

1. General

1.1 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to Site in their original wrappings with labels intact and store in areas directed by Contract Administrator.
- .2 Store insulation on raised platforms and protect with waterproof covers. Prevent exposure of insulation to UV exposure.
- .3 Store materials inside buildings for 24 hours prior to installation.

2. Products

2.1 MATERIALS

- .1 New North/South Stud Cavity Wall Insulation: Semi-rigid Glass Fibre boards, Owens Corning #701, un-faced, 16" width, R-4.2 / inch
- .2 Existing North/South Stud Cavity Wall Insulation at access points: Glass fibre batt insulation, CSA A101-M, 17.5 kg/cu.m. (1.1 pcf) density.
- .3 North/South Vestibule Floors (Phase 3 only): CAN/ULC S701 Type 4, extruded polystyrene board insulation, minimum compressive strength of 170 kPa (25 psi) at 10% deformation or yield; square edges; unfaced, Styrofoam Cavitymate Ultra by Dow Chemical of Canada Ltd.
- .4 Adhesive: Compatible to and as recommended by manufacturer of insulating materials.

3. Execution

3.1 PREPARATION

- .1 Ensure that surfaces to receive adhesive or insulation are dry, firm, straight, and free from loose material, projections, ice, frost, slick, grease, oil or other matter detrimental to bond of the adhesive or uniform bedding of the insulation.
- .2 Maintain surface and ambient temperatures during application and curing of adhesive at a temperature recommended by the manufacturer of the type of adhesive used.

3.2 Installation - General

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces as indicated on Drawings.
- .2 Fit insulation tight to electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other projections or openings.

- .3 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation panels free from ripped backs or chipped or broken edges.
- .4 Install materials in accordance with manufacturer's instructions.
- .5 Do not cover insulation until it has been reviewed by Contract Administrator.

3.3 Installation - Insulation

- .1 Apply adhesives to substrate at rate recommended by manufacturer.
- .2 Fix insulation clip type fasteners on substrate, 2 per 600 mm x 1200 mm (24" x 48") board minimum. Impale insulation board on insulation clips, butting all joints firmly together and secure with washers, cut off spindles 3 mm (1/8") beyond washer.
- .3 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm (6") wide 6 mil polyethylene strip over joint using compatible adhesive prior to application of insulation.
- .4 Provide flexible insulation of equivalent thickness and thermal insulation to fit areas where application of rigid insulation is not possible to provide continuous coverage.
- .5 Installation - Batt Or Roll Insulation
 - .1 Fit batt between framing and press firmly into place. Butt tightly at joints, free of gaps.
 - .2 Insulate behind pipes, ducts, electric conduits and outlets or junction boxes. Cut insulation to fit around and behind obstructions and non-standard spaces.

END OF SECTION

Part 1 General

1.1 INTENT

- .1 This section specifies requirements for sprayed polyurethane foam, primarily intended for use as thermal insulation.

1.2 WORK INCLUDED

- .1 Spray-application of polyurethane foam for thermal insulation .

1.3 REFERENCES

- .1 ULC S705.1-01 “Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Material Specification (Replaces CGSB 51.23-92)
- .2 ULC S705.2-02 “Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installation (Replaces CGSB 51.39-92)
- .3 Installer site reference guides “Sprayed Polyurethane Foam – Certified Installer – Level I Manual”, “Sprayed Polyurethane Foam – Certified Installer – Level II Manual”, “Sprayed Polyurethane Foam – Certified Installer – Level III Manual”, “Sprayed Polyurethane Foam – Certified Installer – Level IV Manual”, “Sprayed Polyurethane Foam – Certified Installer – Level V Manual”, distributed by the Canadian Urethane Foam Contractors Association Inc.

1.4 SYSTEM DESCRIPTION

Materials of this section shall provide continuity of thermal insulation at building enclosure in conjunction with other thermal materials as shown.

1.5 SYSTEM DESCRIPTION

- .1 Provide two 300 mm x 300 mm samples of finished product to Contract Administrator.
- .2 Provide the CCMC Evaluation Report and the manufacturer’s documentation confirming material has been evaluated and conforms to the requirements of the CAN/ULC S705.1-01 Material Standard.

- .3 Submit proof of License of the Contractor by CUFCA (Canadian Urethane Foam Contractors Association Inc.) prior to commencing the work. Licensing is required by CAN/ULC S705.2-02 Installation Standard.
- .4 Manufacturers installation instructions: indicate preparation, installation requirements and techniques, product storage and handling criteria, and limitations of the material.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Materials are to be delivered in original containers and packaged with appropriate MSDS and labels.
- .2 The material is to be stored in a safe manner as recommended by the manufacturer, as required by the CAN/ULC S705.2-02 Installation Standard.
- .3 Containers shall be marked as required by the CAN/ULC S705.1-01 Material standard. The "use before" date shall be included on the drum label.
- .4 Empty isocyanate containers are to be decontaminated or removed from site on a daily basis.

1.7 ENVIRONMENTAL CONDITIONS

- .1 Apply spray polyurethane foam when chemical, atmospheric and cavity/surface temperatures are within the limitations required by the CAN/ULC S705.2-02 Installation Standard and as recommended by the manufacturer.

1.8 SEQUENCING AND SCHEDULING

- .1 Co-ordinate this work with the work of all sections referencing this work.
- .2 All foam insulation closures and substrates shall be completed and secure before the work of this section commences.

1.9 WARRANTY

- .1 The work under this section shall be warranted by the contractor against defects in workmanship or material for a period of two years from date of substantial completion.
- .2 Promptly rectify, at the contractors expense, defects or deficiencies that become apparent during the warranty period.

Part 2 Products

2.1 MATERIALS

- .1 Sprayed polyurethane foam material, when tested, shall meet the requirements of CAN/ULC S705.1-01 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material- Specification.
- .2 A copy of an Evaluation Report (such as the CCMC Evaluation Report) or copies of the test reports from an SCC (Standards Council of Canada) accredited testing laboratory, for each physical property, indicating that the product meets the requirements of ULC S705.1-01 shall be made available upon request. A copy of either the evaluation report or the test reports shall be on file at the CUFCA office.
- .3 Material containers shall be labeled with the Evaluation Report number of the evaluation agency.
- .4 Design RSI value as indicated in test report; minimum RSI/25 mm: 1.05 (R6/inch).
- .5 Products that meet the preceding requirements:
 - BASF Walltite
 - Demilec / Cornell Heatlok 0240 / Airmetic 0223
 - PFSI Polar Foam 7300

2.2 EQUIPMENT

- .1 The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-02 and the equipment manufacturer's recommendations for specific type of application.
- .2 Equipment settings are to be recorded on the Daily Work Record as required by the CAN/ULC S705.2-02 Installation standard.
- .3 Each proportioner unit to supply only one spray gun.

Part 3 Execution

3.1 EQUIPMENT

- .1 Verify that surfaces and conditions are suitable to accept work as outlined in this section.
- .2 Prior to commencement of work report in writing to the Contract Administrator any defects in surfaces or conditions that may adversely affect the performance of products installed under this section.

- .3 Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

3.2 PREPARATION

.1 PROTECTION

- .1 Mask and cover adjacent areas to protect from over spray.
- .2 Ensure any required foam stop or back up material are in place to prevent over spray and achieve complete seal.
- .3 Seal off existing ventilation equipment. Install temporary ducting and fans to ensure exhaust fumes. Provide for make-up air.
- .4 Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

.2 SURFACE PREPARATION

- .1 Surfaces to receive foam insulation shall be clean, dry and properly fastened to ensure adhesion of the polyurethane foam to the substrate.
- .2 Ensure that all work by other trades that may penetrate through the thermal insulation is in place and complete.
- .3 Ensure that surface preparation and any primers required conform to the manufacturers instructions.

3.3 APPLICATION

- .1 Spray-application of polyurethane foam shall be performed in accordance with CAN/ULC S705.2-02 and the manufacturers instructions.
- .2 Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the CAN/ULC S705.2 Installation standard.
- .3 Do not install spray polyurethane foam within 75mm of heat emitting devices such as light fixtures and chimneys.
- .4 Finished surface of foam insulation to be free of voids and imbedded foreign objects.
- .5 Remove masking materials and over spray from adjacent areas immediately after
- .6 foam surface has hardened. Ensure cleaning methods do not damage work

performed by other sections.

- .7 Trim, as required, any excess thickness that would interfere with the application of cladding/covering system by other trades.

END OF SECTION

Part 1 General

1.1 QUALITY ASSURANCE

- .1 Installers: skilled mechanics having minimum five (5) years experience in the Work specified and having an understanding of the design principles of air barrier.
- .2 Installation: maintain continuity of air barrier at interface with adjacent construction and where Work of other Sections project through the air barriers. Allow for expansion and contraction and linear movement of these items.
- .3 Pre-installation meeting: before commencing the Work of this Section, arrange a Site meeting attended by the Contractor of this Section, the Contract Administrator, and the material Manufacturers' qualified representative. Discuss surface conditions, application procedures, suitability of materials and alternative recommendations.

1.2 SUBMITTALS

- .1 Samples: two (2) 150 mm x 150 mm samples of sheet air barriers.

1.3 SAMPLE INSTALLATION

- .1 Provide a one building module representative sample installation on-site at location directed by the Contract Administrator. Include a sample of the condition of the barrier edge at concrete and at metal showing typical fastenings, a barrier to barrier joint and a deflection provision. Modify or replace sample installations as directed to obtain approval. Accepted sample installation shall form the standard for remaining Work and may form part of the Work.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in factory wrapped rolls with labels indicating Manufacturer and trade name, material type, thickness, roll width and area.
- .2 Protect materials from direct exposure to sunlight and physical damage.

1.5 COORDINATION

- .1 Coordinate installation of sheet air-vapour barrier with Work of other Sections to achieve an air and vapour tight building envelope.

Part 2 Products

2.1 MATERIALS

- .1 Air/vapour barrier membrane: 1 mm thick modified bituminous composite sheet, Perm-A-Barrier by W.R. Grace Co. of Canada Ltd., Blueskin SA by Bakor Inc., Air-Shield by WP Meadows, or Sopraseal Stick 1100 by Soprema, complete with primer, mastic and liquid membrane as required.

Part 3 Execution

3.1 INSTALLATION - AIR/VAPOUR BARRIER MEMBRANE

- .1 Install the membrane in strict accordance with the Manufacturer's written instructions and the representative's on-site instructions.
- .2 Ensure complete coverage of and adhesion to all substrate to receive the air/vapour barrier membrane, including all wall protrusions. Extend membrane 150 mm below sill plates at foundation walls. Cooperate with other Sections to ensure continuity of the barrier.
- .3 Apply the membrane to primed substrate in 2400 mm lengths or as recommended by the membrane Manufacturer.
- .4 Apply membrane so that horizontal joints overlap with the upper sheet over the lower sheet, shingle style. Lap all horizontal joints minimum 50 mm all side joints minimum 64 mm and all end joints minimum 150 mm. Stagger vertical joints to avoid four way joints.
- .5 Apply a trowelled head of mastic to all terminations of the membrane at the end of a day's Work and at membrane terminations.
- .6 Reinforce all inside and outside corners with a continuous 300 mm wide sheet membrane prior to installing the air/vapour barrier.
- .7 Fill gaps and joints with liquid membrane and reinforce with a continuous 300 mm wide sheet membrane prior to installing the air/vapour barrier.
- .8 Use liquid membrane at all protrusions and difficult detail areas and provide a minimum 64 mm overlap with the sheet membrane.
- .9 Apply air/vapour barrier so that the exterior wall is air tight, with air tight junctures at openings, penetrations and edges.
- .10 Inspect air/vapour barrier for continuity immediately prior to installation of insulation. Do not cover the air/vapour barrier until it has been inspected the Contract Administrator.
- .11 Repair punctures, rips and tears with pieces of membrane completely adhered to the damaged membrane.
- .12 Where punctures and tears are extensive, replace entire damaged section.
- .13 Install membrane over doors, windows and other openings to exterior walls.
- .14 At openings, extend membrane 200 mm beyond jambs, heads and sills.
- .15 Use mastic or fixing bars to adhere membrane to windows, doors etc. to maintain continuity of the barrier.

3.2 INSPECTION

- .1 Do not cover any portion of the air-vapour barrier until it has been inspected by the Contract Administrator or by an Inspector.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

- .1 Phases 1 & 2: cap flashing at top of interior wall
- .2 Phase 3: Drip and head flashings for new curtain wall
- .3 Phase 3: Drip flashings for wall repair at north terrace
- .4

1.2 REFERENCE STANDARDS

- .1 CRCA – “Canadian Roofing Contractors Association”.
- .2 ASTM A525 Sheet Steel, Zinc Coated, Galvanized by the Hot-Dip Process.
- .3 CGSB 37-GP-5M – “Sealing Compound, Rubber Asphalt”.

Part 2 Products

2.1 SHEET METALS

- .1 Cap Flashing – Phase 1 & 2: 24 gauge black anodized aluminum; mill finish; profile as indicated
- .2 Drip / Head Flashing – Phase 3: 24 gauge anodized aluminum; mill finish; profile as indicated; black for East & West curtain walls, clear anodized for North wall repairs
- .3 Reveal Strips: 16 gauge black anodized aluminum – mill finish; ½”d x 2”h

2.2 ACCESSORY MATERIALS AND COMPONENTS

- .1 Fasteners: Aluminum screws;
- .2 Bituminous paint: acid and alkali resistant type; black colour.

2.3 FABRICATION

- .1 Form sections square, true and accurate to size, free from distortion, and other defects detrimental to appearance or performance.
- .2 Backpaint flashing with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

Part 3 Execution

3.1 PREPARATION

- .1 Field measure Site conditions prior to fabricating Work.

3.2 INSTALLATION

- .1 Cap / drip flashing to be S-locked
- .2 Reveal strips to be butt-jointed

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

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

1.2 REFERENCES

- .1 American Society for Testing and Materials International, (ASTM)
 - .1 ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
 - .2 CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
 - .3 CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
 - .4 CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
 - .5 CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3 Department of Justice Canada (Jus)
 - .1 Canadian Environmental Protection Act, 1999 (CEPA).
- .4 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).

1.3 SUBMITTALS

- .1 Submit product data and samples to Contract Administrator.
- .2 Manufacturer's product to describe.
 - .1 Caulking compound.
 - .2 Primers.
 - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit duplicate samples of each type of material and colour.
- .4 Cured samples of exposed sealants for each color where required to match adjacent material.

.5 Submit manufacturer's instructions to Contract Administrator.

.1 Instructions to include installation instructions for each product used.

1.4 DELIVERY, STORAGE, AND HANDLING

.1 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 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.

1.6 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 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.

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 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 Urethanes One Part.
 - .1 Self-Leveling to CAN/CGSB-19.13, Type 1, colour indicated..
- .2 Silicones One Part.
 - .1 To CAN/CGSB-19.13.
- .3 Butyl.
 - .1 To CGSB 19-GP-14M.
- .4 Preformed Compressible and Non-Compressible back-up materials.
 - .1 Polyethylene, Urethane, Neoprene or Vinyl Foam.
 - .1 Extruded closed cell foam backer rod.
 - .2 Size: oversize 50 %.
 - .2 Neoprene or Butyl Rubber.
 - .1 Round solid rod, Shore A hardness 70.
 - .3 High Density Foam.
 - .1 Extruded closed cell polyvinyl chloride (PVC), extruded polyethylene, closed cell, Shore A hardness 20, tensile strength 140 to 200 kPa, extruded polyolefin foam, 32 kg/m³ density, or neoprene foam backer, size as recommended by manufacturer.
 - .4 Bond Breaker Tape.
 - .1 Polyethylene bond breaker tape which will not bond to sealant.

2.3 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.
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- .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