**PART I – GENERAL**

* 1. **Intent**

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

.2 This section specifies additional requirements for sprayed polyurethane foam, intended for use as an air barrier material, part of an air barrier assembly. This section does not include any requirements for an air barrier system.

.3 This section specifies additional requirements for sprayed polyurethane foam, primarily intended for use as the designated vapour barrier.

*Spec. Note:* Delete .2 if the material is not intended to be part of the air barrier assembly.

*Spec. Note:* Delete .3 if the material is not intended to be the designated vapour barrier in the building assembly.

**1.2 Work Included**

.1 Spray-application of polyurethane foam for thermal insulation [as the material in an air barrier assembly,] [, as the designated vapour barrier in the building assembly].

# Spec. Note: Delete as required.

**1.3 Related Sections**

.1 Cast in place concrete Section 03 30 00

.2 Unit Masonry Section 04 20 00

.3 Steel Deck Section 05 31 00

 .4 Cold Formed Metal Framing Section 05 40 00

 .5 Sheet Waterproofing Section 07 13 00

 .6 Thermal Insulation Section 07 20 00

.7 Vapour Retarders Section 07 26 00

.8 Air Barriers Section 07 27 00

.9 Roofing and Cladding/Siding Section 07 40 00

.10 Applied Fireproofing Section 07 81 00

.11 Metal Support Systems Section 05 45 00

.12 Gypsum Sheathing Substrates Section 09 20 00

*Spec. Note:* *Amend to suit project.* *Delete or add to the above listings only those sections that have a DIRECT affect on this section.*

**1.4 References**

.1 ULC S705.1-09 “Standard for Thermal Insulation - Spray Applied Rigid

Polyurethane Foam, Medium Density, Material Specification

 .2 ULC S705.2-05 “Standard for Thermal Insulation - Spray Applied Rigid Polyurethane Foam, Medium Density, Installation

 .3 ULC S718-18 “Standard for Site Quality Assurance Program for Spray Polyurethane Foam”

.3 Installer site reference guides:

 CUFCA - SPF Installer Handbook,

 CUFCA - SPF Contractor Handbook

 CUFCA - Field Quality Assurance Manual,

 CUFCA - Field Technical Manual, distributed by the Canadian Urethane Foam Contractors Association Inc.

**1.5 System Description**

Materials of this section shall provide continuity of thermal insulation [, the material in the air barrier assembly] [, the vapour barrier] at building enclosure in conjunction with thermal materials as specified in Section(s).

Spec. Note: If the urethane foam is intended to act as the air or vapour barrier in addition to the thermal insulation it shall be described here as part of the system.

**1.6 Submittals**

.1 Provide two 300 mm x 300 mm samples of finished product to consultant in accordance with Section 01300.

.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 S705.2-05 Installation Standard.

.4 Manufacturers installation instructions: indicate preparation, installation requirements and techniques, product storage and handling criteria, and limitations of the material.

.5 When the spray polyurethane foam is the material in an air barrier assembly, submit documentation to confirm that the material meets the requirements of the CCMC’s Technical Guide for Air Barrier Materials Masterformat Section 07 27 36. Air barrier system requirements are not covered in this specification.

# Spec. Note: Delete if not applicable.

.6 When the spray polyurethane foam is the material designated at the vapour barrier in the building component submit documentation to confirm the material meets the requirements of the local building code.

# Spec. Note: Delete if not applicable.

**1.7 Quality Assurance**

.1 Contractor performing work under this section must be licensed under the SPF Quality Field Assurance Program (FQAP) by CUFCA (Canadian Urethane Foam Contractors Association). The contractor shall, under the FQAP Licensing Agreement and as required by the CAN/ULC S705.2-05, only purchase and install, for this project, material that conforms to the requirements of CAN/ULC S705.1-09 Material standard.

.2 Installers (Applicators) performing work under this section must be Licensed under the SPF Field Quality Assurance Program (FQAP). The installer shall be trained by CUFCA or by a recognized training provider and certified by CUFCA in accordance with the requirements outlined in the CAN/ULC S705.2-05 Installation Standard. Installers shall have their photo-identification certification cards in their possession and available on the project site, for inspection upon request at all times.

# Spec. Note: If spray polyurethane foam is specified as the material in an air barrier assembly, then the Installers’ certification photo identification card must show they are Licensed and Certified for both spray polyurethane foam thermal insulation AND air barrier assemblies.

.3 The Licensed Installer shall conduct the on-site daily testing as required by the CAN/ULC S705.2-05 Installation Standard. The Licensed Installer shall complete the Daily Work Report as required by the CAN/ULC S705.2-05 Installation Standard. The Licensed Contractor shall forward to the owner copies of the Daily Work Record upon request. The Licensed Contractor shall submit copies of the Daily Work Records or a monthly summary sheet to the CUFCA office, on a monthly basis, as required by the SPF Field Quality Assurance Program by CUFCA.

**1.8 Field Samples/Mock up**

.1 Construct on site a mock-up in accordance with Section 01300

.2 The mock-up area shall be minimum 5 m² and include components of the work such as attachments, penetrations and corners.

.3 The mock-up shall be reviewed by the contractor and engineer to verify conformance with the specification, workmanship and appearance. Recommended changes to installation methods and procedures may be agreed to at this time.

.4 The mock-up may become part of the finished work.

.5 This mock-up shall constitute a standard of acceptance for the remaining work.

*Spec. Note: If the spray polyurethane foam is the material in the air barrier assembly, then components to be included in the air barrier assembly shall be included in this mock-up.*

* 1. **Pre-installation Meeting**

.1 To ensure isolation of the immediate spray area and non-interference with other trades a pre-installation meeting shall be held prior to the commencement of spray operations.

* 1. **Delivery, Storage and Handling**

.1 Materials are to be delivered in original containers and packaged with appropriate MSDS and identification labels that comply with S705.1.09

.2 The material is to be stored in a safe manner as recommended by the manufacturer, as required by the CAN/ULC S705.2-05 Installation Standard and in compliance with Section 01 66 00.

.3 Containers shall be marked as required by the CAN/ULC S705.1-09 Material standard. The “use before” date shall be included on the drum label.

 .4 Empty isocyanate containers to be decontaminated or removed from site on a daily basis.

* 1. **Environmental Conditions**

.1 Apply spray polyurethane foam when chemical, atmospheric and cavity/surface temperatures are within the limitations required by the CAN/ULC S705.2-05 Installation Standard and as recommended by the manufacturer.

* 1. **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.

**1.13 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.

.3 All work shall be covered by the third party warranty program as set forth by the SPF Quality Assurance Program by CUFCA.

**PART 2 - PRODUCTS**

**2.1 Materials**

.1 Sprayed polyurethane foam material, when tested, shall meet the requirements of CAN/ULC S705.1-09 Standard for Thermal Insulation-Spray Applied Rigid Polyurethane Foam, Medium Density, Material- Specification.

.2 A copy of an Evaluation Report or Listing (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 S705.1-09 shall be made available upon request. A copy of either the evaluation report or the test reports shall be on file at the SPF FQAP (Field Quality Assurance Program) 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/50 mm: 2.1 (R6/inch).

.5 Products that meet the preceding requirements:

 CCMC 14133-L Grizzly Gold with SolsticeTM HFO Blowing Agent

*Spec. Note: Add here requirements for air barrier assembly testing if sprayed polyurethane foam material is to form the air barrier assembly to building code requirements*

**2.2 Equipment**

 .1 The equipment used to spray the polyurethane foam material shall be in accordance with ULC S705.2-05 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 S705.2-05 Installation standard.

 .3 Each proportioner unit to supply only one spray gun.

**2.3 Accessories**

 .1 Prime substrate when required by spray polyurethane manufacturer [or the membrane manufacturer]. The type of primer and the installation of the primer shall follow the requirements of the manufacturer for the surface conditions.

 *Spec. Note: Delete as required..*

 *Spec. Note: If primer is required it should be specified here on which surfaces.*

 .2 Air/Vapour barrier membranes, mastics, sealants, liquids complete with required primers to complete the transitions for the air barrier system.

##  Spec. Note: This item only if the spray polyurethane foam is specified as an air barrier assembly in addition to the thermal insulation.

**PART 3 - EXECUTION**

* 1. **Installers**

.1 Installers of spray polyurethane foam shall be certified and licensed by CUFCA in accordance with CAN/ULC S705.2-05 and CAN/ULC S718-18 requirements.

* 1. **Examination**

 .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 consultant 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.

**3.3 Preparation**

**3.3.1 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 spay area.

**3.3.2 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 penetrates through the thermal insulation is in place and complete.

.3 Ensure that surface preparation and any primers required conform to the manufacturers’ instructions.

**3.4 Application**

.1 Spray-application of polyurethane foam shall be performed in accordance with CAN/ULC S705.2-05 and the manufacturers’ instructions.

.2 Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer and the CAN/ULC S705.2-05 Installation standard.

.3 Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings. Passes shall be not less than 15mm and not greater than 50mm.

*Spec. Note: R or* *RSI values may be substituted for thickness. (R6 per inch or RSI* *1.05 per inch).*

.4 Do not install spray polyurethane foam within 75mm of heat emitting devices such as light fixtures and chimneys.

.5 Finished surface of foam insulation to be free of voids and imbedded foreign objects.

 .6 Remove masking materials and over spray from adjacent areas immediately after 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.

* 1. **Field Quality Control**

**3.5.1 Site Tests**

 .1 The Licensed Installer shall conduct daily visual inspection, adhesion/cohesion testing and density measurements as outlined by the CAN/ULC S705.2-05 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. Copies of the Daily Work Record or monthly summaries shall be sent to the SPF Field Quality Assurance Program office on a monthly basis as required by the Field Quality Assurance Program.

.3 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.

* + 1. **Inspection**

.1 Arrange for third party site-inspection by CUFCA SPF Field Quality Assurance Program and provider of the 3rd Party Warranty Program. The cost of inspections shall be included in the bid provided by the Licensed Contractor.

.2 The 3rd party site-inspection shall verify conformance with the manufacturers’ instructions, the standard CAN/ULC S705.2-05 Installation standard and this section of the project specification.

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

#  Spec. Note: Specifier to determine number of inspections required for the project. When material cost for the project exceeds $25,000.00 mandatory inspections are required by SPF Quality Assurance Program but inspections should be called for in this section regardless.

**3.6 Tolerances**

.1 Maximum variation from indicated thickness: minus (-) 6mm; plus (+) 10mm.

*Spec. Note: It is important to specify here what is allowed for tolerances if the above is not*

*satisfactory.*

**3.7 Protection**

.1 The spray polyurethane foam shall be protected from ultraviolet as per manufacturer’s requirements.

.2 The spray polyurethane foam shall be covered with an appropriate thermal barrier meeting local building codes when installed on the interior of the building.

*Spec. Note: Spray polyurethane foam must be protected from interior occupancy space by an approved thermal barrier to meet the requirements of local Building Codes. Work related to thermal barrier installation should be specified under appropriate sections*.

End of section 07 21 19