Code Compliance Research Report
CCRR-0507

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DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation
Section: 07 21 19 – Foamed-In-Place Insulation

REPORT HOLDER:
SWD Urethane
540 South Drew Street
Mesa, Arizona 85210
(480) 969-8413
www.swdurethane.com
technical@swdurethane.com

REPORT SUBJECT:
SWD Quik-Shield® | GOBLIN Spray-applied Polyurethane Foam Insulation

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2024, 2021 and 2018 *International Building Code®* (IBC)
- 2024, 2021 and 2018 *International Residential Code®* (IRC)
- 2024, 2021 and 2018 *International Energy Conservation Code®* (IECC)

NOTE: This report references the most recent Code editions noted. Sections for earlier editions may differ.

1.2 SWD Quik-Shield® | GOBLIN insulation has been evaluated for the following properties (see Table 1):

- Surface burning characteristics
- Physical properties
- Air permeability
- Vapor permeance

1.3 SWD Quik-Shield® | GOBLIN insulations have been evaluated for the following uses (see Table 1):

- Use as nonstructural thermal insulation in interior and exterior walls, floors, and the underside of roof decks
- Alternatives to Code-prescribed ignition barriers
- Alternatives to Code-prescribed thermal barriers
- Use as air-impermeable insulation
- Use as a Class II vapor retarder
- Use in exterior walls of Types I, II, III, and IV construction
- Use in Type V construction
- Use as duct insulation

2.0 STATEMENT OF COMPLIANCE

SWD Quik-Shield® | GOBLIN insulation complies with the Codes listed in Section 1.1, for the properties stated in Section 1.2 and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

3.0 DESCRIPTION

3.1 SWD Quik-Shield® | GOBLIN: SWD Quik-Shield® | GOBLIN is a two-component foam plastic insulation. The insulation is produced in the field by combining Component A and resin Component B, resulting in insulation with a nominal density of 2 pounds per cubic feet. The insulation components have a shelf life of six months when stored at temperatures between 50°F and 80°F before installation.

3.2 Intumescent Coatings:

3.2.1 DC315 Intumescent Coating: DC315 intumescent coating, manufactured by IFTI, Paint to Protect, is a water-based coating supplied in 5-gallon pails and 55-gallon drums. The coating material has a shelf life of 24 months when stored in factory-sealed containers at temperatures between 41°F and 95°F. DC315 complies with AC456 as recognized in ICC-ES ESR-3702.

3.2.2 Flame Control 60-60A Intumescent Coating: Flame Control 60-60A, manufactured by Flame Control Coatings, is a water-based coating supplied in 5-gallon pails and 55-gallon drums. The coating material has a shelf life of 12 months when stored in factory-sealed containers at temperatures between 50°F and 80°F. Flame Control 60-60A complies with AC456 as recognized in IAPMO UES ER-0596.

3.2.3 NO-BURN® Plus ThB Intumescent Coating: NO-BURN® Plus ThB, manufactured by NO-BURN®, Inc., is a white, water-based latex liquid. Supplied in 5-gallon pails and 55-gallon drums. The coating material has a shelf life of 3 years when stored in factory-sealed containers at temperatures between 40°F and 90°F. NO-BURN® Plus ThB complies with AC 456 as recognized in IAPMO UES ER-0305.

3.2.4 Fireshell F10E Intumescent Coating: Fireshell F10E intumescent coating, manufactured by ICP Construction, is a water-based intumescent coating supplied in 5-gallon pails and 55-gallon drums. The coating has a shelf life of 1 year when stored unopened at temperatures between 45°F and 95°F.

Fireshell F10E complies with AC456 as recognized in ICC-ES ESR-3997.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Surface-burning Characteristics: SWD Quik-Shield® | GOBLIN, at a maximum thickness of 4 inches and a nominal density of 2 pounds per cubic foot, has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84. SWD Quik-Shield® | GOBLIN can be installed at greater thicknesses as described in Sections 5.3 and 5.4.2. When the insulation is separated from the interior living space of the building with minimum 1/2-inch-thick gypsum board, the maximum insulation thickness is not limited. Under the IRC, a thermal barrier of minimum 23/32-inch-thick wood structural panel is also permitted, and the maximum insulation thickness is not limited.

4.2 Thermal Resistance (R-value): SWD Quik-Shield® | GOBLIN has a thermal resistance (R-value) of 7.0 °F·ft²·h/Btu per inch of thickness, at a mean temperature of 75°F, as shown in Table 3.

4.3 Air Permeability: SWD Quik-Shield® | GOBLIN, at a minimum thickness of 1 inch, is considered air-impermeable insulation in accordance with IBC Section 202 and IRC Section R202, based on testing in accordance with ASTM E2178.

4.4 Vapor Permeance: SWD Quik-Shield® | GOBLIN, at a minimum thickness of 1.82 inches, is a Class II vapor retarder in accordance with IBC Section 202, IRC Section R202, based on testing in accordance with ASTM E96 (desiccant method).

The insulation may be used where a Class II vapor retarder is required under IBC Section 1404.3 or IRC Section R702.7 when installed at a minimum of 1.82 inches.

5.0 INSTALLATION

5.1 General: SWD Quik-Shield® | GOBLIN insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. The installation requirements in Sections 5.1 through 5.4 apply to all Types of construction. Section 5.5 applies to use of SWD Quik-Shield® | GOBLIN in Types I, II, III, and IV construction. A copy of the manufacturer's instructions must be available on the jobsite during installation.

The insulation must be stored at temperatures between 50°F and 80°F and must not be used in areas that have a maximum service temperature greater than 250°F. The foam plastic insulation must not be used in electrical outlet or junction boxes, or in contact with rain or water. The substrate must be free of moisture, frost or ice, loose scales, rust, oil, and grease. The insulation must be protected from the weather during and after application, unless approved specifically by SWD Urethane. The manufacturer's published installation instructions must be available on the jobsite at all times during installation.

5.2 Application: The insulation is spray-applied on the jobsite using spray equipment specified in SWD Urethane's published installation instructions. SWD Quik-Shield® | GOBLIN can be installed in one or more passes in thicknesses up to 4 inches per pass to achieve the maximum thicknesses specified in this report. Each pass must be allowed to fully expand prior to application of additional passes. Where used as an air-impermeable insulation, such as in unvented attic spaces in accordance with IBC Section 1202.3 or IRC Section R806.5, the insulation must be installed at a minimum thickness of 1 inch.

5.3 Thermal Barrier:

5.3.1 Application with a Prescriptive Thermal Barrier: The insulation must be separated from the interior of the building by an approved thermal barrier of 1/2-inch-thick gypsum wallboard or an equivalent thermal barrier complying with IBC Section 2603.4 or IRC Section R303.4, as applicable, except where installation is in an attic or crawl space as described in Section 5.4. When the insulation is separated from the interior living space of the building with minimum 1/2-inch-thick gypsum board, the maximum insulation thickness is not limited. Under the IRC, a thermal barrier of minimum 23/32-inch-thick wood structural panel is also permitted, and the maximum insulation thickness is not limited.

5.3.2 Application without a Prescriptive Thermal Barrier:

5.3.2.1 SWD Quik-Shield® | GOBLIN may be installed without the 15-minute thermal barrier prescribed in IBC Section 2603.4 and IRC Section R303.4, when installed as described in assemblies conforming to one of the assemblies described in Table 2.

The intumescent coatings indicated in Table 2 must be applied over the insulation in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris, and other substances that could interfere with adhesion of the coating. The coating is applied with low-pressure airless spray equipment.

5.4 Attics and Crawl Spaces:

5.4.1 Application with a Prescriptive Ignition Barrier: Where SWD Quik-Shield® | GOBLIN insulation is installed within attics or crawl spaces, and where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Sections R303.5.3 and R303.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable Code and must be installed in a manner so that the

foam plastic insulation is not exposed. The insulation, as specified in this section, may be installed in unvented attics and unvented enclosed rafter assemblies in accordance with IBC Section 1202.3 or IRC Section R806.5.

5.4.2 Application without a Prescriptive Ignition Barrier: SWD Quik-Shield® | GOBLIN insulation may be installed in attics and crawl spaces without the ignition barrier prescribed in IBC Section 2603.4.1.6, and IRC Sections R303.5.3 and R303.5.4, as described in Sections 5.4.2.1, and 5.4.2.2 subject to the following conditions:

a. Entry to the attic or crawl space is only to service utilities and no storage is permitted.
b. There are no interconnected attic or crawl space areas.
c. Air in the attic is not circulated to other parts of the building.
d. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806.1, as applicable, except when insulation is permitted in unvented attics in accordance with IBC Section 1202.3, or IRC Section R806.5.
e. Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1202.4 or IRC Section R408.1, as applicable.
f. Combustion air is provided in accordance with IMC (International Mechanical Code®) Section 701.

The insulation may be installed in unvented attics as described in this section in accordance with IBC Section 1202.3 or IRC Section R806.5, when applied at a minimum thickness of 1 inch.

5.4.2.1 Assembly No. 1: SWD Quik-Shield® | GOBLIN insulation may be applied to the underside of roof sheathing, to roof rafters and to walls; and in crawl spaces; the insulation may be spray-applied to the underside of wood floors and to walls, as described in this section.

The thickness of the foam plastic applied to vertical surfaces must not exceed 5-1/2 inches, and the thickness applied to the underside of the wood floor or roof sheathing must not exceed 9-1/2 inches. The foam plastic is not required to be coated. The ignition barrier required by IBC Section 2603.4.1.6 and IRC Sections R303.5.3 and R303.5.4 may be omitted.

5.4.2.2 Use on Attic Floors: SWD Quik-Shield® | GOBLIN insulation may be installed at a maximum thickness of 11-1/2 inches between joists in attic floors without a coating and without an ignition barrier on the attic side of the insulation. The insulation must be separated from the interior of the building by an approved thermal barrier.

5.5 Use on Exterior Walls in Types I, II, III, and IV Construction: When used in exterior walls of Types I, II, III, or IV construction, the assembly must be installed as described in Table 4. The potential heat of the foam plastic in any portion of the wall must not exceed 7367 Btu/ft^2.

5.6 Duct Insulation: SWD Quik-Shield® | GOBLIN insulation may be applied to residential ducts in compliance with IRC Section M1601.3 to a maximum thickness of 4 inches.
The material must be protected in accordance with the ignition barrier requirements of either Section 5.4.1 or 5.4.2.

6.0 CONDITIONS OF USE

The SWD Quik-Shield® | GOBLIN spray-applied insulation described in this Research Report complies with, or is a suitable alternative to, what is specified in those codes listed in Section 1.0 of this report, subject to the following conditions:

6.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

6.2 The insulation must be separated from the interior occupied spaces of the building by an approved thermal barrier, as described in Sections 5.3 and 5.4.

6.3 The insulation thickness must not exceed that noted in sections 4.1.1, 5.3, 5.4, and 5.5.

6.4 The insulation must be protected from the weather during and after application as specified in the manufacturer's instructions.

6.5 A vapor barrier must be installed when required by the applicable Code.

6.6 The insulation must be applied by contractors approved by SWD Urethane.

6.7 The SWD Quik-Shield® | GOBLIN may be used in exterior walls of buildings of Type I, II, III, or IV construction, when the construction is as described in Section 5.5.

6.8 Use of the insulation in areas where the probability of thermite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section R305.4, as applicable.

6.9 Use of the insulation in fire-resistance-rated construction is outside the scope of this report.

6.10 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10, N1101.14 and IECC Section C303.1 or R303.1 and R401.3, as applicable.

6.11 The product is manufactured under a quality control program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Reports of tests in accordance with ASTM C411, ASTM C518, ASTM E84, ASTM E283, ASTM E96, ASTM E970, ASTM E2178, NFPA 286, NFPA 285, UL 1715, and NFPA 259.

7.2 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated February 2020, including reports of tests in accordance with Appendix X.

7.3 Data in accordance with ICC 1100 (2019).

7.4 Research Reports for evaluation of data in accordance with ICC-ES Acceptance Criteria for Fire-protective Coatings Applied to Spray-applied Foam Plastic Insulation Installed without a Code-prescribed Thermal Barrier (AC456), dated October 2015.

7.5 Intertek Listing Report "SWD Quik-Shield® | GOBLIN", on the Intertek Directory of Building Products.

8.0 IDENTIFICATION

The A and B components of the insulation are identified with the manufacturer's name (SWD Urethane), address and telephone number, the product name (SWD Quik-Shield® | GOBLIN), the component type (A or B component), the mixing instructions, the density, the flame-spread and smoke-developed indexes, the shelf-life and date of manufacture, the Intertek Mark as shown below, and the Code Compliance Research Report number (CCRR-0507).

CODE COMPLIANCE
ETL US
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9.0 OTHER CODES

This section is not applicable.

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

10.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

10.3 Reference to the https://bpdirectory.intertek.com is recommended to ascertain the current version and status of this report.

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TABLE 1 – PROPERTIES EVALUATED

PROPERTY	2024 IBC SECTION[1]	2024 IRC SECTION[1]	2024 IECC SECTION[1]
Physical properties	2603.1	Not required	Not required
Surface-burning characteristics	2603.3	R303.3	Not applicable
Alternatives to thermal barrier/ ignition barrier	2603.4	R303.4	Not applicable
Air permeability	1202.3	R806.5	C402.6.2.3.1
Vapor retarder	202 1404.3	202 R702.7	Not applicable
Thermal resistance	1301	N1101.10 N1102	C303.1 R303.1
Exterior walls of Types I – IV construction	2603.5	Not applicable	Not applicable

[1] Section numbers may be different for earlier versions of the International Codes.

TABLE 2 – COATING AND FOAM ASSEMBLIES WITHOUT A CODE-PRESCRIBED THERMAL BARRIER

Foam Insulation Product	Intumescent Coating Product	Assembly Details					Test Method
		Insulation Details		Intumescent Coating Details			
		Maximum Average Thickness, inches		Minimum Average Thickness, mils		Theoretical Application Rate	
		Vertical (e.g. wall)	Overhead (e.g. ceiling)	Wet Film (WFT)	Dry Film (DFT)	gal/100 ft^2	
QS-GOBLIN	DC315	11-1/4	11-1/4	20	13	1.3	NFPA 286
	60-60A	9-1/2	9-1/2	20	13	1.3	NFPA 286
	Fireshell F10E	6	8	17	11	1.05	NFPA 286
	DC315	5-1/2	9-1/2	14	9	0.9	NFPA 286
	NO-BURN® Plus ThB	5	8	14	9	0.85	UL1715

TABLE 3 – SWD Quik-Shield® | GOBLIN THERMAL RESISTANCE (R-Values)[1,2,3]

THICKNESS (inches)	R-VALUE (°F·ft²·h/Btu)
1	7.0
1.5	11
2	14
2.5	18
3	21
3.5	25
4	28
5	35
5.5	39
6	42
7.25	51
8	56
9.25	65
10	70
11.25	79

1 R-values are calculated based on tested K-values at 1 inch thickness and 3.5 inch thickness.
2 R-values less than 10 are rounded to the nearest 1/10th; greater than 10 are rounded to the nearest whole number.
3 To determine R-values for thicknesses not listed, R = 7.0/inch.

TABLE 4 – NFPA 285 COMPLYING WALLS WITH SWD Quik-Shield® | GOBLIN

Base Wall	One layer of 5/8-inch-thick Type X gypsum wallboard complying with ASTM C36 or C1396 on interior, installed over $3^5/_8$ to 6 inch deep, No. 18 gage, C-shaped, steel studs spaced a maximum of 24 inches on center. Openings must be framed with No. 18 gage steel. Gypsum wallboard must be attached with No. 6, 1-1/4-inch-long self-tapping screws located 8 inches on center along the perimeter and 12 inches on center in the field of the wallboard. Gypsum wallboard joints must be taped and treated with joint compound in accordance with ASTM C840 or GA-216.
Fire-Stopping in Stud Cavity at Floorlines	4 pounds per cubic feet mineral wool (e.g., Thermafiber) in each stud cavity at each floor line. The insulation is friction fit between studs.
Cavity Insulation	Minimum 1-inch-thick SWD Quik-Shield | GOBLIN applied to backside of exterior sheathing. Air gap may not exceed 2-1/2 inches.
Exterior Sheathing	Minimum 5/8-inch-thick listed or certified exterior-type gypsum sheathing.
Exterior Insulation- Use Either 1 or 2	1. None. 2. Any noncombustible insulation which meets ASTM E136. Insulation must be attached per manufacturer instructions and must incorporate a noncombustible water-resistive barrier or air/vapor barrier when specified.
Exterior Cladding	Any noncombustible exterior wall covering material. Details of the exterior wall covering must be provided by the report holder, designer or specifier to the Code official, with a fire engineering analysis demonstrating that the addition of the wall covering will not negatively affect conformance of the assembly with the requirements of IBC Section 2603.5.