

PART 1 - GENERAL

1.1 Section Includes

- 1.1.1 Materials and installation methods required for installation of the primary air barrier system.

1.2 References

- 1.2.1 CAN/ULC-S 705.1-98 (replaces CAN/CGSB-51.23-92): Standard for Thermal Insulation – Spray-Applied Rigid Polyurethane Foam, Medium Density, Material Specification
- 1.2.2 CAN/ULC-S705.2-98 (replaces CAN/CGSB-51.39-92): Standard for Thermal Insulation - Spray-Applied Rigid Polyurethane Foam, Medium Density, Installer's Responsibilities-Specification
- 1.2.3 CCMC 12932-R – Evaluation of BASF WALLTITE® as an air barrier system.

1.3 Related Sections

- 1.3.1 Masonry Wall construction - Section 04050
- 1.3.2 Insulation – Section 7213
- 1.3.3 Fire Stopping – Section xxxx
- 1.3.4 Roofing – Section 07500
- 1.3.5 Sealants – Section 07900
- 1.3.6 Door Frames – Section xxxx
- 1.3.7 Window Frames – Section xxxx
- 1.3.8 Gypsum Board – Section xxxx
- 1.3.9 Other – Section xxxxx

1.4 Test Results

- 1.4.1 Submit the following prior to commencing the work:
 - 1.4.1.1 Test reports verifying that qualities of insulation meet or exceed requirements of this specification, in accordance with Section 1400 – quality control
 - 1.4.1.2 Name of installer complete with proof (certification card) that installer is licensed or approved by the Quality and Training Program – Raising Performance To New Heights® by BASF and certified by Morrison Hershfield, to perform the installation of WALLTITE as an insulation / air barrier system
 - 1.4.1.3 Submit the results of all air barrier system tests including transition membrane adhesion verification to an approved CCMC testing facility approved according to the CCMC's Technical Manual # 07272 conducted in order to prove that the air barrier system with transition membrane meets National Building Code (1995) requirements.

1.5 Mock Ups

- 1.5.1 Create samples that are in compliance with section 01340 (shop drawings, data sheets, and samples).
- 1.5.2 Create a sample of 5m² (54 sq.ft.) minimum, showing both inner and outer corners. This sample may be part of the completed structure.
- 1.5.3 Using the polyurethane foam insulation sample that was sprayed in place and the transition membrane, make the necessary tests as per the Standard CAN/ULC-S705.2-98 and the CCMC report # 12932-R and ensure results are in compliance. The following trials must be conducted on site:

1. Verify core density
2. Verify adhesion between the transition membrane and the substrate
3. Verify cohesion / adhesion between the insulation material and the substrate

Enter the results in the daily report, under the Quality and Training Program – Raising Performance To New Heights® from BASF Canada and certified by Morrison Hershfield.

1.6 Protective Measures

- 1.6.1 Ensure the work area is adequately ventilated, in compliance with requirements set out in section 01500 (temporary installations).
- 1.6.2 Ensure continuous and proper ventilation of the work area, through a fresh air intake and the extraction of foul air, during the course of the application process and for 24 hours thereafter.
- 1.6.3 When necessary, install temporary partitions in order to prevent any overspray outside of the work area from the sprayed-on insulation material.
- 1.6.4 Ensure all structures are well protected, in accordance with the manufacturer's recommendations.
- 1.6.5 Protect all adjacent surfaces and equipment against any damage that may be caused by dispersion and overspray of insulation material beyond prescribed limits.
- 1.6.6 When cleaning equipment, it should be performed in areas designated for this purpose, and the contents of the empty containers neutralized according to the procedure established by the CAN/ULC-S705.2-98.

1.7 Delivery, Storage & Handling

- 1.7.1 All materials should be delivered and stored in their original packaging bearing the manufacturer's name, quantity, CCMC numbers, and other appropriate technical indicators or references. The production and expiry date must also appear on the containers as requested by the Standard CAN/ULCS-705.1-98.

1.8 Quality Assurance

- 1.8.1 Personnel licensed or approved by the Quality and Training Program – Raising Performance To New Heights by BASF and certified by Morrison Hershfield must apply the insulating material. These certified individuals must have their certification cards in their possession and available for presentation upon request. The certification cards must have the following: Level 1 (basic), Level 2 (Superior) or Foam Masters (Elite Level) for the polyurethane foam application and air barrier system. A Foam Masters applicator is automatically approved for all.
- 1.8.2 A copy of the BASF Technical manual for the application of sprayed-on polyurethane foam must be kept on site with the section for the air barrier system application guidelines.
- 1.8.3 Tests on the spray polyurethane must be conducted daily as per the Standard CAN/ULC-S705.2-98 and ensure results are in compliance. Enter the results in the daily report under the Quality and Training Program – Raising Performance To New Heights from BASF Canada and certified by Morrison Hershfield.
- 1.8.4 Once the curing time required by the membrane manufacturer has elapsed, a test must be conducted to verify adhesion between the membrane and the substrate. All tests must be performed using COM-TEN INDUSTRIES Series 301N1M equipment or an equivalent. If adhesion is lower than the required minimum of 110 kPa (16 psi), the membrane must be mechanically fastened. Refer to the membrane's manufacturer.

- 1.8.5 Perform adhesion tests on all corners and building angles, wall to concrete slab, an wall to roof intersection as follows:
 1. One test on every wall less than 30m (100ft) in length
 2. Two tests on walls between 30 and 60m (100 to 200ft) in length
 3. One test every 30m (100 ft) on walls more than 60m (200ft) long
 4. Mechanically fasten membrane to concrete slab at all areas where adhesion tests are unable to be conducted
- 1.8.6 Perform transition membrane adhesion tests at perimeter openings as follows:
 1. 10 openings or more: perform tests on 15% of openings
 2. 10 openings and less: perform tests on 30% of openings
- 1.8.7 Perform adhesion tests on the transition membranes at every tenth column or beam
- 1.8.8 Adhesion tests are not required if the membrane is mechanically attached
- 1.8.9 The insulation / air barrier system by BASF – The Chemical Company Report CCMC # 12932-R must be completed by the BASF certified applicator. When the transition membrane is to be installed by another trade for warranty purpose (windows installer), the adhesion tests must be done and approved by the BASF certified applicator prior to spray the WALLTITE® polyurethane spray foam.
- 1.8.10 On request, submit a copy of all completed forms to the Consultant prior to making application for payment.
- 1.8.11 Allow access to the job site to any BASF representative and / or Morrison Hershfield for the purpose of technical assistance, verification of operator certification or for a review under the Quality and Training Program – Raising Performance To New Heights® as requested in the specification.

1.9 Environmental Requirements

- 1.9.1 Apply insulating material only if the surface and ambient air temperatures are within the manufacturer's prescribed limits, i.e., -10°C to +40°C (+14°F to +104°F). For the transition membrane, follow the manufacturer's prescribed limits.
- 1.9.2 Comply with requirements regarding use, handling, storage, and disposal of chemical materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada. .

1.10 Surface Preparation

- 1.10.1 Surfaces must be clean and dry, as required by CAN/ULC-S705.2-98. The substrate must be free of all frost, dust, oil, grease, oxidization, or any other element that may affect adhesion of the system i.e. high moisture content.
- 1.10.2 Metallic surfaces should be checked to ensure no oxidization has occurred. Use of a primer is strongly recommended. Refer to the BASF Technical manual.
- 1.10.3 All transition membranes must be installed prior to application of the polyurethane foam. Transition membranes must be as listed in the CCMC report air barrier system # 12932-R and/or in the BASF technical manual. Contact BASF if other membranes are to be utilized. These membranes must be installed in accordance with the manufacturer's recommendations. Adhesion of the membranes to the substrate must be sufficient to resist the stress applied by the polyurethane foam during the curing time. Refer to the BASF Technical manual.
- 1.10.4 All of the following stages must be completed prior to application of the WALLTITE® insulating / air barrier system:
 - 1.10.4.1 Installation of masonry anchoring system
 - 1.10.4.2 Installation of wood blocking required at all openings
 - 1.10.4.3 Installation of any electrical or mechanical penetrations
 - 1.10.4.4 Air/vapour barrier transition membranes
 - 1.10.4.5 Sub-girt clip angles and sub-girt framing angle for exterior cladding

1.10.4.6 Adjacent areas have been protected via drop sheets or polyethylene masking

1.11 Conditions of Use

- 1.11.1 Follow the manufacturer's written instructions when spraying the polyurethane foam (refer to BASF's technical data sheet and the Technical manual, WALLTITE® - spray application guide and WALLTITE - air barrier system application guide section).
- 1.11.2 The manufacturer's recommendations should be followed with regard to outside air temperature and substrate conditions -10°C to $+40^{\circ}\text{C}$ ($+14^{\circ}\text{F}$ to $+104^{\circ}\text{F}$).

PART 2 - MATERIALS:

- 2.1 Polyurethane Foam: a spray polyurethane foam listed under CAN/ULC-S705.1-98, with CCMC #12932-R for use as an insulation / air barrier system, according to CCMC technical guide: Air Barrier System for exterior walls of low-rise buildings, Master Format Section: 07272, with the following physical properties:
- Density (ASTM D-1622) minimum = 30.4 kg/m^3 (1.9 lb/ft.^3)
 - Compressive strength (ASTM D-1621), parallel to rise (10% compression) = 222 kPa (32 psi)
 - Tensile strength (ASTM D-1623) = 337 kPa (49 psi)
 - Open cell content (ASTM D-2856) = $<1\%$
 - Water absorption (ASTM D-2842) % by volume = 2.5%
 - Dimensional stability (ASTM D-2126), % volume change after 28 days:
 - 20°C (-4°F) = 0.047%
 - $+100^{\circ}\text{C}$ (212°F) = 8.45%
 - $+70^{\circ}\text{C}$ (158°F) with relative humidity $>90\pm 3\%$ = 7.64%
 - Thermal resistance approved by the Standard CAN/ULC-S705.1-98
 - Water vapour permeance (ASTM E-96) – without the skins, core only = 125 ng/Pa.s.m^2
 - Flame spread classification (CAN/ULC-S102, including S127) = 375
 - Smoke determined = 288
 - VOC results during the curing period were below the detectable limit after 24 hrs
 - Eco-efficiency analysis for the evaluation of the insulation / air barrier system
 - Polyurethane durability test of appendix D of the CCMC Technical Guide for Air Barrier Systems for Exterior Walls of Low-Rise Buildings, that specifies the two following limiting criteria:
 - Air permeance test after weathering and heat aging – Requirements: $\leq 110\%$ of original value;
 - Thermal resistance after heat aging of weathered samples – Requirements: 90% retention from original value.
 - Product reference: WALLTITE® by BASF – The Chemical Company
- 2.2 Primers: as recommended in the BASF Technical Manual, taking into account the type and condition of work surfaces.
- 2.3 Transition membrane Self Adhering: SBS modified bitumen, self adhering sheet membrane complete with a cross-laminated polyethylene film, and having the following physical properties
1. Thickness: 1.0mm (40mils) min
 2. Air Leakage: $< 0.005 \text{ L/s.m}^2@ 75 \text{ Pa}$ to ASTM E283-91
 3. Vapour Permeance: 2.8 ng/Pa.m^2 (.05 Perms) to ASTM E96
 4. Low Temperature Flexibility: -30°C to CGSB 37-GP-56M
 5. Elongation: 200% to ASTM D412-modified
- Accepted material: Bluskin® SA as manufactured by Bakor or other material as accepted by BASF (refer to BASF's technical manual).

- 2.4 Transition membrane Thermally Fused: SBS modified bitumen thermally fuse sheet membrane complete with burnable film top and bottom and reinforced with non-woven fibreglass specifically designed for vertical application and having the following physical characteristics:
1. Thickness: approx 2.5mm
 2. Air Leakage: < .000 L/m² @ 75 Pa to ASTM E283-91
 3. Vapour Permeance: 0.2ng/Pa.m².s to ASTM E96
 4. Low Temperature Flexibility: -15C
 5. Elongation: MD 40%, XD 40%
- Accepted material: Blueskin TG as manufactured by Bakor or other material as accepted by BASF (refer to BASF's technical manual).
- 2.5 Through-wall flashing membrane (Self-Adhering): SBS modified bitumen, self-adhering sheet membrane complete with a cross-laminated polyethylene film, having the following physical properties:
1. Thickness: 1 mm (40 mils) min.
 2. Film Thickness: 0.225mm (9.0 mils)
 3. Elongation: 200% to ASTM D412;
 4. Tensile Strength (film): 34500 kPa (5000 psi) ASTN D882
 5. Vapour permeance: 2.8 ng/Pa.m².s (0.05 perms) to ASTM E96;
 6. Low temperature flexibility: -30°C to CGSB 37-GP-56M;
- Acceptable material: Blueskin TWF as manufactured by Bakor or other material as accepted by BASF (refer to BASF's technical manual).
- 2.6 Through-wall flashing and damp-proof coursing mastic: Synthetic asphalt / rubber base compound having the following characteristics:
1. Compatible with air/vapour barrier membrane, substrate and insulation materials,
 2. Chemical resistance: Alkalis, mild acid and salt solutions.
- Acceptable material: Polybitume-570-05 Rubberized Mastic as manufactured by Bakor or other material as accepted by BASF (refer to BASF's technical manual).
- 2.7 Primer for self-adhering membrane: Synthetic rubber based adhesive type, quick setting, having the following physical properties
1. Colour: Blue;
 2. Weight: 0.8 kg/l;
 3. Solids by weight: 35%;
 4. Drying time (initial set): 30 minutes;
- Acceptable material: Blueskin Primer as manufactured by Bakor or other material as accepted by BASF (refer to BASF's technical manual).
- 2.8 Since the foundation wall is designated as part of the air barrier system, in this case, a transition membrane with sealant must sealed to the foundation wall to maintain the continuity of the plane of airtightness.
- Acceptable material: Bakor 570-05 or equivalent. Refer to BASF's technical manual, section 3, details # DT 3B, 3D and 4B
- 2.9 Sealant – warm side of window and door frames:
- Acceptable material: Tremco Dy Monic sealant. Refer to BASF's technical manual, section 3, details # DT 3B, 3D and 4B
- 2.10 Primer for Thermally Fused Membrane: Use a primer for thermofusible sheet membrane and hot applied rubberized asphalt membranes when applied to concrete, masonry, wood, drywall and metal surfaces.
- Acceptable material: Bakor 930-18 primer or other material as accepted by BASF (refer to BASF's technical manual).
- 2.11 Primer for self-adhering membranes: Synthetic rubber based adhesive type.
- Accepted material: Blueskin Primer as manufactured by Bakor other material as accepted by BASF (refer to BASF's technical manual)

Mandatory materials as per the Air Barrier System # 12932-R

Refer to the drawings in section 3 of BASF's technical manual. The following materials must be used in all cases:

- 20 gauge steel studs, installed at 16" OC.
- Transition membranes approved by BASF in compliance with the CCMC/NRC. (The various adhesion tests described in section 4 of the BASF's technical manual are to be used as reference only. Where applicable, the types of primer to be utilized are indicated in the same section, on the individual reports).
- When determining the width of transition membrane to be used, reference should be made to the drawings in section 3 of the BASF's technical manual.
- # 6 TEK drywall screws, 1 1/4"
- Substrate
 - Exterior gypsum wallboard, minimum 1/2"
 - OSB, 7/16" minimum
 - Plywood, 7/16" minimum
 - Concrete block, 6" minimum
 - Poured concrete wall
- Metal tie – Refer to section 3, drawings TD 3C and 4C, in BASF's technical manual.
 - Surface mechanical connectors such as Dur-o-wal model # d/a 213, which are attached using threaded rod pins with bolt, e.g. Dur-o-pair by Dur-o-wal. Refer to section 3, drawings # TD 3C and 4C, in BASF's technical product documentation.
 - Horizontal trussed design reinforcement with built-in masonry connectors, such as Dur-o-eye by Dur-o-wal. Refer to section 3, drawings # TD 3C, in BASF's technical manual.
 - Adjustable mechanical connectors built into the wall framing, such as the Bailey Brick Connector 10–18. Refer to section 3, drawings # TD 4C, in BASF's technical manual.
- Compressible foam pressure gasket, in all openings. Refer to section 3, drawings # TD 3B, 3D, and 4B, in BASF's technical manual.
- Fibreglass, in all openings, where requested. Refer to section 3, drawings # TD 3B, 3D, and 4B, in BASF's technical manual.
- At all openings, TREMCO Dy Monic sealant. Refer to section 3, drawings # TD 3B, 3D and 4B, in BASF's technical product documentation.
- At the edge of the membrane on the cement slab, a bituminous polymer based sealant, i.e., BAKOR 570-05 or equivalent. Refer to section 3, drawings # TD 3B, 3D and 4B, in BASF's technical product documentation.
- Galvanized Z bar (when requested).

Specification Note: The following sections may be added IF required by local jurisdiction

The following paragraph 2.12 and 2.13 may be used for reference only. We recommend that you have the information below checked for compliance with the standards set out in the National Building Code applicable in your Province as well as those established by your local authorities. Paragraphs 2.14, 2.15 and 2.16 are provided for informational purposes only and are without representation or warranty, expressed or implied. The warranty on these products should come from the manufacturers of these products.

- 2.12 Horizontal fire stopping: A preformed angle comprising at least 1.2 mm (18 ga) of steel core zinc coating, as stipulated in ASTM A 525 (galvanized steel G-90). Dimensions should be sufficient to allow the horizontal section to extend beyond the outside polyurethane foam surface in order that a 50% compressed mineral fibre fire stop can be installed in the remaining space.
- 2.13 Vertical fire stopping: A preformed angle comprising at least 0.38 mm (28 ga) of steel core zinc coating, as stipulated in ASTM A 525 (galvanized steel G-90). Dimensions should be sufficient to allow the section perpendicular to the substrate to extend beyond the outside polyurethane foam surface for the full depth of the cavity in order to close off the cavity. Sheet steel fire stop angles corners should be mechanically attached to the substrate at 200 mm (8 inches) OC.

PART 3 - EXECUTION

- 3.1 All excessively wide joints should be covered or filled before applying the polyurethane foam.
- 3.2 Install transition membranes in all places recommended in section 3 of BASF's technical manual.
- 3.3 Install a polymer base caulking strip sealant at outside edge of the transition membrane installed horizontally on the concrete wall foundation recommended in section 3 and 4 drawings # TD 3B, 3D, and 4B, in BASF's technical product documentation.
- 3.4 Polyurethane foam when used for insulation purpose, should be sprayed as per the Standard CAN/ULC-S705.2-98 with a tolerance of +6 /-0 mm (+1/4 / - 0 inch) in relation to the specified thickness. When the intent of the spray polyurethane is for the insulation / air barrier system and the thickness specified is 25 mm (1 inch) then to respect the air barrier system tests results, the tolerance is +6/-0 mm (+1/4 / -0").
- 3.5 Avoid the formation of sub-layer air pockets when applying.
- 3.6 Avoid spraying the foam on any surfaces other than those indicated. Use drop sheets or masking tape to protect other surfaces.
- 3.7 Once the foam has hardened, remove all overspray from non-prescribed surfaces.
- 3.8 Do not allow polyurethane foam once applied, to be damaged during work by other trades.
- 3.9 Ensure the subsequent coverage of the applied insulating foam will be completed within the manufacturer's prescribed time frame (refer to BASF's technical data sheet or Technical manual).
- 3.10 Spray the polyurethane foam in overlapping layers, so as to obtain a smooth, uniform surface.
- 3.11 Do not spray polyurethane foam any closer than 75 mm (3inches) from chimneys, heating vents, steam pipes, recessed lighting fixtures, and other heat sources. Do not spray the interior of any exit openings or electrical junction boxes (refer to the BASF Technical manual).
- 3.12 In temperatures below +10°C (+50°F) use transition membranes specifically formulated for low temperature application with the proper primer. Adhesion tests must be conducted. Refer to the BASF Technical manual. If no proper adhesion, then secure the membranes mechanically. Refer to the membrane's manufacturer.
- 3.13 All mechanical fixtures should be covered with polyurethane foam in order to reduce thermal bridging.