## Part 1 General

### 1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB 37.2, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
- .2 CAN/CGSB 37.3, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
- .3 CAN/CGSB 37.5, Cutback Asphalt Plastic Cement.
- .4 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
- .5 CGSB 37-GP-11M, Application of Cutback Asphalt Plastic Cement.
- .6 CAN/CGSB 37.16, Filled, Cutback, Asphalt for Damproofing and Waterproofing.
- .7 CGSB 37-GP-36M, Application for Filled Cutback Asphalts for Damproofing and Waterproofing.

.2 Health Canada

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

### 1.2 PRODUCT DATA

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

.2 Submit WHMIS MSDS - Material Safety Data Sheets.

.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.

### 1.3 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 Remove only in quantities required for same day use.

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

**1.4 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: Provide continuous ventilation during and curing periods for enclosed applications.

**1.5 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC’s.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

**Part 2 Products**

**2.1 MATERIALS**

.1 For application and curing at temperatures above 5 degrees C: waterproof emulsion, mineral colloid emulsifier type to CAN/CGSB 37.2.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.2 For applications and curing at temperatures above 0 degrees C but below 5 degrees C: solvent type waterproofing and dampproofing compound of selected asphalts and fibers to CAN/CGSB 37.16.

.1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.

.3 Primer for applications at temperatures above 0 degrees C but below 5 degrees C: asphalt/solvent cutback to CAN/CGSB 37.9.

.4 Sealing compound: Plastic cutback asphalt cement to CAN/CGSB-37.5. C.

**2.2 PRODUCTS:**

.1 SEALTIGHT 520 SEALMASTIC waterproofing emulsion by WR Meadows or approved equal in accordance with B7.

**Part 3 Execution**

**3.1 PREPARATION**

.1 Before applying dampproofing:

.1 Seal exterior joints between foundation grade beams, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

**3.2 APPLICATION**

.1 Do dampproofing in accordance with CAN/CGSB 37.3, CGSB 37-GP-36M and manufacturer's instructions 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 Apply primer in accordance with manufacturer's written instructions.

.5 Apply damproofing in accordance with manufacturer's written instructions.

.1 Minimum coverage dampproofing coat: 1.5 $m^2$/L.

**3.3 SCHEDULE**

.1 Apply continuous, uniform coating to entire exterior faces of foundation grade beams from 50 mm below finished grade level.

.2 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.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

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

- .1 ASTM D1709 - 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.
- .2 ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- .3 ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.
- .4 ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- .5 ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
- .6 ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

.2 Canadian General Standards Board (CGSB)

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

.3 Underwriters Laboratories Canada (ULC)

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

### 1.2 SUBMITTALS

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

.2 Product Data: 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).

### 1.3 QUALITY ASSURANCE

.1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.

.2 Obtain vapor retarder materials from a single manufacturer regularly engaged in manufacturing the product.

.3 Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

**1.4 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 Allow two (2) working days for inspection of mock-up by Contract Administrator before proceeding with vapour barrier Work.

.4 When accepted, mock-up will demonstrate minimum standard of quality required for this Work.

**1.5 QUALIFICATIONS**

.1 Applicator: Company specializing in performing Work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

**Part 2 Products**

**2.1 SHEET VAPOUR BARRIER**

.1 Vapour retarder membrane for interior use:

.1 Polyethylene film: to CAN/CGSB-51.34, minimum 0.15mm (6 mil) thick with a water vapour permeance of not greater than 45 ng/(P·s·m$^2$), flame spread rating of less than 150 to CAN/ULC S102.

.2 Vapour retarder membrane for under-slab applications:

.1 Vapour retarder membrane manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:

.1 Maximum Water Vapour Permeance (ASTM E154 Sections 7, 8, 11, 12,13, by ASTM E96, Method B or ASTM F1249).

.1 As received: 0.0183 perms.

.2 After Wetting and Drying: 0.0210 perms.

.3 Resistance to Plastic Flow and Temperature: 0.0197 perms.

.4 Effect Low Temperature and Flexibility: 0.0212 perms.

.5 Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0198 perms.

.2 Puncture Resistance (ASTM D1709): 4,394 grams.

.3 Tensile Strength ASTM E154, Section 9: 52 Lb. Force/Inch.

.4 Acceptable Manufacturer and Product: PERMINATOR 10 mil by W. R. MEADOWS.

**2.2 ACCESSORIES**

.1 Joint sealing tape for interior use: 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 Seam Tape for under-slab use: high density polyethylene tape with pressure sensitive adhesive. Minimum width 100 mm.

.3 Sealant for interior use: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 - Joint Sealants.

.4 Staples: minimum 6 mm leg.

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

.6 Pipe Collars: construct pipe collars from appropriate vapour retarder material and pressure sensitive tape according to manufacturer's instructions.

**Part 3 Execution**

**3.1 EXAMINATION**

.1 The Air Barrier Contractor shall examine substrates, areas, and conditions under which the Air Barrier Assembly will be installed for compliance with requirements.

.2 Verify that surfaces and conditions are suitable prior to commencing Work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.

.3 Verify substrate is visibly dry.

.4 Ensure that the following conditions are met:

.1 Surfaces are sound, dry, even, and free of excess mortar or other contaminants

.2 Inspect substrates to be smooth without large voids or sharp protrusions. Inform Contractor if substrates are not acceptable and need to be repaired by the concrete sub-trade.

**3.2 INSTALLATION**

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

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

.3 Install sheet vapour retarder on granular base (floors only).

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

.5 Inspect for continuity. Repair punctures and tears with sealing tape before Work is concealed.

**3.3 EXTERIOR SURFACE OPENINGS**

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

**3.4 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.

**3.5 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.

**3.6 ELECTRICAL BOXES**

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

.1 Install moulded box vapour barrier or wrap boxes with film sheet providing minimum 300 mm perimeter lap flange.
.2 Apply sealant to seal edges of flange to main vapour barrier and seal wiring penetrations through box cover.

**3.7 CLEANING**

.1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment in accordance with Section 01 74 00 – Cleaning and Waste Management.

**3.8 TESTING**

.1 Air leakage testing as directed by Contract Administrator and paid for by Contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Contract Administrator and test reports will be signed by tester, Site representative and Contractor.

.3 Inform Contract Administrator 48 hours prior to required testing.

.4 If the inspections reveal any defects, promptly remove and replace defective Work at no additional cost to The City or the Contract Administrator

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

.1 Canadian General Standards Board (CGSB)

.1 CGSB 37-GP-56M: Membrane, Modified, Bituminous, Prefabricated, and Reinforced.

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

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

.2 ASTM E2178: Standard Test Method for Air Permeance of Building Materials.

.3 ASTM E283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

.4 E1677 Specification for Air Retarder (AR) Material or System for Low-Rise Framed Building Walls

.5 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

.6 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

.7 ASTM E96: Water Vapour Transmission of Materials.

.3 National Building Code of Canada (NBCC)

.1 NBCC, Part 5 - Environmental Separation

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

### 1.2 SUBMITTALS

.1 Submit documentation from an approved independent testing laboratory certifying the air leakage and vapour permeance rates of the air barrier membranes, including primary membrane and transition sheets, exceed the requirements of the Massachusetts Energy Code and in accordance with ASTM E2178.

.1 Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.

.2 Submit copies of manufacturers' current ISO certification.

.3 Submit manufacturers' current product data sheets for the air barrier membrane system.

### 1.3 QUALITY ASSURANCE

.1 Submit document stating the applicator of the primary air/vapour barrier membranes specified in this section is qualified by the manufacturer as suitable for the execution of the Work.

.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 representative.

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

**1.4 QUALIFICATIONS**

.1 Applicator: Company specializing in performing Work of this section with minimum 5 years documented experience with installation of air/vapour barrier systems. Complete installation must be approved by the material manufacturer.

.2 Applicator: Company who is currently licensed by certifying organization must maintain their license throughout the duration of the project.

**1.5 PRE- INSTALLATION MEETINGS**

.1 Convene one week prior to commencing Work of this section.

**1.6 DELIVERY, STORAGE AND HANDLING**

.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. Deliver membrane materials in factory wrapped packaging indicating name of manufacturer and product.

.3 Avoid spillage. Immediately notify Contract Administrator if spillage occurs and start clean up procedures.

.4 Clean spills and leave area as it was prior to spill.

.5 Store roll materials on end in original packaging.

.6 Store primers at temperatures of 5˚C and above to facilitate handling. Keep solvent away from open flame and excessive heat.

**1.7 PROJECT ENVIRONMENTAL REQUIREMENTS**

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without 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 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

**1.9 WARRANTY**

.1 Provide a written warranty for Work of this section from Manufacturer for failure due to defective materials and from Contractor for failure due to defective installation workmanship for ten (10) years respectively.

.2 Include coverage of installed sealant and sheet materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion or do not cure.

## Part 2 Products

**2.1 SELF ADHERED MEMBRANES**

.1 Basis of Design: Primary sheet air/vapour barrier membrane shall be Blueskin® SA LT manufactured by Henry; an SBS modified bitumen, self-adhering sheet membrane complete with a blue engineered thermoplastic film. Membrane shall have the following physical properties:

.1 ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies,

.2 Air leakage: <0.0001 CFM/ft² @1.6 lbs/ft² to ASTM E2178 and ASTM E283 and have no increased air leakage when subjected to a sustained wind load of 10.5 lbs/ft² for 1 hour and gust wind load pressure of 62.8 lbs/ft² for 10 seconds when tested at 1.6 lbs/ft² to ASTM E331,

.3 Vapoor permeance: 0.03 perms to ASTM E96 (Desiccant Method),

.4 Membrane Thickness: 0.0394 inches (40 mils),

.5 Low temperature flexibility: -22 degrees F to CGSB 37-GP-56M,

.6 Elongation: 200% to ASTM D412-modifed,

.7 Meets CAN/CGSB-51-33 Type I Water Vapour Permeance requirements

.2 Alternate self-adhering membrane for all window and window sill flashings, door openings, inside and outside corners and other transitions shall be HE200 AM Metal Clad manufactured by Henry; a SBS modified bitumen, self-adhering sheet membrane complete with surface layer of metallic aluminum film that many sealants adhere well to. Membrane shall have the following physical properties:

.1 Peel Adhesion to Primed Steel 15.0 to ASTM D 1000

.2 Vapour Permeance: < 0.014 perms to ASTM E 96

.3 Membrane Thickness: 0.0443 inches (45 mils)

.4 Low temperature flexibility: -15 degrees F to ASTM D146 min

.5 Elongation: 40% to ASTM D412-modifed min

.3 Primer for self-adhering membranes at temperatures above 25 degrees F shall be Aquatac™ Primer manufactured by Henry; a polymer emulsion based adhesive, quick setting. Primer shall have the following physical properties:

.1 Color: Aqua,

.2 Weight: 8.7 lbs/gal,

.3 Solids by weight: 53%,

.4 Water based, no solvent odors,

.5 Drying time (initial set): 30 minutes at 50% RH and 70 degrees F

.4 Adhesive for self-adhering membranes at all temperatures shall be Blueskin® Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 Weight: 6 lbs/gal,

.3 Solids by weight: 35%,

.4 Drying time (initial set): 30 minutes

.5 Adhesive with low VOC content for self-adhering membranes at all temperatures shall be Blueskin® LVC Adhesive manufactured by Henry, a synthetic rubber based adhesive, quick setting, having the following physical properties:

.1 Color: Blue,

.2 VOC: <240 g/L,

.3 Solids by weight: 40%,

.4 Drying time (initial set): 30 minutes

.6 Termination Sealant shall be HE925 BES Sealant manufactured by Henry; a 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 Complies with Fed. Spec. TT-S-00230C, Type II, Class A,

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

.4 Elongation: 450 – 550%,

.5 Remains flexible with aging,

.6 Seals construction joints up to 1 inch wide

.7 Insulation adhesive shall be Air-Bloc 21 Insulation Adhesive manufactured by Henry; a synthetic, trowel applied, rubber based adhesive, having the following physical properties:

.1 Compatibility: With air barrier membrane, substrate and insulation,

.2 Air leakage: 0.0026 CFM/ft$^2$ @ 2.1 lbs/ft$^2$ to ASTM E283,

.3 Water vapour permeance: 0.03 perms to ASTM E96,

.4 Long term flexibility: CGSB 71-GP-24M

**2.2 SPUNBONDED SHEET BARRIERS**

.1 Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® CommercialWrap® (or approved equal in accordance with B7) and related assembly components.

.1 Performance Characteristics:

.1 Air Penetration: 0.001 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2357

.2 Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.

.3 Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.

.4 Basis Weight: 2.7 oz/yd2, when tested in accordance with TAPPI Test Method T-410.

.5 Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.

.6 Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.

.7 Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.

.8 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.

.2 Accessories

.1 Seam Tape: 3 inch wide, DuPont™ Tyvek® Tape (or approved equal in accordance with B7) for commercial applications.

.3 Fasteners:

.1 Steel Frame Construction: DuPont™ Tyvek® Wrap Cap Screws , as distributed by DuPont (or approved equal in accordance with B7): 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer

.2 Wood Frame Construction: Tyvek® Wrap Caps, as distributed by DuPont (or approved equal in accordance with B7): #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.

.3 Masonry Construction: Masonry tap-con fasteners with Tyvek® Wrap Caps as distributed by DuPont (or approved equal in accordance with B7): 2-inch diameter plastic cap fasteners.

.4 Sealants:

.1 Provide sealants in accordance with Section 07 92 00 - Joint Sealants and as per manufacturers recommendations.

.5 Adhesives:

.1 Provide adhesive as recommended by manufacturer.

.6 Primers:

.1 Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.

.7 Flashing:

.1 DuPont™ FlexWrap™, as distributed by DuPont (or approved equal in accordance with B7): flexible membrane flashing materials for window openings and penetrations.

.2 DuPont™ StraightFlash™, as distributed by DuPont (or approved equal in accordance with B7): straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.

.3 DuPont™ StraightFlash™ VF, as distributed by DuPont (or approved equal in accordance with B7): dual-sided straight flashing membrane materials for brick mold and non-flanged windows and doors.

.4 DuPont™ Thru-Wall Surface Adhered Membrane with Integrated Drip Edge (or approved equal in accordance with B7): Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.

.5 Preformed Inside and Outside Corners and End Dams as distributed by DuPont (or approved equal in accordance with B7): Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.

**2.3 SUBSTITUTIONS**

.1 Refer to Section B7 – Substitutes of Bid Opportunity 630-2016.

## Part 3 Execution

**3.1 EXAMINATION**

.1 Ensure all surfaces are clean, dry, sound, smooth, continuous and comply with air barrier manufacturer's requirements.

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

.3 Where curing compounds are used they must be clear resin based without oil, wax or pigments.

.4 Do not proceed with application of air barrier membrane when rain is expected within 24 hours.

.5 Condition materials to room temperature prior to application to facilitate handling.

**3.2 PREPARATION**

.1 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.

.2 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.

.3 Ensure all preparatory Work is complete prior to applying primary air/vapour barrier membrane.

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

.5 Apply primer at rate recommended by manufacturer to all areas to receive self-adhering sheet air/vapour barrier membrane and or through-wall flashing membrane as indicated on drawings by roller or spray and allow minimum 30 minute open time. Primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-primed.

**3.3 INSTALLATION – SELF ADHERED MEMBRANES**

.1 Inside and outside corners

.1 Seal inside and outside corners of sheathing boards with a strip of self-adhering air/vapour barrier membrane extending a minimum of 3 inches on either side of the corner detail.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

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

.3 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-adhering air/vapour barrier membrane.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

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

.3 Ensure minimum 2 inch overlap at all end and side laps of membrane.

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

.3 Windows and rough openings

1. Wrap rough openings with self-adhered air/vapour barrier membrane as detailed.

.1 Prime surfaces as per manufacturers' instructions and allow to dry.

.2 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.

.3 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 masonry veneer walls and over shelf angles as detailed.

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

.2 Applications shall form a continuous flashing membrane and shall extend up a minimum of 8 inches up the back-up wall.

.3 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.

.4 Install through-wall flashing membrane and extend 1/2 inch from outside edge of veneer. Provide end dam flashing as detailed.

.5 Primary air barrier

1. Apply self-adhering air/vapour barrier membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
   - .1 Prime surfaces as per manufacturers' instructions and allow to dry.
   - .2 Align and position self-adhering air/vapour barrier membrane, remove protective film and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps of membrane.
   - .3 Roll all laps and membrane with a counter top roller to ensure seal.
   - .4 At the end of each day's 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.

**3.4 INSTALLATION - SPUNBONDED SHEET BARRIERS**

.1 Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.

.2 Install weather barrier prior to installation of windows and doors.

.3 Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.

.4 Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.

.5 Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.

.6 Window and Door Openings: Extend weather barrier completely over openings.

.7 Overlap weather barrier

- .1 Exterior corners: minimum 12 inches.
- .2 Seams: minimum 6 inches.

.8 Weather Barrier Attachment:

- .1 Steel or Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommended fasteners, space 12 -18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
- .2 Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommended fasteners, spaced 12-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project Site.

.9 Apply 4 inch by 7 inch piece of DuPont™ StraightFlash™ or weather barrier manufacturer approved alternate to weather barrier membrane prior to the installation cladding anchors.

.10 Seaming:

.1 Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.

.2 Seal any tears or cuts as recommended by weather barrier manufacturer.

.11 Opening Preparation (for use with non-flanged windows – all cladding types)

.1 Flush cut weather barrier at edge of sheathing around full perimeter of opening.

.2 Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.

.12 Flashing (for use with non-flanged windows – all cladding types)

.1 Cut [7-inch] [9-inch] wide DuPont™ FlexWrap™ or DuPont™ FlexWrap™ NF a minimum of 12 inches longer than width of sill rough opening. Apply primer as required by manufacturer.

.2 Cover horizontal sill by aligning DuPont™ FlexWrap™ edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by Working in along the sill before adhering up the jambs.

.3 Fan DuPont™ FlexWrap™ at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges. Mechanical fastening is not required for DuPont™ FlexWrap™ NF.

.4 Apply 9-inch wide strips of DuPont™ StraightFlash™ at jambs. Align flashing with interior edge of jamb framing. Start DuPont™ StraightFlash™ at head of opening and lap sill flashing down to the sill.

.5 Spray-apply primer to top 6 inches of jambs and exposed sheathing.

.6 Install DuPont™ FlexWrap™ DuPont™ FlexWrap™ NF at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.

.7 Coordinate flashing with window installation.

.8 On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C 1193.

.9 Position weather barrier head flap across head flashing. Adhere using 4-inch wide DuPont™ StraightFlash™ over the 45-degree seams.

.10 Tape top of window in accordance with manufacturer recommendations.

.11 On interior, install backer rod in joint between frame of window and flashed rough framing. Apply sealant around entire window to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

.13 Thru-Wall Flashing Installation

.1 Apply primer per manufacturer's written instructions.

.2 Install preformed corners and end dams bedded in sealant in appropriate locations along wall.

.3 Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.

.4 Extend membrane through wall and leave ¼ inch minimum exposed to form drip edge.

.5 Roll flashing into place. Ensure continuous and direct contact with substrate.

.6 Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant.

.7 Thru-wall flashing / weather barrier interface at base of wall:

.1 Overlap thru-wall flashing with weather barrier by 6-inches.

.2 Mechanically fasten bottom of weather barrier through top of thru-wall flashing.

.3 Seal vertical and horizontal seams with tape or sealing membrane.

.8 Thru-wall flashing / weather barrier interface at shelf angle:

.1 Seal weather barrier to bottom of shelf angle with sealing membrane.

.2 Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.

.3 Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

.9 Thru-wall flashing / weather barrier interface at window head:

.1 Cut flap in weather barrier at window head.

.2 Prime exposed sheathing.

.3 Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.

.4 Install end dams bedded in sealant.

.5 Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.

.6 Apply sealant along thru-wall flashing edges.

.7 Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.

.8 Tape diagonal cuts of weather barrier.

.9 Secure weather barrier flap with fasteners.

**3.5 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.

.6 Air/vapour barrier membrane is not designed for permanent exposure. Good practice calls for covering as soon as possible.

**3.6 INSPECTION**

.1 Carefully inspect for continuity of air barrier prior to placement of insulation.

.2 Repair all deficient membrane areas.

.3 Misaligned or inadequately lapped seams, punctures or other damage must be repaired with a patch of air barrier membrane extending 50mm in all directions from edge of damaged areas.

.4 Cover membrane immediately after Contract Administrator’s inspection to protect from damage by other trades.

**3.7 TESTING**

.1 Air leakage testing as directed by Contract Administrator and paid for by Contractor will be performed by professional testing agency for the locations selected at random for penetrations, laps, corners, etc.

.2 Testing will be witnessed by Contract Administrator and test reports will be signed by tester, Site representative and Contractor.

.3 Inform Contract Administrator 48 hours prior to required testing.

.4 If the inspections reveal any defects, promptly remove and replace defective Work at no additional cost to The City or the Contract Administrator

**END OF SECTION**

## Part 1 General

### 1.1 SECTION INCLUDES

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

### 1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 00 – Cleaning and Waste Management.

.3 Section 07 92 00 - Joint Sealing.

### 1.3 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 D2369-10, Test Method for Volatile Content of Coatings.

.2 ASTM D2832-92(2016), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.

.3 ASTM D5116-10, 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 S-136 for the design of Cold Formed Steel Structural Members

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

.5 Canadian Sheet Steel Building Institute

.1 Standard 20M

.6 Environmental Choice Program (ECP).

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

.7 Underwriters' Laboratories of Canada (ULC).

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

**1.4 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, fascia, metal furring, and related Work.

.3 Samples:

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

.2 Submit duplicate 150 x 150 mm samples of siding material, of colour and profile specified.

.4 Manufacturer's Instructions:

.1 Submit manufacturer's installation instructions.

**1.5 QUALITY ASSURANCE**

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

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

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

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

**1.6 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate waste materials for recycling and dispose of waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Divert used metal cut-offs from landfill by disposal into the on-site metals recycling bin.

.3 Divert reusable materials for reuse at nearest used building materials facility.

.4 Divert unused caulking, sealants, and adhesive materials from landfill through disposal at hazardous material depot.

**Part 2 Products**

**2.1 STEEL CLADDING AND COMPONENTS**

.1 Corrugated siding: to ASTM A653 SQ, Grade 33 (latest revision) with designation Z275 for prepainted, Galvanized Material.

.1 Finish coating: Polyvinylidene Flouride – PVDF Fluoropolymer Anti-graffiti Coating.

.2 Colours:

.1 Colour 1: VicWest # 56076 “White White”,

.2 Colour 2: VicWest # 56069 “Bone White”.

.3 Gloss (ASTM D523): 25% - 35%.

.4 Thickness: 22 GA base metal thickness.

.5 Profile: 68mm corrugation pattern, 22 mm deep, to VicWest ‘Corrugated Sheet – 7/8”; Exposed Fastener’.

.2 Fascia facings and exposed trim: to CGSB 93.4, Class plain:

.1 Finish coating: Polyvinylidene Flouride – PVDF Fluoropolymer Anti-graffiti Coating.

.2 Colour: to match VicWest # 56076 “White White”.

.3 Gloss (ASTM D523): 25% - 35%.

.4 Thickness: 24 GA base metal thickness.

.5 Profile: manufacturer's standard trims as indicated.

## 2.2 POLYCARBONATE CLADDING

.1 1.5mm thick, corrugated profile to match VicWest ‘Corrugated Cladding – 22 mm [7/8”]; Exposed Fastener’.

.2 Colour: ‘Soft White’

.3 85% Light transmittance, 100% Diffusion, 100% UV protection from UV-A and UV-B radiation.

.4 Weather Resistance: Hail and wind resistant in temperatures from -40°c to +100°c.

.5 Warranty: 10 year commercial warranty against loss of light transmittance and breakage due to excessive loss of impact strength against hail.

.6 Acceptable Product: ‘Sunsky’ by Palram Americas (or approved equal according to B7).

## 2.3 ACCESSORIES

.1 Flashing: In accordance with Section 07 62 00. Material to match cladding in exposed locations, galvanized material in concealed locations. Custom fabricated to suit architectural details where standard profile shapes are not suited. Use preformed corner pieces only. Double back exposed edges.

.2 Closures: Metal closures to suit profiles selected, to manufacturer’s recommendations.

## 2.4 FASTENERS

.1 Fasteners: Galvanized with exposed fasteners colour matched to cladding.

## 2.5 CAULKING

.1 Sealants:

.1 Concealed: Tape or compound, non-skinning, non-drying, butyl rubber.

.2 Exposed: Either use Acrylic co-polymer to CGSB 19GP-5M or One part silicone to CGSB CAN2-19.13 for all exposed caulking for this system. Either sealant material is acceptable, but must not be mixed or alternated between the two.

**2.6 SHEATHING MEMBRANE**

.1 Exterior wall sheathing membrane: to CAN2-51.32, spunbonded polyolefin type, non-woven, non-perforated, weather barrier.

.1 Acceptable Material: Dupont™ Tyvek® Commercial Wrap® (or approved equal according to article B7)

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

.2 Install one layer exterior wall sheathing membrane horizontally as per manufacturer’s instructions, lapping edges at least 150 mm.

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

.4 Install outside corners, fillers and closure strips with carefully formed and profiled Work.

.5 Install fascia cladding as indicated.

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

.7 Attach components in manner not restricting thermal movement.

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

**3.3 CLEANING**

.1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers in accordance with Section 01 74 00 – Cleaning and Waste Management.

**END OF SECTION**

## Part 1 General

### 1.1 SECTION INCLUDES

.1 Materials and installation for sheet metal roofing including:

- .1 Air/vapour barrier
- .2 Roof panel and support system
- .3 Accessories including associated flashings, closures, sealants

.2 Related Work not included:

- .1 Flashings associated with other trades.

### 1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 45 00 - Quality Control.

.3 Section 01 74 00 - Waste Management and Cleaning.

.4 Section 07 62 00 – Sheet Metal Flashing and Trim.

.5 Section 07 92 00 - Joint Sealing.

### 1.3 REFERENCES

.1 Aluminum Association (AA).

- .1 AA DAF-45-[R03], Designation System for Aluminum Finishes - 9th Edition.
- .2 AA ASM-35-[October 2000], Specifications for Aluminum Sheet Metal Work in Building Construction, Section 5.

.2 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 A240/A240M-[02a], Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
- .3 ASTM A653/A653M-[02a], Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .4 ASTM A792/A792M-[02], Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot Dip Process.
- .5 ASTM B32-[00e1], Standard Specification for Solder Metal.
- .6 ASTM B370-[98], Standard Specification for Copper Sheet and Strip for Building Construction.
- .7 ASTM D523-[89(1999)], Standard Test Method for Specular Gloss.
- .8 ASTM D822-[01], Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGSB).

- .1 CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.

.2 CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.

.3 CAN/CGSB-51.32- [M77], Sheathing, Membrane, Breather Type.

.4 CAN/CGSB-93.1-[M85], Sheet Aluminum Alloy, Prefinished, Residential.

.4 Canadian Sheet Steel Building Institute (CSSBI):

.1 Standards 10M, 20M and B11

.5 Canadian Standards Association (CSA International).

.1 CAN/CSA A123.3-[98], Asphalt Saturated Organic Roofing Felt.

.2 CAN/CSA S136 for the design of Cold Formed Steel Structural Members

.6 Department of Justice Canada (Jus).

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

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

.1 Material Safety Data Sheets (MSDS).

.8 National Research Council Canada (NRC)/Institute for Research in Construction (IRC) - Canadian Construction Materials Centre (CCMC).

.1 CCMC-[2002], Registry of Product Evaluations.

.9 Transport Canada (TC).

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

## 1.4 DESIGN REQUIREMENTS

.1 Design roof system to resist:

.1 Snow loads and snow build-up and rain load, expected in this geographical region NBCC climatic data, 50 year probability.

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

.3 Dead load of roof system.

.2 Deflection of the roof system is not to exceed 1/240 of the span for the specified live loading.

.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): 20 deg C, ambient; 40 deg C, material surfaces.

## 1.5 WIND REQUIREMENTS

.1 The roof panel shall be UL-90 rated in accordance with UL 580 test for wind uplift performance of roof assemblies.

.2 The roof panel shall have FM 1-90 windstorm resistance approval.

## 1.6 SUBMITTALS

.1 Submit proof of manufacturer's CCMC Listing and listing number to Contract Administrator.

.2 Submit samples of standard coloured metal roof sheet for review by the Contract Administrator prior to fabrication.

.3 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures and general maintenance for incorporation into a manual as per Section 01 78 00 – Closeout Submittals.

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

.5 Submit product data sheets for all components of the metal roofing system. Include:

.1 Product characteristics.

.2 Performance criteria.

.3 Limitations.

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

.1 Indicate arrangement of pre-finished Roof Sheet, including joints, types and locations of supports, fasteners, flashing, gutters, mitres, and all metal components related to the roof installation. Include for Structural Liner, Thermal Barrier, Membrane Air/Vapour Barrier, Insulation, as part of the roof system.

.2 Drawings shall be signed and sealed by a Professional Engineer, registered in the Province of Manitoba, attesting to the ability of the metal panels assembly to withstand the specified loads.

.7 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.

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

.9 Submit duplicate 100 x 100mm samples of each sheet metal material.

## 1.7 PRODUCT 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.

## 1.8 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 00 – Cleaning and Waste Management.

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

.3 Collect and separate for disposal paper, plastic, and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

.4 Separate for recycling and place in designated containers Metal and Plastic waste in accordance with Waste Management Plan.

.5 Place materials defined as hazardous or toxic in designated containers.

.6 Handle and dispose of hazardous materials in accordance with the CEPA, TDGA, Regional and Municipal regulations.

.7 Ensure emptied containers are sealed and stored safely.

.8 Divert unused metal materials from landfill to metal recycling facility as approved by Contract Administrator.

.9 Unused paint, caulking, and sealing compound materials must be disposed of at an official hazardous material collections site as approved by Contract Administrator.

.10 Unused paint, caulking, and sealing compound 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.

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

**1.9 QUALITY ASSURANCE**

.1 Fabricate 450 x 450 mm sample roofing panel using identical project materials and methods to include typical seam.

.2 Manufacturer of roof system and installer shall demonstrate at least five years' experience in projects similar in scope.

.3 Refer to Section B7 – Substitutes of Bid Opportunity 630-2016 regarding proposed substitutions.

**1.10 GUARANTEE**

.1 For Work in this section, warranty by installer against defects or deficiencies in materials or workmanship shall be for a period of one year from date of substantial completion.

**1.11 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 WeatherXL™ (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. WeatherXL™ (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.

.2 Manufacturer of roof system and installer shall demonstrate at least five years' experience in projects similar in scope.

**Part 2 Products**

**2.1 MATERIALS**

.1 Roof System: Tradition 100-4 on Solid Substrate by Vicwest

.1 Underlayment: Membrane shall be Ice and Water Shield by W.R.Grace or approved equal according to article B7 of the Bid Opportunity.

.2 Clip System:

.1 Thermally responsive clips to be fabricated from a minimum of 0.91mm (0.036") steel with minimum Z275 galvanized coating designed to accommodate expansion and contraction of the roof sheet.

.2 Roof fasteners: As specified by manufacturer to resist wind uplift and sliding snow forces.

.3 Prefinished Roof Sheet, exposed to exterior.

.1 Profile: Tradition 100-4, with I-style ribs at 400mm spacing.

.2 Panel: Z275 galvanized sheet steel conforming to ASTM A653M structural quality Grade 230 having a nominal core thickness 0.76mm (0.030").

.4 Snap Cap

.1 Provide 25mm high snap caps for full length of the roof panel and retained by panel clips, fabricated from Z275 galvanized sheet steel conforming to ASTM A653M structural quality Grade 230 having a minimum nominal core thickness 0.61mm (0.024"). Finish and colour to match roof sheet.

**2.2 PANEL FINISHES**

.1 Structural Deck coating – paint exposed interior surface white.

.2 Prefinished Roof Sheet coating: Prepainted with WeatherXL™ Series, one side.

.1 Colour: Prefinished Roof sheet colour to be selected from manufacturer's standard colour range.

**2.3 ACCESSORIES**

.1 Flashing: In accordance with Section 07 62 00. Formed from same materials as the roof sheet. Custom fabricated to suit architectural details, as required.

.2 Closures: Foam and metal closures to suit profiles selected, to manufacturer's recommendations.

.3 Sealants: In accordance with manufacturer's recommendations and Section 07 92 00.

**2.4 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 roof sheet and all accessories in longest practicable length to minimize field lapping of joints.

**Part 3 Execution**

**3.1 EXAMINATION**

.1 Examination Work of other Sections upon which Work of this Section depends.

.2 Report all discrepancies to Contract Administrator before beginning Work on the roof system.

**3.2 INSTALLATION**

.1 Roof Materials:

.1 Underlayment: Install underlayment fully adhered to solid substrate according to manufacturer's recommendations. Ensure all joints are properly lapped and sealed. Tie in with barriers on adjacent surfaces to ensure airtight construction. Provide a continuous seal around all openings in the metal roof system.

.2 Clip: Attach metal roofing clips using fasteners as recommended by the manufacturer, to suit the substrate.

.2 Roof Panel Insulation

.1 Install exterior prefinished roof panels on panel support clips, using manufacturer's proper construction procedure. Ensure metal roofing sheet side-lap is positively retained by clips and proper sheet coverage is maintained.

.2 Install the snap-cap at all sidelaps as shown on the approved shop drawings. Mitre snap-cap as required to resist water entry.

.3 Where indicated on approved shop drawings, secure the end-lap of metal roofing sheets in accordance with the manufacturer's specifications and details to provide a weather-tight seal. Exposed fasteners to match colour of roof sheet.

.4 Provide notched and formed closures, sealed against weather penetration, at changes in pitch and at ridges and eaves, where required.

.5 Install all companion flashing, gutters and ventilators as shown on the approved shop drawings. Use concealed fasteners when possible. Exposed fasteners to match colour of roof sheet.

**3.3 CLEAN-UP**

.1 Remove protective film from panels.

.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 Contract Administrator and only where appearance after touch up is acceptable to the Contract Administrator.

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

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

.1 The Aluminum Association Inc. (AA)

.1 Aluminum Sheet Metal Work in Building Construction-2000.

.2 AA DAF45-97, Designation System for Aluminum Finishes.

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

.1 ASTM A591/A591M-98, Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.

.2 ASTM A606-01, Standard Specification for Steel, Sheet and Strip, High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, with Improved Atmospheric Corrosion Resistance.

.3 ASTM A653/A653M-01a, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.4 ASTM A792/A792M-02, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

.5 ASTM B32-00 Standard Specification for Solder Metal.

.6 ASTM D523-89(1999), Standard Test Method for Specular Gloss.

.3 Canadian Roofing Contractors Association (CRCA)

.1 Roofing Specifications Manual 1997.

.4 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

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

.3 CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

.5 Canadian Standards Association (CSA International)

.1 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.

.2 CSA-A440-00/A440.1-00 - A440-00, Windows / Special Publication A440.1-00. User Selection Guide to CSA Standard A440-00, Windows.

.3 CSA B111-1974(R1998), Wire Nails, Spikes and Staples.

### 1.2 SAMPLES

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

.2 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish products

### 1.3 DELIVERY, STORAGE, AND HANDLING

.1 Storage and Handling Requirements:

.1 Store materials off ground and under cover in a dry, well ventilated enclosure.

.2 Stack preformed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and prepainted surfaces.

.4 Prevent contact of dissimilar metals during storage and protect from acids, flux, and other corrosive materials and elements.

**1.4 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

## Part 2 Products

**2.1 SHEET METAL MATERIALS**

.1 Aluminum-zinc alloy coated steel sheet: to ASTM A792/A792M, commercial quality, grade 33 with AZ150 coating, regular spangle surface, 0.70 mm (24 gauge) and 1.61 mm (16 gauge) base metal thicknesses. Pre-painted to CGSB –GP-71.

**2.2 PREFINISHED STEEL SHEET**

.1 Prefinished sheet with factory applied polyvinylidene fluoride.

.1 Class F1S

.2 Colours:

.1 To match metal roofing system (Section 07 61 13) and Preformed Metal Siding (07 46 13) where exposed.

.2 Where concealed, use galvanized finish

.3 Specular gloss: 30 units +/- 5 in accordance with ASTM D523.

.4 Coating thickness: not less than 22 micrometres.

.5 Resistance to accelerated weathering for caulk 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.

.3 Underlay for metal flashing: No. 15 perforated asphalt felt to CSA A123.3.

.4 Sealants: Section 07 92 00 – Joint Sealants.

.5 Cleats: of same material, and temper as sheet metal, minimum 50 mm wide. Thickness same as sheet metal being secured.

.6 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.

.7 Washers: of same material as sheet metal, 1 mm thick with rubber packings.

**2.4 FABRICATION, GENERALLY**

.1 Fabricate metal flashings and other sheet metal Work in accordance with applicable CRCA 'FL' series details as indicated.

.2 Fabricate aluminum flashings and other sheet aluminum Work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.3 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints.

.4 Hem exposed edges on underside 12 mm. Mitre and seal corners with sealant.

.5 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.

.6 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

.7 Maximum Joint Spacing:

.1 Parapet Face Flashings: 1200 mm.

.2 Cap Flashing 300 mm and Greater in Width: 1200 mm.

.3 All Other Flashings: 2400 mm.

.8 Construct flashing joints to allow for flashing movement, using flat "S" lock seams.

.9 Maintain minimum of 22 mm lap at all joints. Provide 25 mm anchor projection of "S" locks.

.10 At inside and outside corners, mitre the joint, and use upstanding seams, 25 mm minimum height and 22 mm minimum lap.

.11 Maintain minimum 1:5 slope on horizontal surfaces of flashings, parapets and control joints.

.12 Fabricate cap flashing to have a drip leg minimum 110 mm high.

.13 Fabricate cap and counter flashings to lap 100 mm over base flashings.

**2.5 FABRICATION, ROOF ACCESSORIES**

.1 Form sheet steel roof drain sleeves, air-stops etc. from 0.70 mm (24 gauge) galvanized steel.

.2 Form gum boxes from 0.70 mm (24 gauge) galvanized steel, with 75 mm minimum upstand and 100 mm one piece flanges. Solder joints. Make pans wider than member passing through roof membrane by 50 mm minimum all sides.

.3 Fabricate roof scuppers from 0.70 mm (24 gauge), prepainted galvanized sheet steel with one piece deck flange, minimum 150 mm. Contour scuppers to cant strips.

.4 Fabricate air/firestop below control joint box from 0.70 mm (24 gauge) galvanized steel.

.5 Fabricate roof drain sleeves as detailed on drawings, from 0.70 mm (24 gauge) galvanized steel.

## Part 3 Execution

### 3.1 EXAMINATION

.1 Examine surfaces to receive flashings. Notify the Contract Administrator of surfaces which are considered unacceptable to receive the Work of this Section.

.2 The commencement of flashing Work will imply unconditional acceptance of the surfaces and substrates to which the flashing is to be fastened.

.3 Verify that the following are located and installed as detailed on drawings:

.1 Plywood and lumber nailer plates to walls and parapets.

.2 Control joints.

### 3.2 PROTECTION OF EXISTING WORK

.1 Protect the Work of other Sections from damage by the Work of this Section.

.2 Place protection to the requirements and satisfaction of this Section before performing the Work of other Sections.

### 3.3 FLASHING INSTALLATION, GENERAL

.1 Install sheet metal Work in accordance with CRCA FL series details.

.2 Install flashings not later than seven days after installation of the membrane on any particular section of the roof.

.3 Use 0.80 mm thick x 150 mm long anchor clips on fascia faces, and screws or annular ringed nails on the opposite face.

.4 Use exposed fastenings in approved locations. Install anchors using annular ringed nails.

.5 Fasten flashings of 1.2 m length and shorter, through the extended "S" locks. Fasten flashings over 1.2 m length, through the extended "s" locks, and at mid-length with a 150 mm long, 0.80 mm thick galvanized steel clip.

.6 Fasten flashings at maximum 600 mm O.C.

.7 Provide underlay under sheet metal. Secure in place and lap joints 100 mm.

.8 Lock end joints and caulk with sealant.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

.1 The Aluminum Association Inc. (AA)

- .1 Aluminum Sheet Metal Work in Building Construction.
- .2 AA DAF45, Designation System for Aluminum Finishes.

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

- .1 ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM A792/A792M, Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .3 ASTM D523, Standard Test Method for Specular Gloss.
- .4 ASTM D822, Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings.

.3 Canadian General Standards Board (CGBS)

- .1 CAN/CGSB-37.5, Cutback Asphalt Plastic Cement.

.4 Canadian Standards Association (CSA International)

- .1 CSA B111, Wire Nails, Spikes and Staples.

.5 Canadian Roofing Contractors Association (CRCA)

- .1 Roofing Specifications Manual.

### 1.2 SUBMITTALS

.1 Submit duplicate 50 x 50 mm samples of each type of sheet metal material, colour and finish.

.2 Clearly indicate bending, folding, jointing, fastening installation details.

### 1.3 DELIVERY AND STORAGE

.1 Store products off ground and under cover in a dry, well ventilated enclosure.

.2 Stack pre-formed material in manner to prevent twisting, bending and rubbing.

.3 Provide protection for galvanized and pre-coated surfaces.

.4 Prevent contact of dissimilar metals during storage. Protect from acids, flux, and other corrosive materials and elements.

## Part 2 Products

### 2.1 MATERIALS

.1 Rainwater leaders, splash pans, hoppers, downspouts and scuppers: 0.64 mm thick sheet prefinished aluminum, bent to profile as indicated on drawings.

.1 Colour as selected by Contract Administrator from manufacturer's standard range.

.2 Trough Supports: continuous aluminum with a perforated aluminum cover that covers the complete trough to prevent debris from getting stuck in the trough and downpipe.

.3 Downspout: 100 mm x 150 mm profile unless otherwise noted, open face type, single piece length.

.4 Downspout straps: 0.72 mm thick aluminum.

.5 Sealant: As per Section 07 92 00 – Joint Sealing.

.6 Elbows and tees: Aluminum same as trough.

.7 Provide goosenecks, hoppers, sloped outlets, strainer baskets and necessary fastenings.

.8 Provide rain water leader to provide transition to downspout as required.

**2.2 FABRICATION**

.1 Fabricate sheet aluminum Work in accordance with Aluminum Association Aluminum Sheet Metal Work in Building Construction.

.2 Fabricate eavestrough in continuous length up to a maximum length of 12 metres.

.3 Form eavestrough to profiles as indicated on drawings.

## Part 3 Execution

**3.1 INSTALLATION**

.1 Install sheet metal Work to CRCA Specifications.

.2 Install eaves troughs and secure to building at 750 mm on centre with eaves trough spikes through spacer ferrules. Slope eaves troughs to downpipes as indicated. Seal joints watertight.

.3 Install trough supports/debris catchers to provide a continuous slope to drain all water from the trough.

.4 Cut opening in the trough to receive the downpipes.

.5 Install the trough and snap in to the supports (no exposed screws or nails permitted). Install elbows and tees as required. Provide for expansion joints to prevent warping where required.

.6 Install aluminum downpipes and provide goosenecks back to wall. Secure downpipes to wall with straps at 1,200 mm oc designed to match the pipe profile and fasten to building with aluminum or stainless steel screws, minimum 2 straps per downspout.

.7 Install splash pans at end of down pipes spilling out on roof. Seal joint between splash pan and roofing with plastic cement

.8 Install splash pads at end of down pipes spilling out to grade as indicated.

.9 When Work is completed, provide a water test to ensure there are no leaks and that all the water runs from the trough.

**3.2 CLEANING**

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

.2 Leave Work areas clean, free from grease, finger marks and stains.

**END OF SECTION**

## Part 1 General

### 1.1 REFERENCES

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

.1 ASTM C919, Standard Practice for Use of Sealants in Acoustical Applications.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.13, Sealing Compound, One-component, Elastomeric, Chemical Curing.

.3 Department of Justice Canada (Jus)

.1 Canadian Environmental Protection Act (CEPA).

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

.1 Material Safety Data Sheets (MSDS).

.5 Transport Canada (TC)

.1 Transportation of Dangerous Goods Act (TDGA).

### 1.2 SUBMITTALS

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

.1 Submit WHIMIS MSDS – Material Safety Data Sheets in accordance with Section 01 33 00 Submittal Procedures - Shop Drawings, Product Data, and Samples, with the VOC levels highlighted.

.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.

### 1.3 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.

**1.4 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.

**1.5 ENVIRONMENTAL PERFORMANCE REQUIREMENTS**

.1 Adhesives and sealants must conform to following standard:

.1 State of California's South Coast Air Quality Management District (SCAQMD) Rule #1168, June 2006.

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

.1 Architectural Sealants – 250 g/L

.2 Non-membrane Roof Sealant – 300 g/L

.3 Roadway – 250 g/L

.4 Other Sealants – 420 g/L

.5 Non-porous Architectural Sealant Primer – 250 g/L

.6 Porous Architectural Sealant Primer – 775 g/L

.7 Modified Bituminous Sealant Primer – 500 g/L

.8 Other Sealant Primer – 750 g/L

.9 Indoor Carpet and Carpet Pad Adhesives – 50 g/L

.10 Wood Flooring Adhesives – 100 g/L

.11 Rubber Floor Adhesives – 60 g/L

.12 Subfloor Adhesives – 50 g/L

.13 Ceramic Tile Adhesives – 65 g/L

.14 VCT and Asphalt Tile Adhesives – 50 g/L

.15 Gypsum Board and Panel Adhesives – 50 g/L

.16 Cove Base Adhesive – 50 g/L

.17 Multipurpose Construction Adhesives – 70 g/L

.18 Structural Glazing Adhesive – 100 g/L

.19 PVC Welding – 510 g/L

.20 CPVC Welding – 490 g/L

.21 ABS Welding – 325 g/L

.22 Plastic Cement Welding – 250 g/L

.23 Adhesive Primer for Plastic – 550 g/L

.24 Contact Adhesive – 80 g/L

.25 Special Purpose Contact Adhesive – 250 g/L
.26 Structural Wood Member Adhesive – 140 g/L
.27 Sheet Applied Rubber Lining Operations – 850 g/L
.28 Top and Trim Adhesive – 250 g/L
.29 Metal to Metal Adhesive – 30 g/L
.30 Plastic Foams Adhesive – 50 g/L
.31 Porous Material Adhesive (except wood) – 50 g/L
.32 Wood Adhesive – 30 g/L
.33 Fiberglass Adhesive – 80 g/L
.34 Duct Sealants – 250 g/L

.3 Laminate Adhesives must contain no urea-formaldehyde.

**1.6 QUALITY ASSURANCE**

.1 Perform the Work by experienced and skilled mechanics thoroughly trained and competent in the use of caulking and sealing equipment and the specified materials with at least five years experience.

.2 Arrange with the caulking and sealant manufacturers for a visit at the job Site by one of their technical representatives before beginning the caulking and sealing installation to discuss with the Contractor and the Contract Administrator the procedures to be adopted, to analyse Site conditions and inspect the surfaces and joints to be sealed, in order that type of sealant recommendations may be made for typical joint configuration.

.3 Discuss the following items and provide a written report indicating:

.1 Sealants and caulking materials selected for use from those specified;
.2 Surface preparation requirements;
.3 Priming and application procedures;
.4 Verification that sealants and caulking are suitable for purposes intended and joint design;
.5 Sealants and caulkings are compatible with other materials and products with which they come in contact including but not limited to sealants provided under other Sections, insulation adhesives, bitumens, block, concrete, metals and metal finishes.
.6 Verification that sealant and caulking are suitable for temperature and humidity conditions at time of application and will not stain adjacent surfaces;
.7 Recommended sealant for each type of joint configuration;
.8 Joint design;
.9 Anticipated frequency and extent of joint movement.
.10 Number of beads to be used in the sealing operation;
.11 Suitability of durometer hardness and other properties of material to be used.
.12 Weather conditions under which Work will be done.

**1.7 WASTE MANAGEMENT AND DISPOSAL**

.1 Separate and recycle waste materials in accordance with Section 01 74 00 – Cleaning and Waste Management.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away for public.

.4 Use chemical hardeners that are non-toxic, biodegradable and have zero or low VOC's.

.5 Dispose of surplus chemical and finishing materials in accordance with Federal, Provincial and Municipal regulations.

## Part 2 Products

### 2.1 SEALANT MATERIALS

.1 Do not use caulking that emits strong odors, contains toxic chemicals, or is not certified as mould resistant in air handling units.

.2 When low toxicity caulks are not possible, confine usage to areas which off-gas to the exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.3 Sealants and Caulking compounds must:

.1 Meet or exceed all applicable governmental and industrial safety and performance standards; and

.2 Be manufactured and transported in such a manner that all steps fo the process, including the disposal of waste products arising therefrom, will meet the requirements of all applicable governmental acts, by laws and regulations including, for facilities located in Canada, the Fisheries Act and the Canadian Environmental Protection Act (CEPA).

.4 Sealant and caulking compounds must not be formulated or manufactured with: aromatic solvents, fibrous talc or asbestos, formaldehyde, halogenated solvents, mecury, lead, cadium, hexavalent chromium, barium or their compounds, except barium sulphate.

.5 Sealant and caulking compounds must no contain a total of volatile organic compound (VOC's) in excess of 5% by height as calculated from records of the amounts of constituents used to make the product.

.6 Sealant and caulking compounds must be accompanied by detailed instructions for proper application so as to minimize health concerns and maximize performance, and information describing proper disposal methods.

.7 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.

.8 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize off-gas time.

.9 Where sealants are qualified with primers use only these primers.

.10 Sealants acceptable for use on this project must be listed on CGSB Qualified Products List issued by CGSB Qualification Board for Joint Sealants. Where sealants are qualified with primers use only these primers.

### 2.2 SEALANT MATERIAL DESIGNATIONS

.1 Urethanes One Part.

.1 Non-Sag to CAN/CGSB-19.13, Type 2.

.2 Silicones One Part.

.1 To CAN/CGSB-19.13, mildew resistant.

.3 Acoustical Sealant.

.1 To ASTM C919.

.4 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 to 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.

**2.3 SEALANT SELECTION**

.1 Perimeters of exterior openings where frames meet exterior facade of building, Sealant type CAN/CGSB- 19.13.

.2 Expansion and control joints in exterior surfaces of poured-in-place concrete walls: Sealant type CAN/CGSB – 19.13.

.3 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: CAN/CGSB – 19.13.

.4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: CAN/CGSB – 19.13.

.5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls. Sealant Type CAN/CGSB -19.13.

.6 Interior control and expansion joints in floor surfaces: Sealant type CAN/CGSB -19.13.

.7 Perimeters of interior frames, as detailed and itemized: Sealant type CAN/CGSB -19.13.

.8 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type CAN/CGSB -19.13.

.9 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities, counters, plastic laminate and adjacent wall finish, etc.): Sealant type CAN/CGSB – 19.13, mildew resistant.

.10 Exposed interior control joints in drywall: Sealant type: CAN/CGSB -19.13.

.11 Acoustical Sealant ASTM C919.

**2.4 JOINT CLEANER**

.1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.

.2 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.

.4 Remove masking tape after initial set of sealant.

**END OF SECTION**