## PART 1 - GENERAL

### 1.1 WORK INCLUDED

.1 This section specifies requirements for providing all labour, tools, materials, and equipment for exterior waterproofing (horizontal and vertical) and geomembrane on below grade exterior surfaces of sanitary manholes as indicated on drawings.

### 1.2 RELATED WORK

.1 Cast-in-Place Concrete: Section 03 30 00

### 1.3 QUALITY ASSURANCE

.1 Membrane: applied by applicator trained and approved by manufacturer for application of its products.

.2 Applicators: minimum five (5) years proven experience.

.3 Notify manufacturer's representative as to work start-up by applicator.

.4 Manufacturer's representative:
.1 Inspect substrate prior to commencement of work, during application of membrane and upon completion of work.
.2 Provide technical assistance to applicator and assist where required in correct installation of membrane.

### 1.4 DELIVERY, STORAGE AND HANDLING

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

.2 Store role materials in original packaging.

.3 Store adhesives and primers at temperatures of 5°C and above to facilitate handling.

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

.5 Protect rolls from direct sunlight until ready for use.

1.5 COORDINATION

.1 Ensure continuity of the waterproofing membrane throughout the scope of this section.

1.6 ENVIRONMENTAL PROTECTION

.1 Provide forced air circulation during installation and curing periods for enclosed applications.

1.7 WARRANTY

.1 Provide a warranty that states the waterproofing membrane will stay in place and remain leakproof for two (2) years from the date of completion certificate.

.2 Waterproofing membrane manufacturer hereby warrants that the waterproofing membrane will remain in a watertight condition and will not leak as a result of faulty materials for a period of five years. Scope of warranty shall include material required to return the membrane to a watertight condition.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Exterior waterproofing for vertical and horizontal applications shall consist of sheet membrane waterproofing of composite sheets comprised of rubberized asphalt integrally bonded to a film of high density cross laminated polyethylene, minimum 1.5 mm (60 mils) thick. The material shall be suitable for application at low temperature.
.1 Acceptable material: W.R. Grace Bituthene 3000, Bakor Blueskin WP200, or approved equivalent.

.2 Primer: as recommended by the waterproofing manufacturer.

.3 Mastic and tapes: as recommended by membrane manufacturer.

.4 Fillet T-joint sealant: as recommended by membrane manufacturer.

.5 Adhesives: as recommended by membrane manufacturer.

.6 Liquid membrane for detailing: as recommended by membrane manufacturer.

.7 Geomembrane cover: 1.0mm HDPE membrane.
.1 Acceptable products: Solmax 400 or approved equivalent.

2.2 COMPATIBILITY

.1 Ensure that all materials used are compatible.

.2 Provide proof of compatibility.

PART 3 - EXECUTION

3.1 GENERAL

.1 Install materials only in suitable weather, when there is no threat of precipitation, and in accordance with manufacturer's instructions.

3.2 PREPARATION

.1 Prime all surfaces to receive membrane waterproofing by means of roller or spray at a rate recommended by the manufacturer.

.2 Allow primer to dry adequately before proceeding with membrane. Avoid puddles.

.3 Treat only as much area as can be covered with membrane the same day. Primed surfaces not covered by waterproofing membrane during the same working day must be reprimed.

.4 Metal surfaces must be free of grease, oil dirt, loose paint, rust or other contaminants.

.5 Concrete surfaces shall be smooth, clean, dry and free of foreign matter.

3.3 APPLICATION

.1 Do waterproofing work in accordance with membrane manufacturers printed application instructions.

.2 Apply membrane fully adhered to surfaces as indicated.

.3 Lap membrane joints minimum 300mm. Roll all seams continuously.

.4 Install reinforcing strip of membrane waterproofing over all outside corners. Install reinforcing strips prior to field membrane application.

.5 Centre reinforcing strip of membrane waterproofing over non-working joints and cracks up to a maximum of 5 mm. Width of reinforcing strip as recommended by manufacturer.

3.3 APPLICATION (Cont'd)

.6 Notify Departmental Representative of non-working joints over 5 mm and treat as directed.

.7 Apply liquid mastic to horizontal and vertical terminations.

.8 Seal daily terminations with mastic.

.9 Seal penetrations through membrane with liquid membrane and sheet membrane as recommended by manufacturer.

3.4 GEOMEMBRANE

.1 Ensure geomembrane is undamaged before application.

.2 Apply geomembrane over entire surface of waterproofing membrane using compatible adhesive. Follow manufacturer's recommendations.

.3 Minimum lap: 450mm, shingle style for horizontal laps.

.4 Poly strapping may be applied to secure geomembrane on approval of Departmental Representative.

.5 Do not backfill until after geomembrane is applied.

END

## PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 03 33 00 - Cast-in-Place Concrete.

.2 Section 04 05 00 - Common Work Results for Masonry.

1.2 REFERENCES

.1 Canadian Government Standards Board
.1 CAN/CGSB 37 -GP-56M-80(A1985) - Standards for Modified Bituminous Sheet Membranes.

.2 CAN/CGSB 37-GP-9Ma - Standard for Unfilled Asphalt Primer

.3 CAN/CGSB 37-GP-5M - Standard for Asphalt Plastic Cement

1.3 QUALITY ASSURANCE

.1 Perform work in accordance with manufacturer's printed instructions.

.2 Maintain one copy of documents on site.

.3 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience approved by materials manufacturer.

1.4 SUBMITTALS

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

.2 Product Data: Provide data on material characteristics, performance criteria, limitations.

.3 Manufacturer's Installation Instructions: Indicate preparation, installation requirements and techniques, product storage and handling criteria.

1.5 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour systems and approved by materials' manufacturer.

1.6 ENVIRONMENTAL REQUIREMENTS

.1 Do not install solvent curing sealants or vapour release adhesive materials in enclosed spaces without ventilation.

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

1.7 COORDINATION

.1 Coordinate work of this section with all sections referencing this section.

1.8 MOCK-UP

.1 Construct mock-up in accordance with Section 01 33 00 Submittal Procedures and Section 01 45 00 - Quality Control.
.1 Locate where directed.

.2 Mock-up may remain as part of the Work

.3 Allow 72 hours for inspection of mock-up by Departmental Representative before proceeding with Work.

1.9 WARRANTY

.1 For sheet waterproofing the 12 months warranty period is extended to 24 months.

.2 Warranty: include coverage of installed sheet materials which fail to achieve watertight seal or exhibit loss of adhesion.

.3 Provide a written warranty on materials and workmanship for a period of two years after substantial performance.

1.10 WASTE MANAGEMENT AND DISPOSAL

.1 Collect, separate and recycle all site generated waste materials in accordance with Section 01 74 21 Construction/Demolition Waste Management and Disposal.

## PART 2 - PRODUCTS

2.1 MATERIALS

.1 Sheet Materials:
.1 Prefabricated composite sheet membrane: comprised of rubberized asphalt integrally bonded to a film of high density cross laminated polyethylene membranes maintaining a minimum thickness of 1.5mm (60 mils), provided in rolls with lap lines clearly marked.
.2 The membrane shall incorporate a 6mm edge bead of rubberized asphalt running continuously along both sides of the roll.
.3 Acceptable materials:
.1 Blueskin WP200 by Bakor.
.2 Bituthene 3000, by W.R. Grace.
.3 Colphene 1500, by Soprema.
.4 Carlisle QSC-701, by Carlisle Syntec.
.5 Aquabarrier FP by IKO Industries.

.2 Primer: solvent based, as recommended by and supplied by the sheet membrane manufacturer.

.3 Mastics: at termination and projections as recommended and supplied by membrane manufacturer.

.4 Reinforcement: at cracks, inside and outside corners and penetrations: as recommended and supplied by membrane manufacturer.

.5 Termination bar: provide and install recommended by manufacturer.

2.2 COMPATIBILITY

.1 Ensure that all materials used are compatible.

.2 Provide proof of compatibility.

## PART 3 - EXECUTION

### 3.1 PREPARATION

.1 Inspect mud slabs, walls and all related surfaces and prepare and prime surfaces to receive prefabricated composite sheet membrane waterproofing material.

.2 Concrete substrates shall be smooth finished and monolithic. Fill gaps or voids greater than 12mm.

.3 Do not proceed with work on surfaces not in accordance with manufacturer's recommendations.

### 3.2 APPLICATION

.1 Apply membrane to surfaces fully adhered in accordance with membrane manufacturer=s instructions.

.2 Where membrane is applied over mud slabs, lap membrane from walls above over membrane on mud slab by 200mm minimum. Seal together completely.

### 3.3 FIELD QUALITY CONTROL

.1 Inspection of waterproofing application will be carried out by the Project Manager.

.2 Give a minimum of 48 hours notice of when waterproofing is to be inspected.

### 3.4 PROTECTION OF COMPLETED WORK

.1 Ensure membrane is undamaged before application of protection board.

.2 Apply protection board to cover membrane at all locations, except at underside of pits where concrete is cast on top of membrane.

### 3.5 SCHEDULE

.1 Membrane waterproofing is required at:
.1 Exterior surfaces of foundation.
.2 All pits, utility trenches and SIT trenches internal to the building (bottom and sides).

3.5 SCHEDULE (Cont'd)

.2 Composite Drainage Mat is required at
.1 Exterior surfaces of foundation.

END

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

.1 Section 03 30 00 - Cast-in-Place Concrete.

.2 Section 04 05 00 - Common Work Results for Masonry.

.3 Section 07 26 00 - Sheet Membrane Air/Vapour Barriers.

.4 Section 70 46 13 - Preformed Metal Cladding System.

### 1.2 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
.1 ASTM E96/E96M-05, Test Methods for Water Vapour Transmission of Materials.

.2 Canadian General Standards Board (CGSB).
.1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

.3 Underwriters Laboratories of Canada (ULC).
.1 CAN/ULC-S701-05, Thermal Insulation, Polystrene, Boards and Pipe Coverings.
.2 CAN/ULC-S702-09, Thermal Insulation, Mineral Fibre, for Buildings.

### 1.3 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:
.1 Submit manufacturer's installation instructions.

### 1.4 WASTE MANAGEMENT AND DISPOSAL

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

1.4 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

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

PART 2 - PRODUCTS

2.1 INSULATION

.1 Extruded polystyrene (XPS): Regular Density: to CAN/ULC-S701; for vertical applications:
- .1 Type: 4.
- .2 Thickness: 50 mm or as indicated.
- .3 Size: to suit.
- .4 Edges: shiplapped.
- .5 Compressive Strength: 210 kPa.
- .6 Acceptable material:
  - .1 Celfort 300
  - .2 Styrofoam SM

.2 Extruded Polystyrene (XPS) High Density: to CAN/ULC-S701; for horizontal applications:
- .1 Type: 4.
- .2 Thickness: 50 mm or as indicated.
- .3 Size: to suit.
- .4 Edges: shiplapped.
- .5 Compressive Strength: 690 kPa.
- .6 Acceptable material:
  - .1 Foamular 1000
  - .2 Styrofoam Highload 100.

.3 Semi-rigid mineral fibre board insulation for metal wall assembly: to CAN/LC-S02.
- .1 Minimum nominal RSI of 0.76m2 K/W per 25mm (R-4.3 per inch).
- .2 Thickness as indicated; in widths to suit Z-girt spacings.

.4 Polyethylene vapour retarder: to CAN/CGSB-51.34, 0.15mm, 6 mil thick.

2.2 ADHESIVE

.1 Adhesive (for polystyrene): to CGSB 71-GP-24.
- .1 As recommended by board manufacturer.
- .2 VOC emission: zero.

2.3 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.

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 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.

.5 Do not enclose or cover insulation until it has been inspected and approved by Project Manager.

3.3 EXAMINATION

.1 Examine substrates and immediately inform Departmental Representative 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 PERIMETER FOUNDATION INSULATION

.1 Vertical Application: Extend regular density boards vertically from top of foundation wall (continuous with insulation of wall assembly) to top of footings, installed on inside face of perimeter foundation walls, or as indicated.

3.5 UNDERSLAB INSULATION

.1 Horizontal Application: Lay high density boards on level compacted fill below exterior concrete pads and as indicated.

.2 Install regular density insulatioin boards under slab. Shiplapped edges.

.3 Install semi-rigid mineral fibre board insulation on outer face of metal liner panel or on outer surface of sheet membrane air/vapour barrier over concrete block back-up. Secure with insulation clips and disks 6 per board minimum, four of which are no more than 75mm from any corner and two in the centre area. Cut off fastener spindle 3mm beyond disk. Install in strict accordance with insulation and anchor manufacturer's recommendations.

3.6 CLEANING

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

END

## PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 03 33 00 - Cast-In-Place Concrete - Specification for vapour barrier for slabs on grade.

.2 Section 04 05 00 - Common Work Results for Masonry.

.3 Section 07 21 13 - Board Insulation.

.4 Section 07 46 13 - Preformed Metal Siding.

.5 Section 07 52 00 - Modified Bituminous Membrane Roofing: barriers provided with roof systems.

.6 Section 07 92 00 - Joint Sealing: Sealant materials and installation techniques.

.7 Section 08 11 14 - Metal Doors and Frames: Installation of air/vapour barrier connection to door frames.

.8 Section 08 44 13 - Glazed Aluminum Curtain Walls and windows. Installation of air/vapour barrier connection to aluminum frames.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-51.33-M89, Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

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:
.1 Product characteristics.
.2 Performance criteria.
.3 Limitations.

1.3 SUBMITTALS (Cont'd)

.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.

1.4 QUALIFICATIONS

.1 Applicator: Company specializing in performing work of this section with minimum 5 years documented experience with installation of air/vapour systems and approved by material's manufacturer.

1.5 QUALITY ASSURANCE

.1 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 70 12 - Safety Requirements.

.2 Mock-Ups:
.1 Submit mock ups in accordance with Section 01 45 00 - Quality Control.
.2 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.
.3 Mock-up will be used to judge workmanship, substrate preparation, and material application.
.4 Locate where directed.
.5 Allow 48 hours for inspection of mock-up by Departmental Representative before proceeding with vapour barrier work.

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

1.6 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

## PART 2 - PRODUCTS

2.1 SHEET MATERIALS

.1 Rubberized asphalt bonded to sheet polyethylene, nominal total thickness of 40 mil.

.1 Acceptable material:

.1 Perm-A-Barrier by WR Grace, System 4000.

.2 Sopra Seal Stick 1100 by Soprema.

.3 Carlisle QSC - 705 Adhered Membrane Vapour/Barrier by Carlisle Syntec.

.4 Blueskin by Bakor.

.5 Aqua Barrier ABV by IKO Industries.

.6 ExoAir 110 by Tremco.

2.2 ACCESSORIES

.1 Primer: solvent based, as recommended and supplied by the sheet membrane manufacturer for application to concrete block substrate and other substrates as indicated.

.2 Mastics: at termination, projections and penetrations, as recommended and supplied by membrane manufacturer.

.3 Reinforcement: at cracks, corners, and penetrations, as recommended and supplied by membrane manufacturer.

.4 Thinner and cleaner for rubberized asphalt sheet: As recommended by sheet material manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

.1 Verify that surfaces and conditions are ready to accept the Work of this section.

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

.3 Report any unsatisfactory conditions to the Departmental Representative in writing.

.4 Do not start work until deficiencies have been corrected. Commencement of Work implies acceptance of conditions.

### 3.2 PREPARATION

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

.2 Ensure all substrates are clean of oil or excess dust, all masonry joints struck flush and open joints filled; and all concrete surfaces free of large voids, spalled areas or sharp protrusions.

.3 Ensure all 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.

### 3.3 INSTALLATION: SHEET MATERIALS

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

.2 Secure sheet material to primed masonry and relevant materials. Caulk with mastic as per manufacturer's recommendations to ensure complete seal. Position lap seal over firm bearing.

.3 Lap sheet material under roof vapour retarder. Position lap seal over firm bearing.

.4 Apply sealant within recommended application temperature ranges. Consult manufacturer when

3.3 INSTALLATION: SHEET MATERIALS (Cont'd)

.4 (Cont'd) sealant cannot be applied within these temperature ranges.

3.4 CLEAN UP

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

END

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

.1 Section 04 05 00 - Common Work Results for Masonry.

.2 Section 07 26 00 - Sheet Membrane Air/Vapour Barriers.

.3 Section 07 52 00 - Modified Bituminous Membrane Roofing.

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

.5 Section 07 92 10 - Joint Sealing.

.6 Section 08 44 13 - Glazed Aluminum Curtain Walls and Windows.

### 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 A653/A653M-08 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot Dip Process.
.2 ASTM A755/A755M-03(2008), Steel Sheet, Metallic-Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Projects.
.3 ASTM A924/A924M-08a, Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

.3 Canadian Sheet Steel Building Institute (CSSBI).
.1 CSSBI 20M-08 Sheet Steel Cladding for Architectural, Industrial and Commercial Building Applications.

.4 Canadian Standards Association (CSA International).
.1 CSA B111-1974(R2003), Wire Nails, Spikes and Staples.

1.2 REFERENCES (Cont'd)

.4 (Cont'd)
.2 CSA S136-07, Cold Formed Steel Structural Members.
.3 CSA S136.1-95, Commentary or CSA Standard S136-94, Cold Formed Steel Structural Members.
.4 CAN/CSA-S16.1-94(R2000), Limit States Design of Steel Structures.

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, metal sub-girts, liner panels, insulation and related work.
.3 Indicate arrangements of sheets and joints, types and locations of fasteners and special shapes and relationship of panels to structural frame.
.4 No fabrication and/or installation shall commence until all shop drawings have been approved.
.5 All shop drawings are to be stamped by a Professional Engineer licensed to practice in Nova Scotia.
.6 Material thicknesses indicated are the minimum base steel thickness required for this project. Increase thicknesses as required.

.3 Samples:
.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
.2 Submit duplicate 300x300mm samples of flashing. Submit samples of siding and liner panel. Colours and profiles to match existing siding material and liner panel.

1.3 SUBMITTALS (Cont'd)

.4 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.

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 System.

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

1.6 DESIGN CRITERIA

.1 Design metal cladding systems in accordance with CAN/CSA-S136.1 standards, in conformance with relevant Canadian Sheet Steel Building Institute (CSSBI) standards.

.2 Contractor to coordinate and provide all framing, supports and openings necessary for the installation and proper functioning of the air heating system.

.3 Design metal cladding systems to provide for thermal movement of component materials caused by ambient temperature range of 80 deg C without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects.

.4 The laps will be designed to take up the movement caused by the expansion and contraction between the sheets themselves and between the sheets and building structure, and by the shifting of the frame (wind and snow loads) without causing permanent distortions, damage to filling materials, racking of

1.6 DESIGN CRITERIA (Cont'd)

.4 (Cont'd)
joints, breakage of joints or water penetration.

.5 Sheets will be designed according to the specified tolerances for the erection of the structural support.

.6 Specified tolerances for the installation of sheets:
.1 Maximum allowable variation from plane between the components shall not exceed 20mm/10m.
.2 Maximum allowable offset between two adjoining sheets in the same plane shall not exceed 1.00mm.
.3 The load-bearing capacity (dead load and wind loads) of the panels shall be 1.4 kPa. This value is based on the NBCC 2005 requirements for a "category 3" building in Petawawa. The maximum allowable deflection is 1/180.

.7 Design metal cladding systems to provide for positive drainage of condensation occurring within wall through outside joints to the exterior.

1.7 PROTECTION

.1 Protect all cladding materials that have been removed from building.

.2 When stocked on site, the panels must be piled on wooden blocks and sufficiently inclined to avoid water remaining on the material. Stock the membrane according to the instructions of their respective manufacturers.

PART 2 - PRODUCTS

2.1 COMPLETE SYSTEMS

.1 Metal cladding system with concrete block back-up or metal liner on horizontal structural steel girts.
.1 Type of system: Insulated panel system, site assembled on sub-girts.
.2 Prefabricated steel exterior facing panel (vertical and horizontal) with exposed fastening.
.3 Horizontal/vertical steel sub-girts, galvanized.
.4 Insulation: by Section 07 21 13.
.5 Sheet membrane air/vapour barrier at transitions.
.6 Concrete block by Division 4.

2.2 METAL CLADDING AND COMPONENTS

.1 Metal Cladding:
.1 Prefabricated exterior panel, zinc coated sheet steel, produced in accordance with ASTM A653/A653M S.S., Z-275 (G90), Gr. 33, 0.76mm (22ga.) thick (excluding finish coat).
.2 Topcoat finish to be 4 coat PVDF (Polyvinylidene Flouride) system with a minimum total topcoat DFT of 1.6 mil comprised of 0.80-1.20 mil PVDF primer and a 0.8 mil PVDF colour coat.
.3 Colour: Baycoat 10000 Series QC 195, Arctic White. Black where indicated.
.4 Acceptable Materials:
.1 Vic West CL 7040.
.2 Agway Metals 7-175.
.3 Roll Form S-175.

.2 Steel liner panel:
.1 Fabricated from ASTM A65M structural quality Grade 230 galvanized steel with Z275 zinc coating, as designated by ASTM A653M. 0.61mm (24 ga.; 0.024").
.2 Plain galvanized finish on exterior face, paint finish on interior face; white.
.3 Acceptable product:
.1 Vic West Liner Profile L-800R.
.2 Agway Metals.
.3 Roll Form Group.

2.2 METAL CLADDING AND COMPONENTS (Cont'd)

.3 Aluminum Soffits: at underside of entrance canopy and canoies over overhead doors. Acceptable material:
.1 4mm thick composite aluminum panels.
.2 Finish:
.1 Coloured finish: Duranar, colour to be determined.

.4 Sub-girts: of suitable minimum base metal thickness, structural quality steel to ASTM A653, with Z 275 (G-90) zinc coating, profile as indicated to accept exterior sheet with structural attachment to buidling components. Minimum sub-girt thickness to be 1.6mm (16 ga.)

.5 Insulation: semi-rigid mineral fibre board by Section 07 21 13.

.6 Air/Vapour Barrier: Refer to Section 07 26 00 for sheet membrane air/vapour barrier transition materials and installation procedures.

.7 Concrete block backup: by Division 4.

2.3 ACCESSORIES

.1 Exterior corners: of same profile, material and finish as adjacent cladding material, factory built and brake formed to required angle, concealed corner brace, pop rivet connections with painted head to match cladding.

.2 Exposed joint: ends of cladding sheet shop cut clean and square, backed with tight fitting filler lapping back of joint, exposed components colour matched to cladding.

.3 Accessories: cap flashing, drip flashings, internal corner flashings, copings and closures for head, jamb, sill and corners, of same material, thickness and finish as exterior cladding, brake formed to shape.

.4 Closures: pre-painted metal closures complete with foam closure backer at termination of metal siding.

.5 Butyl tape: 100% solid Polyisobutylene-butyl preformed sealant, 3mm thickness by 13mm

2.3 ACCESSORIES (Cont'd)

.5 Butyl tape:(Cont'd)
width, supplied in rolls with protective backing paper.

.6 Thermal tape: flexible, resilient and conformable of closed cell polyvinyl chloride (PVC) foam, with a pressure-sensitive adhesive backing and protective liner.

.7 Foam closure: polyethylene compressive foam closure strip to match the profiles (2 lbs/cu.ft. of density).

2.4 FASTENERS

.1 All exposed fasteners to be stainless steel, in accordance with the manufacturer's standards and meet the ANSI B18.6.4 and CSA B-35.31962 specifications. Exposed fasteners to be #12 self-tapping screws. Screw heads to match colour of siding/trim.

.2 Sub-girt fasteners to be #14 with corrosion-resistant coating to withstand:
.1 2000 hours salt spray exposure before appearance of red rust when tested to ASTM B-117.
.2 35 cycles Kesternich 1 litre SO2 before appearance of red rust.

2.5 FLASHINGS

.1 All the visible flashings must be in the same material, thickness and finish as the existing exterior panels.

2.6 SEALANTS

.1 Exterior, exposed: as per Section 07 92 00, Part 2.2, Type 2.

2.7 FABRICATION

.1 Roll form profiled panels and other work unless impossible because of special design. Use other forming methods only with approval.

.2 Form bends sharp and true.

.3 Fabricate systems to conform to shop drawings and to allow for structural movements within the systems.

2.7 FABRICATION (Cont'd)

.4 Fabricate systems with fasteners of same materials as siding unless required otherwise for structural design and of same colour as siding where exposed to view.

.5 Fabricate systems to prevent entry of water into building and from collection within assembly and to prevent infiltration of air through system.

.6 Join intersecting parts together to provide tight, accurately fitted joints with adjoining surfaces in true planes.

.7 Fabricate systems to confirm to requirements of reference standards specified.

2.8 FABRICATION: ALUMINUM SOFFITS

.1 Shop fabricate aluminum soffits. Assembly to allow for expansion and construction of the installed system. Provide closures, Z-girts, clips, channel reveals, stiffeners, flashings and fasteners to complete the installation.

.2 Accurately fit and secure joints and corners.

.3 Arrange fasteners and attachments to ensure concealment from view.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Take site measurements to ensure that work is fabricated to fit structure, existing construction, around obstructions and projections in place, or as shown on drawings, and to suit locations of services.

.2 Verify that backup construction is aligned for proper installation of siding before commencing erection.

.3 Commencement of installation will constitute acceptance of back-up construction.

3.2 REQUIRED EQUIPMENT

.1 Provide all equipment necessary to complete the work.

.2 Abrasive blades must not be used for cutting steel.

.3 Use modern (laser) equipment to insure a perfect alignment of the panels, the fastening systems and the flashings.

3.3 INSTALLATION OF THE SHEET AIR/ VAPOUR BARRIER

.1 .1 Install the sheet membrane air/vapour barrier transitions at all movement joints, between dissimilar materials and as indicated in strict accordance with Section 07 26 00.

3.4 INSTALLATION OF THE INSULATION

.1 Install semi-rigid insulation board in accordance with the approved shop drawings and Section 07 21 13. Ensure a continuous thermal barrier and position the boards tightly against each other. Make a staggered joint. Press the board tightly against the clips and subgirts.

3.5 ERECTION

.1 Install components in accordance with the approved shop drawings.

.2 Install the metal siding and flashing in accordance with CSSBI standards and also as per manufacturers written recommendations.

.3 Carry out the installation by qualified and experienced personnel. The specialized contractor shall be certified by the manufacturer of the metal cladding.

.4 Install panels in maximum lengths available. End laps shall be a minimum of 150mm.

.5 Erect systems complete with flashings forming part of the systems, subgirts, clips fasteners, closures and caulking to meet same design criteria as specified for fabrication.

.6 Cut and flash panel penetrations.

3.5 ERECTION (Cont'd)

.7 Erect work in straight lines that are true, level and plumb.

.8 Provide for differential thermal and structural movement between systems and structure as well as between elements of systems.

.9 Attach systems to structural steel girts and other structure and to other system components with fasteners of the same material and colour as the panels except where other materials are approved.

.10 Caulk systems and junctions with adjoining work to meet specified requirements of Section 07 92 00.

.11 Work of this section to include installation of complete wall panel system (liner panel, insulation, metal cladding, etc.)

3.6 INSTALLATION, ALUMINUM SOFFITS

.1 Install aluminum soffit systems in accordance with manufacturer's instructions and engineering requirements.

.2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

.3 Provide all steel anchors, alignment attachments and shims to permanently fasten system to building structure.

.4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances and align with adjacent work.

3.7 ADJUSTMENT & CLEANING

.1 After erection, touch up galvanized coatings removed or damaged during erection.

.2 Remove damaged, dented, defaced, defectively finished or tool marked components and replace with new.

.3 Clean off dirt resulting from erection from surfaces exposed to view.

END

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

.1 Materials and installation for modified bituminous roofing for either conventional build up roofing (BUR) or protected membrane roofing (PMR) systems.

### 1.2 RELATED SECTIONS

.1 Section 05 12 23 - Structural Steel.

.2 Section 05 21 00 - Steel Joists.

.3 Section 05 31 00 - Steel Deck.

.4 Section 06 10 00 - Rough Carpentry.

.5 Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashings to be supplied and installed by Section 07 52 00.

.6 Section 07 92 10 - Joint Sealing.

.7 Section 22 42 01 - Plumbing Specialties and Accessories: Roof drains.

### 1.3 REFERENCES

.1 American Society for Testing and Materials International, (ASTM).
.1 ASTM C36/C36M-03e1, Standard Specification for Gypsum Wallboard.
.2 ASTM D 312-00, Asphalt Used in Roofing.
.3 ASTM D 6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
.4 ASTM D 6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
.5 ASTM D6164-05e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

.2 Canadian General Standards Board (CGSB).
.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

1.3 REFERENCES (Cont'd)

.2 (Cont'd)
.2 CGSB 37-GP-9Ma, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
.3 CGSB 37-GP-15M, Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
.4 CGSB 37-GP-19M, Cement, Plastic, Cutback Tar.
.5 CAN/CGSB-37.29-M89, Rubber-Asphalt Sealing Compound.
.6 CGSB 37-GP-56M, Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.

.3 Canadian Roofing Contractors Association (CRCA).
.1 CRCA Roofing Specifications Manual-1997.

.4 Canadian Standards Association (CSA International).
.1 CAN/CSA-A123.3-05, Asphalt Saturated Organic Roofing Felt.
.2 CAN/CSA-A123.4-04, Asphalt for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.

.5 Department of Justice Canada (Jus).
.1 Canadian Environmental Protection Act, 1999 (CEPA).

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

.9 Underwriters Laboratories' of Canada (ULC).
.1 CAN/ULC-S701-05, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
.2 CAN/ULC-S706-2002, Standard for Wood Fibre Thermal Insulation for Buildings.

1.4 PERFORMANCE REQUIREMENTS

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

1.5 SUBMITTALS

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

.2 Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.

.3 Submit WHMIS MSDS - Material Safety Data Sheets.
.1 Indicate VOC content for:
.1 Primers.
.2 Asphalt.
.3 Sealers.

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

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

.6 Provide layout for tapered insulation.

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

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

1.6 STORAGE AND HANDLING

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

.2 Store rolls of felt and membrane in upright position. Store membrane rolls with selvage edge up.

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

1.6 STORAGE AND HANDLING (Cont'd)

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

.5 Store sealants at +5°C minimum.

.6 Store insulation protected from daylight, weather and deleterious materials.

.7 Handle roofing materials in accordance with manufacturer's written directives, to prevent damage or loss of performance.

1.7 PROTECTION

.1 Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable type with hose and shut-off nozzle, ULC labeled for A, B and C class protection. Size 9 kg, one on roof per torch applicator, within 6 m of torch applicator.

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

.3 Use a hand infrared thermometer to monitor temperatures.

1.8 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 and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.

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

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

1.8 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

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

.7 Clearly label location of salvaged material's storage areas and provide barriers and security devices.

.8 Ensure emptied containers are sealed and stored safely.

.9 Divert unused metal materials from landfill to recycling facility as approved by Project Manager.

.10 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.

.11 Divert unused gypsum materials from landfill to recycling facility as reviewed by Project Manager.

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

1.9 ENVIRONMENTAL REQUIREMENTS

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

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

.3 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.

1.10 WARRANTY

.1 .1 For modified bituminous membrane roofing the one (1) year warranty period is extended as follows:
.1 Five (5) year CRCA, or equivalent, materials and workmanship against leaks and blowoff.
.2 Ten (10) year material warranty that the membrane will perform as a roofing material.

1.10 WARRANTY (Cont'd)

.2 Provide a written warranty, signed and issued in the name of the owner, on materials and workmanship.

.3 Extended Warranties shall commence on the termination of the standard one-year warranty under this Contract and shall be an extension of these same provisions.

PART 2 - PRODUCTS

2.1 DECK COVERING

.1 Moisture and mould resistant, 12.7mm thick.
.1 Acceptable material:
.1 Densdeck by Georgia Pacific.
.2 Securock Roof Board by CGC Inc.

2.2 DECK PRIMER

.1 Asphalt primer: to CGSB 37-GP-9Ma.

2.3 VAPOUR RETARDER

.1 .1 Two-ply bituminous membrane consisting of: No. 15 asphalt saturated organic roofing felts to CAN/CSA A123.3.
.1 Acceptable material:
.1 BP.
.2 IKO.
.2 Type 2 asphalt to CAN/CSA A123.4.
Provide EVT, FBT and Flash Point Temperature.
.1 Acceptable material:
.1 BP.
.2 IKO.
.3 Bitumar.

2.4 MEMBRANE

.1 Base sheet: to CAN/CGSB- 37-GP-56M.
.1 Styrene-Butadiene-Styrene (SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, having nominal weight of 180 g/m2.
.2 Type 2, fully adhered.
.3 Class C - plain surfaced.
.1 Grade 2 - heavy duty service.
.2 Top and bottom surfaces:
.1 Polyethylene/sanded.

2.4 MEMBRANE (Cont'd)

.1 Base sheet:(Cont'd)
.3 (Cont'd)

.2 Acceptable material:
.1 Modified Plus NP 180 by Bakor.
.2 Modiflex MP - 180 - BASE by IKO.
.3 Elastophene 180 by Soprema.

.2 Cap sheet membrane: to CGSB 37-GP-56M.
.1 Styrene-Butadiene-Styrene(SBS) elastomeric polymer prefabricated sheet, polyester reinforcement, having nominal weight of 250 g/m2.
.2 Type 1, fully adhered.
.3 Class A-granule surfaced.
.1 Colour for granular surface: gray.
.4 Grade 2 heavy duty service.
.5 Bottom surface polyethylene.
.6 Acceptable materials:
.1 Modified Plus NP 250 gT4 by Bakor.
.2 IKO TP-250 CAP by IKO.
.3 Sopralene Flam 250 by Soprema.

2.5 BITUMEN

.1 Asphalt: to CAN/CSA-A123.4-98 Type 2.
.1 Acceptable material:
.1 BP.
.2 IKO.
.3 Bitumar.

2.6 CLOSED CELL POLYISOCYANURAE INSULATION

.1 .1 Glass mat faced closed cell polyisocyanurate insulation, Long Term Thermal Resistance Rating LTTR-6 per inch: to CAN/ULC-S704, flat and tapered, thicknesses as indicated, FM-approved for I-90 Windstorm Classifications.

.2 Square edges.

.3 The insulation thicknesses shown on drawings are based on R-4.14 per inch. Adjust roof details as required for other thermal ratings. Equivalency based on 5 year aged R-value. Submit verification of equivalency.

2.7 INSULATING FIBREBOARD

.1 To CAN/ULC-S706-2002, Type 1-roof board, surface coated, 12.5mm thick.

2.8 SEALERS

.1 Plastic cement: asphalt, to CAN/CGSB-37.5-M89.
- .1 Acceptable material:
  - .1 Bakor 810-21.
  - .2 Karnak 19.
  - .3 BP Multi Purpose RC 315.

.2 Sealing compound: to CAN/CGSB-37.29-M89, rubber asphalt type.
- .1 Acceptable material:
  - .1 Bakor 570-05.
  - .2 Sopramastic 200.
  - .3 Liquid sealer: for use at through roof assemblies: Pourable Sealer.

2.9 WALKWAYS

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

2.10 CARPENTRY

.1 Refer to Section 06 10 00 - Rough Carpentry.

2.11 FASTENERS

.1 Covering to steel deck: No. 12 FM approved screws and plates. One per 0.372$m^2$ (2sq.ft.).

.2 Insulation and first layer of fiberboard to deck: coated insulation fasteners and galvanized plates must meet FM Approval for wind uplift and corrosion resistance.

2.12 DRAINS

.1 Drains supplied by the mechanical contractor and set by the roofer.

2.13 VENT PIPE FLASHINGS

.1 Spun aluminum vent pipe flashings, purpose made.

2.14 PATIO PAVER LANDINGS

.1 610 x 610 x 50mm thick concrete patio pavers.

.2 Underlayment: extruded polystyrene, 25mm thick, for use below patio pavers. Score underside for unobstructed drainage.

PART 3 - EXECUTION

3.1 WORKMANSHIP

.1 Do examination, preparation and roofing Work in accordance with Roofing Manufacturer's Specification Manual.

.2 Do priming for asphalt roofing in accordance with CGSB 37-GP-15M.

.3 The interface of the walls and roof assemblies will be fitted with plywood providing connection point for continuity of air barrier.

3.2 EXAMINATION OF ROOF DECKS

.1 Inspect deck conditions including parapets, construction joints, roof drains, plumbing vents and ventilation outlets to determine readiness to proceed and immediately inform Departmental Representative in writing of any defects.

.2 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

.1 Cover walls, walks and adjacent work where materials are 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 Project Manager.

.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.

3.5 DECK COVERING

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

.2 Mechanically fasten to steel deck with screws and plates to steel deck's upper rib surfaces.

.3 Screws and plates to be placed at a rate of 16 per 1220mm x 2440mm sheet in the field to give a Factory Mutual I-90 rating.

.4 Increase density to 24 per sheet in the edge areas and 28 in the corners. The edge width for this project will be 4200mm and corner area will be 4200 x 4200mm. See drawing [ ].

3.6 PRIMING OF DECK COVERING

.1 Apply deck primer to board roofing substrate at the rate recommended by manufacturer and as per CRCA specification.

3.7 VAPOUR RETARDER

.1 Apply self-adhesive base sheet vapour barrier.

.2 Ensure that roof vapour barrier is made continuous with wall vapour air/vapour barrier.

.3 Seal vapour barrier to curbs and penetrations through roof assembly.

3.8 INSTALLATION OF INSULATION AND FIBRE BOARD

.1 Install insulation over the vapour barrier in two layers.

.2 Place boards in parallel rows with ends staggered and in firm contact with one another.

.3 Cut end pieces to suit.

.4 Place tapered boards to form roof slopes/crickets as indicated.

.5 Install the first layer of fibre board over the insulation.

.6 Mechanically fasten the insulation and first layer of fibre board using screws and pressure distribution plates.

.7 Number and pattern of screws/plates per board to meet Factory Mutual requirements. Density of fasteners in the field areas to be 16 per 1220mm x 2440mm sheet. Increase density to 24 per sheet at the edges and 28 per sheet in the corners. The edge width for this project will be 4200mm and corner area will be 4200 x 4200mm.

.8 Adhere the protection board to the first layer by the 'mop and flop' method with hot type 2 asphalt at the rate of 1.2kg/m2 with all joints staggered from those in the first layer of fibreboard.

3.9 EXPOSED MEMBRANE ROOFING INSTALLATION

.1 Base and cap sheet are to unrolled and left to relax for the minimum time specified by the manufacturer before being installed.

.2 Base sheet application:
.1 Starting at low point of roof, perpendicular to slope, unroll base sheet, align and reroll from both ends.
.2 Unroll and embed base sheet in uniform coating of asphalt applied at rate of 1.2 kg/m2, at 230 degrees C at point of contact.
.3 Lap sheets 75 mm for side and 150 mm for end laps.
.4 Application to be free of blisters, wrinkles and fishmouths.
.5 Asphalt to be mopped no more than 900mm in front of roll.

.3 Cap sheet application:
.1 Starting at low point on roof, perpendicular to slope, unroll cap sheet, align and reroll from both ends.
.2 Unroll and torch cap sheet onto base sheet taking care not to burn membrane or its reinforcement.
.3 Lap sheets 75 mm minimum for side laps and 150 mm minimum for end laps. Offset joints in cap sheet 300 mm from those in base sheet.
.4 Application to be free of blisters, fishmouths and wrinkles.
.5 Do membrane application in accordance with manufacturer's recommendations.
.6 Degranulate all end and side laps which are not factory degranulated.
.7 Ensure that there is some bleed out of bitumen at laps.

.4 Flashings:
.1 Complete installation of flashing base sheet stripping prior to installing membrane cap sheet.
.2 Torch base and cap sheet onto substrate in 1 metre wide strips.
.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 and torch weld.
.5 Provide 75 mm side lap and seal.
.6 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.

3.9 EXPOSED MEMBRANE ROOFING INSTALLATION (Cont'd)

.4 Flashings:(Cont'd)
.7 Do Work in accordance with manufacturer's recommendations.

.5 Roof penetrations:
.1 Install roof drain pans, vent stack covers and other roof penetration flashings and seal to membrane in accordance with the manufacturer's recommendations and details and CRCA details.

3.10 ROOF DRAINS

.1 Set roof drains and install under deck clamps.

.2 Complete membrane seal to bowl and install clamping ring.

.3 Sump all roof drains by 25mm.

3.11 WALKWAYS

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

3.12 PATIO PAVER LANDINGS

.1 Install patio paver landings over underlayment material in patterms as indicated.

3.13 FIELD QUALITY CONTROL

.1 Inspection and testing of roofing application will be carried out by testing laboratory designated by Departmental Representative.

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

3.14 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

3.14 CLEANING (Cont'd)

.2 (Cont'd)
and complying with their documented instructions.

.3 Repair or replace defaced or disfigured finishes caused by work of this section.

END

## PART 1 - GENERAL

### 1.1 RELATED SECTIONS

.1 Section 07 52 00 - Modified Bituminous Membrane Roofing -installation of all roof edge and parapet cap flashings.

### 1.2 REFERENCES

.1 American Society for Testing and Materials (ASTM International)
.1 ASTM A653/A653M-08, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.2 Canadian Roofing Contractors Association (CRCA)
.1 Roofing Specifications Manual 1997.

.3 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.

.4 Canadian Standards Association (CSA International)
.1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
.2 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.

### 1.3 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.

### 1.4 WASTE MANAGEMENT AND DISPOSAL

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

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

1.4 WASTE MANAGEMENT AND DISPOSAL (Cont'd)

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

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

.1 Steel sheet: 24 ga. Minimum base metal thickness. The core will be formed from Grade 230 (33) steel, having a minimum yield stress of 230 Mpa (33 000 psi) and a maximum allowable stress resistance of 144 Mpa (20 625 psi).

2.2 PREFINISHED STEEL SHEET

.1 Prefinished steel sheet.

.2 Protective coating: zinc coated sheet steel to Z-275 (G90) designation in accordance with ASTMA653/A653M.

.3 Top coat finish:
.1 To match finish on metal siding system.
.2 Colour: to match metal system colour.

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: as per Section 07 92 00, Part 2.2, Type 1.

.5 Cleats: of same material and temper as sheet metal, minimum 50mm wide. Thickness to be one guage heavier than sheet metal being secured.

.6 Fasteners: hidden fasteners of same material as sheet metal, to CSA B111, flat head roofing nails of length and thickness suitable for metal flashing application. All exposed fasteners to be stainless steel and meet the ANSI B18.6.4 and CSA B-35.31962 specifications. Exposed fasteners to be #12

2.3 ACCESSORIES (Cont'd)

.6 Fasteners:(Cont'd)
self-tapping screws. Screw heads to match colour of siding/trim.

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

.8 Touch-up paint: as recommended by prefinished material manufacturer.

2.4 FABRICATION

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

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

.3 Hem exposed edges on underside 12 mm. 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.

PART 3 - EXECUTION

3.1 INSTALLATION

.1 Install sheet metal work in accordance with CRCA FL series details and as detailed.

.2 Use concealed fastenings except where approved before installation. Cleats to be secured at 300mm O.C. minimum

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

.4 Counterflash bituminous flashings at intersections of roof with vertical surfaces and curbs. Flash joints using S-lock forming tight fit over hook strips and as detailed.

.5 Lock end joints and caulk with sealant.

3.1 INSTALLATION (Cont'd)

.6 Turn top edge of flashing into recessed reglet or mortar joint minimum of 25 mm. Lead wedge flashing securely into joint.

.7 Caulk flashing at reglet cap flashing with sealant.

END

## PART 1 - GENERAL

### 1.1 RELATED WORK

.1 Firestopping and smoke seals within mechanical assemblies (i.e inside ducts, dampers) and electrical assemblies (i.e. inside cable trays) are specified in Mechanical and Electrical sections respectively.

### 1.2 RELATED SECTIONS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3 Section 01 45 00 - Quality Control.

### 1.3 REFERENCES

.1 CAN4-S115-05, Standard Method of Fire Tests of Firestop Systems.

.2 Underwriters Laboratories of Canada (ULC) of Scarborough runs CAN4-S115-M under their designation of UCL-S115-M and publishes the results in their "Fire Resistance Ratings Directory" that is updated annually. Underwriters Laboratories (UL) of Northbrook, IL runs ASTM E-814 under their designation of UL 1479 and publishes the results in their "Fire Resistance Directory" that is updated annually. UL tests that meet the requirements of ULC-S115-M are given a cullisting and are published by UL in their "Products Certified for Canada (cUL) Directory. Omega Point Laboratories runds ASTM E-814 and publishes the results annually in their "Omega Point Laboratories Directory".

.3 Test requirements: UL 2079 Revision 1, "Tests for Resistance of Building Joint Systems" or ASTM E1966-07, "Standard test method for Fire Resistive Joint Systems". These test requirements provide more guidelines for testing moving joints than that given in CAN4-S115-M. UL tests that meet the requirements of ULC-S115-M are given a cUL

1.3 REFERENCES (Cont'd)

.3 Test requirements:(Cont'd) listing and are published by UL in their "Products Certified for Canada (cUL) Directory".

.4 Inspection requirements:ASTM E2174-09, "Standard Practice for On-site Inspection of Installed Fire Stops (destructive testing).

.5 International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.

.6 CAN/ULC-S102-M, Standard Test Method for Surface Burning Characteristics of Building Materials.

.7 NBC - National Building Code of Canada, latest edition.

.8 NFPA 101 - Life Safety Code.

.9 Canadian Electrical Code.

1.4 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.

1.5 SYSTEM DESCRIPTION

.1 Firestopping Materials: In accordance with CAN4-S115M and ASTM E814-09 to achieve a fire protection rating of one (1) hour construction, typical, as indicated.

.2 Work of this section comprises firestop and smoke seal materials and/or systems to provide closures to fire and smoke at openings, around penetrations, at unpenetrated openings, at projecting or recessed items, and at openings and joints within fire separations and assemblies having a fire-resistance rating, including openings and spaces at perimeter edge conditions.

.3 The installed seal shall provide and maintain a fire resistance rating equivalent to the rating of the adjacent floor, wall or other fire separation assembly to the requirements of and as acceptable to the Authorities Having Jurisdiction and to Project Manager.

.4 Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies (i.e. inside electrical busducts) shall be provided as part of work of Mechanical and Electrical sections respectively. Otherwise, one trade only shall be responsible for all firestopping work on the project including firestopping and smoke seals around the outside of such mechanical and electrical assemblies where they penetrate fire-rated separations.

.5 If the pentration or substrate is combustible or has the potential to melt then an adequate intumescent component to seal any void created by combustion or melting shall be a component of the system.

1.6 SHOP DRAWINGS

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

.2 Submit shop drawings to show proposed material, reinforcement, anchorage, fastenings and method of installation. Construction details should accurately reflect actual job conditions.

1.7 SUBMITTALS

.1 Submit product data: manufacturer's specifications and technical data for each material including the composition and limitations, documentation of ULC or cUL firestop systems to be used and manufacturer's installation instructions to comply with Section 01 33 00.

.2 Manufacturer's engineering judgement identification number and drawing details when no ULC or cUL system is available for an application. Engineered judgement must include both project name and contractor's name who will install firestop system as described in drawing.

.3 Submit Material Safety Data Sheets provided with product delivered to job site.

1.8 QUALITY ASSURANCE

.1 Manufacturer: Company specializing in manufacturing products of this Section.

.2 Applicator is to be a certified fire stopping contractor with a minimum of 5 years experience in the application of ULC fire stopping assemblies.

.3 Manufacturer's Obligations:
.1 The manufacturer shall play an active role in the installation of their product during the period of this contract.
.2 The manufacturer shall be represented at all relevant meetings by a trained and qualified technical representative with a minimum of three (3) years experience.
.3 The technical representative shall be approved by the. Project Manager.
.4 The project shall be subdivided into "Sectors of Work".
.5 A minimum of three field reviews per sector from the Manufacturer's representative must be made prior to and during installation to ensure proper application of systems.
.6 After each visit provide a written report to the Project Manager within five (5) working days.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver and store materials in a dry, protected area, off ground in original, undamaged, scaled containers with manufacturer's labels and sealed intact, and in accordance with manufacturer's instructions.

.2 Do not use damaged or expired materials.

.3 Do not use materials that contain flammable solvents.

1.10 PROJECT/SITE CONDITIONS

.1 Do not apply materials when temperature of substrate material and ambient air is below 5°C.

.2 Maintain this minimum temperature before, during and for 3 days after installation of materials.

1.11 SEQUENCING AND SCHEDULING

.1 Sequence work to permit installation of firestopping and smoke seal materials after adjacent work is complete and before closure of spaces.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Firestopping and smoke seal systems: in accordance with ULC-S115 and CAN 4-S115.
.1 Asbestos-free materials and systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of ULC-S115 and not to exceed opening sizes for which they are intended.
.2 Firestop system rating: F.

.2 Smoke seals: materials for use as smoke seals only, with no requirement for a rating, may be approved firestop products or butyl Acoustical Sealant in concealed applications, and permanently elastic, paintable latex acrylic Acoustical Sealant in exposed applications.

2.1 MATERIALS (Cont'd)

.3 Service penetration assemblies: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.

.4 Service penetration firestop components: certified by ULC in accordance with ULC-S115 and listed in ULC Guide No.40 U19.13 and ULC Guide No.40 U19.15 under the Label Service of ULC.

.5 Fire-resistance rating of installed firestopping assembly in accordance with NBC.

.6 Firestopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal. Do not use cementitious or rigid seal at such openings.

.7 Firestopping 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.

.12 Acceptable material: subject to compliance with through penetration firestop systems and joint systems listed in the ULC FIre Resistance Directory - Volume III or UL Products Certified for Canada (cUL) Directory, products of the following manufacturers are acceptable:

.1 Hilti (Canada) Corp.
.2 3M.
.3 Nuco.
.4 Tremco.

## 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 data sheets.

### 3.2 EXAMINATION

.1 Examine surfaces to receive work of this section and report any defects which may affect the work of this Section.

.2 Verify that openings are ready to receive the work of this Section.

.3 Confirm compatibility of surfaces to receive firestopping and smoke seal materials.

.4 Beginning of installation means acceptance of existing surfaces and substrate.

### 3.3 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 firestopping materials and smoke seals to manufacturer's instructions.

.3 Maintain insulation around pipes and ducts penetrating fire separation without interuption to vapour barrier.

.4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

### 3.4 INSTALLATION

.1 Install firestopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions.

3.4 INSTALLATION (Cont'd)

.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 a neat finish.

.5 Remove excess compound promptly as work progresses and upon completion.

3.5 FIELD QUALITY CONTROL

.1 Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

.2 Keep areas of work accessible until inspection by applicable code authorities and manufacturer's technical representative.

.3 Provide field review services with written reports by manufacturer's technical representative in accordance with Part 1.10 Quality Assurance.

.4 Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174-09, "Standard Practice for On-Site Inspection of Installed Fire Stops" or other recognized standard.

.5 Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

3.6 SCHEDULE

.1 Firestop and smoke seal at:
.1 Penetrations through fire-resistance rated masonry partitions and walls.
.2 Edge of floor slabs at exterior wall assembly.
.3 Top of fire-resistance rated masonry partitions.

3.6 SCHEDULE (Cont'd)

.1 (Cont'd)
.4 Intersections of fire-resistance rated masonry partitions and at exterior wall assembly.
.5 Control and sway joints in fire-resistance rated masonry partitions and walls.
.6 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
.7 Openings and sleeves installed for future use through fire separations.
.8 Around mechanical and electrical assemblies penetrating fire separations.
.9 Rigid ducts: 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.

.2 Smoke seal only at:
.1 Penetrations through all masonry partitions and walls specified as separations without ratings.
.2 Top of all "unrated" masonry partitions, as per plans. (Separations without a fire-resistant rating.)

3.7 CLEAN UP

.1 Remove excess materials and debris and clean adjacent surfaces immediately after application.

.2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END

## 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.

### 1.2 RELATED SECTIONS

.1 Section 04 05 00 - Common Work Results for Masonry.

.2 Section 06 40 00 - Architectural Woodwork.

.3 Section 06 47 00 - Plastic Laminate Finishing.

### 1.3 REFERENCES

.1 Canadian General Standards Board (CGSB)
.1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
.2 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
.3 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.

.2 Department of Justice Canada (Jus)
.1 Canadian Environmental Protection Act, 1999 (CEPA).

.3 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.

.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, 1992 (TDGA).

1.4 SUBMITTALS

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

.2 Manufacturer's product data 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.

1.5 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 joints 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 48 hours for inspection of mock-up by Project Manager 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.

1.6 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.

1.7 WASTE MANAGEMENT AND DISPOSAL

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

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

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

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

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

.6 Unused sealant material 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.

.7 Divert unused joint sealing material from landfill to official hazardous material collections site approved by Project Manager.

.8 Empty plastic joint sealer containers are not recyclable. Do not dispose of empty containers with plastic materials destined for recycling.

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

1.8 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.

1.9 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 Project Manager by use of approved portable supply and exhaust fans.

## PART 2 - PRODUCTS

### 2.1 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 Use only no or low VOC content materials. When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.

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

### 2.2 SEALANT MATERIAL DESIGNATIONS

.1 Type 1 - Urethanes One Part.
- .1 Self-leveling.
- .2 Acceptable material:
  - .1 Tremco Tremflex S/L.
  - .2 Vulkem 45.
  - .3 Sonneborn SL 1.

.2 Type 2 - Urethanes One Part.
- .1 Non-Sag to CAN/CGSB-19.13, Type 2, MCG-2-25 colour to be selected.
- .2 Acceptable material:
  - .1 Tremco Dymonic.
  - .2 Vulkem 116.
  - .3 Sonneborn NP 1.

.3 Type 3 - Silicones One Part.
- .1 To CAN/CGSB-19.22 (mildew resistant).
- .2 Acceptable material:
  - .1 Tremco Proglaze.
  - .2 Dow 786.
  - .3 Sonneborn Omniplus.

.4 Type 4 - Acrylic Latex One Part.
- .1 To CAN/CGSB-19.17.
- .2 Acceptable material:
  - .1 Tremco 100 latex.
  - .2 Sonneborn Sonolac.

.5 Type 5 - Acoustical Sealant.
- .1 To CAN/CGSB-19.21.

2.2 SEALANT MATERIAL DESIGNATIONS (Cont'd)

.5 (Cont'd)
.2 Acceptable material:
.1 Tremco acoustical sealant.
.2 Sonneborn Acoustical.

.6 Preformed Compressible and Non-Compressible back-up materials.
.1 Neoprene or Butyl Rubber.
.1 Round solid rod, Shore A hardness 70.
.2 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.
.3 Bond Breaker Tape.
.1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SELECTION

.1 Primeters of exterior openings where frames meet exterior facade of building: (i.e. concrete, siding): Sealant Type 2.

.2 Coping joints and coping-to-facade joints: Sealant Type 2.

.3 Exterior joints in horizontal wearing surfaces: Sealant Type: 1.

.4 Seal interior perimeters of exterior openings as detailed on drawings: Sealant Type: 4.

.5 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: Sealant Type 2.

.6 Interior control and expansion joints in floor surfaces: Sealant Type: 2

.7 Perimeters of interior frames and trim: Sealant Type: 4.

.8 Interior masonry vertical control joints (block-to-block, block-to-concrete

2.3 SEALANT SELECTION (Cont'd)

.8 (Cont'd) block-to-steel and intersecting masonry walls): Sealant Type 2.

.9 Perimeter of washroom fixtures (eg urinals, waterclosets, basins, vanities, etc: Sealant Type 3.

.10 Concealed joints in reinforced metal vapour barrier and between other components comprising vapour barrier of building envelope where concealed: Sealant Type 5.

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.

3.6 APPLICATION (Cont'd)

.3 (Cont'd)

.2 Remove excess and droppings, using recommended cleaners as work progresses.

.3 Remove masking tape after initial set of sealant.

.4 Defective work: shall include, but not be restricted to, joint leakage, cracking, crumbling, melting, runny, loss of adhesion, loss of cohesion, or staining of adjoining or adjacent work or surfaces. Contractor to make good any defective sealant work.