SPFA TechTip R9 – Application of Spray Polyurethane Foam (SPF) Systems Directly to Wood Decks

SPF roofing systems are easily installed to a variety of new and existing roof structures. Acceptable substrates for SPF roofing include:

- Metal
- Concrete
- Wood
- Built-Up Roofing
- Modified Bitumen
- EPDM, PVC and TPO (with cover board)

In this document, the application of SPF directly to wood decks will be addressed.

Figure 1 - Roofing SPF Applied Directly to an OSB Wood Deck (top) and a Wood Plank Roof Deck Ready for Roofing SPF Application (bottom)

There are several SPFA guidance documents and standards available describing the roof surface requirements prior to SPF (See SPFA-122[i], SPFA-138[ii]). In general, three major considerations should be observed for any substrate prior to application of SPF:

(1) The roof system and roof deck should be securely fastened to the building structure, and meet all load requirements established by building codes, insurance requirements and sound engineering standards.
(2) Any material that is saturated with moisture shall be removed prior to SPF application.
(3) Any loose debris or surface contaminates (oils, paints, grease, rust, etc.) must be removed or properly covered prior to SPF application.

EXISTING STRUCTURE

SPF, when properly applied, adheres well to many different substrates. When properly adhered to any substrate, an SPF roofing system will provide suitable resistance to wind uplift. However, wind uplift resistance depends upon the general condition of the roof deck, underlying structure and method of fastening.

Wood roof decks should be inspected for general condition, including signs of mildew, rotting and insect damage. Affected areas should be removed and replaced. The

underlying structural supports of the roof system should also be inspected to ensure that they are free from rotting, excessive corrosion and other factors that can weaken the structure. Finally, the type, condition and number of fasteners between the deck and structure should be inspected, especially near perimeter corners and edges.

The existing structure should meet all requirements established by the building code, insurance requirements and sound engineering practice. It is good practice to have an engineering evaluation of the existing roof structure prior to application of SPF roof systems, especially if the condition of the existing roof is questionable.

MOISTURE

Unlike many roof substrates found on new and existing roofs, wood decks can absorb moisture. Excessive moisture can impact the processing of SPF during application, resulting in poor quality foam and poor adhesion.

Manufacturer's installation instructions typically provide maximum allowable moisture content for wood substrates, which is typically about 18%. Always consult these installation instructions regarding maximum allowable moisture.

A best practice approach, especially for existing wood roof decks, is to perform an infrared scan of the entire roof to identify any hidden moisture issues. In addition, the moisture content of the wood deck should be sampled using a moisture meter properly adjusted to measure surface moisture. Handheld moisture meters using pin probes to measure electrical resistance are suitable for checking surface moisture.

ADHESION

SPF used in roofing systems tends to naturally contract after installation. To resist this natural contraction, SPF must be applied so that it is well-adhered to a rigid, stable substrate. While minimizing the surface moisture of the wood will improve adhesion, best practice includes regular evaluation of foam adhesion on wood substrates.

Adhesion of SPF to the wood deck can be measured with core samples and an adhesion testing device. Consult the manufacturers installation instructions and/or the warranty requirements for proper foam adhesion. If proper adhesion of the SPF to the wood is not possible, the use of primers or cover boards may be needed.

SURFACE PREPARATION

After proper inspection of the existing structure, completion of a moisture evaluation and adhesion check, the wood deck will need to be prepared for the application of SPF. Joints in excess of ¼" in width will need to be sealed prior to the application of primer, vapor retarder or polyurethane foam.

Pre-treatment of the wood deck with a primer is often recommended to promote adhesion of the polyurethane foam to the

wood deck. The presence of moisture negatively impacts the application of SPF on any surface. Porous substrates like wood are especially vulnerable to surface moisture retention. Polyurethane foam or coatings sprayed over wood may require a primer designed to minimize the transfer of substrate moisture to the SPF or coating as it is applied. Surface moisture will cause poor adhesion due to inferior physical properties at the interface between the substrate and the material being applied. The primer also seals the porous surface to minimize any problems due to entrapped air or moisture
In addition, a dark primer may be used over wood decks. Dark primer increases solar heat gain, elevating the roof deck temperature. The elevated surface temperature of the wood deck reduces the occurrence of moisture condensation and will increase foam yield.

Consult the manufacturer's installation instructions for selection of a suitable primer.

ABOUT THE SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)

Founded in 1987, the Spray Polyurethane Foam Alliance (SPFA) is the voice, 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 consultants who provide inspections and other services. The organization supports the best practices and the growth of the industry through several 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. www.sprayfoam.org

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DOCUMENT HISTORY

Date	Sections Modified	Description of Changes
January 2025	New Document	

[i] SPFA-122 "The Renewal of Spray Polyurethane Foam and Coating Roof Systems" available for download from www.sprayfoam.org

[ii] SPFA-138 "Guideline for Roof Assembly Evaluation for Spray Polyurethane Foam Roof Systems" available for download from www.sprayfoam.org