PART 1 GENERAL

1.1 GENERAL REQUIREMENT

1. Conform to Sections of Division 1 as applicable.

2. This section includes closed-cell medium density spray applied polyurethane foam insulation, air barrier and vapour barrier.

1.2 REFERENCED STANDARDS

1. ASTM E-96 Standard Test Methods for Water Vapor Transmission of Materials.

2. CAN/ULC S705.1-15: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density.

3. CAN/ULC S705.2-20: Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Application.

4. CAN/ULC-S710.1:2019 Standard for Bead Applied One-Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

5. CCMC L– 1400 Evaluation of BASF WALLTITE ® CM01as an insulation and air barrier material.

6. Canadian Construction Materials Centre (CCMC) Evaluation Report CCMC 13659-R. Walltite CM01 Air Barrier System.

7. CCMC's Technical Guide, Air Barrier Systems for Exterior Walls of Low-Rise Buildings, MasterFormat Number 07272 (07 21 19.02).

8. Canadian Construction Materials Centre (CCMC) Technical Guide, Air Barrier Systems for Exterior Walls of Low-Rise Buildings, MasterFormat Number 07 27 09.01.

9. Quality assurance installation standards for application by certified contractors approved by CUFCA or Caliber.

10. Do elastomeric membrane installation in accordance with manufacturers printed application instructions, except where specified otherwise.

1.3 SUBMITTALS

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

2. Installer Qualifications: Submit proof confirming the installing contractor is certified by Caliber QA to perform the installation of the product or system specified or an application certified contractor approved by CUFCA.

3. Licensing of the installer is required by CAN/ULC S705.2-20 Installation Standard.

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

5. Submit samples of all materials in accordance with Section 01300.

6. Submit duplicate 12" x 12" samples of sheet membrane material.

1.4 PRODUCT, DELIVERY, STORAGE AND HANDLING

1. Deliver materials in original unopened containers.

2. Label containers with brand name, installation instructions and identification of various items.

3. Store materials except membrane between 15°C and 27°C. If exposed to lower temperature restore to acceptable level before using.

4. Store materials except membrane in dry area and protect.

1.5 QUALITY ASSURANCE

1. Contractor performing work under this section must certified by Caliber QA or by CUFCA. The contractor is required by the CAN/ULC S705.2-20 to purchase and install, for this project, only material that conforms to the requirements of CAN/ULC S705.1-15 Material standard.

2. Applicators shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request.

3. Maintain one copy of installation manual on site.

4. The Licensed Installer shall conduct the on-site daily testing as required by the CAN/ULC S705.2-20 Installation Standard. The Licensed Installer shall complete the Daily Work Report as required by the CAN/ULC S705.2-20 Installation Standard. Upon request submit copy of all completed forms to Consultant prior to making application for payment.

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

6. Applicators: minimum 5 years proven experience.

7. Membrane manufacturer’s representative:

    1. Inspect substrate prior to commencement of work, during application of membrane and upon completion of work.

    2. Provide technical assistance to applicator and assist where required in correct installation of membrane.

1.6 QUALIFICATIONS

1. Installer to be a Qualified Applicator of the products from the manufacturer/distributor. Submit proof of status upon request.

2. Material manufacturer/distributor must have an on-site quality assurance program. Submit three copies of quality assurance program upon request.

1.7 MOCK-UP

1. Provide mock-up of air-vapour barrier materials.

2. Construct typical exterior sample wall in conjunction with Section 04200 incorporating window frame head jamb and sill insulation, building corner condition junction with roof air barrier illustrating materials interface and seals.

3. Locate where directed by Architect.

4. Mock-up will not remain as part of the Work.

1.8 SCOPE/LOCATION

1. At all exterior cavity wall locations and any other locations, as noted on drawings.

1.9 PRE-INSTALLATION CONFERENCE

1. Convene with Architect, Inspection and Testing Company and General Contractor one week prior to commencing work of this section to review application procedure and detailing of openings and other areas.

1.10 ENVIRONMENTAL REQUIREMENTS

1. Maintain temperature and humidity recommended by the materials manufacturer before, during and after installation.

1.11 CO-ORDINATION

1. Co-ordinate the work of this section with all sections referencing this section.

2. Provide sprayed foam insulation/air-vapour barrier at masonry cavity wall locations, at curtain wall systems where spray foam is shown at cavity wall locations, and at all metal wall cladding cavity wall locations.

1.12 WARRANTY

1. Warrant work of this section against defects or deficiencies for a period of two years from date Work is certified as substantially performed in accordance with General Condition of the Contract.

2. Promptly correct, at own expense, defects or deficiencies which become

apparent within the warranty period.

3. Obtain from the manufacturer a material guarantee stating that the membrane shall be free of manufacturing defects and premature deterioration for a period of ten years from date of final Certification of Substantial Completion.

PART 2 PRODUCTS

2.1 MATERIALS

1. WALLTITE ® CM01 by BASF The Chemical Company as represented by Building Resource Inc. (1.416.410.4055).

2. Other acceptable product: HeatLok Soya HFO, by Demilic Canada (1.866.437.0223), Sealtite One by Carlisle Spray Foam Insulation, Boreal Natural Elite by Genyk Inc., or Insulthane Extreme by Elastochem Specialty Chemicals Inc.

3. Insulation/ Air Barrier Material and Air barrier System: Closed cell, spray applied polyurethane foam, medium density, ccSPF meeting the requirements of CAN / ULC-S705-15, CAN / ULC S742 and the CCMC's Technical Guide, Air Barrier Systems for Exterior Walls of Low-Rise Buildings, MasterFormat Number 07272 (07 21 19.02). Certified by a third party as containing a minimum of 5% recycled content by mass of finished product. GREENGUARD Indoor Air Quality Certified by the GREENGUARD Environmental Institute under the GREENGUARD for Children & Schools product certification program. Product to utilize low GWP, HFO , Zero ODS (Ozone Depleting Substance) blowing agent.

   1. Density (ASTM D1622) = 28.9 kg/m^3 (1.8 lb/ft.^{3}), minimum.

   2. Long Term Thermal Resistance (LTTR) in accordance with CAN/ULC-S770-09, as per CAN/ULC-S705-15.

THICKNESS MM (INCHES)	R | RSI VALUES
50.0 (1.97)	R**10.3** | RSI**1.82**
50.8 (2.00)	**10.5 | 1.85**
63.5 (2.50)	**13.5 | 2.37**
75.0 (2.95)	**16.1 | 2.83**
76.2 (3.00)	**16.4 | 2.88**
88.9 (3.50)	**19.3 | 3.39**
100.0 (3.94)	**21.8 | 3.84**
102.0 (4.00)	**22.1 | 3.90**

   3. Flame Spread Classification as per CAN / ULC-S102, including S127, Flame Spread <500.

   4. Compressive strength as per ASTM D1621, 201 kPa(29.2 psi)

5. Tensile strength as per ASTM D1623, >200kPa (>29 psi)

6. Open cell content as per ASTM D2856, 6%.

7. Water absorption as per ASTM D2842, < 0.4% by volume.

8. Water Vapour Permeance as per ASTM96,

1. 50mm sample: <60 ng/Pa•s•m^2 (1.0 Perms).

9. VOC emissions - below the detectable limit after 24 hrs.

11. Modify spray foam to suit temperature application as per manufacturer's recommendations. Spray foam shall not have any, HFC, CFC or HCFC or any depletion substance affecting the ozone layer.

2.2 PRIMERS

1. As per manufacturer's recommendations and CAN/ULC-S705.2 for surface conditions, for oily steel surface like Z-Bar, steel deck roof or curtain wall pan, aluminum tube, PVC pipes, applied ADBOND 8388-1 adhesive primer, colour: red before spraying polyurethane foam.

2.3 AIR/VAPOUR BARRIER

1. Elastomeric Sheet Membrane Air/Vapour Barrier:

1. To be used in areas including all control joints over parapet wall at roof locations down onto roof air barrier, and between all junctions of dissimilar materials. Install prior to the application of the insulation. Install in widths of min. 12" (300mm)with 6" (150mm) cover to each side of joints or onto dissimilar products; and at base wall flashing membrane with min. 8" (200 mm) upturn and extended out over concrete foundation wall and extended a min. ¼" beyond. 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 adhesion tests must be performed using COM-TEN INDUSTRIES Series 301N1M equipment or an equivalent. If adhesion is lower than the required minimum of 100 kPa (15 psi), the membrane must be mechanically fastened.

2. Acceptable Products:

1. Blueskin TG air/vapour membrane and "Blueskin SA" air/vapour membrane (at all heat temperature sensitive locations) complete with end of membrane and termination sealer "Air Block 06". Manufactured by Henry , PW 100/40 BH manufactured by Protectowrap, or equal by W. R. Meadows.

3. Upon Architect's approval, products that function better in cold weather to be used at no additional cost to the Owner.

2.4 APPLICATORS

1. Installers of spray polyurethane foam shall be trained by BASF in accordance with CAN/ULC S705.2-20 and certified by Caliber QA to install the system specified or by CUFCA.

2.5 COMPATIBILITY

1. Ensure that all materials used are compatible.

2. Provide proof of compatibility.

PART 3 EXECUTION

3.1 EXAMINATION

1. Verify that surfaces and conditions are ready to accept the Work of this section. Application of Work of this section shall be deemed acceptance of existing work and existing conditions. Report in writing defects in substrate which may adversely affect the performance of the foam insulation/air barrier.

2. Examine joints before sealing to ensure configuration, surfaces and widths are suitable for vapour barrier. Report in writing the locations of joints which are deemed unacceptable for the application of vapour barrier and/or air barrier.

3.2 PREPARATION

1. Surfaces to receive foam insulation/air-vapour barrier shall be free of frost, loose or foreign matter which might impair adhesion of materials.

2. Prepare surface by brushing, scrubbing, scraping, or grinding to remove loose mortar, dust, oil, grease, oxidation, millscale and other contaminants which will affect adhesion and integrity of the foam insulation/air barrier system. Wipe down metal surfaces to remove release agents or other non-compatible coatings, using clean sponges or rags soaked in a solvent compatible with the foam insulation. Ensure surfaces are dry before proceeding.

3. Prepare joints to receive foam air barrier sealant by brushing, scrubbing, wiping, scraping or grinding to remove loose mortar, dust, oil, grease, solvents, oxidation, mill scale and other contaminants which will affect adhesion and integrity of foam sealant.

4. Where joints between sheathing boards exceeds 6 mm apply air-vapour barrier membrane to lap onto each sheathing board a 3" (75mm) for a min. total width of 6" (150 mm).

3.3 APPLICATION

1. Apply sheet membrane air-vapour barrier and foam insulation/air-vapour barrier membrane materials over clean and dry surfaces.

2. Installation shall be in accordance with CAN/ULC S705.2-20 , sheet membrane air vapour barrier and foam insulation air-vapour barrier membrane manufacturer's recommendations for this application overlapping all joints of sheet membrane with minimum 4" (100 mm) laps. Seal all laps and termination joints with "Air Bloc 06".

3. Masonry contractor will ensure that the surface is prepared to meet the requirements specified by spray foam insulation / air-vapour barrier manufacturer.

4. Before commencing work, the contractor will ensure that environmental and site conditions are suitable for installation of materials in accordance with each manufacturer's recommendations and notify architect in writing of unsuitable surfaces and conditions.

5. Commencement of work shall imply acceptance of surfaces and conditions.

6. Apply foam insulation/air-vapour barrier in strict accordance with manufacturer's written instructions, specifications or recommendations.

7. Apply foam insulation/air-vapour barrier only when surfaces and ambient temperatures are within limits prescribed by the material manufacturer.

8. Fill joints with foam sealant making allowances for post expansion of foam.

9. Finish joints shall be free from air pockets and imbedded foreign materials. Cut back excess foam sealant after cutting flush with surrounding surfaces unless otherwise directed and/or detailed.

10. Apply foam insulation/air-vapour barrier to a minimum 80 mm (3 1/4") thickness with a minimum two passes (min. 15mm, max. 50mm and allowing foam to cure between passes) to within the following tolerances: +6.4 mm (1/4"); - 0" (0 mm) thickness at all locations where cavity wall insulation/air barrier is shown on drawings and to provide a minimum R 18. Take particular care at base of wall and transition membrane flashing locations. First pass to create thin coat. 3 passes may be required at these critical areas.

11. Finished sprayed foam insulation/air barrier shall be free of voids and imbedded foreign materials.

12. Do not allow foam insulation to cover or mark adjacent surfaces. Use masking materials if necessary.

13. Remove over-spray and masking materials immediately after foam has cured to hard surface film.

14. Clean and make good surfaces soiled or damaged by work of this section. Consult with section of work soiled before cleaning to ensure methods used will not damage their work.

15. Do not permit adjacent work to damage work of this section. Damage to work of

this section caused by other sections shall be made good by this section at the expense of the section which caused the damage.

3.4 FIELD QUALITY CONTROL

1. Site Tests:

    1. The Licensed Installer shall conduct daily visual inspection, adhesion/cohesion testing and density measurements as outlined by the CAN/ULC S705.2-20 Installation standard.

    2. The Licensed Installer shall complete the Daily Work Record and record all information required including the results of the testing. The Daily Work Record shall be kept on site for routine inspection. Copies of the Daily Work Record shall be forwarded to the owner or owner's representative upon request.

    3. Copies of the Daily Work Record or monthly summaries shall be sent to the Caliber Quality Assurance Program office on a monthly basis as required by Caliber, CUFCA, or other third party QAP as required by Demilic.

    4. The costs incurred for daily testing and inspection by the Licensed Installer and the completion of the Daily Work Record shall be borne by the Licensed Contractor.

2. Inspection:

    1. Arrange for third party site-inspection by qualified inspection company/engineer. The cost of inspections shall be included in the bid provided by the Licensed Contractor.

    2. Arrange for third party site-inspection is required. The number of inspections is to be in accordance with the following schedule and is based on the area covered by spray foam insulation air vapour barrier system.

3. For area insulation/air barrier system:

    1. 0-25,000 ft^2 – 1 inspection

    2. 25,001 – 50,000 ft^2 – 2 inspections

    3. 50,001 – 75,000 $ft.^2$ – 3 inspections

    4. 75,001 $ft.^2$ + - 4 inspections

4. The 3rd party site-inspection shall verify conformance with the manufacturer's instructions, the CAN/ULC S705.2-20 Installation standard.

5. If the inspection reveals any defects, the Licensed Contractor shall immediately rectify all such defects at his cost.

3.5 CLEAN UP

1. Clean up and remove all debris from site.

2. Clean up all overspray.

End of Section 07 21 29