

PART 1 – GENERAL

1.1 RELATED SECTIONS

- .1 Division 1.
- .2 06 10 00 – Rough Carpentry.
- .3 08 52 13 – Aluminum Clad Windows.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)
 - .1 ASTM C1289, Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .2 Canadian Gas Association (CGA)
 - .1 CAN/CGA B149.1, Natural Gas and Propane Installation Code Handbook.
 - .2 CAN/CGA B149.2, Propane Storage and Handling Code.
- .3 Canadian General Standards Board (CGSB).
 - .1 CGSB 71-GP-24M, Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.
- .4 Underwriters' Laboratories of Canada (ULC).
 - .1 CAN/ULC-S701, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
 - .2 CAN/ULC-S702, Standard for Thermal Insulation, Mineral Fibre, for Buildings.
 - .3 CAN/ULC-S704, Standard for Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.

1.3 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data.
 - .2 Submit two copies of WHMIS MSDS Material Safety Data Sheets. Indicate VOC's insulation products and adhesives.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

- .1 Provide certificate of qualify compliance from insulation manufacturer.

PART 2 - PRODUCTS

2.1 INSULATION

- .1 Wall insulation: Extruded polystyrene rigid insulation to CAN/ULC S701, Type 3, 51mm thickness, R5/inch, 140 kPa compressive strength. 610mm x 2438mm size, square edge.

2.2 ACCESSORIES

- .1 Adhesive suitable for bonding polystyrene insulation to substrates.
- .2 Low expansion spray polyurethane foam insulation.

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 Offset both vertical and horizontal joints in multiple layer applications.
- .6 Do not enclose insulation until it has been reviewed and approved by Engineer-Architect.

3.3 EXAMINATION

- .1 Examine substrates and immediately inform Owner's 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 WALL INSULATION INSTALLATION

- .1 Apply adhesive to insulation board in accordance with manufacturer's recommendations.
- .2 Fill gaps with low expansion spray foam and trim off excess.

3.5 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 1
- .2 Section 06 10 00 – Rough Carpentry
- .3 Section 09 21 16 – Gypsum Board Assemblies

1.2 REFERENCES

- .1 American Society for Testing and Materials, (ASTM).
 - .1 ASTM C553, Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C665, Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C1320, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
 - .4 ASTM E84, Test Method for Surface Burning Characteristics of Building Materials.
- .2 Canadian Standards Association (CSA International).
 - .1 CSA B111, Wire Nails, Spikes and Staples.
 - .2 CSA B149 PACKAGE, Consists of B149.1, Natural Gas and Propane Installation Code and B149.2, Propane Storage and Handling Code.
- .3 Underwriters Laboratories of Canada (ULC).
 - .1 CAN/ULC-S702, Standard for Mineral Fibre Insulation.

1.3 SUBMITTALS

- .1 Product data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet.
- .2 Manufacturer's instructions:
 - .1 Submit manufacturer's installation instructions.

PART 2 PRODUCTS

2.1 INSULATION

- .1 Exterior wall batt insulation:
 - .1 Unfaced semi-rigid batt insulation, made from basalt rock and slag, 89 mm thickness, RSI 2.64 (R15), for wood stud applications.
 - .1 CAN/ULC S102: Flame Spread 0, Smoke Developed 0
 - .2 ASTM C 1104: Absorbs less than 1% by volume
 - .3 NFPA 101: Class A interior finish
 - .4 Recycled Content: Minimum 70%
- .2 Interior wall batt insulation:
 - .1 Unfaced formaldehyde free batt insulation, made from basalt rock and slag, 75mm thickness, 2.5 pcf density, for wood stud applications.
 - .1 CAN/ULC S102: Flame Spread 0, Smoke Developed 0
 - .2 ASTM C 1104: Absorbs less than 1% by volume
 - .3 NFPA 101: Class A interior finish

.4 Recycled Content: Minimum 70%

2.2 ACCESSORIES

- .1 Low expansion spray foam insulation, low flame spread.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal and acoustic protection to building elements and spaces and for sound attenuation as noted on drawings.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls and CSA B149.1 and CSA B149.2 Type B and L vents.
- .5 Do not enclose insulation until it has been reviewed by engineer-architect.
- .6 Fill voids around exterior frames and junctions to existing materials with low expansion spray foam, trim off excess.

3.3 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 1.
- .2 Section 06 10 00 – Rough Carpentry.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction.
- .2 Underwriters Laboratories Canada (ULC)
 - .1 CAN/ULC S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.3 SUBMITTALS

- .1 Submit manufacturer's printed product literature, specifications and datasheet and include:
 - .1 Product characteristics.
 - .2 Performance criteria.
 - .3 Limitations.
- .2 Submit two copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS).
- .3 Quality assurance submittals:
 - .1 Certificates: submit certificates 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 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 Owner's Representative before proceeding with vapour barrier work.
- .4 When accepted, mock-up will demonstrate minimum standard of quality required for this work.

PART 2 PRODUCTS

2.1 SHEET VAPOUR RETARDER

- .1 Polyethylene film: to CAN/CGSB-51.34, 0.15mm thick with a water vapour permeance of not greater than 45ng/(P.s.m²), flame spread rating of less than 150 to CAN/ULC S102.

2.2 ACCESSORIES

- .1 Joint sealing tape: air resistant pressure sensitive adhesive tape, type recommended by vapour barrier manufacturer, 50 mm wide for lap joints and perimeter seals, 25mm wide elsewhere.
- .2 Sealant: compatible with vapour retarder, recommended by vapour retarder manufacturer, to Section 07 92 00 – Joint Sealants.
- .3 Staples: minimum 6 mm leg.
- .4 Moulded box vapour barrier: factory-moulded polyethylene box for use with recessed electric switch and outlet device boxes.

PART 3 EXECUTION

3.1 INSTALLATION

- .1 Ensure services are installed and inspected prior to installation of retarder.
- .2 Install sheet vapour retarder on warm side of exterior wall and ceiling space assemblies prior to installation of gypsum board to form continuous retarder.
- .3 Use sheets of largest practical size to minimize joints.
- .4 Inspect for continuity. Repair punctures and tears with sealing tape before work is concealed.

3.2 EXTERIOR SURFACE OPENINGS

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

3.3 PERIMETER SEALS

- .1 Seal perimeter of sheet vapour barrier as follows:
 - .1 Apply continuous bead of sealant to substrate at perimeter of sheets.
 - .2 Lap sheet over sealant and press into sealant bead.
 - .3 Install staples through lapped sheets at sealant bead into wood substrate.
 - .4 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.4 LAP JOINT SEALS

- .1 Seal lap joints of sheet vapour barrier as follows:
 - .1 Attach first sheet to substrate.
 - .2 Apply continuous bead of sealant over solid backing at joint.
 - .3 Lap adjoining sheet minimum 150 mm and press into sealant bead.
 - .4 Install staples through lapped sheets at sealant bead into wood substrate.
 - .5 Ensure that no gaps exist in sealant bead. Smooth out folds and ripples occurring in sheet over sealant.

3.5 ELECTRICAL BOXES

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

3.6 CLEANING

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

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

- .1 Supply labour, materials and equipment to complete the Work as shown on the Drawings and as specified herein to bridge and seal the following air leakage pathways and gaps:
 - .1 Connections of the walls to adjoining masonry wall.
 - .2 Transition of the walls to the foundation.
 - .3 Seismic and expansion joints.
 - .4 Openings and penetrations of windows and door frames.
 - .5 Pipe, conduit, duct, louvres and similar penetrations.
 - .6 Screws, bolts and similar penetrations.
 - .7 Other air leakage pathways through the building envelope affected by this contract.
- .2 Materials and installation methods of the primary vapour permeable air barrier membrane system and accessories.
- .3 Materials and installation methods of self-adhering flashing membranes.

1.2 RELATED SECTIONS

- .1 Division 1.
- .2 Section 06 10 00 – Rough Carpentry
- .3 Section 08 11 13 – Steel Doors and Frames

1.3 REFERENCES

- .1 The following standards are applicable to this section:
 - .1 ASTM E 2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
 - .2 ASTM E 2178: Standard Test Method for Air Permeance of Building Materials.
 - .3 ASTM E 283: Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - .4 ASTM E 96: Water Vapour Transmission of Materials.
 - .5 ASTM C 920; Standard Specification for Elastomeric Joint Sealants.
 - .6 ASTM C 1193; Standard Guide for Use of Joint Sealants.
 - .7 ASTM E 84: Test Method for Surface Burning Characteristics of Building Materials.
 - .8 ICC-ES AC 38: Acceptance Criteria for Water-Resistive Barriers.
 - .9 ICC-ES AC 188: Acceptance Criteria for Roof Underlayments.
 - .10 ICC-ES AC 48: Acceptance Criteria for Roof Underlayment for use in Severe Climates.
 - .11 AAMA 2400: Standard Practice for Installation of Windows with a Mounting Flange in Stud Frame Construction.
 - .12 ASTM E 2112: Standard Practice for Installation of Exterior Windows, Doors and Skylights.
 - .13 AAMA 711-05: Specification for Self Adhering Flashing Used for Installation of Exterior Wall Fenestration Products.
- .2 AATCC – American Association of Textile Chemists and Colorists.

- .1 Test Method 127 Water Resistance: Hydrostatic Pressure Test.
- .3 TAPPI
 - .1 Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area).
 - .2 Test Method T-460; Air Resistance (Gurley Hill Method).

1.4 SUBMITTALS

- .1 Submit documentation from an approved independent testing laboratory certifying compliance with a) the air leakage rates of the air barrier membrane assembly, including primary membrane, primer and sealants have been tested to meet ASTM E2357, b) ICC-AC 38, c) Peel adhesion to unprimed plywood and cyclic and elongation per ICC-AC 48, d) Class A flame spread index and smoke development per ASTM E 84.
- .2 Submit documentation from an approved independent testing laboratory, certifying that the air leakage and vapour permeance rates of the air barrier membrane system exceed the requirements of the National Building Code of Canada (NBCC) and in accordance with ASTM E 2178 and ASTM E 2357.
 - .1 Test report submittals shall include test results on porous substrate and include sustained wind load and gust load air leakage results.
- .3 Submit manufacturers' current product data sheets for the air barrier membrane system and flashing membrane system.

1.5 QUALITY ASSURANCE

- .1 Submit document stating the applicator of the primary air barrier membranes specified in this section is authorized by the manufacturer as suitable for the execution of the Work.
- .2 Perform Work in accordance with manufacturer's written instructions and this specification.
- .3 Maintain one copy of manufacturer's written instructions on site.
- .4 Allow access to Work site by the air barrier membrane manufacturer's representatives.
- .5 Components used shall be sourced from one manufacturer, including sheet membrane, air barrier sealants, primers, mastics, flashings and adhesives.
- .6 Single-Source Responsibility:
 - .1 Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
 - .2 Provide products which comply with all federal, provincial, and local regulations with regards to controlling the use of volatile organic compounds (VOC's).

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Refer to current Product MSDS for proper storage and handling.
- .2 Deliver all materials to the job site in undamaged and original packaging indicating the name of the manufacturer and product.
- .3 Store all roll materials on end in original packaging. Protect rolls from direct sunlight and weather until ready for use.
- .4 Store all air barrier membranes, adhesives and primers at temperatures of 5 degrees C (40 degrees F) and rising.
- .5 Keep solvent away from open flame or excessive heat.

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

1.7 CO-ORDINATION

- .1 Ensure continuity of the water resistive air barrier throughout the scope of this section.

1.8 WARRANTY

- .1 Provide manufacturer's standard assembly warranty exceeding 5 years.

PART 2 PRODUCTS

2.1 MATERIALS

- .1 Air barrier membrane components and accessories must be obtained as a single-source from the membrane manufacturer to ensure total system compatibility and integrity.

2.2 SELF-ADHERING AIR BARRIER

- .1 Primary water resistive air barrier membrane and window flashing shall be; a self-adhering reinforced modified polyolefin tri-laminate sheet air barrier membrane for wall construction, specifically designed to be water resistant and vapour permeable. Membrane shall have the following physical properties:
 - .1 Air leakage: <0.02L/s/m² @ 75Pa [<0.004 CFM/ft² @ 1.57 lbs/ft²] when tested in accordance with ASTM E 2178.
 - .2 Water Vapour Permeance: 1658 ng/Pa.m².s (29 perms) to ASTM E96, Method B – Desiccant Method.
 - .3 Tested to ASTM E 2357 for Air Leakage of Air Barrier Assemblies.
 - .4 Resistance to Water Penetration: Pass ICC-ES AC 38.
 - .5 Water Penetration Resistance around Nails: Pass when tested to AAMA 711-05 & ASTM D 1970 modified.
 - .6 Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84: Flame Spread Rating of 0 and Smoke Development Classification of 105.
 - .7 Basis Weight: 120 g/m², when tested in accordance with TAPPI Test Method T-410.
 - .8 Tensile Strength: 182N MD and 129N CD per ASTM D828.
 - .9 Average Dry Breaking Force: 565N MD, and 405N CD per ASTM D 5034.
 - .10 Cyclic and Elongation: Pass at 100 cycles, -29 deg C. (-20 deg F.) per ICC-ES AC 48.
- .2 Self-Adhered membrane for window opening flashing and transition membrane shall be an SBS modified bitumen, self-adhering sheet membrane which is integrally laminated to a engineered thermoplastic film. Membrane shall have the following physical properties:
 - .1 Membrane Thickness: 1.0 mm (0.040 inches (40 mils)).
 - .2 Low temperature flexibility: -30° C to ASTM D146.
 - .3 Elongation: 200% minimum to ASTM D412-modified.
 - .4 Minimum Puncture Resistance 178 N to ASTM E154.
 - .5 Lap Peel Strength: 4378.4 N/m to ASTM D903; 180° bend.
 - .6 Auxiliary tested component of ASTM E2357 for Air Leakage of Air Barrier Assemblies.

- .3 Through-wall flashing membrane (Self-Adhering) shall be; an SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film. Membrane shall have the following physical properties:
 - .1 Membrane Thickness: 1.0 mm (0.0394 inches; 40 mils).
 - .2 Film Thickness: 0.1mm 4.0 mils.
 - .3 Flow (ASTM D5147): Pass @ 100°C (212°F).
 - .4 Puncture Resistance: 134 lbf to ASTM E 154.
 - .5 Tensile Strength (film): 39500 kPa (5723 psi) ASTM D882.
 - .6 Tear Resistance: 200 N (13lbs.) MD to ASTM D1004.
 - .7 Low temperature flexibility: -30°C (-22°F) to CGSB 37-GP-56M.

2.3 ADHESIVE PRIMERS

- .1 Adhesive Primer for primary self-adhering water resistive air barrier membrane, self-adhering transition membrane and SBS modified bitumen membranes at all temperatures shall be, a synthetic rubber based adhesive, quick setting, having the following physical properties:
 - .1 Weight: 0.8 kg/l.
 - .2 Solids by weight: 35%.
 - .3 Drying time (initial set): 30 minutes.
 - .4 Auxiliary tested component of ASTM E 2357 for Air Leakage of Air Barrier Assemblies.
- .2 Adhesive Primer with low VOC content for self-adhering membranes at all temperatures shall be a synthetic rubber based adhesive, quick setting, having the following properties:
 - .1 VOC: <240 g/L,
 - .2 Solids by weight: 40%,
 - .3 Drying time (initial set): 30 minutes
- .3 Primer for self-adhering membranes at temperatures above -4°C shall be a polymer emulsion based adhesive, quick setting, having the following physical properties:
 - .1 Weight: 1.0 kg/l,
 - .2 Solids by weight: 53%,
 - .3 Water based, no solvent odours,
 - .4 Drying time (initial set): 30 minutes at 50% RH and 20°C.

2.4 PENETRATION & TERMINATION SEALANT

- .1 Termination Sealant shall be 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 25 mm (1 inch) wide.
 - .7 Auxiliary tested component of ASTM E 2357 for Air Leakage of Air Barrier Assemblies.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Verify that surfaces and conditions are ready to accept the Work of this section. Notify Engineer/Architect in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.
- .2 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.
- .3 Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

3.2 SURFACE PREPARATION

- .1 All 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 primer for air barrier membranes are applied.
- .3 Ensure all preparatory Work is complete prior to applying primary air 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 Pre-cast and concrete block substrates are required to be adhesive primed prior to application of self-adhering water resistive air barrier membrane.

3.3 APPLICATION OF SUBSTRATE ADHESIVE PRIMER

- .1 Required Adhesive Primer for SBS Modified Self-Adhered Membranes.
 - .1 For the application of SBS modified self-adhered window sill pan flashings, through-wall flashings and other applications of SBS modified self-adhered transition membranes, the substrate needs to be conditioned with applicable adhesive primer.
 - .2 Apply adhesive primer at rate recommended by manufacturer to all areas to receive SBS modified self-adhering sheet membrane as indicated on drawings by roller or spray and allow to fully dry.
 - .3 Adhesive primed surfaces not covered by self-adhering membrane or self-adhering through-wall flashing membrane during the same working day must be re-conditioned.
- .2 Adhesive Primer for Primary Water Resistive Air Barrier Membrane.
 - .1 Conditions not typically requiring adhesive-primers:
 - .1 Application above 40°F (5°C) to clean & dry wood and sheathing boards, such as plywood and OSB. Ensure substrate and membrane temperatures are above 40°F (5°C)
 - .2 Conditions requiring use of adhesive-primers:
 - .1 Metal, DensGlass® products, exterior grade sheathing board, Concrete, CMU and other masonry substrates
 - .2 If appropriate adhesion is not obtained due to conditions beyond the control of the installer, the adhesion can be aided by continuous application of adhesive-primer to the substrate and laps. Ensure all primed surfaces are covered in the same day.

3.4 INSTALLATION OF AIR BARRIER SYSTEM

.1 INSIDE AND OUTSIDE CORNERS

- .1 Seal inside and outside corners of sheathing with a strip of self-adhering vapour permeable membrane extending a minimum of 75mm (3 inches) on either side of the corner detail.
 - .1 For inside corners, pre-treat the corner with a continuous 13mm (½ inch) bead of termination sealant.
 - .2 Adhesive prime surfaces in an intermittent pattern, at a rate of 3 – 6 m²/L (200 – 250 sq ft/gal) where appropriate due to surface conditions, to achieve surface adhesion as per manufacturers' instructions and allow drying.
 - .3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2 inches) overlap at all side laps and 75 mm (3 inches) overlap at all end laps of membrane.
 - .4 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 with self-adhered air barrier transition membrane.
- .2 Prime surfaces in an intermittent pattern, at a rate of 3 – 6 m²/L (200 – 250 sq ft/gal) where appropriate due to surface conditions, to achieve surface adhesion as per manufacturers' instructions and allow to dry.
- .3 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Provide minimum 75 mm (3 inch) lap to all substrates.
- .4 Ensure minimum 50 mm (2 inches) overlap at all side laps and 75 mm (3 inches) overlap at all end laps of membrane.
- .5 Roll all laps and membrane with a counter top roller to ensure seal.

.3 EXTERIOR ROUGH OPENINGS

- .1 Place specified SBS modified self-adhered window flashing membrane across window sills. Pre-treat inside corners with a bead of termination sealant. Install window sill pan membrane and end dam terminations, seal cuts and terminations with termination sealant per window manufacturer's instructions and ASTM E 2112.
- .2 Wrap head and jamb of rough openings with specified self-adhered water resistive air barrier transition membrane as detailed.
- .3 Extend specified self-adhered water resistive air barrier membrane into rough window openings sufficient to provide a connection to interior vapour retarder.
- .4 Prime surfaces in an intermittent pattern, at a rate of 3 – 6 m²/L (200 – 250 sq ft/gal) where appropriate to achieve surface adhesion as per manufacturers' instructions and allow drying.
- .5 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 50 mm (2 inches) overlap at all side laps and 75 mm (3 inches) overlap at all end laps of membrane.
- .6 Roll all laps and membrane with a counter top roller to ensure seal.

.4 THROUGH-WALL FLASHING MEMBRANE

- .1 Apply through-wall flashing membrane along the base of walls and over flashings as detailed.

- .2 Adhesive prime surfaces and allow to dry, press membrane firmly into place, overlap minimum 50 mm (2 inches) at all side and end laps. Promptly roll all laps and membrane to ensure the seal.
- .3 Applications shall form a continuous flashing membrane and shall extend up a minimum of 200 mm (8 inches) up the back-up wall.
- .4 Seal the top edge of the membrane where it meets the substrate using termination sealant. Trowel-apply a feathered edge to seal termination to shed water.
- .5 Install through-wall flashing membrane and extend 13mm (½ inch) from outside edge of veneer. Provide “end dam” flashing.
- .5 **PRIMARY WATER RESISTIVE AIR BARRIER**
 - .1 Apply self-adhering water resistive air barrier membrane complete and continuous to substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.
 - .2 Prime surfaces in an intermittent pattern, at a rate of 3 – 6 m²/L (200 – 250 sq ft/gal) where appropriate to achieve surface adhesion as per manufacturers’ instructions and allow to dry.
 - .3 Align and position self-adhering membrane to substrate, remove top panel of protective release film and press firmly into place.
 - .4 Ensure alignment, hold membrane in place to avoid wrinkles and sequentially remove remaining panels of protective film and press firmly into place.
 - .5 Ensure minimum 75 mm (3 inch) overlap at all end and 50 mm (3 inch) side laps of subsequent membrane applications.
 - .6 Apply pressure to all membrane surfaces, laps and flashings using an appropriate roller to provide best possible surface adhesion.
 - .7 At the end of each days work, seal the top edge of the membrane where it meets the substrate with termination sealant. Trowel to a feathered edge to seal termination and shed water.

3.5 APPLICATION OF TERMINATION SEALANT

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

3.6 FIELD QUALITY CONTROL

- .1 Make notifications when sections of Work are complete to allow review prior to covering air barrier system.
- .2 Manufacturer’s Representative shall review the work and provide letter stating the work conforms with their installation standards.

3.7 PROTECTION

- .1 Damp substrates must not be inhibited from drying out. Do not expose the backside of the substrate to moisture or rain.
- .2 Cap and protect exposed back-up walls against wet weather conditions during and after application of membrane, including wall openings and construction activity above completed air barrier installations.

- .3 Water resistive air barrier membranes are not designed for permanent exposure. Good practice calls for covering as soon as possible, not to exceed 150 days.

END OF SECTION

PART 1 – GENERAL

1.1 RELATED SECTIONS

- .1 Division 1.
- .2 Section 06 10 00 – Rough Carpentry
- .3 Section 07 92 00 – Joint Sealants
- .4 Section 09 90 00 - Painting

1.2 REFERENCES

- .1 ASTM International (ASTM):
 - .1 ASTM C1186 - Standard Specification for Flat Non-Asbestos Fiber-Cement Sheets.
 - .2 ASTM E96 - Test Methods for Water Vapor Transmission of Materials.
 - .3 ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.4 SUBMITTALS

- .1 Indicate details of construction, profiles, jointing, fastening and other related details.
- .2 Indicate materials, thicknesses, finishes and hardware.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with Division 1.
- .2 Protect materials against dampness during and after delivery.
- .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

PART 2 - PRODUCTS

2.1 FIBER CEMENT PANELS

- .1 Composite panels made with Portland cement reinforced with synthetic fibers and additives. Non-combustible, rot proof.
 - .1 Sheet size: 6mm x 1220mm x 1220mm
 - .2 Finish: Smooth
 - .3 Density: 1,500 kg/m³
 - .4 Manufacturing Tolerances: +/- 3mm length and width, +/- 1.5mm thickness, - 1mm/m squareness.
 - .5 Dimensional change due to moisture: 0.15%
 - .6 Freeze-thaw resistance: No loss to mass
 - .7 Surface burning: 0 flame spread per ULC-S 102.M

2.2 ACCESSORIES

- .1 Manufacturer recommended screw fasteners for exterior applications. Stainless steel or coated hot dipped galvanized.
- .2 Sheet metal trim: Prefinished sheet with factory applied polyvinylidene fluoride.

- .1 Class F1S, 0.6mm (24 gauge). Colour as selected by Departmental Representative from manufacturer's standard range. Specular gloss: 30 units +/- 5 in accordance with ASTM D523.
- .2 Coating thickness: not less than 22 micrometres.
- .3 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:
- .4 Outdoor exposure period 2500 hours.
- .5 Humidity resistance exposure period 5000 hours.

PART 3 – EXECUTION

3.1 INSTALLATION

- .1 Ensure walls to receive cladding are flat, uniform, dry, and free of dirt, dust, and grease. Ensure air barrier, furring, and sheet metal work is complete prior to installation of panels.
- .2 Studs and furring strips must be spaced a maximum of 400mm on centre.
- .3 Locate joints on centre of framing. Leave 3mm expansion space between panels.
- .4 Pre-drill holes 1.5mm larger than the diameter of the screws, fasteners must penetrate minimum 19mm into solid wood. Place fasteners minimum 19mm from edge of panels and in field pattern recommended by manufacturer.
- .5 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects. Finished panel appearance should match existing adjacent.
- .6 Caulk all joints, observing rain screen principles.
- .7 Painting by Section 09 90 00.

END OF SECTION

PART 1 GENERAL

1.1 RELATED SECTIONS

- .1 Division 1.
- .2 Mechanical and Electrical.
- .3 Section 09 21 16 – Gypsum Board Assemblies
- .4 Section 09 51 99 – Acoustical Panel Ceilings

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC).
 - .1 ULC S115 1995, Fire Tests of Fire stop Systems.

1.3 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted; (ref: NBC Part 3.1.9.1.1 and 9.10.9.6.1): penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.
 - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Division 1.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 1 (one) copy of WHMIS MSDS Material Safety Data Sheets.
- .3 Shop Drawings:
 - .1 Submit shop drawings to show location and details of proposed material, reinforcement, anchorage, fastenings and method of installation.
 - .2 Construction details shall accurately reflect actual job conditions.
- .4 Quality Assurance Submittals:
 - .1 Test reports: in accordance with CAN-ULC-S101 for fire endurance and CAN-ULC-S102 for surface burning characteristics.

- .1 Submit certified test reports from approved independent testing laboratories, indicating compliance of applied fire stopping with specifications for specified performance characteristics and physical properties.

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company and personnel specializing in fire stopping installations with 5 years documented experience, approved by manufacturer.
- .2 Pre-Installation Meetings: convene pre-installation meeting 2 (two) weeks prior to beginning work of this Section, with contractor's representative and engineer-architect to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building sub-trades.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- .1 All firestopping products shall be by one manufacturer.

2.2 GENERAL

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
 - .1 Asbestos free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC S115 and not to exceed opening sizes for which they are intended.
 - .2 Fire stop system rating: 1(one) hour and 2 (two) hour where indicated.
 - .3 For fire separations with fire resistance rating less than 1 hour, provide 1 hour firestopping system.
- .2 Service penetration assemblies: systems tested to CAN-ULC S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC S115.
- .4 Fire resistance rating of installed fire stopping assembly in accordance with NBC.

2.3 MATERIALS

- .1 Sealant: High performance intumescent firestop sealant, tested in accordance with CAN/ULC-5115.
 - .1 Density: 84.3 lb/ ft³
 - .2 Mold and mildew performance: class 0 (ASTM G21-96)
 - .3 Flame spread: 0
 - .4 Smoke Development: 10
 - .5 Expansion ration: 1:5
- .2 Firestop joint spray: Sprayable or brush applied fire rated mastic for construction joints.

- .1 Density: 10.8 lb/ ft³
- .2 Movement capability: 50%
- .3 Flame spread: 15 (CAN/ULC-S102)
- .4 Smoke development: 10 (CAN/ULC-S102)
- .5 Sound transmission class: 59
- .3 Firestop collar: Ready to use firestop collar, galvanized steel housing with intumescent inserts for firestopping combustible pipes.
 - .1 Diameter to suit pipe.
 - .2 Expansion ratio: 1:10
- .4 Firestop cable collar: ready to use firestop collar, galvanized steel housing with intumescent inserts for firestopping cabling.
 - .1 Flame spread: 10
 - .2 Smoke development: 15
 - .3 Expansion Ratio: 1:3
- .5 Firestop wrap strip: Wrap strip of intumescent flexible firestop for use with plastic and insulated pipe penetrations.
 - .1 Density: 1.35 g/cm³
 - .2 Expansion ratio: 1:40
- .6 Firestop block: Ready to use intumescent flexible block designed to seal medium to large openings, multiple penetrations, and cable trays.
 - .1 Expansion ratio: 1:3
 - .2 Flame spread: 10
 - .3 Smoke Development: 15
 - .4 Sound transmission class: 52
- .7 Firestop putty pad: Moldable firestop putty designed to protect electrical boxes in stud wall assemblies.
 - .1 Density: 1.48 g/cm³
 - .2 Flame spread: 15
 - .3 Smoke development: 10

2.4 ACCESSORIES

- .1 Primers: to manufacturer's recommendation for specific material, substrate, and end use. Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .2 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.
- .3 Sleeves: Provide sleeves in walls and floors where required for firestopping detail.

PART 3 EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Comply with health regulations.
- .3 Cooperate with the Owner, comply with the requirements specified under Division 1.

3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke through termination devices, and un-penetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.
- .6 Install firestop putty on electrical boxes of gypsum board fire separations.

3.4 SCHEDULE

- .1 All fire separations indicated on architectural drawings, and fire rated beams, columns, and supporting walls:
 - .1 Firestop new penetrations of gypsum board and masonry by mechanical and electrical systems.
 - .2 Apply firestopping putty around electrical boxes in gypsum board walls
 - .3 Firestop new duct fire dampers
- .2 New gypsum board at wall fire separations:
 - .1 Firestop wall tops and any openings, joist and beam penetrations, to make a complete fire separation.
- .3 New fire rated acoustic panel ceilings:
 - .1 Apply firestopping putty around ceiling electrical boxes

3.5 CLEANING

- .1 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .2 Remove temporary dams after initial set of fire stopping and smoke seal materials.

END OF SECTION

PART 1 – GENERAL

1.1 SECTION INCLUDES

- .1 Materials, preparation and application for non-structural caulking and sealants.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .2 American Society for Testing and Materials (ASTM).
 - .1 See various standards referred to in Part 2 of this Specification.
 - .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS).
 - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submit shop drawings in accordance with Division 1.
- .2 Manufacturer's product data to describe:
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility with other surfaces.
 - .4 Colour selection chart.
- .3 Submit manufacturer's instructions with installation instructions for each product used.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, handle, store and protect materials in accordance with manufacturer's instructions.
- .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.

1.5 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 the limits permitted by joint sealant manufacturer or are below 4.4°C.
 - .2 When joint substrates are wet.

- .2 Joint-Width Conditions:
 - .1 Do not proceed with installation of joint sealants where joint widths are beyond the limitations allowed by the 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.
- .4 Remove and reinstate only the amount of caulking that can be accomplished per work day. Leaving joints open to rain and weather is unacceptable. Provide protection of work as necessary to prevent ingress of water into building and to protect new sealant while curing.
- .5 Protect new sealant from dirt and airborne dust sources. New sealant with excessive dust or dirt stuck to the surface will be rejected and is to be replaced at no additional cost to Owner.

1.6 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 Data Safety 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.

PART 2 - PRODUCTS

2.1 GENERAL

- .1 Use low toxicity/low VOC materials. Do not use caulking that emits strong odours, or contain toxic chemicals that leach.
- .2 When low toxicity caulks are not possible, confine usage to areas which off-gas to exterior.
- .3 Where sealants are qualified with primers, use only these primers.

2.2 SEALANT MATERIALS

- .1 **Type A:** One-part Silicone Sealant.
 - .1 One part, neutral cure architectural grade sealant that easily extrudes in any weather and cures quickly at room temperature. A cold applied, non-sagging silicone material that cures to medium modulus silicone rubber upon exposure to atmospheric moisture. The cured sealant shall be durable and flexible enough to accommodate +/-

50% movement of original joint dimension when installed in a properly designed weather seal joint.

- .1 Weatherability: Unaffected by sunlight, rain, snow, ozone, and temperature extremes of -40°F (-40°C) to 300°F (149°C).
- .2 Excellent unprimed adhesion to a wide variety of construction materials and building components including anodized aluminum, steel, painted metal, EIFS, plastics, and masonry.
- .3 ASTM C 679 Tack Free Time, 50% RH: 3 hours
- .4 ASTM C 679 Curing Time, 50% RH and 25°C: 7-14 days
- .5 ASTM C 679 Full Adhesion: 14-21 days
- .6 ASTM C 639 Flow, Sag or Slump: 0.1 inches (2.54mm)
- .7 ASTM C 639 Working Time: 20-30 minutes
- .8 VOC content: 28g/L
- .9 ASTM D 2240 Durometer Hardness, Shore A: 35 points
- .10 ASTM C 794 Peel Strength: 3lb/in (5.7kg/cm)
- .11 ASTM C 1135 Tension Adhesion Strength at 50% extension: 45 psi (0.31 MPa)
- .12 ASTM C 719 Joint Movement Capability: +/- 50%
- .13 ASTM C 1248 Staining: None

.2 **Type B:** Paintable Siliconized Acrylic Latex Sealant.

- .1 General purpose interior sealant, siliconized acrylic latex, paintable, also suitable for use on vinyl siding, bathroom and kitchen fixtures.
 - .1 Applicable standards:
 - .1 ASTM C-834, Type OP, Grade -18C.
 - .2 CAN/CGSB 19-GP-17M.
 - .2 Colours: Clear and white.

.3 **Accessories:** 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 Bond breaker tape:
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 SEALANT SCHEDULE

- .1 Perimeters of exterior openings and flashings where door, louver, and window frames meet exterior facade of building:
 - .1 **Type A** Silicone Sealant.
- .2 Interior trim gaps meeting window frames, sills, door frames, flooring base trims:
 - .1 **Type B** Paintable Silicone Sealant.

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 and existing surfaces from staining or contamination.

3.2 PREPARATION OF JOINT SURFACES

- .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.
- .6 Prime all surfaces to receive sealant with recommended primer unless adhesion tests prove otherwise.

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.

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, if required, in strict accordance with sealant manufacturer's instructions.

3.6 APPLICATION

- .1 Apply sealant in accordance with manufacturer's written instructions.
 - .1 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
 - .2 Apply sealant in continuous beads.
 - .3 Apply sealant using gun with proper size nozzle.
 - .4 Use sufficient pressure to fill voids and joints solid.
 - .5 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
 - .6 Tool exposed surfaces before skinning begins to give slightly concave shape.
 - .7 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing:
 - .1 Cure sealants in accordance with sealant manufacturer's instructions.
 - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup:
 - .1 Clean adjacent surfaces immediately and leave work neat and clean.
 - .2 Remove excess and droppings, using recommended cleaners as work progresses.
 - .3 Remove masking tape after initial set of sealant.

END OF SECTION