommended by manufacturer.

.3 Apply sprayed foam insulation in thickness as indicated.

.4 Spray foam insulation to be covered with Gypsum board after installation.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.2 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

.3 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).

.4 Quality assurance submittals:

.1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.2 Instructions: submit manufacturer's installation instructions and comply with written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

1.3 QUALITY ASSURANCE

.1 Mock-Ups:

.1 Construct mock-up of sheet vapour barrier installation including one lap joint, one inside corner and at one electrical box. Mock-up may be part of finished work.

.2 Mock-up will be used to judge workmanship, substrate preparation, and material application.

.3 Locate where directed by Contract Administrator.

.4 Allow 24 hours for inspection of mock-up by Contract Administrator before proceeding with vapour barrier work.

.2 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.4 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 SHEET VAPOUR BARRIER

.1 Polyethylene film: to CAN/CGSB-51.34, 6 mil thickness.

2.2 ACCESSORIES

.1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25 mm wide elsewhere.

.2 Sealant: Low or no VOC compatible with vapour retarder materials, recommended by vapour retarder manufacturer. See Section 07 92 00 - Joint Sealing

.3 Staples: minimum 6 mm leg.

.4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

Part 3 Execution

3.1 INSTALLATION

.1 Ensure services are installed and inspected prior to installation of retarder.

.2 Install sheet vapour retarder on warm side of exterior wall and ceiling assemblies prior to installation of gypsum board to form continuous retarder.

.3 Use sheets of largest practical size to minimize joints.

.4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

.1 Cut sheet vapour retarder to form openings and ensure material is lapped and sealed to frame.

3.3 PERIMETER SEALS

.1 Seal perimeter of sheet vapour barrier as follows:

.1 Apply continuous bead of sealant to substrate at perimeter of sheets.

.2 Lap sheet over sealant and press into sealant bead.

.3 Install staples through lapped sheets at sealant bead into wood substrate.

.4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

.1 Seal lap joints of sheet vapour barrier as follows:

.1 Attach first sheet to substrate.

.2 Apply continuous bead of sealant over solid backing at joint.

.3 Lap adjoining sheet minimum 150 mm and press into sealant bead.

.4 Install staples through lapped sheets at sealant bead into wood substrate.

.5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

.1 Seal electrical switch and outlet device boxes that penetrate vapour barrier as follows:

.1 Install moulded box vapour barrier.

.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Construction Documents Committee

.1 CCDC 2-94, Stipulated Price Contract.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13M-M87, Sealing Compound, One Component, Elastomeric Chemical Curing.

.2 CAN/CGSB-19.24M-M90, Multi-Component, Chemical Curing Sealing Compound.

.3 CGSB 19-GP-14M-84, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

.3 Sealant and Waterproofer's Institute - Sealant and Caulking Guide Specification.

.4 American Society for Testing and Materials.

.1 ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.

.2 ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.3 ASTM E 96: Water Vapour Transmission of Materials.

.4 ASTM C 920; Standard Specification for Elastomeric Joint Sealants.

.5 ASTM C 1193; Standard Guide for Use of Joint Sealants.

.6 ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.

.7 ICC-ES AC 38: Acceptance Criteria for Water-Resistive Barriers.

.8 ICC-ES AC 188: Acceptance Criteria for Roof Underlayments.

.9 ICC-ES AC 48: Acceptance Criteria for Roof Underlayment for use in Severe Climates.

.10 AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.

.11 ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.

.12 AAMA 711-05: Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.

.5 AATCC – American Association of Textile Chemists and Colorists.

.1 Test Method 127 Water Resistance: Hydrostatic Pressure Test.

.6 TAPPI

.1 Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area).

1.2 PERFORMANCE REQUIREMENTS

.1 Provide a air barrier constructed to perform as a continuous air barrier assembly and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water which has penetrated the cladding. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 At bid submission, provide evidence to the Architect that the contractor is licensed by the National Air Barrier Association (NABA) by providing a Licensed Contract number and a certificate from NABA that confirms that the contractor is in good standing and the installers are certified and licensed or registered under the Air Barrier Quality Assurance Program used by NABA.

.3 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.4 Quality Assurance Submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Existing Substrate Condition: report deviations, as described in PART 3 - EXAMINATION in writing to Contract Administrator.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Submit manufacturer's product data sheets for each type of membrane, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties for all materials which comprise the manufacturers declared air barrier assembly.

.4 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

.1 Submit test results of air permeability testing of primary air barrier material using either ASTM E 2178-01 or the CCMC Technical Guide for Air Barrier Materials testing protocol.

.2 Submit documentation from an approved independent testing laboratory certifying the air leakage and vapour permeance rates of the air barrier membranes exceed the requirements of the National Building Code (NBC) and in accordance with ASTM E 2178.

1.4 QUALITY ASSURANCE

.1 Project Requirements:

.1 The intent of this specification is to have this project conform to all the requirements of the Air Barrier Quality Assurance Program used by NABA. For complete details of all the requirements, contact NABA.

.2 Perform Work in accordance with manufacturer's written instructions and this specification.

.3 Maintain one copy of manufacturer's written instructions on site.

.4 Allow access to Work site by the air barrier membrane manufacturer's representatives.

.5 Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, flashings and adhesives.

.6 Single-Source Responsibility:

.1 Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.

.7 Provide products which comply with all federal, provincial, and local regulations controlling use of volatile organic compounds (VOCs).

.2 Mock-Up:

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct typical exterior wall panel, 2 m long by 2 m wide, incorporating window frame, insulation, building corner condition, junction with roof system and illustrating materials interface and seals.

.3 Coordinate with NABA to test mock-up for air and water infiltration to conform to Section 01 45 00 - Quality Control, in accordance with ASTM E 783 and ASTM E1105.

.4 Locate where directed.

.5 Mock-up may remain as part of finished work.

.6 Allow 24 hours for inspection of mock-up before proceeding with air/vapour barrier Work.

.3 Contractor Qualifications:

.1 Applicator: company specializing in performing work of this section with minimum 3 years experience with installation of air/vapour barrier systems.

.1 Completed installation must be approved by the material manufacturer.

.2 Applicator: company:

.1 The air barrier contractor shall be, during the bidding period as well as for the duration of the installation, officially recognized as a Licensed Contractor by the Air Barrier Quality Assurance Program (QAP) used by NABA.

.2 Must maintain their license throughout the duration of the project.

.3 Submit document stating the applicator of the primary air barrier membranes specified in this section is authorized by the manufacturer as suitable for the execution of the Work.

.4 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Ensure all contractors responsible for creating a continuous plane of air tightness are present.

.3 Meet twice during progress of Work at 25% and 60% completion.

.4 Meet upon completion of Work, after cleaning is carried out.

1.5 INSPECTIONS

.1 Inspections shall be carried out at in accordance with the Air Barrier Quality Assurance Program used by NABA. A minimum of one inspection shall be conducted at the 5% completion stage.

.2 The inspection is limited to the installation of the air barrier materials and components only.

.3 A written inspection report shall be forwarded to the City or the City's representative.

.4 The General Contractor shall include in the work full and typical inspection from the Air Barrier Quality Assurance Program Inc. used by NABA by a NABA Licensed Inspector and shall include in general.

.1 A review of general practices of the Licensed Installers

.2 Conduct visual examination of application to confirm that the assembly has been applied properly and according to the manufacturers instructions and any NABA Specifications

.3 Inspectors shall check environmental conditions, substrate, application methodology, visually inspect the air barrier application, the material, the installer's documentation and material handling and storage.

.4 Inspectors shall check the Daily Work Record and verify that the information recorded is complete and accurate. The inspector shall check and document that evidence of daily adhesion testing has been completed by the installer.

.5 Inspector will inspect only the installation of materials and components used in the air barrier assembly.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Refer to current Product MSDS for proper storage and handling.

.3 Deliver materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.

.4 Store role materials on end in original packaging. Protect rolls from direct sunlight and weather until ready for use.

.5 Store air barrier membranes, adhesives and primers at temperatures of 5 degrees C (40 degrees F) and rising.

.6 Keep solvent away from open flame or excessive heat.

.7 Contractor to verify compliance for Volatile Organic Compounds (VOC) limitations of products to comply with all federal, provincial, and local regulations controlling use of volatile organic compounds (VOCs).

1.7 AMBIENT CONDITIONS

.1 Install solvent curing sealants and vapour release adhesive materials in open spaces with ventilation.

.2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.

.3 Maintain temperature and humidity recommended by materials manufactures before, during and after installation.

1.8 SEQUENCING

.1 Sequence work to permit installation of materials in conjunction with related materials and seals.

1.9 WARRANTY

.1 Provide manufacturer's standard 10-year assembly warranty.

.2 Warranty: include coverage of installed sealant and sheet materials which:

.1 Fail to achieve air tight and watertight seal.
.2 Exhibit loss of adhesion or cohesion.
.3 Do not cure.

1.10 DESCRIPTION

.1 Supply labour, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:

.1 Connections of the walls to the roof air barrier.
.2 Connections of the walls to the foundations.
.3 Seismic and expansion joints.
.4 Openings and penetrations of window and door frames, store front, curtain wall.
.5 Piping, conduit, duct and similar penetrations.
.6 Masonry ties, screws, bolts and similar penetrations.
.7 All other air leakage pathways in the building envelope.
.8 Materials and installation methods of the primary vapour permeable air barrier membrane system and accessories.
.9 Materials and installation methods of through-wall flashing membranes.

1.11 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 MEMBRANE

.1 Primary water resistive air barrier membrane and window flashing shall be BlueskinVP^{TM} 100 manufactured by Henry, or approved equivalent in accordance with B6 substitutes.

.2 Self-adhering reinforced modified polyolefin tri-laminate (Blue) sheet air barrier membrane for wall construction, specifically designed to be water resistant and vapour permeable. Patented adhesive backing to be protected with 3 piece release film.

.1 Pre-cut membrane for all window jambs, headers, door openings, inside and outside corners.

.3 Membrane shall have the following physical properties:

.1 Air leakage: <0.02L/s/m^2 @ 75Pa, <0.004 CFM/ft^2 @ 1.57 lbs/ft^2 when tested in accordance with ASTM E 2178.

.2 Water Vapour Permeance: 1914 ng/Pa.m².s (33 perms) to ASTM E96, Method B.

.3 Resistance to Water Penetration: Pass ICC-ES AC 38.

.4 Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified.

.5 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 5 and Smoke Development Classification of 125.

.6 Basis Weight: Minimum 100 gm/m^2, when tested in accordance with TAPPI Test Method T-410.

.7 Average Dry Breaking Force: 245N MD, and 214N CD per ASTM D 5034.

.8 Cyclic and Elongation: Pass at 100 cycles, -29 deg C. (-20 deg F.) per ICC-ES AC 48.

.4 Self-Adhered membrane for window sill pan flashings shall be Blueskin® SA or LT manufactured by Henry or approved equivalent in accordance with B6 substitutes.

.1 SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a blue polyethylene film. Membrane shall have the following physical properties:

.1 Membrane Thickness: 1.0 mm (0.040 inches (40 mils)).

.2 Low temperature flexibility: -35 degrees C (-30 degrees F) to ASTM D146.

.3 Elongation: 200% minimum to ASTM D412-modifed.

.4 Minimum Puncture Resistance 40lbf to ASTM E154.

.5 Lap Peel Strength 10 lbf/in width to ASTM D903 180° bend.

.6 Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

.5 Through-wall flashing membrane (self-Adhering) shall be Blueskin® TWF manufactured by Henry, or approved equivalent in accordance with B6 substitutes.

.1 SBS modified bitumen, self-adhering (Yellow) sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:

.1 Membrane Thickness: 1.0 mm (0.0394 inches (40 mils)).

.2 Film Thickness: 0.1mm 4.0 mils.

.3 Flow (ASTM D5147): Pass @ 100 degree C (212 degrees F).

.4 Puncture Resistance: 134 lbf to ASTM E 154.

.5 Tensile Strength (film): 5723 psi ASTM D882.

.6 Tear Resistance: 13lbs. MD to ASTM D1004.

.7 Low temperature flexibility: -30 degree C (-22 degrees F) to CGSB 37-GP-56M.

2.2 PRIMERS

.1 Air barrier membrane to be self-adhered without use of primer.

.1 If site conditions or manufacturer requirements dictate use of primer, then Contractor shall notify Contract Administrator. Primer shall be low VOC to LEED requirements.

.2 Primer for SBS modified bitumen self-adhering membranes at temperatures above -4°C.

.1 Shall be Aquatac™ Primer manufactured by Henry or approved equivalent in accordance with B6 Substitutes.

.2 Polymer emulsion based adhesive, quick setting.

.3 Primer shall have the following physical properties:

.1 Colour: Aqua.

.2 Weight: 1.0 kg/l.

.3 Solids by weight: 53%.

.4 Water based, no solvent odours.

.5 Drying time (initial set): 30 minutes at 50% RH and 20 degrees C.

2.3 PENETRATION & TERMINATION SEALANT

.1 Termination Sealant shall be HE925 BES Sealant manufactured by Henry or approved equivalent in accordance with B6 substitutes.

.1 Low VOC to LEED requirements.

.2 Moisture cure, medium modulus polymer modified sealing compound having the following physical properties:

.1 Compatible with sheet air barrier, roofing and waterproofing membranes and substrate.

.2 Maximum VOC: 5 g/l.

.3 Complies with Fed. Spec. TT-S-00230C, Type II, Class A.

.4 Complies with ASTM C 920, Type S, Grade NS, Class 25.

.5 Elongation: 450 – 550%.

.6 Remains flexible with aging.

.7 Seals construction joints up to 25 mm (1 inch) wide.

.8 Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 GENERAL

.1 Perform Work in accordance with National Air Barrier Association - Professional Contractor Quality Assurance Program and requirements for materials and installation.

3.3 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section. Notify Contract Administrator in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

.2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.

.3 Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.4 PREPARATION

.1 Remove loose or foreign matter, which might impair adhesion of materials.

.2 Surfaces must be sound, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane.

.3 Ensure substrates are free of surface moisture prior to application of self-adhesive membrane and primer.

.4 Ensure metal closures are free of sharp edges and burrs.

.5 Ensure all preparatory Work is complete prior to applying primary air barrier membrane.

.6 Mechanical fasteners used to secure sheathing boards or penetrate sheathing boards shall be set flush with sheathing and fastened into solid backing.

.7 Pre-cast and concrete block substrates are required to be primed prior to application of self-adhering water resistive air barrier membrane.

3.5 APPLICATION OF SUBSTRATE PRIMER

.1 Required Primer for SBS Modified Self-Adhered Membranes.

.1 For the application of SBS modified self-adhered window sill pan flashings, through-wall flashings and other applications of SBS modified self-adhered transition membranes, the substrate needs to be conditioned with applicable primer.

.2 Apply primer at rate recommended by manufacturer to all areas to receive SBS modified self-adhering sheet membrane as indicated on drawings by roller or spray and allow to dry.

.3 Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

.2 Primer for Primary Water Resistive Air Barrier Membrane.

.1 Clean, dry surfaces of most common construction materials including exterior grade gypsum board, primed steel, aluminum and galvanized metal do not require to be primed to achieve appropriate surface adhesion.

3.6 INSTALLATION

.1 Inside and outside corners:

.1 Seal inside and outside corners of sheathing boards with a strip of self-adhering vapour permeable membrane extending a minimum of 75mm on either side of the corner detail.

.2 For inside corners, pre-treat the corner with a continuous 13mm (½ inch) bead of termination sealant.

.3 Prime surfaces where appropriate due to surface conditions, to achieve surface adhesion as per manufacturers' instructions and allow to dry.

.4 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2 inches) overlap at all side laps and 75 mm (3 inches) overlap at all end laps of membrane.

.5 Roll all laps and membrane with a counter top roller to ensure seal.

.2 Transition Areas:

.1 Tie-in to structural beams, columns, floor slabs and intermittent floors, parapet curbs, foundation walls, roofing systems and at the interface of dissimilar materials as indicated in drawings with self-adhered air barrier transition membrane.

.2 Prime surfaces where appropriate due to surface conditions, to achieve surface adhesion as per manufacturers' instructions and allow to dry.

.3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 75 mm lap to all substrates.

.4 Ensure minimum 50 mm overlap at all side laps and 75 mm overlap at all end laps of membrane.

.5 Roll all laps and membrane with a counter top roller to ensure seal.

.3 Windows and rough openings:

.1 Place specified SBS modified self-adhered window sill pan flashing membrane across window sills. Pre-treat inside corners with a bead of termination sealant. Install window sill pan membrane and end dam terminations, seal cuts and terminations with termination sealant per window manufacturers instructions and ASTM E 2112.

.2 Wrap head and jamb of rough openings with specified self-adhered water resistive air barrier transition membrane as detailed.

.3 Extend specified self-adhered water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapour retarder.

.4 Prime surfaces where appropriate to achieve surface adhesion as per manufacturers' instructions and allow to dry.

.5 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm overlap at all side laps and 75 mm overlap at all end laps of membrane.

.6 Roll all laps and membrane with a counter top roller to ensure seal.

.4 Through wall flashing membrane:

.1 Apply through-wall flashing membrane along the base of wall cladding and over shelf angles / metal flashing as detailed.

.2 Prime surfaces and allow to dry, press membrane firmly into place, over lap minimum 50 mm at all side and end laps. Promptly roll all laps and membrane to ensure the seal.

.3 Applications shall form a continuous flashing membrane and shall extend up a minimum of 203 mm up the back-up wall.

.4 Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.

.5 Install through-wall flashing membrane and extend 13mm from outside edge of veneer. Provide “end dam” flashing as detailed.

.5 Primary water resistive Air Barrier:

.1 Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.

.2 Align and position self-adhering membrane to substrate, remove top panel of protective release film and press firmly into place.

.3 Ensure alignment, hold membrane in place to avoid wrinkles and sequentially remove remaining panels of protective film and press firmly into place.

.4 Ensure minimum 75 mm overlap at all end and 50 mm side laps of subsequent membrane applications.

.5 Pressure roll all membrane surfaces, laps and flashings with a counter top roller or ‘J-roller’ to ensure appropriate surface adhesion.

.6 At the end of each days work seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel apply a feathered edge to seal termination and shed water.

3.7 APPLICATION OF TERMINATION SEALANT

.1 Seal membrane terminations, heads of mechanical fasteners, masonry tie fasteners, around penetrations, duct work, electrical and other apparatus extending through the primary water resistive air barrier membrane and around the perimeter edge of membrane terminations at window and door frames with specified termination sealant.

3.8 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.9 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.10 PROTECTION OF WORK

.1 Protect finished work in accordance with Section 01 61 00 - Common Product Requirements.

.2 Do not permit adjacent work to damage work of this section.

.3 Ensure finished work is protected from climatic conditions.

.4 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.

.5 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations.

.6 Water resistive air barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible, not to exceed 90 days.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials and installation for wall system consisting of compressed wood fibre panel in aluminum grid installed over rigid insulation and Z-girts.

.2 Materials and installation for cementitious grade beam finishing installed over rigid insulation and Z-girts

1.2 REFERENCES

.1 Aluminum Association (AA).

.1 AA-DAF-45-R03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM A653/A653M-02a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 ASTM B136 - Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.

.3 ASTM B244 - Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.

.4 ASTM C834 - Standard Specification for Latex Sealants.

.5 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

.6 ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.

.7 ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

.8 ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.

.9 ASTM D1730 - Standard Practices for Preparation of Aluminum and Aluminum-Alloy Surfaces for Painting.

.10 ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

.11 ASTM D1117 - Standard Guide for Evaluating Nonwoven Fabrics.

.12 ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

.13 ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

.14 ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure.

.15 ASTM E1333 - 96(2002) Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates from Wood Products Using a Large Chamber.

.3 American National Standards Institute (ANSI)

.1 ANSI A135.6-2006, Hardboard Siding.

.4 Canadian General Standards Board (CGSB).

.1 CAN/CGSB 1-GP-71 Amendment 13-1995, Methods of Testing Paints and Pigments (including Amendments 1 to 12 and Supplement No. 1).

.2 CAN/CGSB 11.5 M-87: Hardboard, Precoated, Factory Finished, for Exterior Cladding.

.5 Department of Justice Canada (Jus).

.1 Canadian Environmental Protection Act (CEPA), 1999.

.6 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.7 The Master Painters Institute (MPI).

.1 Architectural Painting Specification Manual - March 1998 (R2002).

.8 National Research Council (NRC).

.9 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act (TDGA), 1992.

.10 AATCC127 - Water Resistance: Hydrostatic Pressure Test.

.11 TAPPI - T460 - Air Resistance of Paper (Gurley Method).

.12 Underwriters Laboratories' of Canada (ULC).

.1 CAN/ULC-S701-01, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702-1997, Standard for Thermal Insulation, Mineral Fibre, for Buildings.

.3 CAN/ULC-S704-2001, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.3 DESIGN REQUIREMENTS

.1 Design composite building panel wall to provide for thermal movement of component materials caused by ambient temperature range of 80 degrees C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.2 Include expansion joints to accommodate movement in wall system and between wall system and building structure, caused by structural movements, without permanent distortion, damage to infills, racking of joints, breakage of seals, or water penetration.

.3 Design members to withstand dead load and wind loads as calculated in accordance with NBC and applicable Municipal/Territorial regulations.

.4 Design wall system to accommodate specified erection tolerances of structure.

.5 Maintain following installation tolerances:

.1 Maximum variation from plane or location shown on approved shop drawings: 10 mm/m of length and up to 20 mm/100 m maximum.

.2 Maximum offset from true alignment between two adjacent members abutting end to end, in line: 0.75 mm.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate dimensions, wall openings, head, jamb, sill and mullion detail, materials and finish, anchor details, compliance with design criteria and requirements of related work.

.3 Shop Drawings to indicate:

.1 Z-girt gauge and spacing as required for product installation.

.2 Fastener type and fastening pattern per panel.

1.5 SUBMITTALS

.1 Product Data: Manufacturer's data sheets, and maintenance and installation instructions.

1.6 SAMPLES

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit full size sample of wall system, representative of materials, finishes and colours.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Store products in manufacturer's unopened packaging until ready for installation.

.2 Store flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets (MSDS) acceptable to Labour Canada.

.2 Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.9 QUALITY ASSURANCE

.1 Installer Qualifications: Minimum of 2 years experience with installation of similar products and listed by Manufacturer.

.2 Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

- .1 Finish areas designated by Contract Administrator.
- .2 Do not proceed with remaining work until approved by Contract Administrator.
- .3 Mock-up may remain as part of finished work.

1.10 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.6 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

- .1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.
  - .1 Low VOC complying with SCAQMD Rule #1168, Latest edition.
- .2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.
  - .1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.
  - .2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.
  - .3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.
- .3 LEED Indoor Environmental Quality Credit EQ – 4.4 Low-Emitting Materials: Composite Wood and Laminate Adhesives.
  - .1 No added urea-formaldehyde resins.

.2 Adhesives for fabrication of laminated assemblies to contain no urea-formaldehyde.

Part 2 Products

2.1 WOOD FIBRE PANELS

.1 MATERIALS

.1 Wood Fibre Panels: Kaycan Wood Products Naturetech panel.

.1 1/2" (12.7mm) thickness.

.2 Smooth finish finish one side.

.3 1219 mm wide 2438 mm long.

.4 Wood content: 100% post-industrial recycled content. (Total recycled content 39% or greater by LEED definition: Post consumer plus ½ post industrial.)

.5 Regional Materials: To meet LEED Regional Materials requirements.

.6 Factory prime finish.

.1 Paint finish – coordinate with Section 09 91 23 – Painting.

.2 Standards:

.1 Evaluation listing: CCMC 13384L

.2 ANSI A135.6-2006, Hardboard Siding.

.3 CAN/CGSB 11.5 M-87: Hardboard, Precoated, Factory Finished, for Exterior Cladding.

.4 Environmentally Preferable Product (EPP) certified.

.5 Exceed California Air Resources Board (CARB) Phase 1 and 2 standards.

.6 Meet Class E1 emission ratings.

.7 Less than 0.01ppm emissions rating to ASTM E1333 - 96(2002)

.3 Weather Barrier: See Section 07 27 00.01 – Air Barriers.

.4 Insulation: See Section 07 21 13 – Board Insulation.

.2 ACCESSORIES

.1 Trims: Reveal Trims by Fry Reglet or approved equivalent in accordance with B6 Substitutes.

.1 25% recycled content. (Post consumer plus ½ post industrial.)

.2 Reveal Trims shall confirm to a 6063 alloy in T-5 temper with a minimum thickness of .050 inch (1.3mm). All reveal trims are 12 feet (3660mm) in length.

.1 Horizontal trim – TDM-625-1125

.2 Vertical trim –DCS-625-50

.3 Outside corner trim – XDM-625-625

.4 Inside corner trim – FCP-Inside CNR

.5 J channel trim – JDM-625

.3 Finishes of Reveal Trims:

.1 Clear anodized for shiny mill finish metallic aesthetic; clear anodizing shall conform to ASTM B244 and ASTM B136.

.3 FASTENERS

.1 Fasteners: Stainless Steel fasteners or as recommended for application by manufacturer.

.1 Screw type, size and arrangement to meet manufacturer's requirements.

.2 Screws to be left exposed complete with matching finishing washers.

.3 Fastening pattern to be equally spaced and consistent for all panels.

2.2 GRADE BEAM PANEL FINISH

.1 MATERIALS

.1 GreenE-board: Magnesium Oxide board.

.1 12.7mm thickness.

.2 15% Recycled Content. (Post consumer plus ½ post industrial.)

.3 Asbestos, Silica and Formaldehyde free.

.4 Fungus resistant to ASTM G-21.

.5 ASTM D1037.

.2 Insulation: See Section 07 21 13 – Board Insulation.

.2 ACCESSORIES & INSTALLATION

.1 Fasten to horizontal galvanized J-channels / Z-girt supports at max. 16" o.c.

.2 Install with smooth face outwards.

.3 Fasteners: Corrosion resistant buglehead tapping screws or as recommended for application by manufacturer.

.4 Finish with latex fortified Portland cement with 50mm wide high-strength alkali-resistant glass fibre tape over joints.

.5 Coloured acrylic finish – confirm colour with Contract Administrator.

Part 3 Execution

3.1 EXAMINATION

.1 Do not begin installation until substrates have been properly prepared.

3.2 PREPARATION

.1 Clean surfaces thoroughly prior to installation.

.2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

.1 Install materials in strict accordance with manufacturer's installation instructions.

.2 Fibre panels: Field cut edges shall be coated during the installation process using an exterior grade primer/sealer that is compatible with the type of paint to used on project.

3.4 PROTECTION

.1 Protect installed products until completion of project.

.2 Touch-up, repair or replace damaged products before Substantial Completion.

3.5 ACCESSORIES

.1 Install all head and sill flashings, edge trim, cap pieces and fillers, and other trim as required for complete installation, including trim around wall penetrations.

.2 Control/expansion joints as per manufacturer's requirements.

3.6 CLEANING

.1 Wash down exterior surfaces using solution of mild domestic detergent in warm water, applied with soft clean wiping cloths.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Requirements for the installation of preformed metal cladding/siding.

1.2 REFERENCES

.1 American National Standards Institute (ANSI).

.1 ANSI B18.6.4-99, Thread Forming and Thread Cutting Tapping Screws and Metallic Drive Screws.

.2 American Society for Testing and Materials International, (ASTM).

.1 ASTM D2369-03, Test Method for Volatile Content of Coatings.

.2 ASTM D2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.3 ASTM D5116-97, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.3 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.

.2 CAN/CGSB-93.2-M91, Prefinished Aluminum Siding, Soffits and Fascia, for Residential Use.

.3 CAN/CGSB-93.3-M91, Prefinished Galvanized and Aluminum-Zinc Alloy Steel Sheet for Residential Use.

.4 CAN/CGSB-93.4-92, Galvanized and Aluminum-Zinc Alloy Coated Steel Siding Soffits and Fascia, Prefinished, Residential.

.5 CGSB 93.5-92, Installation of Metal Residential Siding, Soffits and Fascia.

.4 Canadian Standards Association (CSA International).

.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.5 Environmental Choice Program (ECP).

.1 CCD-045-95, Sealants and Caulking Compounds.

.6 Underwriters' Laboratories of Canada (ULC).

.1 CAN/ULC-S706-02, Wood Fibre Thermal Insulation for Buildings.

1.3 SUBMITTALS

.1 Product data: submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring and related work.

.3 Indicate arrangement of cladding system, including dimensions, location of joints, profiles of inner and outer skin, types and locations of supports, fasteners, flashing, closures and all metal components related to the cladding installation.

.4 Drawings shall be signed and sealed by a Professional Engineer, attesting to the ability of the metal panels assembly to withstand the specified loads.

.3 Samples:

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit duplicate 400 x 400 mm samples of siding material, of colour and profile specified.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 DELIVERY, HANDLING AND STORAGE

.1 Store components and materials in accordance with panel manufacturer’s recommendations and protect from elements.

.2 Protect prefinished steel during fabrication, transportation, site storage and erection, in accordance with CSSBI Standards.

1.5 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

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

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.4 Manufacturer of wall system, and installer shall demonstrate at least five years experience in projects similar in scope.

1.6 DESIGN REQUIREMENTS:

.1 Design wall system to resist

.1 Wind loads, positive and negative, expected in this geographical region NBCC climatic data, 50 year probability.

.2 Deflection of the wall system is not to exceed $1/180^{th}$ of the span for the wind load based on serviceability limit states.

.3 Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, overstressing of components, failure of connections, and

other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.

.1 Temperature Change (Range): 80 degrees C.

.4 Design expansion joints to accommodate movement in cladding and between cladding and structure to prevent permanent distortion or damage to the cladding.

.5 Design wall system to maintain the following erection tolerances:

.1 Maximum variation from plane or location shown on shop drawings: 20 mm/10 m (3/4 inch/30 feet).

.2 Maximum offset from true alignment between two adjacent members abutting end to end in line: 1 mm (0.04 inches).

1.7 WARRANTY

.1 Provide a manufacturer's written warranty: Furnish panel manufacturer's written warranty covering failure of factory-applied exterior finish within the warranty period. Warranty period for finish: 40 years after the date of Substantial Completion. The values below are based on normal environments and exclude any aggressive atmospheric conditions.

.1 {WeatherX™ (Siliconized Polyester - SMP) will not crack, chip, or peel (lose adhesion) for forty (40) years from date of installation (40.5 yrs from application). This does not include minute fracturing that may occur during the normal fabrication process. WeatherX™ (Siliconized Polyester - SMP) will not chalk in excess of a number six (6) rating, in accordance with ASTM D-4214-98 method D659 at any time for thirty (30) years from date of installation (30.5 yrs from application); will not change colour more than eight (8.0) Hunter ΔE units as determined by ASTM method D-2244-02.}

1.8 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.6 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 STEEL CLADDING AND COMPONENTS

.1 Recycled Content: To contain ≥ 26% recycled material by LEED definition. (Post consumer plus ½ post-industrial content.)

.2 Regional Materials: To meet LEED Regional Materials requirements.

.3 Metal Wall System:

.1 Steel Cladding: Profile: 7/8” (22mm) Corrugated Sheet by Vicwest or approved equivalent in accordance with B6 Substitutes.

.2 Fabricated from Z275 galvanized sheet steel conforming to ASTM A653M Grade 230 having a nominal core thickness of 22 gauge.

.3 Fasteners: Screws: ANSI B18.6.4. Purpose made cadmium plated steel with exposed fasteners colour matched to cladding.

.4 Panel Finishes: Cladding coating: Prepainted with WeatherX™ system.

.5 Colour: Prefinished cladding colour to be selected from the manufacturer’s standard colour range.

.4 Canopy Soffit: to CGSB 93.4:

.1 Fabricated from Z275 galvanized sheet steel conforming to ASTM A653M Grade 230 having a nominal core thickness of 20 gauge.

.2 Fasteners: Screws: ANSI B18.6.4. Purpose made cadmium plated steel with exposed fasteners colour matched to cladding.

.3 Panel Finishes: Cladding coating: Prepainted with WeatherX™ system.

.4 Colour: Silver metallic or as determined by Contract Administrator.

.5 Profile: flat sheet 'V' crimped for stiffness, preformed with small perforations.

.1 AD 300R perforated by Vicwest or approved equivalent in accordance with B6 Substitutes.

.5 Accessories:

.1 Flashing: In accordance with Section 07 62 00.

.2 Exposed trim: inside corners, outside corners, cap strip, drip cap, undersill trim, starter strip and window/door trim of same material, colour and gloss as cladding, with fastener holes pre-punched.

.3 J-channels and Z-girts: 18 ga. Galvanized.

.4 Non-exposed accessories: galvanized.

.5 Custom fabricated to suit architectural details, as required. Use preformed corner pieces only. Double back exposed edges.

.6 Closures: Metal closures to suit profiles selected, to manufacturer's recommendations.

.6 Caulking:

.1 Sealants: 07 92 00 – Joint Sealants.

.1 Low VOC. See 01 35 21 – LEED Requirements.

.2 Plastic cement: to CAN/CGSB 37.5.

.1 Low VOC. See 01 35 21 – LEED Requirements.

.7 **FABRICATION**

.1 Fabricate roof components to comply with dimensions, profiles, gauges and details as shown on the shop drawings, including fascia and soffit panels and all companion flashing.

.2 Fabricate all components of the system in the factory, ready for field installation.

.3 Provide metal liner and cladding and all accessories in longest practicable length to minimize field lapping of joints.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 EXAMINATION

.1 Examine work of other Sections upon which work of this Section depends.

.2 Report all discrepancies to consultant before beginning work on the roof system.

3.3 INSTALLATION

.1 Install cladding in accordance with CGSB 93.5, and manufacturer's written instructions

.2 Install continuous starter strips, inside and outside corners, edgings, soffit, drip, cap, sill and window/door opening flashings as indicated.

.3 Install outside corners, fillers and closure strips with carefully formed and profiled work.

.4 Maintain joints in exterior cladding, true to line, tight fitting, hairline joints.

.5 Attach components in manner not restricting thermal movement.

.6 Caulk junctions with adjoining work with sealant. Do work in accordance with Section 07 92 00 - Joint Sealing.

3.4 CLEANING

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

.2 Clean exposed panel surfaces in accordance with manufacturer's instructions.

.3 Repair and touch up with colour matching high grade enamel minor surface damage, only where permitted by the Architect and only where appearance after touch-up is acceptable to Architect.

.4 Replace damaged panels and components that, in opinion of the Architect, cannot be satisfactorily repaired.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 ASTM International Inc.

.1 ASTM C726-05, Standard Specification for Mineral Fiber Roof Insulation Board.

.2 ASTM C728-05, Standard Specification for Perlite Thermal Insulation Board.

.3 ASTM C1177/C1177M-06, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.

.4 ASTM C1396/C1396M-06a, Standard Specification for Gypsum Board.

.5 ASTM D41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.

.6 ASTM D312-00(2006), Standard Specification for Asphalt Used in Roofing.

.7 ASTM D448-03a, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.

.8 ASTM D2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.

.9 ASTM D6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.

.10 ASTM D6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.

.11 ASTM D6164-05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.12 ASTM D6222-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcement.

.13 ASTM D6223-02e1, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcement.

.14 ASTM D6509-00, Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcement.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.

.2 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.3 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

.3 Canada Green Building Council (CaGBC)

.1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.

.2 Rating System Addenda for New Construction and Major Renovations LEED Canada-NC Version 1.0-Addendum 2007.

.3 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

.4 Canadian Roofing Contractors Association (CRCA)

.1 CRCA Roofing Specifications Manual-1997.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.21-04, Standard Test Method for the Dynamic Wind Uplift Resistance of Mechanically Attached Membrane-Roofing Systems

.2 CSA-A123.3-05, Asphalt Saturated Organic Roofing Felt.

.3 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.

.4 CSA A231.1-06, Precast Concrete Paving Slabs.

.5 CSA O121-08, Douglas Fir Plywood.

.6 CSA O151-04, Canadian Softwood Plywood.

.6 Factory Mutual (FM Global)

.1 FM Approvals - Roofing Products.

.7 Health Canada / Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.8 Underwriters Laboratories' of Canada (ULC)

.1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

.2 CAN/ULC-S702.2-03, Standard for Mineral Fibre Thermal Insulation for Buildings.

.3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

.4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.2 ADMINISTRATIVE REQUIREMENTS

.1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative and Contract Administrator.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Provide two copies of most recent technical roofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Provide two copies of WHMIS MSDS in accordance with Section 01 35 43 - Environmental Procedures, and indicate VOC content for:

.1 Primers.

.2 Asphalt.

.3 Sealers.

.4 Filter fabric.

.3 Provide shop drawings:

.1 Indicate flashing, control joints, tapered insulation details.

.2 Provide layout for tapered insulation.

.4 Manufacturer's Certificate: certify that products meet or exceed specified requirements.

.5 Test and Evaluation Reports: submit laboratory test reports certifying compliance of bitumen membrane with specification requirements.

.6 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.

.7 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.

.8 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.

.9 Sustainable Design Submittals:

.1 LEED Submittals: in accordance with Section 01 35 21 - LEED Requirements.

1.4 QUALITY ASSURANCE

.1 Installer qualifications: company or person specializing in application of modified bituminous roofing systems with 5 years documented experience and approved by manufacturer.

1.5 FIRE PROTECTION

.1 Fire Extinguishers:

.1 Maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle.

.2 ULC labelled for A, B and C class protection.

.2 Maintain fire watch for 1 hour after each day's roofing operations cease.

1.6 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions andSection 01 61 00 - Common Product Requirements.

.2 Storage and Handling Requirements:

.1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

.2 Provide and maintain dry, off-ground weatherproof storage.

.3 Store rolls of felt and membrane in upright position. Store membrane rolls with salvage edge up.

.4 Remove only in quantities required for same day use.

.5 Place plywood runways over completed Work to enable movement of material and other traffic.

.6 Store sealants at +5 degrees C minimum.

.7 Store insulation protected from daylight and weather and deleterious materials.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, paddling, and wood packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Collect and separate plastic, paper packaging and corrugated cardboard in accordance with Waste Management Plan.

.2 Fold up metal banding, flatten and place in designated area for recycling.

1.7 FIELD CONDITIONS

.1 Ambient Conditions

.1 Do not install roofing when temperature remains below -18 degrees C for torch application, or -5 degrees C for mop application.

.2 Minimum temperature for solvent-based adhesive is -5 degrees C.

.2 Install roofing on dry deck, free of snow and ice, use only dry materials and apply only during weather that will not introduce moisture into roofing system.

1.8 WARRANTY

.1 For Work of this Section 07 52 00 - Modified Bituminous Membrane Roofing , 12 months warranty period is extended to 120 months – no charge.

1.9 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.5 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 GENERAL

.1 Roofing system is to meet LEED Regional materials requirements.

.2 Roofing adhesives, sealants, primers, coatings to meet LEED Low Emitting Materials requirements.

2.2 PERFORMANCE CRITERIA

.1 Compatibility between components of roofing system is essential. Provide written declaration to Contract Administrator stating that materials and components, as assembled in system, meet this requirement.

.2 Roofing System: to CSA A123.21 for wind uplift resistance.

2.3 DECK COVERING

.1 Acoustic Metal Deck: Deck flutes to be filled with acoustic fibreglass batts. Coordinate installation with Section 07 21 16 – Blanket Insulation and Section 05 31 00 – Steel Decking.

.2 Gypsum board sheathing: to ASTM C1396/C1396M Standard 12.7 mm thick.

.1 Section 09 21 16 – Gypsum Board Assemblies.

2.4 VAPOUR BARRIER TO GYPSUM PRIMER

.1 Polymer emulsion-based primer. Solvent based primer is not permitted.

.1 Low or no VOC compliant with LEED requirements.

.2 To be approved by roofing system manufacturer, supplier, installer as compatible with vapour retarder and gypsum board.

.2 Properties:

.1 Specific Gravity @ 20 degrees C: 1 kg/l.

.2 Solids by Weight: 55%

.3 Colour: Blue

.4 Viscosity: 500cP

.5 Drying time: 30min to 3hr.

.3 Product: Soprema Elastocol Stick H20 or approved equivalent in accordance with B6 Substitutes.

2.5 VAPOUR RETARDER

.1 Self adhesive vapour barrier membrane composed of SBS modified bitumen.

.1 Thickness: 0.8mm

.2 Under Face: Silicone release film.

.3 Top face: Tri-laminate woven polyethylene.

.4 Tensile Strength, MD/XD 11.3/15.4 kN/m to ASTM D5147.

.5 Ultimate elongation, MD/XD 52/24% to ASTM D5147.

.6 Cold bending -35*C to ASTM D5147.

.7 Static puncture: 400N to ASTM D5602.

.8 Tear resistance, MD/XD 375/400 N to ASTM D5601.

.9 Lap adhesion 2000 N/m to ASTM D 1876.

.10 Water absorption 0.1 % max to ASTM D5147.

.11 Peel resistance 1200 N/m to ASTM D903.

.12 Water vapour permeance 0.017 perm to ASTM E96 Procedure B.

.13 Air permeability $\leq$ 0.007 L/sec.m2 to ASTM E283 (75 Pa)

.2 Product: Soprema Sopravap'r or approved equivalent in accordance with B6 Substitutes.

2.6 MEMBRANE

.1 Base & Cap Sheet membrane system: Styrene-Butadiene-Styrene (SBS) elastomeric polymer.

.1 Base & Cap sheet to function as a roofing system and approved for direct application to approved poly-iso insulation.

.1 Soprema Colvent 800 or approved equivalent in accordance with B6 substitutes.

.2 Base Sheet: Self semi-adhered to manufacturer approved poly-iso insulation.

.1 Soprema Colvent 810 or approved equivalent in accordance with B6 Substitutes.

.3 Cap Sheet: Torched on with white (or near-white) granular top surface.

.1 Soprema Colvent Traffic Cap 860 or approved equivalent in accordance with B6 Substitutes.

.4 Base & Cap Sheet membrane properties: to CGSB 37-GP-56M 9th Draft.

.1 Strain energy (longitudinal/transversal) MD/XD: 8.4/8.3 kN/m.

.2 Breaking strength (longitudinal/transversal)) MD/XD: 18/16 N/5 kN/m.

.3 Ultimate elongation (longitudinal/transversal) MD/XD: 55/56%.

.4 Tear resistance: 120 N.

.5 Initial and > 90 days: Cold bending at -30 degrees C.

.6 Static puncture resistance: 380.

.7 Dimensional Stability) MD/XD: 0.1/0.4 %.

.8 Plastic Flow: 105 degrees C.

.2 Flashing as recommended by manufacturer and compatible with roofing system.

.1 Flashing base sheet: Sopralene Flam Stick, Sopraflash Flam Stick or approved equals.

2.7 ADHESIVE

.1 Low-rise two-part urethan adhesive.

.1 Highly elastomeric formulation.

.2 No solvents.

.3 No temperature restrictions.

.4 Properties:

.1 Colour: Amber

.2 Tensile Strength 1.72 MPa to ASTM D412.

.3 Density: 1.02 kg/L to ASTM D1875.

.4 Viscosity: 22,000 – 60,000 cP to ASTM D2556.

.5 Peel Strength: 3 kN/m to ASTM D903.

.6 Flexibility: Pass @ -56 degrees C to ASTM D816.

.2 Product: Soprema Duotack or approved equivalent in accordance with B6 Substitutes.

2.8 POLYISOCYANURATE INSULATION

.1 Polyisocyanurate insulation to 150mm thickness in two 75mm layers.

.1 Top layer perpendicular to base layer.

.2 Mechanically fastened.

.3 Adhesive applied above rooms with exposed roof assemblies. (No ceilings.)

.4 Sloped insulation as required for slopes.

.2 75mm Base layer: polyisocyanurate foam core inserted between two facers.

.1 Soprema Isolant Colgrip B or approved equivalent in accordance with B6 Substitutes.

.2 ASTM C1289-95 Type 2.

.3 FM Standard 4450/4470 Approval: Class 1.

.4 To CAN/ULC-S704

.5 Properties:

.1 Dimensional Stabilty: < 2% liner change to ASTM D2126

.2 Compressive Strength: 20psi to ASTM D1621

.3 Water Absorption: < 1% by volume to ASTM C209

.4 Moisture vapour Transmission: < 1 Perm to ASTM E96

.5 Product Density: Nominal 2.0 pcf to ASTM D1622

.6 Flame Spread: 25-50 to ASTM E84

.7 Service Temperature: -73 to 122 degrees C.

.3 75mm Top layer: polyisocyanurate foam core inserted between two fibreglass facers for smooth consistent surface free of loose fibres.

.1 Soprema Isolant Colgrip A or approved equivalent in accordance with B6 Substitutes.

.2 ASTM C1289-95 Type 2.

.3 FM Standard 4450/4470 Approval: Class 1.

.4 To CAN/ULC-S107

.5 Properties:

.1 Dimensional Stabilty: < 2% liner change to ASTM D2126

.2 Compressive Strength: 20psi to ASTM D1621

.3 Water Absorption: < 1% by volume to ASTM C209

.4 Moisture vapour Transmission: < 1 Perm to ASTM E96

.5 Product Density: Nominal 2.0 pcf to ASTM D1622

.6 Flame Spread: 25-50 to ASTM E84

.7 Service Temperature: -73 to 122 degrees C.

2.9 EXPANSION JOINT

.1 Soprema Soprajoint system or approved equivalent in accordance with B6 Substitutes.

.1 Waterproofing membrane combining polyester fabric with SBS mod-bit.

.1 Thickness: 4mm

.2 Top face: Silicone release sheet and aluminum foil

.3 Underface: Thermofusible plastic film.

.4 Reinforcement: 70 g/m2 polyester fabric.

.5 Breaking Strength: 5kN/m to CAN/CGSB-37.56-M

.6 Ultimate Elongation: 120% at 20ºC to CAN/CGSB-37.56-M

.7 Ultimate Elongation: 100% at -20ºC to CAN/CGSB-37.56-M

.8 Cold Bending: -30ºC to CAN/CGSB-37.56-M

.9 Elasticity limit: 40% internal.

.10 Fatigue Resistance: No rupture at 1000 cycles to CAN/CGSB-37.56-M.

.2 Install in accordance with manufacturer's instructions over mineral wool cant strip.

.3 Install at roof joints between new and existing buildings.

2.10 SEALERS

.1 Low or no VOC to meet LEED requirements.

.2 Sealants: Caulking - see Section 07 92 00 - Joint Sealants.

2.11 WALKWAYS

.1 Walkways to consist of one additional ply of cap sheet membrane. Colour to be different from field membrane as selected by Contract Administrator.

2.12 CANT STRIPS

.1 Cut from pressure-treated wood material, to measure 140 mm on slope.

2.13 FASTENERS

.1 Covering to steel deck: As recommended by manufacturer of roofing system.

.2 Insulation to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance, and as recommended by insulation manufacturer.

Part 3 Execution

3.1 QUALITY OF WORK

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual and CRCA Roofing Specification Manual, particularly for fire safety precautions.

.2 Do priming in accordance with manufacturers written recommendations.

.3 Assembly, component and material connections will be made in consideration of appropriate design loads, with reversible mechanical attachments.

3.2 EXAMINATION OF ROOF DECKS

.1 Verification of Conditions:

.1 Inspect with Contract Administrator deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed.

.2 Evaluation and Assessment:

.1 Prior to beginning of work ensure:

.1 Decks are firm, straight, smooth, dry, free of snow, ice or frost, and swept clean of dust and debris. Do not use calcium or salt for ice or snow removal.

.2 Curbs have been built.

.3 Roof drains have been installed at proper elevations relative to finished roof surface.

.4 Plywood and lumber nailer plates have been installed to deck, walls and parapets as indicated.

.3 Do not install roofing materials during rain or snowfall.

3.3 PROTECTION OF IN-PLACE CONDITIONS

.1 Cover walls, walks and adjacent work where materials hoisted or used.

.2 Use warning signs and barriers. Maintain in good order until completion of Work.

.3 Clean off drips and smears of bituminous material immediately.

.4 Dispose of rain water off roof and away from face of building until roof drains or hoppers installed and connected.

.5 Protect roof from traffic and damage. Comply with precautions deemed necessary by Contract Administrator.

.6 At end of each day's work or when stoppage occurs due to inclement weather, provide protection for completed Work and materials out of storage.

.7 Metal connectors and decking will be treated with rust proofing or galvanization.

3.4 PREPARATION OF STEEL DECK (CHANNEL TYPE)

.1 Install sound absorbing insulation in flutes of acoustical steel roof deck in accordance with deck manufacturer's instructions and Section 05 31 00 - Steel Decking, 07 21 16 – Blanket Insulation.

.2 Steel decking will be treated with rust proofing or galvanization.

3.5 DECK SHEATHING

.1 Mechanically fasten to steel deck Gypsum Board Sheathing with reversible mechanical attachments to steel deck's upper rib surfaces, spaced 400 mm on centre each way.

.2 Place with long axis of each sheet transverse to steel deck ribs, with end joints staggered and fully supported on ribs.

3.6 PRIMING GYPSUM

.1 Substrate must be clean, dry and free of dust, grease or other contaminants.

.2 Apply primer to gypsum board roofing substrate at the rate and in manner recommended by manufacturer.

3.7 VAPOUR RETARDER (STEEL DECK)

.1 Adhere vapour retarder using solvent free adhesive as per manufacturer's instructions.

3.8 (EXPOSED) CONVENTIONAL MEMBRANE ROOFING (CMR) APPLICATION

.1 Insulation: fully adhered, adhesive application: (Exposed roof assemblies – no ceiling.)

- .1 Adhere insulation to steel deck using specified adhesive.
- .2 Place boards in parallel rows with ends staggered, and in firm contact with one another.
- .3 Cut end pieces to suit.
- .4 Apply adhesive in accordance to manufacturer’s instructions.

.2 Insulation: mechanically fastened application: (Concealed roof assemblies – with ceiling.)

- .1 Mechanically fasten insulation as per manufacturer's written recommendations.
- .2 Number and pattern of screws per board to meet Factory Mutual requirements.
- .3 Place boards in parallel rows with ends staggered, and in firm contact with one another.
- .4 Cut end boards to suit.

.3 Tapered insulation application:

- .1 Install tapered insulation as first insulation layer, in accordance with shop drawings. Stagger joints between layers 150 mm minimum.

.4 Base sheet application:

- .1 Install in accordance with roofing manufacturer’s instructions.
- .2 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
- .3 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m^2, at 230 degrees C.
- .4 Unroll and torch base sheet onto substrate taking care not to burn membrane or its reinforcement or substrate.
- .5 Lap sheets 75 mm minimum for side and 150 mm minimum for end laps.
- .6 Application to be free of blisters, wrinkles and fishmouths.

.5 Cap sheet application:

- .1 Install in accordance with roofing manufacturer’s instructions.
- .2 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
- .3 Unroll and embed cap sheet in uniform coating of asphalt applied at rate of 1.2 kg/m^2, EVT at point of contact.
- .4 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
- .5 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm minimum from those in base sheet.
- .6 Application to be free of blisters, fishmouths and wrinkles.

.7 Do membrane application in accordance with manufacturer's recommendations.

.6 Flashings:

.1 Install in accordance with roofing manufacturer's instructions.

.2 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.

.3 Lap flashing base sheet to membrane base sheet minimum 150 mm and seal by mopping or torch welding.

.4 Lap flashing cap sheet to membrane cap sheet 250 mm minimum and torch weld.

.5 Provide 75 mm minimum side lap and seal.

.6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.

.7 Do work in accordance with manufacturer's recommendations and Section 07 62 00 - Sheet Metal Flashing and Trim.

.7 Roof penetrations:

.1 Install roof drain pans, vent stack covers, solatubes and other roof penetration flashings and seal to membrane in accordance with manufacturer's recommendations and details.

3.9 WALKWAYS

.1 Install walkway membrane in accordance with manufacturer's instructions and as indicated.

.1 Apply primer to cap sheet membrane and torch apply, ensuring selvage edge is removed.

3.10 FIELD QUALITY CONTROL

.1 Inspections:

.1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Contract Administrator.

.2 The City will pay for tests as specified in Section 01 45 00 - Quality Control.

.3 Inspection and testing of roofing application will be carried out by testing laboratory designated by Contract Administrator.

3.11 CLEANING

.1 Remove bituminous markings from finished surfaces.

.2 In areas where finished surfaces are soiled caused by work of this section, consult manufacturer of surfaces for cleaning advice and complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

.4 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal 01 35 21 - LEED Requirements.

.1 Place materials defined as hazardous or toxic in designated containers.

.2 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.3 Ensure emptied containers are sealed and stored safely.

.4 Unused adhesive, sealant and asphalt materials must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

.5 Dispose of unused adhesive material at official hazardous material collections site approved by Contract Administrator.

.6 Dispose of unused sealant material at official hazardous material collections site approved by Contract Administrator.

.7 Dispose of unused asphalt material at official hazardous material collections site approved by Contract Administrator .

.8 Divert unused gypsum materials from landfill to recycling facility as reviewed by Contract Administrator.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 The Aluminum Association Inc. (AAI)

- .1 AAI-Aluminum Sheet Metal Work in Building Construction-2002.
- .2 AAI DAF45-03, Designation System for Aluminum Finishes.

.2 American Society for Testing and Materials International (ASTM)

- .1 ASTM A167-99(2004), Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A240/A240M-07e1, Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .3 ASTM A606-04, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.
- .4 ASTM A653/A653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .5 ASTM A792/A792M-06a, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .6 ASTM B32-04, Standard Specification for Solder Metal.
- .7 ASTM B370-03, Standard Specification for Copper Sheet and Strip for Building Construction.
- .8 ASTM D523-89(1999), Standard Test Method for Specular Gloss.
- .9 ASTM D822-01(2006), Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canada Green Building Council (CaGBC)

- .1 LEED Canada-NC Version 1.0-2004, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations.
- .2 LEED Canada-CI Version 1.0-2007, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Guide For Commercial Interiors.

.4 Canadian Roofing Contractors Association (CRCA)

- .1 Roofing Specifications Manual 1997.

.5 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-51.32-M77, Sheathing, Membrane, Breather Type.
- .2 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.6 Canadian Standards Association (CSA International)

.1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.

.2 AAMA/WDMA/CSA 101/I.S.2/A440-2008, Standard/Specification for Windows, Doors, and Unit Skylights.

.3 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

.7 Green Seal Environmental Standards

.1 Standard GS-03-93, Anti-Corrosive Paints.

.2 Standard GS-11-97, Architectural Paints.

.3 Standard GS-36-00, Commercial Adhesives.

.8 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.9 South Coast Air Quality Management District (SCAQMD), California State

.1 SCAQMD Rule #1113-04, Architectural Coatings.

.2 SCAQMD Rule #1168-05, Adhesives and Sealants.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature for sheet metal flashing systems materials, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 35 43 - Environmental Procedures.

.3 Shop Drawings:

.1 Shop drawings: submit drawings stamped and signed by professional engineer registered or licensed in the Province of Manitoba, Canada.

.4 Samples:

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, finishes and colours.

.5 LEED Submittals: in accordance with LEED Canada-NC and Section 01 35 21 - LEED Requirements.

.6 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section, with contractor's representative and Contract Administrator:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Regional Materials: Supply building materials that are regionally extracted, harvested, or recovered within 800km of the project location when shipped by truck, or within 2400km of the project location when shipped by rail, in accordance with LEED Materials and Resources Credit MR 5.1 & 5.2 – Regional Materials.

.6 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 SHEET METAL MATERIALS

.1 Recycled Content: To contain ≥ 26% recycled material by LEED definition. (Post consumer plus ½ post-industrial content.)

.2 Regional Materials: To meet LEED Regional Materials requirements.

.3 Zinc coated steel sheet: 22 gauge minimum, commercial quality to ASTM A653/A653M, with Z275 designation zinc coating.

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel with factory applied 10,000 series polyvinylidene fluoride finish. Use in all exposed locations.

.1 Class F1S.

.2 Colour selected by Contract Administrator from manufacturer's standard range.

.3 Specular gloss: 30 units +/- in accordance with ASTM D523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for chalk rating of 8, colour fade 5 units or less and erosion rate less than 20 % to ASTM D822 as follows:

.1 Outdoor exposure period 2500 hours.

.2 Humidity resistance exposure period 5000 hours.

2.3 ACCESSORIES

.1 Isolation coating: alkali resistant bituminous paint.

.2 Plastic cement: to CAN/CGSB 37.5.

.1 Low VOC. See 01 35 21 – LEED Requirements.

.3 Sealants: 07 92 00 – Joint Sealants.

.1 Low VOC. See 01 35 21 – LEED Requirements.

.4 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.5 Fasteners: of same material as sheet metal, to CSA B111, ring thread flat head roofing nails of length and thickness suitable for metal flashing application.

.6 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

.7 Touch-up paint: as recommended by prefinished material manufacturer.

.1 Low VOC. See 01 35 21 – LEED Requirements.

2.4 FABRICATION

.1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Form pieces in 2400 mm maximum lengths.

.1 Make allowance for expansion at joints.

.3 Hem exposed edges on underside 12 mm.

.1 Mitre and seal corners with sealant.

.4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

2.5 METAL FLASHINGS

.1 Form flashings, copings and fascias to profiles indicated of 22 gauge prefinished steel.

2.6 OVERFLOW SCUPPERS

.1 Form scuppers from 22 gauge galvanized and prefinished steel.

.2 Sizes and profiles as indicated.

.3 Provide necessary fastenings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details, FL, AAI-Aluminum Sheet Metal Work in Building Construction.

.2 Use concealed fastenings except where approved before installation.

.3 Provide underlay under sheet metal.

.1 Secure in place and lap joints 100 mm.

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs.

.1 Flash joints using S-lock forming tight fit over hook strips.

.5 Lock end joints and caulk with sealant.

3.3 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Leave work areas clean, free from grease, finger marks and stains.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Requirements for installation of roof hatches and their components.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM A506-00, Specification for Alloy and Structural Alloy Steel, Sheet and Strip, Hot-Rolled and Cold-Rolled.

.2 ASTM B370-98, Specification for Copper Sheet and Strip for Building Construction.

.3 ASTM A653/A653M-03, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM D2369-03, Test Method for Volatile Content of Coatings.

.5 ASTM D2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.6 ASTM D5116-97, Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.

.2 Canadian General Standards Board (CGSB).

.1 CAN/CGSB-1.105-M91, Quick-Drying Primer.

.3 Canadian Standards Association (CSA International).

.1 CSA B111-1974(R2005), Wire Nails, Spikes and Staples.

.4 Environmental Choice Program (ECP).

.1 CCD-045-92, Sealants and Caulking Compounds.

.2 CCD-047a-98, Surface Coatings.

.3 CCD-048-95, Recycled Water-borne Surface Coatings.

1.3 SUBMITTALS

.1 Product data: Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.

.1 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for caulking materials during application and curing.

.2 Shop Drawings:

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate size and description of components, materials, attachment devices, description of frame and finish, and construction details.

.3 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

.1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

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

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.5 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for hardware complete with pertinent details, spare parts lists and warnings against harmful maintenance materials and practices for incorporation into manual specified in 01 78 00 - Closeout Submittals.

1.6 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2 Products

2.1 MATERIALS

.1 Roof hatch: Bilco enhanced performance model in E-50T size or approved equivalent in accordance with B6 Substitutes.

.1 Size: width: 914mm x length: 914mm. Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled by the manufacturer.

.2 Performance characteristics:

.1 Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m2) with a maximum deflection of 1/150th of the span or 20 psf wind uplift.

.2 Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.

.3 Operation of the cover shall not be affected by temperature.

.4 Entire hatch shall be weathertight with fully welded corner joints on cover and curb.

.3 Cover: Shall be 2.3mm aluminum with a 102mm beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

.4 Cover insulation: Shall be polyisocyanurate of 50mm thickness with an R-value of 12. Insulation shall be fully covered and protected by an aluminum liner.

.2 E. Curb: Shall be 305mm in height and of 2.3mm aluminum. The curb shall be formed with a 114mm flange with 11mm holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 153mm on center, to be bent inward to hold roofing membrane securely in place.

.3 Curb insulation: Shall be polyisocyanurate of 50mm thickness with an R-value of 12.

.4 Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe that is bolted to the curb assembly.

.5 Hardware:

.1 Heavy pintle hinges shall be provided.

.2 Cover shall be equipped with a spring latch with interior and exterior turn handles.

.3 Roof hatch shall be equipped with interior and exterior padlock hasps.

.4 The latch strike shall be a stamped component bolted to the curb assembly.

.5 Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 25.4mm diameter red vinyl grip handle to permit easy release for closing.

.6 Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed. Springs shall have an electrocoated acrylic finish for corrosion resistance.

.7 Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

.6 Finishes: Factory finish shall be mill finish aluminum.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

3.2 INSTALLATION

.1 Erect components plumb, level and in proper alignment.

.2 Ensure continuity of building envelope air barrier and vapour retarder systems.

.3 Adjust and seal assembly with provision for expansion and contraction of components.

.4 Coat aluminum and copper in contact with dissimilar materials, with isolation coating.

.5 Secure and seal frame to curb.

3.3 CLEANING

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

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Shop fabricated roof mounted anchors for support of landscape trees.

.2 Shop fabricated roof mounted personal safety restraints.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).

.1 ASTM A167-99, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

.2 ASTM A500-03, Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

.2 Canadian Standards Association (CSA International).

.1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.2 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.

.3 CSA-W47.1-92(R2001), Certification of Companies for Fusion Welding of Steel Structures.

.4 CSA-W55.3-65(R1998), Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.

.3 Master Painters Institute (MPI).

.1 Architectural Painting Specification Manual.

.4 The Society for Protective Coatings (SSPC).

.1 SP -2, Hand-Tool Cleaning.

1.3 SUBMITTALS

.1 Submit control submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

1.4 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

.2 Indicate component profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

.3 Indicate welded connections using standard welding symbols include net weld lengths.

1.5 QUALITY ASSURANCE

.1 Submit design data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit Test Reports and substantiating engineering data and test results of previous tests which purport to meet performance criteria, and other supportive data.

.3 Design structural support framing components and site inspect the installation under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the Province of Manitoba.

.4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

.5 Co-ordinate the Work with installation of roofing assembly work.

.6 Fall arrest roof anchors manufacturer to have minimum 5 years documented experience in the design and fabrication of fall protection systems.

.7 Comply with all requirements of: NBC (National Building Code of Canada.

1.6 WELDERS' QUALIFICATIONS

.1 Welders Certificates: furnish welders' qualifications to Contract Administrator.

.2 Welding qualifications to be in accordance with CSA B51.

.3 Employ qualified and licensed welders possessing certificates for each procedure to be performed from authority having jurisdiction.

.4 Each welder to possess identification symbol issued by authority having jurisdiction.

.5 Certification of companies for fusion welding of steel structures to be in accordance with CSA-W47.1.

.6 Manufacturer Qualifications: company specializing in manufacturing Products specified in this section with minimum three years experience.

1.7 SITE CONDITIONS

.1 Verify dimensions, tolerances, and method of attachment with other work.

1.8 SYSTEM DESCRIPTION

.1 Design anchors to resist without fracture a pull-out force of 5400 lbs (24.03 kN), applied in the most adverse direction.

.2 Design safety anchor fall protection system to provide for safe execution of window washing or other suspended maintenance operations including travel restraint.

1.9 WARRANTY

.1 Warrant products installed under this section of work to be free of leaks, condensation and defects in materials and/or manufacture for a period of 20 years when installed in accordance with the manufacturer's written instructions.

1.10 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Recycled Content: Supply building materials with recycled materials (post consumer plus ½ post-industrial content) in accordance with LEED Materials and Resources Credits MR 4.1 & 4.2 – Recycled Content.

.5 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

.2 LEED Indoor Environmental Quality Credit EQ 4.2 – Low-Emitting Materials: Paints and Coatings.

.1 Architectural paints, coatings and primers applied to interior walls and ceilings to Green Seal Standard GS-11, latest edition.

.2 Anti-corrosive and anti-rust paints applied to interior ferrous metal substrates to Green Seal Standard GS-03, latest edition.

.3 Clear wood finishes, floor coatings, stains and shellacs applied to interior elements to SCAQMD Rule 1113, latest edition.

Part 2

2.1 MANUFACTURER

.1 Provide products as manufactured by Thaler Metal Industries, 1-800-387-7217 (Mississauga, Ontario, Canada) or 1-800-576-1200 (New Braunfels, TX) or provide equal products by another manufacturer approved in advance by the Architect, based upon:

.1 20 year warranty against leaks, condensation and defects in materials and/or manufacture, as applicable;

.2 Ultimate load (structural rating) for up to 5400 lbs (24.03 kN) strength for anchors equipped with forged round eye;

.3 Structural integrity backed by $7,000,000.00 liability insurance;

.4 Injection molded urethane insulation to CGSB-51-GP 46MP and ASTM C1029-90, as applicable;

.5 Air barrier flashing design using EPDM seals only complying with CSA B272-93 flashing standard;

.6 Maintenance free design;

.7 Materials and sizes options, and thicknesses;

.8 Treated flashing deck flange, as applicable;

.9 Written installation instructions.

2.2 MANUFACTURED UNITS

.1 "Fixed Eye" Fall Arrest Roof anchors.

.2 Bolt Around OWSJ style, Non-Standard Height. Thaler FARA-6NS or approved equivalent in accordance with B6 Substitutes.

.1 Galvanized forged 1018 steel eye roof anchor to CSA Z91-02 114mm outside diameter and 82mm inside diameter.

.2 Forged eye welded to urethane insulated hollow hot dipped galvanized ASTM 500C steel post (HSS) 6mm wall thickness x 114mm dia. x 400mm high.

.1 Confirm to depth of roof insulation and sloped insulation. Ensure anchor eye is minimum 229 mm above roof surface.

.3 Round HSS post welded to 19mm x 203mm x 203 mm 44W base plate;

.4 Base plate bolted to 19mm x 203mm x 203mm under-joist plate around crosstube assembly.

.1 Crosstube assembly to be 6 mm x 102 mm x 102 mm HSS. Span three joists and anchor to end joists with additional anchor plates to manufacturer's requirements.

.2 Coordinate crosstube assembly to Section 05 50 00 – Metal Fabrications.

.5 Four 19 mm Type 304 s.s. bolts with lock washers and nuts;

.6 SJ-37(9), 178 mm high New-Standard STACK JACK flashing of 1.6 mm mill finish 1100-0T alloy aluminum to CSA B272-93.

.7 EPDM Triple Pressure Grommet Seal and EPDM Base Seal and bituminous painted deck flange.

.8 Supplier and Contractor to confirm system compatibility with roof assembly.

2.3 MATERIALS

.1 Steel Sections and Plates: CSA G40.20M/G40.21.

.2 Steel Tubing: ASTM A500, Grade B.

.3 Steel Rings: forged steel, ring thickness determined by imposed loads.

.4 Bolts, Nuts, and Washers for Stainless Steel: stainless steel, matte finish.

.5 Gaskets Under Anchors: neoprene pads, compatible with roof membrane, cut to size.

.6 Welding Materials: CSA-W47.1 for materials being welded.

.7 Shop Primer: Epoxy, anti-corrosive type, two coats.

2.4 FABRICATION

.1 Fit and shop assemble items in largest practical sections, for delivery to site.

.2 Fabricate items with joints tightly fitted and secured.

.3 Continuously seal joined members by intermittent welds and plastic filler.

.4 Grind exposed joints flush and smooth with adjacent finish surface.

.1 Make exposed joints butt tight, flush, and hairline.

.2 Ease exposed edges to small uniform radius.

.5 Exposed Mechanical Fastenings: screws or bolts; consistent with design of component.

.6 Furnish and install components required for anchorage of fabrications.

.7 Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.5 FABRICATION TOLERANCES

.1 Squareness: 3 mm maximum difference in diagonal measurements.

.2 Maximum Deviation From Plane: 1.5 mm from 1 m.

2.6 FINISHES

.1 Concealed steel anchors, clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

.2 Concealed Structural Components and Anchors: galvanize after fabrication to CAN/CSA-G164 to minimum 600 g/sq m galvanized coating.

.3 Shop coat primer: to CAN/CGSB-1.40.

.1 Shop primers shall be coordinated with 09 91 23 – Painting.

.2 Surface preparation, cleaning and priming to be in accordance with 09 91 23 – Painting and shall be low VOC to meet LEED requirements.

.4 Do not prime surfaces in direct contact with concrete or where field welding is required.

Part 3 Execution

3.1 EXAMINATION

.1 Verify dimensions, tolerances, and method of attachment with other work.

.2 Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions. Verify site dimensions. Commencement of work will imply acceptance of prepared work.

.3 Confirm anchor eye height is designed for minimum 229mm clearance above project roof surface and design and manufacture accordingly.

3.2 PREPARATION

.1 For re-roofing or retrofit work, remove existing roof assembly as necessary to allow for installation of roof anchors.

.2 In the event of structural deficiencies, deck corrosion or deterioration, ensure that a structural engineer has assessed and approved all surfaces upon which the work of this Section depends. Institute repairs and/or reinforcement where necessary.

.3 If necessary, protect building interior and contents against ingression of water, dust, debris or other material.

3.3 INSTALLATION

.1 Install anchors or equipment in accordance with manufacturer's printed instructions, shop drawings and as specified.

.2 Ensure anchors or equipment is installed under the direct supervision of a Professional Engineer.

.3 Where necessary, provide protection against deterioration due to contact of dissimilar materials.

.4 Where bolting is used for fastening anchors, no fewer than two threads is to be exposed and the nut is to be positively locked by deforming threads, welding, pinning or equivalent method.

.5 Ensure work is inspected prior to application of roofing.

.6 Flashing

.1 Install roof support flashing in accordance with manufacturer's printed instructions.

.2 Torch membrane until bitumen is fluid and set flashing deck flange into fluid. Flash in flange with two overlapping layers of ModBit and seal with asphalt sealer. Do not overheat (melt) EPDM Base Seal.

.7 Install items plumb and level, accurately fitted, free from distortion or defects.

.8 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

.9 Field weld components as indicated on shop drawings. Perform field welding.

.10 Obtain approval from Contract Administrator prior to site cutting or making adjustments not scheduled.

.11 After erection, apply touch-up primer in accordance with MPI Painting Manual to: welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

3.4 ADJUSTING AND FINAL INSPECTION

.1 Verify that all manufactured units have been installed in accordance with specifications and details, and will function as intended. Adjust any items where necessary to ensure proper operation.

.2 Provide Engineer's Certificate of Acceptance certifying system is acceptable for service.

3.5 CLEANING

.1 Clean manufactured units using materials and methods approved by manufacturer. Do not use cleaners or techniques which could impair performance of the roofing system.

3.6 PROTECTION OF FINISHED WORK

.1 Protect finished Work from damage.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.2 Underwriter's Laboratories of Canada (ULC)

.1 ULC-S115-1995, Fire Tests of Fire stop Systems.

1.2 DEFINITIONS

.1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.

.2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.

.3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.

.4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of noncombustible construction or have "0" annular space in buildings of combustible construction.

.1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Shop Drawings:

.1 Submit shop drawings to show location, proposed material, reinforcement, anchorage, fastenings and method of installation.

.2 Construction details should accurately reflect actual job conditions.

.4 Quality assurance submittals: submit following in accordance with Section 01 45 00 - Quality Control.

.1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

.1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

.2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.3 Manufacturer's Instructions: submit manufacturer's installation instructions and special handling criteria, installation sequence and cleaning procedures.

.4 Manufacturer's Field Reports: submit to manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.4 QUALITY ASSURANCE

.1 Qualifications:

.1 Installer: company specializing in fire stopping installations with 5 years documented experience and approved by manufacturer.

.2 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning work of this Section with contractor's representative and Contract Administrator.

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

.3 Provide shop drawings of proposed ULC listed firestopping systems for approval by Contract Administrator.

.4 Site Meetings: as part of Manufacturer's Services described in PART 3 - FIELD QUALITY CONTROL, schedule site visits, to review Work, at stages listed.

.1 After delivery and storage of products, and when preparatory Work is complete, but before installation begins.

.2 Once during progress of Work at 50% complete.

.3 Upon completion of Work, after cleaning is carried out.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

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

.2 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.

.2 Storage and Protection:

.1 Store materials indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

1.6 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

Part 2 Products

2.1 MATERIALS

.1 Firestopping to meet the requirements of Indoor Environmental Quality Credit EQ - 4 Low - Emitting Materials.

.1 VOC content to be $\leq$ 250 g/l.

.2 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.

.1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended and conforming to specified special requirements described in PART 3.

.3 Service penetration assemblies: systems tested to CAN-ULC-S115.

.4 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.

.5 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.

.6 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.

.7 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.

.8 Primers: to manufacturer's recommendation for specific material, substrate, and end use.

.9 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.

.10 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.

.11 Sealants for vertical joints: non-sagging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 PREPARATION

.1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials. Ensure that substrates and surfaces are clean, dry and frost free.

.2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

.1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.

.2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

.3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.

.4 Tool or trowel exposed surfaces to neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.4 SEQUENCES OF OPERATION

.1 Proceed with installation only when submittals have been reviewed byContract Administrator.

.2 Install floor fire stopping before interior partition erections.

.3 Metal deck bonding: fire stopping to precede spray applied fireproofing to ensure required bonding.

.4 Mechanical pipe insulation: certified fire stop system component.

.1 Ensure pipe insulation installation precedes fire stopping.

3.5 FIELD QUALITY CONTROL

.1 Inspections: notify Contract Administrator when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

.2 Manufacturer's Field Services:

.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

.2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 - Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

.3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.7 FIRESTOPPING SYSTEMS

.1 Select firestopping manufacturer ULC listed system for each firestopping condition.

.2 Manufacturer is to provide ‘Engineering Judgments’ for firestopping conditions that are not in conformance with a ULC listed firestopping system.

3.8 SCHEDULE

.1 1hr Firestop and smoke seal at:

.1 Penetrations through fire-resistance rated concrete block and gypsum board partitions. Coordinate with wall types. Includes but not limited to:

.1 Mechanical Duct Shaft.

.2 Janitor room M19.

.3 Interior walls of Stairs S01 and S02.

.4 Electrical / Mechanical room B04.

.5 Storage room B17.

.2 Top of fire-resistance rated masonry and gypsum board partitions.

.3 Intersection of fire-resistance rated masonry and gypsum board partitions.

.4 Control and sway joints in fire-resistance rated masonry and gypsum board partitions and walls.

.5 Penetrations through floor assembly above basement.

.6 Around mechanical and electrical assemblies penetrating fire separations.

.7 Rigid ducts through rated assemblies: greater than 129 cm^2 : fire stopping to consist of bead of fire stopping material between retaining angle and fire separation and between retaining angle and duct, on each side of fire separation.

.1 Use non-intumescent firestopping around ducts unless specifically permitted by ULC firestopping system.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

.1 Materials, preparation and application for caulking and sealants.

.2 Text to complete other various Sections containing sealant or caulking specifications, including Section 07 52 00 - Modified Bituminous Membrane Roofing.

1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM)

.1 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).

.2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).

.4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.

.5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act, 1999 (CEPA).

.4 General Services Administration (GSA) - Federal Specifications (FS)

.1 FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.

.5 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

.6 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act, 1992 (TDGA).

1.3 SUBMITTALS

.1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.

.2 Manufacturer's product to describe.

.1 Caulking compound.

.2 Primers.

.3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.

.3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.4 Submit duplicate samples of each type of material and colour.

.5 Cured samples of exposed sealants for each color where required to match adjacent material.

.6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.

.1 Instructions to include installation instructions for each product used.

1.4 QUALITY ASSURANCE/MOCK-UP

.1 Construct mock-up in accordance with Section 01 45 00 - Quality Control.

.2 Construct mock-up to show location, size, shape and depth of joint s complete with back-up material, primer, caulking and sealant.

.3 Mock-up will be used:

.1 To judge workmanship, substrate preparation, operation of equipment and material application.

.4 Locate where directed.

.5 Allow 24 hours for inspection of mock-up by Department Representative before proceeding with sealant work.

.6 When accepted, mock-up will demonstrate minimum standard of quality required for this Work. Approved mock-up may remain as part of finished Work.

1.5 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

1.6 PROJECT CONDITIONS

.1 Environmental Limitations:

.1 Do not proceed with installation of joint sealants under following conditions:

.1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 degrees C.

.2 When joint substrates are wet.

.2 Joint-Width Conditions:

.1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

.3 Joint-Substrate Conditions:

.1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 ENVIRONMENTAL REQUIREMENTS

.1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.

.2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

.3 Ventilate area of work as directed by Contract Administrator by use of approved portable supply and exhaust fans.

1.8 LEED REQUIREMENTS

.1 See Section 01 35 21 - LEED Requirements.

.2 LEED Submittals: Submit LEED supporting documentation in accordance with Section 01 35 21 - LEED Requirements.

.3 Waste Management and Disposal: Dispose of packaging and waste materials in appropriate on-site bins for recycling and disposal in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.4 Indoor Environmental Quality Credit EQ 4 – Low - Emitting Materials.

.1 LEED Indoor Environmental Quality Credit EQ 4.1 – Low-Emitting Materials: Adhesives and Sealants.

.1 Low VOC complying with SCAQMD Rule #1168, Latest edition.

Part 2 Products

2.1 GENERAL

.1 Indoor Environmental Quality Credit EQ4-1 Low-Emitting Materials: Adhesives and Sealants. Interior applications requiring adhesives, sealants and sealant primers must comply with the following content limits for VOC of the State of California's South Coast Air Quality Management District (SCAQMD) Rule 1168, latest edition.

.1 Wood Glues: 30 g/L.

.2 Structural Wood Member Adhesive: 140 g/L.

.3 Metal to Metal Adhesives: 30 g/L.

.4 Adhesives for Porous Materials (Except Wood): 50 g/L.

.5 Subfloor Adhesives: 50 g/L.

.6 Plastic Foam Adhesives: 50 g/L.

.7 Carpet Adhesives: 50 g/L.

.8 Carpet Pad Adhesives: 50 g/L.

.9 VCT and Asphalt Tile Adhesives: 50 g/L.

.10 Cove Base Adhesives: 50 g/L.

.11 Gypsum Board and Panel Adhesives: 50 g/L.

.12 Rubber Floor Adhesives: 60 g/L.

.13 Ceramic Tile Adhesives: 65 g/L.

.14 Multipurpose Construction Adhesives: 70 g/L.

.15 Fiberglass Adhesives: 80 g/L.

.16 Structural Glazing Adhesives: 100 g/L.

.17 Wood Flooring Adhesive: 100 g/L.

.18 Contact Adhesive: 80 g/L.

.19 Special Purpose Contact Adhesive: 250 g/L.

.20 Plastic Cement Welding Compounds: 250 g/L.

.21 ABS Welding Compounds: 325 g/L.

.22 CPVC Welding Compounds: 490 g/L.

.23 PVC Welding Compounds: 510 g/L.

.24 Adhesive Primer for Plastic: 550 g/L.

.25 Sealants: 250 g/L.

.26 Sealant Primers for Nonporous Substrates: 250 g/L.

.27 Sealant Primers for Porous Substrates: 775 g/L.

.28 Modified Bituminous Sealant Primers: 500 g/L.

.29 Single Ply Roof Membrane Adhesives: 250 g/L.

.30 Single Ply Roof Membrane Sealants: 450 g/L.

2.2 SEALANT MATERIALS

.1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant, in air handling units.

.2 Where sealants are qualified with primers use only those primers.

2.3 SEALANT MATERIAL DESIGNATIONS

.1 Polysulfide Two Part: Self-Leveling to CAN/CGSB-19.24, Type 1, Class B.

.2 Polysulfide Two Part: Non-Sag to CAN/CGSB-19.24, Type 2, Class B.

.3 Polysulfide One Part: Self-Leveling to CAN/CGSB-19.13, MC-1-40-B-N MC-1-25-B-N.

.4 Polysulfide One Part: Non-Sag to CAN/CGSB-19.13, MC-2-40-B-NMC-2-25-B-N.

.5 Urethanes Two Part: Self-Leveling to CAN/CGSB-19.24, Type 1.

.6 Urethanes Two Part: Non-Sag to CAN/CGSB-19.24, Type 2.

.7 Urethanes One Part: Self-Leveling to CAN/CGSB-19.13, Type 1.

.8 Urethanes One Part: Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25, MCG-2-40.

.9 Silicones One Part: To CAN/CGSB-19.13. Mildew resistant.

.10 Acrylics One Part: To CGSB 19-GP-5M.

.11 Acrylic Latex One Part: To CAN/CGSB-19.17.

.12 Acoustical Sealant: To ASTM C919.

.13 Butyl: To CGSB 19-GP-14M.

.14 Preformed Compressible and Non-Compressible back-up materials.

.1 Polyethylene, Urethane, Neoprene or Vinyl Foam.

.1 Extruded closed cell foam backer rod.

.2 Size: oversize 30-50 %.

.2 Neoprene or Butyl Rubber.

.1 Round solid rod, Shore A hardness 70.

.3 High Density Foam.

.1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m^3 density, or neoprene foam backer, size as recommended by manufacturer.

.4 Bond Breaker Tape.

.1 Polyethylene bond breaker tape which will not bond to sealant.

2.4 SEALANT SELECTION

.1 General purpose exterior use: Urethanes One Part. Non-Sag to CAN/CGSB-19.13, Type 2, colour to match and as approved by Contract Administrator.

.1 VOC ≤ 100 g/l.

.2 Perimeters of exterior openings where frames meet exterior finish materials.

.3 Expansion and control joints in exterior concrete, masonry, and other materials.

.4 Joints between building components, including concrete, metals, and other materials.

.2 Exterior joints in horizontal wearing surfaces: Urethanes One Part: Self-Leveling to CAN/CGSB-19.13, Type 1, colour to match and as approved by Contract Administrator.

.1 VOC ≤ 100 g/l.

.3 General purpose interior use: Acrylic Latex One Part: To CAN/CGSB-19.17, colour to match and as approved by Contract Administrator.

.1 VOC ≤ 20 g/l.

.2 Perimeters of interior door, window and other frames.

.3 Joints in walls and ceilings.

.4 STC rated walls or acoustic applications to ASTM C919.

.4 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: Silicones One Part: To CAN/CGSB-19.13. Mildew resistant.

.1 VOC ≤ 50 g/l.

2.5 JOINT CLEANER

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 Low VOC Primer: as recommended by manufacturer.

Part 3 Execution

3.1 PROTECTION

.1 Protect installed Work of other trades from staining or contamination.

3.2 SURFACE PREPARATION

.1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.

.2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.

.3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.

.4 Ensure joint surfaces are dry and frost free.

.5 Prepare surfaces in accordance with manufacturer's directions.

3.3 PRIMING

.1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.

.2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.4 BACKUP MATERIAL

.1 Apply bond breaker tape where required to manufacturer's instructions.

.2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

3.5 MIXING

.1 Mix materials in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

.1 Sealant.

- .1 Apply sealant in accordance with manufacturer's written instructions.
- .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
- .3 Apply sealant in continuous beads.
- .4 Apply sealant using gun with proper size nozzle.
- .5 Use sufficient pressure to fill voids and joints solid.
- .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
- .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
- .8 Remove excess compound promptly as work progresses and upon completion.

.2 Curing.

- .1 Cure sealants in accordance with sealant manufacturer's instructions.
- .2 Do not cover up sealants until proper curing has taken place.

.3 Cleanup.

- .1 Clean adjacent surfaces immediately and leave Work neat and clean.
- .2 Remove excess and droppings, using recommended cleaners as work progresses.
- .3 Remove masking tape after initial set of sealant.

END OF SECTION