

## FOAMED-IN-PLACE INSULATION

Staycell ONE STEP® Spray Foam Systems

SPEC NOTE: This guide specification is intended for use when specifying closed-cell spray polyurethane foam as thermal insulation and as an air barrier for projects located in the United States.

DISCLAIMER: The information in this Guide Specification is organized and presented to assist the specification writer working on a construction project in selecting the appropriate products and to save time in writing the project Section. The specification writer is responsible for product selection as well as the use and application of this information and should contact the manufacturer to ensure all options are available and the associated specification information is valid and correct.

## SECTION 07 21 19 - FOAMED-IN-PLACE INSULATION

### PART 1 - GENERAL

#### 1.1 GENERAL REQUIREMENTS

- A. 1. General Conditions, Supplementary Conditions, Instructions to Bidders and Division One General Requirements shall be read in conjunction with and govern this section.

#### 1.2 SECTION INCLUDES

- A. Staycell® MONOLITHIC Spray Polyurethane Foam Insulation System consisting of:
  - 1. Staycell ONE STEP® 255 intumescent spray polyurethane foam insulation
- B. Staycell® HYBRID Spray Polyurethane Foam Insulation System consisting of:
  - 1. Staycell® 302 spray polyurethane foam insulation applied as the base layer on specified substrates.
  - 2. Staycell ONE STEP® 255 intumescent spray polyurethane foam insulation (top layer) applied onto the Staycell® 302 base layer as the exposed surface.

#### 1.3 REFERENCES

- A. ASTM C 518-04 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter
- B. ASTM D 1621-04a Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- C. ASTM D 1622-03 Standard Test Method for Apparent Density of Rigid Cellular Plastics
- D. ASTM D 1623-03 Standard Test Method for Tensile and Tensile Adhesion Properties for Rigid Cellular Plastics
- E. ASTM D 6226-05 Standard Test Method for Open Cell Content of Rigid Cellular Plastics
- F. ASTM E 283-04 Standard Test Method for Determining Rate of Air Leakage

- G. ASTM E 84-08 Standard Test Method for Surface Burning Characteristics of Building Materials
- H. ASTM E 96-05 Standard Test Method for Water Vapor Transmission of Materials
- I. UL 1715 - 97 Fire Test of Interior Finish Material

#### 1.4 SUBMITTALS

##### A. Qualifications:

1. Applicator shall be a designated Authorized Applicator of Preferred Solutions, Inc., Cleveland, Ohio. Such designation certified in writing by Preferred Solutions, Inc. shall be submitted by the applicator.

##### B. Products:

1. Manufacturer's technical data sheets.
2. Manufacturer's installation instructions.
3. Product Safety Data Sheets (SDS).
4. Evaluation Reports: Issued by an organization accredited by International Accreditation Services, Inc. (a subsidiary of ICC) indicating the products have a flame spread index  $\leq 25$ , smoke developed index  $\leq 450$  and complies with all acceptance criteria of the UL 1715, UL 1040, FM 4880 or NFPA 286 large-scale fire test standards when tested without thermal barriers, ignition barriers or any other fire protective surface(s).
5. Field quality control procedures to be utilized by Applicator to assure proper installation of the products.
6. Shop drawings on sheet metal, accessories or other fabricated items, if required.
7. Samples: Submit samples (3" x 3") of each material specified.

#### 1.5 MATERIALS DELIVERY AND STORAGE

- A. Materials shall be delivered in the manufacturer's original, tightly sealed containers, labeled with the manufacturer's name, product identification, date of manufacture, lot number(s) and fire ratings issued by an accredited inspection agency.
- B. Containers shall be stored out of the weather, direct sun and in compliance with manufacturer's recommendations.

#### 1.6 PROJECT CONDITIONS

- A. Temperature and field conditions: Install products within range of ambient air and substrate temperatures recommended by manufacturer. Do not apply products when substrate has surface moisture or has been contaminated by condensation, rain, mist, fog or snow. It is recommended that spray foam application not be done within 5 degrees F of the dew point.

## PART 2 - PRODUCTS

Architect Note: The 2009, 2012 and 2015 editions of the International Building Code (IBC) have specific fire performance requirements when spray foam insulation (SPF) is installed in occupied spaces inside buildings. Although SPF is typically formulated to have code-compliant flame spread and smoke developed ratings as determined by laboratory fire tests, such ratings are not indicative of actual fire performance. As a result, these codes require all SPF be protected from ignition sources by ½" thick gypsum board or other fire protective products unless the SPF product is classified as an Alternative Thermal Barrier Assembly as qualified by the IBC-designated UL1715 or NFPA 286 large-scale fire tests.

The single-layer Staycell ONE STEP® 255 Monolithic System and the two-layer Staycell® 302/Staycell ONE STEP® 255 Hybrid System shown as the Basis of Design are classified as Alternative Thermal Barrier Assemblies and do not require distinct thermal barriers when installed in accordance with tested assemblies and product listings. SPF requiring distinct thermal barriers creates potential fire hazards during the time the SPF is exposed to cutting torches, welding sparks, trash fires and vandalism during the weeks or months prior to the installation of the thermal barrier.

### 2.1 INSULATION & AIR BARRIER (Basis of Design)

#### A. Staycell® 302 spray polyurethane foam insulation:

1. Thermal Resistance/Insulation Value (ASTM C-518): R-7.0 per inch
2. Compressive Strength (ASTM D-1621): 41 psi
3. Nominal Density (ASTM D-1622): 2.0 pcf
4. Tensile Strength (ASTM D-1623): 58 psi
5. Closed Cell Content (ASTM D-6226): >96%
6. Air Leakage (ASTM E-283): 0.0010 cfm/ft<sup>2</sup> @ 1 inch
7. Water Vapor Permeance (ASTM E-96):
  - 1.49 perms @ 1"
  - .92 perms @ 1.5"
  - .77 perms @ 2"
8. Fire Ratings:
  - ASTM E-84 (tested at 4 inch thickness):
    - Flame spread index: <25
    - Smoke developed index: <450
9. Manufacturer: Preferred Solutions, Inc., Cleveland, OH

#### D. Staycell ONE STEP® 255 intumescent spray polyurethane foam insulation:

1. Thermal Resistance/Insulation Value (ASTM C-518): R-4.6 per inch
2. Compressive Strength (ASTM D-1621): 22 psi
3. Density (ASTM D-1622): 2.0 pcf
4. Tensile Strength (ASTM D-1623): 28 psi
5. Closed Cell Content (ASTM D-6226): 90%
6. Air Leakage (ASTM E-283): .0014 cfm/ft<sup>2</sup> @ 1.25"
7. Water Vapor Permeance (ASTM E-96): .99 perms @ 2.4 inches
8. Fire Ratings:
  - ASTM E-84 (tested at 4 inch thickness):
    - Flame spread index: 25
    - Smoke developed index: 400
  - Passes UL 1715 large-scale, enclosed-room fire test standard when tested exposed without thermal barriers, ignition barriers or any other fire protective surface(s).

9. Manufacturer: Preferred Solutions, Inc., Cleveland, OH

## 2.2 AUXILIARY MATERIALS (if necessary)

- A. Transition membranes for joints and transitions
  - 1. AIR-SHIELD or AIR-SHIELD LT by W.R. Meadows, Inc.
  - 2. Blueskin SA or Blueskin SA LT by Henry Corporation
  - 3. CCW 705 or CCW 705 LT by Carlisle Coatings and Waterproofing
- B. Primers to prepare substrates for receipt of transition membranes
  - 1. MEL-PRIME Adhesive or MEL-PRIME W/B by W.R. Meadows, Inc.
  - 2. Blueskin Adhesive or Blueskin LVC Adhesive by Henry Corporation
  - 3. CCW-702 WD or CCW-702 LV by Carlisle Coatings and Waterproofing
- C. Foam stop angle: Plastic angle used for foam stop at terminations and transitions
  - 1. Jam-Ex extruded plastic angle or equal made by Exo-Tec Manufacturing, Inc.
- D. Single-component sealant to bond plastic angle to substrate
  - 1. Dow 795 silicone building sealant, Dow Corning Corporation
  - 2. Sikaflex 1A polyurethane sealant, Sika Sarnafil Corporation
  - 3. Dymonic FC polyurethane sealant, Tremco Corporation
- E. Portable SPF application units for sealing around windows, doors and penetrations
  - 1. Versi-Foam by RHH, Inc.
  - 2. Froth-Pak, Dow Chemical Company
  - 3. Filler Foam by Hilti, Inc.
  - 4. Touch n' Foam by Convenience Products, Inc.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions over which the spray polyurethane foam insulation and air barrier will be installed for compliance with requirements.
- B. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
- C. Ensure items such as hangers for piping and ductwork are installed before work begins.

### 3.2 SURFACE PREPARATION

- A. Clean, prepare and treat substrate according to manufacturer's written instructions. Provide clean, dust-free and dry substrate for spray polyurethane foam application.
- B. Ensure installed transition membranes and foam stop angles are fully adhered to all applicable surfaces and are capable of receiving spray polyurethane foam.

### 3.3 PROTECTION

- A. Mask and cover adjacent areas to protect from over spray.

- B. Ensure any required foam stop or back up material are in place to prevent over-spray.
- C. Seal off existing ventilation equipment and ductwork.
- D. Erect barriers, isolate area and post warning signs to advise non-protected personnel to avoid the spray area.

#### 3.4 APPLICATION OF SPRAYED POLYURETHANE FOAM

- A. Spray-application of spray polyurethane foam shall be installed in accordance with manufacturer's written instructions.
- B. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.
- C. Apply in consecutive passes as recommended by manufacturer to thickness as indicated on drawings and to achieve the specified R-Value.
- D. Staycell® MONOLITHIC System: Staycell ONE STEP® 255 shall be sprayed onto the specified substrates at a nominal **<Insert thickness \_\_\_\_>** inch thickness where shown on the applicable drawings.
- E. Staycell® HYBRID System: The Staycell® HYBRID System (comprised of either the Staycell® 302 base layer sprayed at a nominal **<Insert thickness \_\_\_\_>** inch thickness covered by the Staycell ONE STEP® 255 top layer sprayed at a nominal **<Insert thickness \_\_\_\_>** inch thickness) shall be sprayed onto the specified substrates where shown on the applicable drawings.
- F. Do not install spray polyurethane foam within 3 inches of heat emitting devices such as light fixtures and chimneys.
- G. Remove masking materials and overspray from adjacent areas after the foam surface has hardened. Ensure cleaning methods do not damage work performed by other sections.
- H. Trim as required any excess thickness that would interfere with the installation of the interior finish (steel framing, gypsum board, etc.) by other trades.
- I. Clean and restore surfaces soiled or damaged by Work of the section.
- J. Do not permit adjacent Work to be damaged by Work of this section. Damage to work of this section caused by other trades shall be repaired at the expense of the subcontractor causing the damage.

#### 3.5 FIELD QUALITY CONTROL

- A. Daily records: The applicator shall keep daily records as to the square feet of surface sprayed each day, quantities of all materials used and thickness tests performed. One thickness test shall be conducted on every 500 square feet of covered surface. Such records shall be provided upon request.
- B. Installed product evaluation: In addition to verifying the thickness of all installed products, the following characteristics shall also be provided:
  - 1. The cellular structure shall be uniform and not be soft or spongy.
  - 2. The foam shall not have areas with hard or brittle sections or improperly proportioned materials.

#### 3.6 SAFETY REQUIREMENTS

- A. Applicator shall comply with all provisions of MSDS sheets for the product.
- B. Ventilation shall be provided to assure fresh air is brought into the area being sprayed. Air shall be exhausted to the outside of the building by utilizing existing fans or by supplemental ventilation.

- C. Disposal of waste materials and containers shall be comply with federal, state and local regulations.

3.7 CLEAN-UP

- A. At the completion of the project, applicator shall clean up and remove from the site all material containers, waste materials and debris.

END OF SECTION 07 21 19