Code Compliance Research Report
CCRR-1051

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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:
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REPORT SUBJECT:
SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge Spray-applied Polyurethane Foam Insulation

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2021, 2018, 2015 *International Building Code®* (IBC)
- 2021, 2018, 2015 *International Residential Code®* (IRC)
- 2021, 2018, 2015 *International Energy Conservation Code®* (IECC)

NOTE: This report references the most recent edition of the Codes cited. Section numbers in earlier versions of the Codes may differ.

1.2 SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge have been evaluated for the following properties (see Table 1):

- Physical properties
- Surface burning characteristics
- Air permeability
- Thermal resistance

1.3 SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge have been evaluated for the following uses (see Table 1):

- Use as nonstructural thermal insulation on or in interior and exterior walls, floors, and underside of roof decks
- Alternatives to Code-prescribed ignition barriers
- Alternatives to Code-prescribed thermal barriers
- Use as air-impermeable insulation
- Use in Type V construction

2.0 STATEMENT OF COMPLIANCE

SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge comply 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.

3.0 DESCRIPTION

3.1 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 pounds per cubic foot. The insulation components have a shelf life of six months when stored at temperatures between 50°F and 80°F before installation.

3.2 SWD Quik-Shield® | YM Edge: SWD Quik-Shield® | YM Edge 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 pounds per cubic foot. The insulation components have a shelf life of six months when stored at temperatures between 50°F and 80°F before installation.

3.3 Intumescent Coatings:

3.3.1 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 ICC-ES AC456 as recognized in ICC-ES ESR-3702.

3.3.2 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.

3.3.3 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.

3.3.4 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: The insulations, at a maximum thickness of 4 inches, have a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84. The insulatons may 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 Air Permeability: The insulations, at a minimum thickness of 3-1/2 inches, are considered air-impermeable insulation in accordance with IBC and IRC Sections 202 and R202, respectively, based on testing in accordance with ASTM E283.

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

5.0 INSTALLATION

5.1 General:

SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

The insulations 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.

5.2 Application:

The insulations are spray-applied on the jobsite using spray equipment specified in SWD Urethane's published installation instructions. The insulations may be installed in one pass. Where multiple passes are required, the cure time between passes is negligible.

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 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 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-inchthick wood structural panel is also permitted, and the maximum insulation thickness is not limited.

5.3.2 Application without a Prescriptive Thermal Barrier: The insulations 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 coatings 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 coatings are applied with low-pressure airless spray equipment.

5.3.2.1 Application with DC315 Intumescent Coating: 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 8.5 inches. The foam plastic must be covered on all surfaces with DC315 intumescent coating at an application rate of 0.9 gallon per 100 sq. ft. to achieve 14 wet mils (9 dry mils).

5.3.2.2 Application with NO-BURN® Plus ThB Intumescent Coating: 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 8.5 inches. The foam plastic must be covered on all surfaces with NO-BURN® Plus ThB intumescent coating at an application rate of 0.85 gal per 100 sq. ft. to achieve 14 wet mils (9 dry mils).

5.3.2.3 Application with Fireshell F10E Intumescent Coating: The thickness of the foam plastic insulation applied to the underside of the roof sheathing and floors must not exceed 13 inches, and the thickness on walls must not exceed 8 inches. The foam plastic must be covered on all surfaces with Fireshell F10E intumescent coating at an application rate of 1.05 gal per 100 sq. ft. to achieve 17 wet mils (11 dry mils).

5.4 Attics and Crawl Spaces:

5.4.1 Application with a Prescriptive Ignition Barrier: Where SWD Quik-Shield® | 108 or Quik-Shield® | YM Edge 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 IBC Section 1202.3 or IRC Section R806.5.

5.4.2 Application without a Prescriptive Ignition Barrier: The insulations 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 this Section, 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 1202.2 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 3-1/2 inches.

5.4.2.1 Application with DC315 Intumescent Coating: The insulations maybe 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 DC315 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.

5.4.2.2 Application with FS-IB Intumescent Coating: SWD The insulations 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.

5.4.2.3 Application with NO-BURN® Plus ThB Coating: The insulations 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 NO-BURN Plus ThB intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate to provide a minimum 14 mil wet film (9 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.

5.4.2.4 Use on Attic Floors: The insulations 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:

- DC315 intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate of 0.3 gallon per 100 sq. ft. to provide a minimum 4 mil wet film (3 mil dry film) thickness.
- FS-IB intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate of 0.4 gallon per 100 sq. ft. to provide a minimum 6 mil wet film (4 mil dry film) thickness.
- NO-BURN® Plus ThB intumescent coating, applied in accordance with the manufacturer's instructions, at a minimum application rate of 0.85 gallon per 100 sq. ft. to provide a minimum 14 mil wet film (9 mil dry film) thickness.

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

5.4.2.5 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 and Quik-Shield® | YM Edge insulations without a prescriptive ignition barrier or intumescent coating in unvented attics conforming with IBC Section 1202.3 or IRC Section R806.5. 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 or Quik-Shield® | YM Edge is applied in unvented attics conforming to IBC Section 1202.3 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 or Quik-Shield® | YM Edge insulation.

6.0 CONDITIONS OF USE

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 of the building by an approved 15-minute thermal barrier, as described in Section 5.3, or by an approved ignition barrier, as described in Section 5.4.

6.3 The insulation thickness must not exceed that noted in Sections 4.1, 5.3, and 5.4.

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 When SWD Quik-Shield® | 108 or Quik-Shield® | YM Edge insulation is installed under the conditions of Section 5.4.2 of this report, the following conditions apply:

6.7.1 Since the performance of SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge, 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 5.4.2.5 and Conditions a. through c. and Condition f. of Section 5.4.2. A copy of the Priest & Associates Engineering Evaluation (referenced in Sections 7.5 through 7.8) must be provided to the Code official upon request.

6.7.2 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."

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

6.9 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.

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 insulations are 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 C518, ASTM E283, ASTM E84, and NFPA 286.

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

7.3 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.

7.4 Data in accordance with ICC 1100 (2019).

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

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

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

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

7.9 Intertek Listing Report "SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge", on the Intertek Directory of Building Products.

8.0 IDENTIFICATION

The A and B components are identified with the manufacturer's name (SWD Urethane), address and telephone number, the product name (SWD Quik-Shield® | 108 or Quik-Shield® | YM Edge), the product 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-1051).

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	2021 IBC SECTION[1]	2021 IRC SECTION[1]	2021 IECC SECTION[1]
Physical properties	2603.1.1	Not required	Not required
Surface-burning characteristics	2603.3	R316.3	Not applicable
Alternatives to thermal barrier / ignition barrier	2603.4	R316.4	Not applicable
Air permeability	1202.3	R806.5	C402.5 R402.4
Thermal resistance	1301	N1101.10 N1102	C303.1 R303.1

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

TABLE 2 - SWD Quik-Shield® | 108 and Quik-Shield® | YM Edge 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:
a. Between 1 inch and 4 inch can be determined through linear interpolation
b. Greater than 4 inches can be calculated based on R = 3.6/inch