



Code Compliance Research Report

Subject: SES 1 lb Spray
Spray-Applied Polyurethane Foam Insulation System

Date: March 19, 2011

Materials: SES 1 lb Spray

Test Standards:

1. ASTM E 84 Test for Surface Burning Characteristics of Building Materials
2. NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
3. NFPA 286 as modified in AC 377, Appendix X

Summary:

1. Based on the test data submitted and the reference documents, SES 1 lb Spray spray polyurethane foam at a maximum thickness of 11.25 inches in walls and/or ceilings, covered with an approved or equivalent thermal barrier meets the requirements for use under 2006 IBC, 2006 IRC, 2009 IBC and 2009 IRC.
2. Based on the test data submitted and the reference documents, SES 1 lb Spray spray polyurethane foam at a maximum thickness of 10 inches may be applied to all geometric construction planes in attics and crawl spaces without the prescribed protection from ignition as required in 2009 IBC Section 2603.4.1.6 or 2009 IRC Sections R316.5.3 and R316.5.4 provided the following limitations are followed:
 - 1) Entry to the attic or crawl spaces is only to service utilities and no storage is permitted.
 - 2) There are no interconnected attic or crawl space areas.
 - 3) Air in the attic or crawl space is not circulated to other parts of the building.
 - 4) Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with Section R806.4 of IRC, Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
 - 5) Combustion air is provided in accordance with Sections 701 and 703 2006 IMC) and Section 701 (2009 IMC).
3. Based on the test data submitted and the reference documents, SES 1 lb Spray spray polyurethane at a maximum thickness of 3.25 inches would not need to be covered with a thermal barrier when applied to sill plates and headers in accordance with 2009 IRC Section R316.5.11.

Labeling Requirements:

A- and B-components for SES 1 lb Spray insulation must be identified with the manufacturer's name (SES Foam, LLC), address and telephone number; the name of the insulation product (SES 1 lb Spray); the flame spread and smoke developed indices; and the name of the third-party inspection agency.

Discussion:

1. **Surface burning characteristics:** The 2009 IBC and IRC (and earlier editions) require that unless otherwise allowed, foam plastic must be tested in accordance with ASTM E 84 as having a flame spread index of not more than 75 and a smoke-developed index of not more than 450.

Intertek Test Report 100214257SAT-031A, December 18, 2010 reports the following at a thickness of 4.25 inches in accordance with ASTM E 84:

Flame Spread Index	20
Smoke Developed Index	400

Therefore, SES 1 lb Spray insulation meets the surface burning characteristics as stipulated in the IBC and IRC.

2. **Maximum thickness:** The maximum thickness that can be tested in accordance with ASTM E 84 is four (4) inches. For thicknesses greater than four inches, the IBC (Section 2603.3, Exception 4) and the IRC (R316.3, Exception) provide for testing greater thicknesses in accordance with the Special Approval and Specific Approval sections, respectively.

To this end, SES 1 lb Spray has been tested in accordance with NFPA 286 and reported in Intertek Test Report No. 100214257SAT-001A, November 19, 2010. The foam plastic was tested covered with 1/2-inch gypsum wall board (an approved thermal barrier) at a thickness of 11.25 inches in the walls and ceiling. The test assembly met the pass/fail criteria of IBC Section 803 (IRC has a similar pass/fail criteria but the IBC criteria is more stringent).

Therefore, SES 1 lb Spray insulation meets the IBC Special Approval and the IRC Specific Approval sections for application thicknesses up to 11.25 inches when covered with an approved thermal barrier or an approved equivalent thermal barrier.

3. **Use in attics and crawl spaces:** Both the IBC and IRC provide exceptions to the thermal barrier requirement for the use of foam plastic insulation in certain attics and crawl spaces. Specifically, both model building codes provide for protecting the foam plastic from ignition through the use of coverings described as prescriptive ignition barriers (2009 IBC Section 2603.4.1.6 or 2009 IRC Sections R316.5.3 and R316.5.4).

Omitting the prescriptive ignition barriers is permitted under both model building codes under the IBC Section 2603.9 Special Approval and the IRC Section R316.6 Specific

Approval. However, neither the IBC or the IRC provides a specific test method for the approval of alternate materials or assemblies to prescriptive ignition barriers.

ICC Evaluation Service, in AC 377 Acceptance Criteria for Spray-Applied Foam Plastic Insulation, provides a protocol in Appendix X based on NFPA 286 to qualify alternate assemblies to those using prescriptive ignition barriers. ICC-ES accepts Appendix X test results for the purposes of issuing Evaluation Reports. Furthermore, this protocol is widely accepted within the building construction community as providing acceptable evidence under IBC Special Approval and IRC Specific Approval sections.

Intertek Test Report No. 100214257SAT-001B, December 2, 2010 reports that SES 1 lb Spray passes the AC 377, Appendix X protocol at a maximum thickness of 10 inches in the walls and ceiling. No prescriptive ignition barriers covered the foam plastic in this test; neither were there any coatings or other coverings applied (i.e., the foam plastic was left exposed for this test).

Therefore, SES 1 lb Spray meets the Special Approval and Specific Approval sections of the IBC and IRC respectively for use in attics and crawl spaces. The limitations as stipulated in AC 377, Appendix X apply.

4. **Sill plates and headers:** Based on the surface burning characteristics referenced above, SES 1 lb Spray insulation meets the requirements of IRC Section R316.5.11 for use on sill plates and headers without being covered with a thermal barrier at a maximum thickness of 3.25 inches.

Conclusions:

SES 1 lb Spray foam plastic insulation meets the requirements and intent of the IBC and IRC as specified and as limited in the Summary section above.

Respectfully submitted,
Deer Ridge Consulting, Inc.

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President

Reference Documents:

1. 2009 International Building Code: Sections 803.1.2.1; 2603.
2. 2009 International Residential Code: Sections R302.9.4; R316.
3. Intertek Test Report No. 100214257SAT-031A, December 18, 2010 (ASTM E 84)

4. Intertek Test Report No. 100214257SAT-001A, November 19, 2010 (NFPA 286)
5. Intertek Test Report No. 100214257SAT-001B, December 2, 2010 (AC 377, Appx. X)
6. SES 11b Spray Technical Data Sheet
7. Acceptance Criterial 377, Appendix X