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Guide Specification

FOAMED-IN-PLACE INSULATION

Staycell ONE STEP® Intumescent Spray Foam Systems as Basis of Design

Preferred Solutions, Inc.
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SECTION 07 21 19

FOAMED-IN-PLACE INSULATION

**** NOTE TO SPECIFIER ****

This section is based on spray foam insulation products of Preferred Solutions, Inc., located at:
5000 Rockside Road
Cleveland, OH 44131
Toll Free: 800-522-4522
Tel: 216-642-1200
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Preferred Solutions, Inc. manufactures the patented Staycell ONE STEP® Intumescent Spray Foam Insulation Systems that provide superior fire safety during construction and throughout the building life.

The closed-cell, Staycell ONE STEP® Monolithic and Hybrid Systems are classified as *Alternative Thermal Barrier Assemblies* when installed exposed, eliminating time and costs to install gypsum board or other fire-protective products.

The 2012, 2015, 2018 and 2021 editions of the International Building Code (IBC) and the International Residential Code (IRC) have specific fire performance requirements when spray foam insulation (SPF) is installed in occupied building spaces. Although most SPF is formulated to have code-compliant flame spread and smoke development 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 1/2 inch thick gypsum board or other equivalent fire-protective products unless the SPF products are classified as an *Alternative Thermal Barrier Assembly* as qualified by complying with the IBC and IRC-designated UL 1715 or NFPA 286 large-scale fire test standards.

PART 1 GENERAL

1.1 SECTION INCLUDES

****NOTE TO SPECIFIER** Delete items below not required for project.**

A. Foamed-In-Place Insulation consisting of one or more of the following:

1. Single-layer, closed-cell, intumescent spray polyurethane foam insulation (Staycell ONE STEP® 502, Monolithic System)
2. Two-layer, closed-cell, intumescent spray polyurethane foam insulation (Staycell® Hybrid System)
3. Closed-cell, polyurethane foam insulation with fire protective layer (Staycell® 504 with fire protective layer)

1.2 RELATED SECTIONS

****NOTE TO SPECIFIER** Delete any sections below not relevant to this project; add others as required.**

A. Section 03 30 00 - Cast-in-Place Concrete (03 30 00) - Cast-in-Place Concrete
B. Section 03 41 10 - Plant-Precast Structural Concrete (03 41 16) - Precast Concrete Slabs
C. Section 04 21 13 - Brick Masonry (04 20 00) - Unit Masonry
D. Section 05 30 00 - Metal Decking (05 30 00) - Metal Decking
E. Section 05 40 00 - Cold-Formed Metal Framing (05 40 00) - Cold-Formed Metal Framing
F. Section 06 10 00 - Rough Carpentry (06 10 00) - Rough Carpentry
G. Section 07 10 00 - Dampproofing and Waterproofing (07 10 00) - Dampproofing and Waterproofing
H. Section 07 27 19 - Plastic Sheet Air Barriers (07 26 00) - Vapor Retarders
I. Section 07 27 00 - Air Barriers (07 27 00) - Air Barriers
J. Section 07 42 00 - Wall Panels (07 40 00) - Roofing and Siding Panels
K. Section 07 65 00 - Flexible Flashing (07 65 00) - Flexible Flashing
L. Section 07 80 00 - Fire and Smoke Protection (07 80 00) - Fire and Smoke Protection
M. Section 07 84 13 - Penetration Firestopping (07 84 00) - Firestopping
N. Section 09 28 13 - Cementitious Backing Boards (09 29 00) - Gypsum Board

1.3 REFERENCES

****NOTE TO SPECIFIER** Delete references from the list below that aren't actually required by the text of the edited section.**

A. ASTM International (ASTM):
1. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
2. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics
3. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics
4. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
5. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials
6. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials
7. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculations of Air Permeance of Building Materials

B. National Fire Protection Association (NFPA):
1. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies Containing Combustible Components
2. NFPA 286 - Standard Method of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth

C. Underwriters Laboratories (UL):
1. UL 1715 - Fire Test of Interior Finish Material

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements
B. Product Data:
1. Manufacturer's technical and safety data sheets on each product to be used
2. Preparation instructions and recommendations
3. Storage and handling requirements and recommendations
4. Typical installation methods
C. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
   1. Applicator shall be a designated Authorized Applicator of manufacturer at time when bids or quotes are submitted.

C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

**** NOTE TO SPECIFIER ** Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.**

D. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
   1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
   2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
   3. Retain mock-up during construction as a standard for comparison with completed work.
   4. Do not alter or remove mock-up until work is completed or removal is authorized.

1.6 PRE-INSTALLATION CONFERENCE

A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.

B. Protect from damage due to weather, excessive temperature, and construction operations.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

B. Ventilate area to receive insulation to maintain safe working conditions.

C. Protect workers as recommended by standards and manufacturer's recommendations.

1.9 WARRANTY

A. Manufacturer’s Warranty: Provide manufacturer’s standard limited warranty

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Preferred Solutions, Inc., located at: 5000 Rockside Road, Independence, OH 44131; Toll Free: 800-522-4522; Tel: 216-642-1200; Fax: 216-642-1166; Email: **info@preferredsolutions.net** Website: **www.preferredsolutions.net**

**** NOTE TO SPECIFIER ** Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.**

B. Substitutions: Not permitted

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

**** NOTE TO SPECIFIER ** Staycell ONE STEP® 502 is an intumescent SPF that is specified for use in two systems: Single-layer (Monolithic System) or as the surface layer applied onto Staycell® 504 base layer (Hybrid System). Both Systems are classified as *Alternative Thermal Barrier Assemblies* and do not require distinct fire protective coverings when installed in accordance with tested assemblies and product listings. Classification for each system requires them to be installed on walls only or on the underside of ceilings/roofs/floors only or wall-roof transitions but not installed on entire wall and entire roof/ceilings/floors when adjacent to each other.**

The Staycell® Monolithic and Hybrid Systems are often specified to maximize fire safety during the construction process. Other SPF products that require the installation of distinct fire-protective products, termed "thermal barriers", can create potential fire hazards during the construction process when the SPF is exposed to cutting torches, welding sparks, trash fires, vandalism or arson during the weeks or months prior to the SPF being covered with gypsum board or other fire-protective products.

The single-layer Staycell ONE STEP® 502 Monolithic System is typically specified for applications where an R-10 or lower rating is required. In projects requiring greater than R-10 where access to the surfaces to be sprayed is limited or when having just one product to be installed may be preferred due to project schedule or simplicity of installation, the Monolithic System can also be the most cost-effective solution. In such cases, both the Monolithic and Hybrid Systems can be specified to enable the installing contractor to quote the most cost-effective system. The Hybrid System is typically most cost effective for higher than R-10 ratings.

**** NOTE TO SPECIFIER ** Delete article if not required.**

2.2 SINGLE-LAYER, CLOSED-CELL INTUMESCENT POLYURETHANE FOAM INSULATION

A. Basis of Design: Staycell® Monolithic System; Staycell ONE STEP® 502; manufactured by Preferred Solutions, Inc. and classified as an *Alternative Thermal Barrier Assembly*.

1. Standards compliance:
   a. UL 1715:

**** NOTE TO SPECIFIER ** Delete options not required.**

1. Underside of Roofs, Ceilings, and Floors: Exposed interior application of maximum 8.5 inch thickness.
2. Walls: Exposed interior application of maximum 4 inch thickness.

   b. NFPA 285 compliance for exterior walls in Building Types I, II, III, IV, and V when required by building code.
   c. ASTM E84, Class A
2. Description: Closed-cell, single layer, intumescent sprayed-in-place polyurethane foam insulation.

**** NOTE TO SPECIFIER ** Use either the thickness or R-rating required. Delete options not required.**

3. R-Rating: As indicated on Drawings.
4. R-Rating:_____.
5. Thickness: As indicated on Drawings.
6. Thickness:_____.
7. Physical Properties:
   a. Nominal Density per ASTM D1622: 2.0 lb. / cu. ft.
   b. Thermal Resistance per ASTM C518: R-5.7 @ 1", R-19.7 @ 3.5"
   c. Air Leakage per ASTM E 2178: $\leq$ 0.02 cfm/ft^2 @ 1"
   d. Compressive Strength per ASTM D1621: 22 psi
   e. Tensile Strength per ASTM D1623: 55 psi
   f. Water Vapor Transmission per ASTM E96: 0.98 perms @ 3.75"

**** NOTE TO SPECIFIER ** Delete article if not required.**

2.3 TWO-LAYER, CLOSED-CELL, INTUMESCENT SPRAY POLYURETHANE FOAM INSULATION

A. Basis of Design: Staycell® Hybrid System; manufactured by Preferred Solutions, Inc. and classified as an *Alternative Thermal Barrier Assembly.*

1. Standards compliance
   a. UL 1715:

**** NOTE TO SPECIFIER ** Delete options not required.**

1. Underside of Roofs, Ceilings, and Floors: Exposed interior application of maximum 8 inch thickness of

Staycell® 504 covered with 0.5 inch thick Staycell ONE STEP® 502.

2. Walls: Exposed interior application of maximum 3 inch thickness of Staycell® 504 covered with 1.0 inch thick Staycell ONE STEP® 502.

b. NFPA 285 compliance for exterior walls in Building Types I, II, III, IV, and V when required by building code.

c. ASTM E84, Class A

2. Description: Closed-cell, two-layer, intumescent sprayed-in-place polyurethane foam insulation.

3. Base Layer: Staycell® 504

**** NOTE TO SPECIFIER ** Use either the thickness or R-rating required. Delete options not required.**

a. R-Rating: As indicated on Drawings.

b. R-Rating:_____.

c. Thickness: As indicated on Drawings.

d. Thickness:_____.

e. Nominal Density per ASTM D1622: 1.7 lb. / cu. ft.

f. Thermal Resistance per ASTM C518: R-7.1 @ 1", R-23 @ 3.5"

g. Air Leakage per ASTM E 2178: ≤ 0.02 cfm/ft^2 @ 1"

h. Compressive Strength per ASTM D1621: 27 psi

i. Tensile Strength per ASTM D1623: 45 psi

j. Water Vapor Transmission per ASTM E96: 1 perm @ 1.7"

4. Exposed Surface Layer: Staycell ONE STEP® 502:

**** NOTE TO SPECIFIER ** Delete thickness option not required.**

a. Thickness: ½"

b. Thickness: 1"

c. Density per ASTM D1622: 2.0 lb. / cu. ft.

d. Thermal Resistance per ASTM C518: R-5.7 @ 1", R-2.85 @ ½"

e. Air Leakage per ASTM E 2178: ≤ 0.02 cfm/ft^2 @ 1"

f. Compressive Strength per ASTM D1621: 22 psi

g. Tensile Strength per ASTM D1623: 55 psi

h. Water Vapor Transmission per ASTM E96: 0.98 perms @ 3.75"

**** NOTE TO SPECIFIER ** Delete article if not required.**

2.4 CLOSED-CELL, POLYURETHANE FOAM INSULATION WITH FIRE PROTECTIVE LAYER

**** NOTE TO SPECIFIER ** In addition to being the base layer in the Staycell® Hybrid System, Staycell® 504 is also code compliant when separated from the interior of the building by 1/2 inch or greater thickness gypsum board or intumescent paint in accordance with product listings.**

A. Basis of Design: Staycell® 504; manufactured by Preferred Solutions, Inc.

1. Standards Compliance:

a. UL 1715 / NFPA 286:

**** NOTE TO SPECIFIER ** Delete options not required.**

1. All Applications: Unlimited thickness when covered with minimum 1/2 inch gypsum board.

2. Underside of Roofs, Ceilings, and Floors: Interior application of maximum 9.5 inch thickness when covered with intumescent paint.

3. Walls: Interior application of maximum 5.5 inch thickness when covered with intumescent paint.

b. NFPA 285 compliance for exterior walls in Building Types I, II, III, IV, and V when required by building code.

c. ASTM E84, Class A

2. Description: Closed-cell, sprayed-in-place polyurethane foam insulation with fire protective layer.

3. Physical Properties:

**** NOTE TO SPECIFIER ** Use either the thickness or R-rating required. Delete options not required.**

a. R-Rating: As indicated on Drawings.

b. R-Rating:_____.

c. Thickness: As indicated on Drawings.
d. Thickness:_____.
e. Density per ASTM D1622: 1.7 lb. /cu. ft.
f. Thermal Resistance per ASTM C518: R-7.1 @ 1", R-23 @ 3.5"
g. Air Leakage per ASTM E 2178: $\leq$ 0.02 cfm/ft^2 at 1"
h. Compressive Strength per ASTM D1621: 27 psi
i. Tensile Strength per ASTM D1623: 45 psi
j. Water Vapor Transmission per ASTM E96: 1 perm @ 1.7"

**** NOTE TO SPECIFIER ** Delete fire protective layer options not required.**

4. Fire Protective Layer: Minimum 1/2 inch thick gypsum board as specified in Section 09 28 13 Cementitious Backing Boards
5. Fire Protective Layer: Minimum 14 wet mil thickness, No-Burn Plus ThB intumescent paint. Maximum foam thickness on underside of roofs, ceilings and floors is 9.5 inches and 6.5 inches on vertical surfaces.
6. Fire Protective Layer: _____.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly constructed and prepared.
B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.
B. Protect adjacent surfaces, windows, equipment and site areas from damage of overspray.
C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
B. To maximize fire safety during construction, all thermal barrier, fire-protective products shall be installed within 72 hours after the spray foam is installed.
C. Comply with manufacturer's safety recommendations.

3.4 PROTECTION AND CLEAN-UP

A. Protect installed products until completion of project.
B. Touch-up, repair or replace damaged products before Substantial Completion.
C. Clean up and remove from the site all material containers, waste materials and debris.
D. Dispose of waste material and containers in accordance with federal, state and local regulations.

END OF SECTION