SPRAY POLYURETHANE FOAM ALLIANCE

SPFA-142

Securing Roof Components with Spray Polyurethane Foam Adhesives

Spray Polyurethane Foam Alliance
O: (800) 523-6154 | F: (703) 563-7425
www.sprayfoam.org | info@sprayfoam.org

ABOUT SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)

Founded in 1987, the Spray Polyurethane Foam Alliance (SPFA) is the voice, and educational and technical resource, for the spray polyurethane foam industry. A 501(c)6 trade association, the alliance is composed of contractors, manufacturers, and distributors of polyurethane foam, related equipment, and protective coatings; and who provide inspections, surface preparations, and other services. The organization supports the best practices and the growth of the industry through a number of core initiatives, which include educational programs and events, the SPFA Professional Installer Certification Program, technical literature and guidelines, legislative advocacy, research, and networking opportunities. For more information, please use the contact information and links provided in this document.

DISCLAIMER

This document was developed to aid building construction and design professionals in choosing spray-applied polyurethane foam systems. The information provided herein, based on current customs and practices of the trade, is offered in good faith and believed to be true to the best of SPFA's knowledge and belief.

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DOCUMENT HISTORY

Date	Sections Modified	Description of Changes
August 2015	All	Administrative changes
January 2021	Cover and Header	New SPFA Logo
January 2025	All	Editorial changes

ROOFING COMMITTEE

Mission Statement

The mission of the Roofing Committee is to provide a wide range of technical service to the SPF (spray polyurethane foam) industry such as, but not limited to:

1. Review existing documents and serve as a clearing house to ensure the "Continuity of Value" of technical information published by SPFA and others concerning roofing system products and services to the SPF industry;
2. Review, research, develop, and issue documents concerning new products, systems and services for SPF roofing applications; and
3. To identify, explore, develop, and communicate an understanding of roofing technical issues facing to the SPF industry.

Participating Members	
Jack Moore Creative Polymer Solutions, LLC	Will Lorenz General Coatings Manufacturing Co.
Jim Andersen JA Consulting, LLC	Butch Mackey NCFI Polyurethanes
Eric Banks e.w.banks consulting llc	Pat McCoy BASF Corporation
Daniel Boyles NCFI Polyurethanes	Roger Morrison Deer Ridge Consulting
Ashleigh Denman Johns Manville	Eric Pilgrim North Central Insulation
Jermecia Garner BASF Corporation	Bruce Schenke Weathering Systems Services
MacLean Hess Creative Polymer Solutions, LLC	Jodi Thomas* Henry Company
Robert Lepage Ex-El Sustainable Building Systems, LLC	Chris West West Roofing Systems, Inc.

*Participated in most recent document update.

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Description and Features

SPF (spray polyurethane foam) adhesive can be used to adhere a variety of roof construction materials to many roof substrates in both new and reroof applications. SPF adhesive may also be used to adhere board stock to board stock. SPF adhesive features may include:

- Elimination of thermal bridging caused by fasteners
- Rapid application and ease of install
- No predrilling into difficult substrates, such as concrete and cementitious wood fiber plank
- Reduces the risk of damage and maintains the integrity of the insulation board
- Controlled cure rate
- Excellent wind uplift resistance
- Potential air seal

Adhesive Classifications and Definitions

TWO-COMPONENT SPF ADHESIVE

For the purpose of this document, a "two component SPF adhesive" is defined as follows:

- The two components include the A-component (isocyanate) and the B-component (polyol blend), packaged independently.
- Components are dispensed through a hose that may be heated or unheated.
- Components are mixed at a spray gun.
- Components are dispensed by pressurized containers or pumps and applied in liquid form.
- Curing takes place through a chemical reaction between the two components.
- Tack-free time is typically less than 20 minutes.

PACKAGING OF TWO-COMPONENT SPF ADHESIVE

The A- and B-components are typically packaged in liquid volume containers ranging between 5 and 250 gallons.

SINGLE-COMPONENT SPF ADHESIVE

For the purpose of this document, a "single-component SPF adhesive" is defined as follows:

- Packaged in one container. May be dispensed by pressurized containers or poured from non-pressurized containers.
- Curing takes place through a reaction with moisture in the air—typically after more than 30 minutes depending on ambient conditions.
- Tack-free time is typically less than 30 minutes.

PACKAGING OF SINGLE COMPONENT SPF ADHESIVE

Single-component SPF adhesive may be packaged in cans or cylinders in volumes ranging between 1 and 5 gallons.

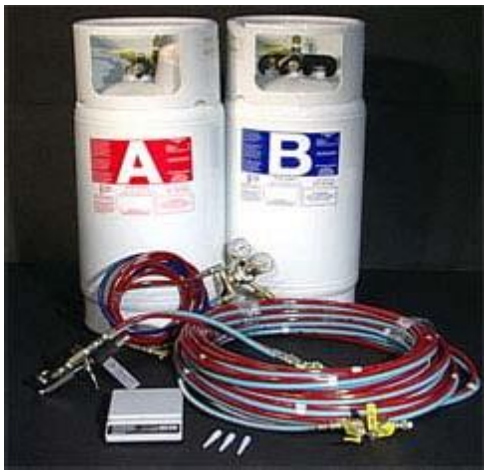

FIGURE 1: TWO-COMPONENT SPF ADHESIVE IN PRESSURIZED CYLINDERS

FIGURE 2: SINGLE-COMPONENT SPF ADHESIVE IN PRESSURIZED CYLINDER

Recommended Applications

Two-component SPF adhesive is applied to the substrate in ribbons or full coverage. After being applied, two-component SPF adhesives will typically rise between 1/8 inch (3 mm) and 1 inch (25 mm). Board stock is placed in the adhesive before it becomes tacky. Working time will range between 30 seconds and 15 minutes depending on ambient conditions and other variables. Maximum adhesion takes 24 hours.

Single-component SPF adhesive is applied to the substrate in 1 in.-2 in. ribbons, patties, or spots. After being applied, the adhesive can rise between 1/2 inch (13 mm) and 1 inch (25 mm). Board stock is placed in the adhesive before it becomes tacky, and normally requires ballasting of the

boards. Working time and maximum adhesion are dependent on ambient conditions and other variables.

1. **Compatible Roof Decks and Substrates**
   The following list includes those substrates typically used with SPF adhesive. Always consult the adhesive manufacturer for specific recommendations:
   - Poured-in-place structural concrete
   - Precast concrete
   - Plywood (5/8 inch [16 mm] minimum thickness)
   - Existing built-up roofs and modified bitumen
   - Steel (22 gauge minimum)
   - Existing SPF
   - Cementitious wood fiber plank
   - Base sheets

2. **Compatible Roofing Components**
   The following list of components includes those that may be adhered with SPF adhesive. NOTE: SPF adhesives may not adhere well to some board stock facers. Always consult the adhesive manufacturer for specific approvals regarding components and questions regarding adhesion to facers.
   - Polyisocyanurate
   - High-density wood fiber
   - Fiberglass reinforced gypsum
   - Expanded polystyrene
   - Extruded polystyrene
   - Tile
   - Membranes

3. **Limitations**
   Consult the adhesive manufacturer for specific limitations. SPF adhesive is not recommended for application in the following situations:
   - When ambient or substrate temperatures are below 2°C (35°F)
   - During inclement weather
   - On wet surfaces
   - To any roof deck that shows signs of deterioration or loss of structural integrity
   - Over large gravel, excessively dirty, or grease-laden surfaces

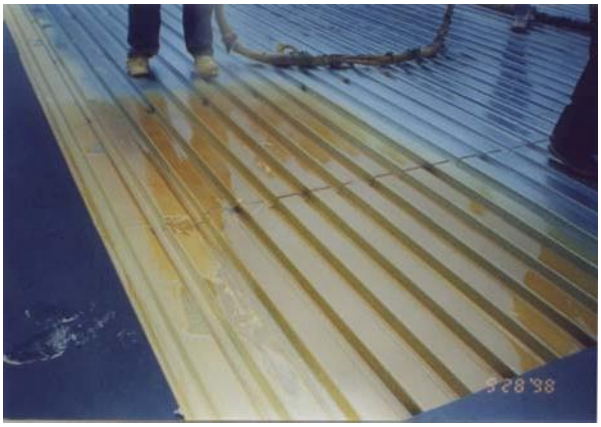

FIGURE 3: SPF ADHESIVE FULL COVERAGE

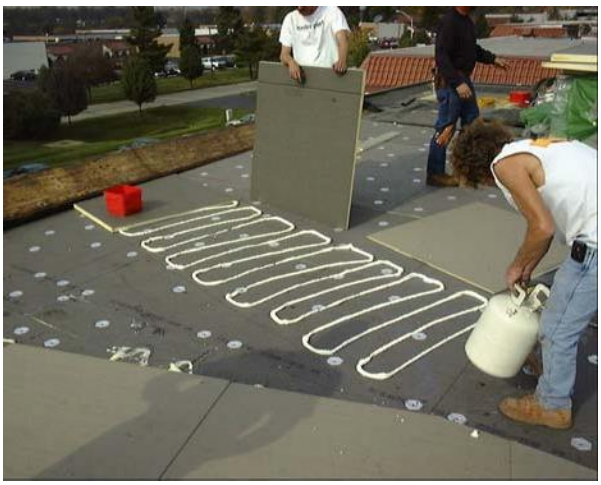

FIGURE 4: SPF ADHESIVE RIBBON APPLICATION

FIGURE 5: SPF ADHESIVE PATTY APPLICATION

APPLICATION

This section contains basic guidelines for applying SPF adhesive.
Safety This section contains basic guidelines for applying SPF adhesive.

SAFETY

(1) See American Chemistry Council – Center for the Polyurethanes Industry AX-205 "Guidance for Working with MDI: Things You Should Know", March 2021
(2) Refer to appropriate MSDS (Material Safety Data Sheets) for additional safety information.
(3) Before the application of the SPF adhesive is started, all HVAC equipment on the roof must be turned off. These units and any other potential sources of air entry into the building must be sealed.

HANDLING OF SPF ADHESIVE

Containers should be kept closed and stored in a dry, well-ventilated area between 20oC (70oF) and 35oC (95oF). Do not store containers in direct sunlight.

SURFACE PREPARATION

1. Priming—Some surfaces may require priming. Contact the adhesive manufacturer for additional requirements.
2. Structural Concrete and Wood—These surfaces must be free of any debris, dirt, oil, grease, and moisture before applying SPF adhesive.
3. Built-up Roofing (BUR) and Modified Bitumens—Non-graveled surfaces should be free of any debris, dirt, oil, grease, moisture, and standing water. Graveled surfaces must be free of loose gravel, dirt, and debris. Contact the adhesive manufacturer for additional requirements.
4. Steel—The surface should be free of any processing oil. The bonding surface must be free of any cleaner before application. Contact adhesive manufacturer for additional requirements.
5. Insulation—Review the roofing insulation plan. Multiple layers of boards should have staggered joints.
6. Existing SPF—The surface should be removed by scarifying (minimum of 1/4 inch [6 mm]). The surface should be blown clean before applying SPF adhesive per the manufacturer's recommendations.

TWO-COMPONENT SPF ADHESIVE INSTALLATION

1. Verify all materials are in sound condition and free of irregularities.
2. The resin component (B-side) may require mixing before using (check with the manufacturer).
3. The application rate will vary depending on the surface roughness.
4. SPF may be applied to extremely irregular surfaces before applying SPF adhesive.

SINGLE-COMPONENT SPF ADHESIVE INSTALLATION

1. Verify all materials are in sound condition and free of irregularities.
2. Mix the material container as recommended by the manufacturer.
3. Attach dispensing hose and nozzle as recommended by the manufacturer.
4. Apply the adhesive in a continuous bead or ribbon with a bead diameter of 3/4 to 1 inch (20 to 25 mm).
5. Spacing between beads or ribbons may be varied to achieve desired adhesion or wind uplift characteristics.

REACTION TIME

1. Two-component SPF adhesive is designed to react slower than SPF (typically 5 to 10 minutes). It is important to choose a reaction speed based on both the substrate and ambient temperature.
2. Single-component SPF adhesive reacts with moisture in the air; the speed will vary significantly depending on temperature and humidity.

NOTE: Components to be adhered must be placed into the SPF adhesive while it is still wet and prior to tack-free time.

QUALITY CONTROL

MANUFACTURER'S RESPONSIBILITY

It is the manufacturer's responsibility to provide a product that conforms to its claims relative to basic product description and uses, physical properties, and in-place performance. To assure that the end-user receives a product comparable to the manufacturer's claims, the manufacturer should provide the following:

1. **Literature**—Published product literature may include the following information: Product description, basic uses, wet properties, cured physical properties, performance characteristics, approvals, building code and insurance acceptance, application instructions and techniques, limitations, and precautions.
2. **Applicator Training and Approval**—Most manufacturers will help the contractor train personnel to handle and apply their products. This training can be undertaken in formal, seminar-type programs or as an in-field exercise, depending on the complexity of the product and the equipment necessary for its application.

CONTRACTOR'S RESPONSIBILITY

The contractor should assume responsibility for proper product use, handling, and application.

1. **Knowledge of Product**
   a. Contractors and their crews should be fully aware of all the parameters regarding a particular product, including uses, packaging, mixing, storage, and all application

requirements.

b. Field personnel should be provided with the proper training and knowledge by the contractor to successfully apply the particular system.

2. Equipment

a. Applicators must have a complete understanding of their equipment and its use with the particular material being applied. Of particular importance are mix ratios, pressures, output, filters, spray tip size, and operating temperatures.

b. Proper maintenance, repair, and clean-up of equipment will also minimize downtime, increase production, and improve crew and product performance.

3. Job Inspection

c. Spot checks per the manufacturer's recommendations of product ratios, output, and cured properties are good measures for quality control.

d. Monitoring specific output measured in gallons and areas covered will provide material yields and more uniform coverage.