



Code Compliance Research Report CCRR-1051

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

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REPORT SUBJECT:

SWD Quik-Shield® | 108 Spray-applied Polyurethane Foam Insulation

1.0 SCOPE OF EVALUATION

This Research Report addresses compliance with the following Codes:

- 2015, 2012, 2009, and 2006 *International Building Code*® (IBC)
- 2015, 2012, 2009, and 2006 *International Residential Code*® (IRC)
- 2015, 2012, 2009, and 2006 *International Energy Conservation Code*® (IECC)

The SWD Quik-Shield® | 108 insulation has been evaluated for the following properties:

- Physical properties
- Surface-burning characteristics
- Air Permeability
- Thermal resistance (R-values)
- Alternatives to ignition barriers

See Table 1 for applicable Code sections related to these properties.

NOTE: This report references 2015 Code sections. Section numbers for the 2012, 2009, and 2006 Codes may differ.

2.0 USES

SWD Quik-Shield® | 108 insulation has been evaluated for the properties noted in Section 1.0 and Table 1. The insulation is a nonstructural thermal insulating material

for use on or in interior and exterior walls, floors, and roofs.

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

3.0 DESCRIPTION

3.1 Materials:

3.1.1 SWD Quik-Shield® | 108: SWD Quik-Shield® | 108 is a two-component, open-cell, foam plastic insulation. The insulation is produced in the field by combining an isocyanate (Component A) with a proprietary resin (Component B), resulting in insulation with a nominal density of 0.4 pcf. The insulation components have a shelf life of six months when stored at temperatures between 50°F and 80°F before installation.

3.1.2 DC 315 Intumescent Coating: DC 315 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. DC 315 is an Intertek certified product.

3.1.3 FS-IB Intumescent Coating: FS-IB intumescent coating, manufactured by Flame Seal Coatings, is a single-component latex-based coating supplied in 5-gallon pails and 55-gallon drums. The coating material has a shelf life of six months when stored in factory-sealed containers at temperatures between 60°F and 80°F.

3.2 Performance Characteristics:

3.2.1 Surface-burning Characteristics: The insulation, at a maximum thickness of 4 inches, 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® | 108 can be installed at greater thicknesses as described in Sections 4.3 and 4.4.2. When the insulation is separated from the interior living space of the building with minimum 1/2 inch thick gypsum board, the maximum thickness is not limited. Under the 2015



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IRC, a thermal barrier of minimum 23/32 inch thick wood structural panel is also permitted and the thickness is not limited.

3.2.2 Air Permeability: The insulation, at a minimum thickness of 3-1/2 inches, is considered air-impermeable insulation in accordance with 2015 IBC and 2015 IRC Sections 202 and R202 respectively, based on testing in accordance with ASTM E283. Air permeability was not defined in the 2012 and 2009 IBC.

3.2.3 Thermal Resistance (R-value): The insulation has thermal resistance (R-value), at a mean temperature of 75°F, as shown in Table 2.

4.0 INSTALLATION

4.1 General:

The 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 4.1 through 4.4 apply to all types of construction.

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 180°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.

4.2 Application:

The insulation is spray-applied on the jobsite using spray equipment specified in SWD Urethane's published installation instructions. Quik-Shield® | 108 can be installed in one pass. Where multiple passes are required, the cure time between passes is negligible.

4.3 Thermal Barrier:

4.3.1 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 15-minute thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable, except where installation is in an attic or crawl space as described in Section 4.4. When the insulation is separated from the interior living space of the building with minimum 1/2 inch thick gypsum board, the maximum thickness is not limited. Under the 2015 IRC, a thermal barrier of minimum 23/32 inch thick wood structural panel is also permitted and the thickness is not limited.

4.3.2 Application without a Prescriptive Thermal Barrier: SWD Quik-Shield® | 108 may be installed without the 15-minute thermal barrier prescribed in IBC Section 2603.4 and IRC Section R316.4, when installed as described in this section. The thickness of the foam plastic insulation applied to the underside of the roof sheathing and floors must not exceed 14 inches, and the thickness on walls must not exceed 8 inches. The foam plastic must be covered on all surfaces with 18 wet mils (12 dry mils) of DC 315 intumescent coating.

The coating 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.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: Where SWD Quik-Shield® | 108 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 R316.5.3 and R316.5.4, 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 2015 IBC Section 1203.3 or IRC Section R806.5.

4.4.2. Application without a Prescriptive Ignition Barrier: SWD Quik-Shield® | 108 insulation may be installed in attics and crawl spaces without the ignition barrier prescribed in IBC Section 2603.4.1.6, and IRC Sections R316.5.3 and R316.5.4, as described in Sections 4.4.2.1, 4.4.2.2, 4.4.2.3, and 4.4.3, subject to the following conditions:

- a. Entry to the attic or crawlspace 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 2015 IBC Section 1203.3 [not applicable under the 2012, 2009 or 2006 IBC], or IRC Section R806.5.
- e. Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.5 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 2015 IBC Section 1203.3 or IRC Section R806.5, when applied at a minimum thickness of 3-1/2 inches.

4.4.2.1 Application with DC 315 Intumescent Coating: SWD Quik-Shield® | 108 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 8 inches, and the thickness applied to the underside of the wood floor or roof sheathing must not exceed 12 inches. The foam plastic must be covered with DC 315 intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate to provide a minimum 4 mil wet film (3 mil dry film) coating.

The ignition barrier required by IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4 may be omitted.

4.4.2.2 Application with FS-IB Intumescent Coating: SWD Quik-Shield® | 108 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 8 inches, and the thickness applied to the underside of the wood floor or roof sheathing must not exceed 14 inches. The foam plastic must be covered with FS-IB intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate to provide a minimum 6 mil wet film (3 mil dry film) coating.

The ignition barrier required by IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4 may be omitted.

4.4.2.3 Use on Attic Floors: SWD Quik-Shield® | 108 insulation may be installed at a maximum thickness of 8 inches between joists in attic floors, when covered on the attic side of the insulation with one of the following:

- DC 315 intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate to provide a minimum 4 mil wet film (3 mil dry film) coating.
- FS-IB intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate to provide a minimum 6 mil wet film (3 mil dry film) coating.

The insulation must be separated from the interior of the building by an approved thermal barrier.

4.4.2.4 Unvented Attics: SWD has conducted end use configuration testing (per IBC Section 2603.9 and IRC Section R316.6) and analysis to qualify the use of SWD Quik-Shield® | 108 insulation without a prescriptive ignition barrier or intumescent coating in unvented attics conforming with 2015 IBC Section 1203.3 or IRC Section R806.5. (Note that unvented attics were not addressed in the 2012 and earlier versions of the IBC.) The testing and analysis is described in Priest & Associates EEV 10124b, Revision 3, dated August 24, 2015, and Engineering Evaluation dated December 9, 2015. The conclusions of that evaluation (and associated Engineering Letters) are as follows: When Quik-Shield® | 108 is applied in unvented attics conforming to IBC Section 1203.3 or IRC Section R806.5, the insulation may be applied to the underside of roof sheathing and/or to rafters and to vertical surfaces to a minimum thickness of

3-1/2 inches. Maximum thickness on the underside of roof sheathing or on vertical wall surfaces is 18 inches. The insulation may be left exposed to the attic without a prescriptive ignition barrier or an intumescent coating. The attic must have attic access complying with IRC Section R807, horizontally placed in the attic floor, opening outward toward the living space. For items penetrating the roof deck or walls, such as skylight wells or vents, the annular space must be sealed and penetrations extending through the attic space that are combustible shall be covered with a minimum of 3-1/2 inches of Quik-Shield® | 108 insulation.

5.0 CONDITIONS OF USE

The SWD Quik-Shield® | 108 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:

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

5.2 The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, as described in Section 4.3, or by an approved ignition barrier, as described in Section 4.4.

5.3 The insulation thickness must not exceed that noted in Sections 3.1, 4.3, and 4.4.

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

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

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

5.7 When SWD Quik-Shield® | 108 insulation is installed under the conditions of Section 4.4.2 of this report, the following conditions apply:

5.7.1 Since the performance of SWD Quik-Shield® | 108, when installed in unvented attics without a Code-prescribed ignition barrier or an intumescent coating,

is based on fire performance of an unvented attic, the installation must be approved by the Code official. The installation must conform with the provisions of Section 4.4.2 and Conditions a. through c. and Condition f. of Section 4.4.2. A copy of the Priest & Associates Engineering Evaluation (referenced in Sections 6.3 through 6.7) must be provided to the Code official upon request.

5.7.2 Signage shall be permanently affixed in the attic and shall be visible from all entry points into the attic. The sign shall state "Caution, this is an unvented attic by design. No modification may be made to this unvented condition. The attic shall not be vented. Holes into the unvented attic shall be immediately repaired and sealed. Penetrations of the ceiling or wall membrane between the unvented attic and living space, other than the horizontal access hatch, must be protected in an approved manner. This unvented attic shall not be used for storage. See Intertek Code Compliance Research Report CCRR-1051 on the [Intertek website](#)."

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

5.9 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section R318.4, as applicable.

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

5.11 The insulation components are produced in Mesa, Arizona, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-647).

6.0 SUPPORTING EVIDENCE

6.1 Reports of tests in accordance with ASTM C518, ASTM E283, and ASTM E84.

6.2 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated April 2016, including tests in accordance with Appendix X.

6.3 Priest & Associates Engineering Evaluation, Project 1028, dated January 22, 2014.

6.4 Priest & Associates Engineering Evaluation, Project 10200, dated January 6, 2014.

6.5 Priest & Associates Engineering Evaluation 10124b, Revision 3, dated August 24, 2015.

6.6 Priest & Associates letters dated January 3, 2014, and December 9, 2015.

6.7 Intertek Listing Report [SWD QUIK-SHIELD® | 108](#).

7.0 IDENTIFICATION

The A and B components of the insulation are identified with the manufacturer's name (SWD Urethane), address and telephone number, the product trade name (SWD Quik-Shield® 108), the product type (A or B component), the mixing instructions, the density, the flame-spread and smoke-developed indices, the shelf life and date of manufacture, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1051).

8.0 OTHER CODES

This section is not applicable.

9.0 CODE COMPLIANCE RESEARCH REPORT USE

9.1 The approval of building products is the responsibility of the Authority Having Jurisdiction.

9.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product, material or system by Intertek.

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TABLE 1 – PROPERTIES EVALUATED

PROPERTY	IBC SECTION ¹	IRC SECTION ¹	IECC SECTION ¹
Physical properties	Not required	Not required	Not required
Surface-burning characteristics	2603.3	R316.3	Not applicable
Thermal barrier / ignition barrier	2603.4	R316.4	Not applicable
Thermal resistance	1301	N1101.10, N1102 [2012 and 2009 - N1101.12, N1101.1] [2006 – N1101.3, N1102]	C303.1.1 C303.1.4 R303.1.1 R303.1.4 [2012 and 2009 - 303.1.1 and 3.3.1.2] [2006 – 402, 502]

¹ Section numbers refer to the 2015 Codes with 2012, 2009, and 2006 Codes in [brackets], if different.

TABLE 2 – SWD Quik- Shield® | 108 THERMAL RESISTANCE (R Values)^{1,2,3}

THICKNESSES (inches)	R-VALUE (°F.ft ² .h/Btu)
1	3.7
1.5	5.5
2	7.3
2.5	9.0
3	11
3.5	13
4	14
5	18
5.5	20
6	22
7	25
7.5	27
8	29
9	32
9.5	34
10	36
11	40
11.5	41
12	43
13	47
14	50

¹ R-values are calculated based on tested K-values at 1 inch and 4 inch thicknesses.

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: between 1 inch and 4 inch can be determined through linear interpolation or greater than 4 inches can be calculated based on R = 3.6/inch.