



Designation: D 5469 – 00

Standard Guide for Application of New Spray Applied Polyurethane Foam and Coated Roofing Systems¹

This standard is issued under the fixed designation D 5469; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers the application of new roofing systems consisting of spray applied polyurethane foam insulation, elastomeric protective coatings, and optional mineral granules. This guide does not apply to retrofit or remedial applications.

1.2 Design criteria associated with the installation of spray in place polyurethane foam are beyond the scope of this specification.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- C 1029 Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation²
- D 451 Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products³
- D 1079 Terminology Relating to Roofing, Waterproofing, and Bituminous Materials³
- D 1621 Test Method of Compressive Properties of Rigid Cellular Plastics⁴
- D 1622 Test Method for Apparent Density of Rigid Cellular Plastics⁴
- D 2856 Test Method for Open-Cell Content of Rigid Cellular Plastics by the Air Pycnometer⁵
- D 4442 Test Methods for Direct Moisture Content Measure-

ment of Wood and Wood-Base Materials⁶

2.2 Other Standard:

SSPC SP-6 Steel Structures Painting Council⁷

2.3 Other Documents:

Underwriters Laboratories, *Roofing Materials and Systems Directory*⁸

Factory Mutual Research Corporation, Loss Prevention Data Sheets 1–28⁹

Alliance for the Polyurethane Industry AX119 *Guide for the Safe Handling and Use of Polyurethane and Polyisocyanurate Foam Systems*¹⁰

Spray Polyurethane Foam Alliance Documents:¹⁰

AY-102 Guide for Selection of Protective Coatings Over Spray Polyurethane Foam Roofing Systems

AY-104 Spray Polyurethane Foam Roofing Systems for New and Remedial Roofing

AY-118 Moisture Vapor Transmission

NRCA Roofing and Waterproofing Manual, Spray Polyurethane Foam-Based Roofing Manual

NRCA/SPFA Quality Control Guidelines for the Application of Spray Polyurethane Foam Roofing

NRCA/SPFA Manual for Inspection and Maintenance of Spray Polyurethane Foam-Based Roof Systems, A Guide for Building Owners

NOTE 1—*Details*: Numerous details are found in the referenced documents, in foam and coating manufacturers literature and from other sources. These details are to be considered general in nature. They should not be used without modification to allow for movement between the building, roofing, roof top equipment, and roof drainage systems.

3. Terminology

3.1 *Definitions*—Definitions are in accordance with Terminology D 1079.

¹ This guide is under the jurisdiction of ASTM Committee D08 on Roofing, Waterproofing, and Bituminous Materials and is the direct responsibility of Subcommittee D08.06 on Spray Polyurethane Foam Roof Systems.

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² *Annual Book of ASTM Standards*, Vol 04.06.

³ *Annual Book of ASTM Standards*, Vol 04.04.

⁴ *Annual Book of ASTM Standards*, Vol 08.01.

⁵ *Annual Book of ASTM Standards*, Vol 08.02.

⁶ *Annual Book of ASTM Standards*, Vol 04.10.

⁷ Available from Steel Structures Painting Council, 4400 5th Ave., Pittsburgh, PA 15213.

⁸ Available from Underwriters Laboratories Inc., 333 Pfingsten Rd., Northbrook, IL 60062.

⁹ Available from Factory Mutual Research Corporation, 1151 Boston-Providence Tpke., Norwood, MA 02062.

¹⁰ Available from Spray Polyurethane Foam Alliance, 1300 Wilson Boulevard, Suite 800, Arlington, VA 22209.

3.2 *Definitions of Terms Specific to This Standard:* Figs. 1-6 show the various types of polyurethane foam surfaces.

3.2.1 *coarse orange peel surface*—a surface of spray applied polyurethane foam that is slightly rough, having irregularities that form obtuse angles with the plane of the surface.

3.2.2 *core samples*—cylindrical sections of approximately 50 to 75 mm (2 to 3 in.) diameter. They shall be cut using a round metal template or coring tool, and they shall extend from surface down to substrate.

3.2.3 *lift*—a single application of spray applied polyurethane foam.

3.2.4 *lightweight or insulating concrete fill*—concrete made with or without aggregate additions to portland cement, water, and air to form a hardened material which, when oven dried, will have a unit weight of 800 kg/m³ (50 lb/ft³) or less.

3.2.5 *orange peel surface*—a surface of spray applied polyurethane foam that is relatively smooth, but has a slightly rippled or dimpled appearance.

3.2.6 *popcorn surface*—a surface of spray applied polyurethane foam that is extremely rough, having irregularities that form angles which are perpendicular to the plane of the surface.

3.2.7 *verge of popcorn surface*—a surface of spray applied polyurethane foam that is moderately rough, but does not exhibit sharp angles perpendicular to the plane of the surface.

3.2.8 *slit samples*—crescent-shaped samples approximately 25 mm (1 in.) long and 12.5 mm (½ in.) in depth. They are used to check coating surface quality and coating adhesion and thickness.

3.2.9 *smooth surface*—a surface of spray applied polyurethane foam that is relatively smooth.

3.2.10 *tree bark surface*—a surface of spray applied polyurethane foam that is extremely rough and irregular, having undercuts (upper surface of foam overhangs a lower surface) and usually accompanied by pinholes.

4. Significance and Use

4.1 This guide outlines general procedures and precautions necessary for correct and safe application of spray applied polyurethane foam roofing systems.

4.2 This guide is not all-inclusive; this guide is intended only to supplement detailed instructions from manufacturers and safety requirements established by law.

4.3 Refer to Polyurethane Foam Contractors Alliance AY-104 and NRCA Spray Polyurethane Foam-Based Manual for industry guidelines.

5. Substrate Requirements

5.1 General Requirements:

5.1.1 Application shall conform to codes having jurisdiction.

5.1.2 All substrates shall be clean and free of moisture, dust, oil, grease, and release agents or other contaminants.

5.1.3 If a vapor retarder is specified, it should be installed in accordance with instructions of the vapor retarder manufacturer and be compatible with the spray applied polyurethane foam and substrate being covered. Refer to SPI/PFCD document AY-118.

5.1.4 If a primer is specified or required, it shall be installed to a clean surface in accordance with the primer manufacturer's instructions. The primer must be suitable for the substrate, be able to meet service temperature requirements, be compatible with the spray applied polyurethane foam, and acceptable to the foam manufacturer.

5.2 Metal:

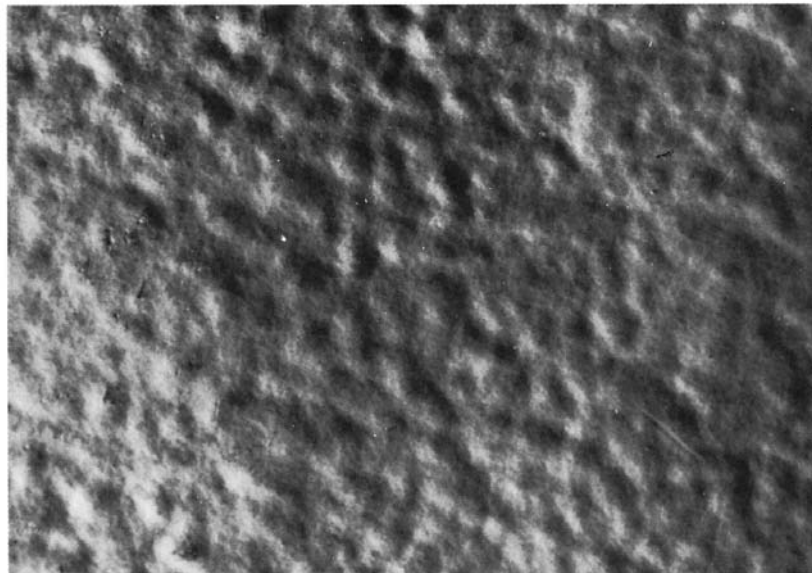


FIG. 1 Polyurethane Foam Texture—Smooth

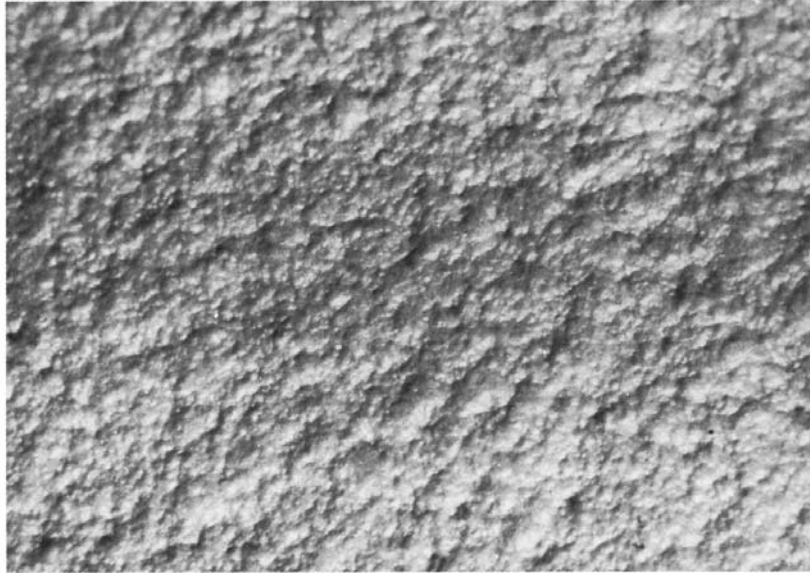


FIG. 2 Polyurethane Foam Texture—Orange Peel

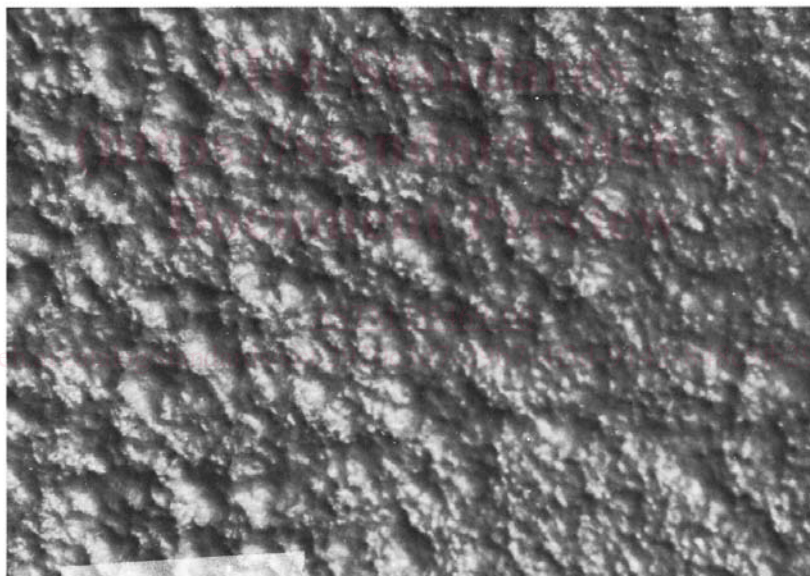


FIG. 3 Polyurethane Foam Texture—Coarse Orange Peel

5.2.1 Metal decks shall conform to requirements of the Steel Deck Institute¹¹, American Iron and Steel Institute (AISI)¹², American Society of Civil Engineers (ASCE)¹³, 7-88 and Factory Mutual Research Corporation (FMRC)⁹.

5.2.2 *Surface Preparation:*

5.2.2.1 *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. The sandblasted area shall be primed the same day.

5.2.2.2 *Non-Ferrous Metal*—Clean and prime all surfaces as recommended by primer and foam manufacturer.

5.2.2.3 Fluted metal decks shall have flutes filled, covered, or taped with materials and procedures approved by the manufacturer of the polyurethane foam, prior to spray applied polyurethane foam application.

5.2.3 Lightweight corrugated roofs, which are secured to meet industry standards, shall meet the surface requirements in 5.2.1 and 5.2.2.

¹¹ Steel Deck Institute, P.O. Box 9506, Canton, OH 44711.

¹² American Iron and Steel Institute, 1133 15th St., Suite 300, Washington, DC 20005-2701.

¹³ American Society of Civil Engineers, 345 E. 47th St., New York, NY 10017.