**Section 07 21 19 – THERMAL INSULATION**

**Foamed in Place Insulation**

For best results, display hidden notes to specifier.

\*\* NOTE TO SPECIFIER \*\* BASF Corporation sprayed polyurethane foam insulation for building envelope insulation.

This section is based on the products of BASF Corporation, which is located at:

1703 Crosspoint Ave

Houston, TX 77054

Tel: (888) 900-FOAM

Fax: (713) 383-4592

This section covers the foam insulation and thermal barrier (fire resistive) coating or other material, plus optional vapor retarder. This section should not be used for cold storage facility insulation, use Section 07212 instead. For sprayed foam roofing, use Section 07570.

**PART 1 GENERAL**

\*\* NOTE TO SPECIFIER \*\* Edit items below as required for project.

1.1 SECTION INCLUDES

 A. Spray polyurethane foam insulation.

 B. Thermal barrier (fire resistive) coating.

1.2 RELATED SECTIONS

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

\*\* NOTE TO SPECIFIER \*\* Roof Decks: This section should not be used to specify foam insulation on the exterior side of a roof -- use a true foam roofing specification for that.

 A. Section 03 30 00 – Cast-In-Place Concrete

 B. Section 04 20 00 – Masonry Units

 C. Section 06 10 00 – Rough Carpentry

 D. Section 07 26 00 – Vapor Retarders

 E. Section 07 84 00 – Fire-stopping

 F. Section 07 92 00 – Joint Sealants

 G. Section 09 96 00 – High Performance Coatings

 H. Section 05 31 00 – Metal Decking

 I. Section 07 14 00 – Fluid-Applied Waterproofing

 J. Section 07 27 36 – Sprayed Foam Air Barrier

 K. Section 07 81 00 – Fireproofing

 L. Section 09 29 00 – Gypsum Board

 M. Division 15 - Mechanical: Plumbing and HVAC components penetrating insulation.

 N. Division 16 - Electrical: Electrical components penetrating insulation.

1.3 REFERENCES

\*\* NOTE TO SPECIFIER \*\* Add any references to the list below that are included in text you have added to the section.

 A. American Society for Testing and Materials (ASTM):

1. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
2. ASTM C 1338 - Standard Test Method for Determining Fungi Resistance of Materials and Facings.
3. ASTM C 1848 – Standard Practice for Installation of High-Pressure Spray Polyurethane Foam Insulation for the Building Enclosure
4. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
5. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
6. ASTM D 1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
7. ASTM D 2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
8. ASTM D 2842 – Standard Test Method for Water Absorption of Rigid Cellular Plastics.
9. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics.
10. ASTM E 119 – Standard Test Methods for Fire Test of Building Construction Materials.
11. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
12. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials.
13. ASTM E 2178 – Standard Test Method for Air Permeance of Building Materials.
14. ASTM E 283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
15. ASTM E 970 - Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source.

 B. International Code Council Evaluation Services:

 1. AC-377 Acceptance Criteria for Spray-Applied Foam Plastic Insulation

 2. International Building Code®, 2015, 2012, 2009

 3. International Residential Code®, 2015, 2012, 2009

 4. International Energy Conservation Code®, 2015, 2012, 2009

 C. Underwriters Laboratories (UL):

 1. UL 263, UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials.

 2. UL 1715 - Fire Test of Interior Finish Material.

 D. Additional Testing, Approvals & Certifications:

 1. California Green Building Codes Standards, 2006 Title 24, Part 11.

 2. National Green Building Standard, ICC -700, 2015, 2012, 2008.

 3. LEED v4, Point potential for; Environmental Product Recommendation, Raw Material Source and Extraction Reporting and Recycled Content.

 4. GREENGUARD and GREENGUARD Gold Certification for VOC emissions and formaldehyde.

 E. Center for the Polyurethanes Industry – Health and Safety Product Stewardship Workbook for High Pressure application of Spray Polyurethane Foam, June 2016. See <http://www.spraypolyurethane.org> for industry guidelines.

1.4 SUBMITTALS

\*\* NOTE TO SPECIFIER \*\* Delete types of submittals not required. Coordinate submittal statements with other provisions in the section.

 A. Submit under provisions of Section 01300.

 B. Product Data: Manufacturer's data on products to be installed including:

 1. Application or installation instructions.

 2. Listing, classification, and approval certifications.

 3. Safety and handling instructions for storage, handling and use of the materials.

 C. Code Research Reports including:

 1. ICC-ES (International Code Council Evaluation Service) <http://www.spf.basf.com/evaluation_reports.php>.

 2. Intertek CCRR (Code Compliance Research Report) [www.spf.basf.com/evaluation\_reports.php#](http://www.spf.basf.com/evaluation_reports.php).

 D. Certifications: If manufacturer's published data sheets do not indicate compliance with all specification requirements, provide letter of certification that all products comply with the specification requirements; include primers (if required), foam, vapor retarder and thermal barriers.

1.5 QUALITY ASSURANCE

 A. Installer Qualifications: A firm with experience installing insulation systems of the type specified.

\*\* NOTE TO SPECIFIER \*\* Delete the following paragraph if not required. The Spray Polyurethane Foam Alliance (SPFA) conducts an Accreditation Program for improvement of quality in the application of spray polyurethane foams. The list of accredited individuals and firms is available from SPFA.

 1. Approved by the foam manufacturer as qualified to install the specified system or be certified by the Spray Polyurethane Foam Alliance (SPFA) Professional Certification Program (PCP).

 2. Provide information concerning projects similar in nature to the one proposed including location and person to be contacted.

1.6 DELIVERY, STORAGE, AND HANDLING

 A. Provide materials packaged in the manufacturer's original, tightly sealed containers or unopened packages, clearly labeled with the manufacturer's name, product identification, safety information, and batch or lot numbers where appropriate. Where materials are covered by a referenced specification, the labels shall bear the specification number, type and class, as applicable.

 B. Comply with the manufacturer’s written instructions for the storage, handling, and protection of products, both prior to and during installation.

 C. Store materials out of the weather and out of direct sunlight in locations where the temperatures are within the limits specified by the manufacturer.

1.7 PROJECT CONDITIONS

\*\* NOTE TO SPECIFIER \*\* Normally safety procedures are the responsibility of the contractor. For more information about polyurethane foam, see, www.spraypolyurethane.org for industry guidelines.

 A. Comply with the manufacturer's instructions and industry recommendations as to handling and safety procedures.

1.8 WARRANTY

 A. Provide manufactures standard 3-year Limited Warranty

**PART 2 PRODUCTS**

2.1 MANUFACTURERS

 A. Provide products by BASF Corporation, 1703 Crosspoint Avenue, Houston, TX 77054. Tel: (888) 900-FOAM. Fax: (713) 383-4592. [www.spf.basf.com/](http://www.spf.basf.com/), spfinfo@basf.com.

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with Division 1 requirements.

 B. Substitutions are not acceptable.

 C. Submit requests for substitutions in accordance with provisions of Section 01600.

2.2 MATERIALS

\*\* NOTE TO SPECIFIER \*\* Most published data is run on laboratory produced samples, not in-place material. The thickness of polyurethane foam sprayed, number of passes, temperature of substrate, ambient temperatures, etc., all affect properties. The following values are for BASF’s product in-place.

 A. Foam: BASF Corporation ENERTITE® G Insulation; sprayed-in-place two- component open-cell polyurethane foam system. ENERTITE G foam products are designed for use in in residential and common commercial insulation applications, made by combining an isocyanate (A) component with a polyol (B) component, with the following physical characteristics:

 1. Density in Place: 0.5-0.6 lb/cu ft, when tested in accordance with ASTM D 1622.

 2. Open Cell Content: >90%, when tested in accordance with ASTM D 6226.

 3. R-Value: 3.9 per inch, when tested in accordance with ASTM C 518.

 4. Vapor Permeance (perms): 16.9 @ 5.5” thickness, when tested in accordance with ASTM E-96.

\*\* NOTE TO SPECIFIER \*\* From a fire safety standpoint, polyurethane foams can be used safely. It is important, however, that all persons associated with the design, fabrication, storage and installation understand the materials and environments involved. Polyurethane foam insulation is combustible and should be treated as such. Flame spread ratings provided for polyurethane products using small scale tests are not intended to reflect the hazards presented by this or any other materials under actual fire conditions. Care must be taken to ensure that the foam is not exposed to heat or flame.

 5. Flame Spread Index: Less than or equal to 25, when tested in accordance with ASTM E 84.

 6. Smoke Developed Index: Less than or equal to 450, when tested in accordance with ASTM E 84.

7. Air Leakage: <0.02 L/s\*m² @ 75 Pa, when tested in accordance with ASTM E283

8. See product specific technical data sheet for additional physical data [http:/www.spf.basf.com/technical\_data.php](http://www.spf.basf.com/technical_data.php)

\*\* NOTE TO SPECIFIER \*\* A thermal barrier (fire resistive) is normally required over polyurethane foam exposed on the interior of the building. Typically, the minimum thermal barrier is a material that constitutes 15 minutes of fire protection for the foam. Materials that have been used include sprayed cementitious or fiber material (such as fireproofing) and gypsum board.

 B. Thermal Barrier: Gypsum Board or Intumescent Coating or Sprayed-in- place cementitious materials or Sprayed-in-place cellulose fiber, applied to achieve fire resistance rating of 15 minutes over spray polyurethane foam in accordance with NFPA 275 or NFPA 286 or UL 1715.

 C. Primers: (if required): The primer to be applied must be specifically selected for the given substrate to be primed and must be compatible with the spray polyurethane foam.

 1. Wood: chlorinated rubber, modified alkyds, others.

 2. Steel: modified alkyds, epoxy, acrylics, others (typically including rust inhibitors).

 3. Galvanized: vinyl copolymer acrylic, “vinyl wash primer”, modified alkyds, others.

 4. Concrete/masonry: chlorinated rubber, vinyl copolymer acrylic, asphaltic, other.

 D. Fire Resistant assemblies available, tested in accordance with UL 263.

**PART 3 EXECUTION**

3.1 GENERAL

 A. Comply with the instructions and recommendations of the foam and other material manufacturers.

 B. Familiarize all installers with correct and safe application and handling procedures:

 1. Workbook for High Pressure application of Spray Polyurethane Foam, June 2016. See [www.spraypolyurethane.org](http://www.spraypolyurethane.org) for industry guidelines.

 2. Refer to appropriate Safety Data Sheets (SDS) and Technical Product Data Sheets for additional safety information [http:/www.spf.basf.com/technical\_data.php](http://www.spf.basf.com/technical_data.php).

 3. Installer(s) must be able to provide documentation that they have completed the Spray Polyurethane Foam Chemical Health & Safety Training from the Center for Polyurethanes Industry, which can be found on the following website: [www.spraypolyurethane.org](https://basf-my.sharepoint.com/personal/goodbrc_basfad_basf_net/Documents/_Migration/W7JWJC6R1/Documents/2020%20-%20Projects/Light%20Commercial/BASF%20Existing/Product%20Specifications/www.spraypolyurethane.org).

3.2 PREPARATION

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

 A. Primed Steel: If the surface is free of loose scale, rust, weathered or chalking paint, it can be cleaned using vacuum equipment and hand or power tools to remove loose dirt. Remove oil, grease, form release agents, laitance, and other contaminants using proper cleaning solutions.

 B. Previously Painted Steel: Clean using hand or power tools to remove loose scale and dirt. Remove oil, grease, form release agents, laitance, and other contaminants using proper cleaning solutions.

 C. Galvanized Steel and Unpainted Steel: Clean as recommended by primer manufacturer.

 D. Ferrous Metal: Sandblast iron and steel surfaces, which are not primed, shop painted, or otherwise protected in accordance with SSPC SP-6. Remove loose rust and unsound primer from shop-primed iron and steel surfaces by scraping or wire brushing.

 E. Non-Ferrous Metal: Clean galvanized metal, aluminum, and stainless-steel surfaces as recommended by the manufacturer of materials to be applied.

 F. If metal surface is free of loose scale, rust, weathered or chalking paint, clean using compressed air jet, vacuum equipment, and hand or power broom to remove loose dirt. Remove grease, oil and other contaminants using proper cleaning solutions.

 G. New Concrete: Allow to cure for twenty-eight (28) days prior to the application of primer or foam, and loose dirt and any other contaminants removed.

 H. Previously Painted Surfaces: Remove all loose paint.

 I. Remove loose dirt, dust and debris by using compressed air, vacuum equipment or brooming. Remove oil, grease, form release agents, laitance, and other contaminants using proper cleaning solutions. Do not wash wood or porous materials with water.

 J. Grout, tape, or calk all joint openings that exceed 1/4 inch (6 mm) in width.

3.3 FOAM APPLICATION

\*\* NOTE TO SPECIFIER \*\* Typical application of foam exists with a round pattern of material, applied 6” to 24” from the target surface. Smaller / tighter areas may need to be addressed with a single-component sealing foam. Specify in another section as necessary.

 A. Do not begin application of foam until all preparation requirements have been completed.

 B. Do not apply foam when the temperature is below that specified by the manufacturer for ambient air and substrate. Do not apply foam when temperature is within 5 degrees F (3 degrees C) of dew point.

 C. Apply foam in accordance with the BASF specifications and processing guidelines.

 D. Apply foam to a \_\_\_\_ inch (\_\_\_\_ mm) thickness, with pass thickness of 1/2 inch (13 mm) to 6 inches (50 mm). Allow cooling time of 5 minutes between passes.

3.4 THERMAL BARRIER APPLICATION

A. The interior surface of the spray polyurethane foam must be covered with a 15-minute rated thermal barrier (fire protection) as required by building codes, insurance and industry standards. Certain areas such as sill plate/rim joists and attics/crawlspaces have specific exceptions per the building code. See Foam Plastics in your local building code for guidance. When required, apply thermal barrier in accordance with building code requirements and the manufacturer's specifications and instructions. As a standard, gypsum board meets this thermal barrier requirement for residential and commercial construction. See above for alternative materials.

\*\* NOTE TO SPECIFIER \*\* The interior surface of the spray polyurethane foam must be covered with a 15-minute rated thermal barrier. Delete this article if the thermal barrier is not a spray-applied coating.

 B. Apply thermal barrier over entire surface of foam in accordance with manufacturer guidelines.

 C. Allow thermal barrier to cure. Inspect for defects and repair defects prior to subsequent coats.

3.5 FIELD QUALITY CONTROL

 A. The installer shall complete the installation certificate documenting the foam type, manufacturer, product name, lot/batch number, as well as any fire protective products that have been used. The installation card shall be signed by the Insulation Contractor representative and delivered to the general contractor or building owner.

END OF SECTION