Spray Foam Requirements for thermal barriers and ignition barriers in the IRC

Since 1955

GACO WESTERN

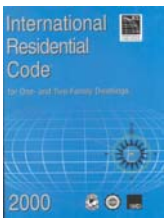
Presenter

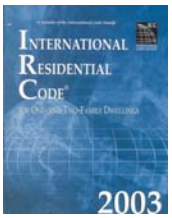
Mark Fortney
Building Science Specialist
Manager GacoUniversity
Product Compliance Specialist
Gaco Western LLC
262-832-0674
262-409-0390 Cell
MFortney@gaco.com

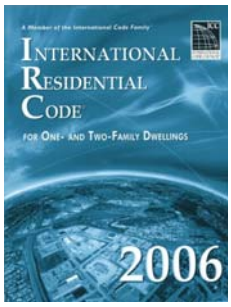
Agenda

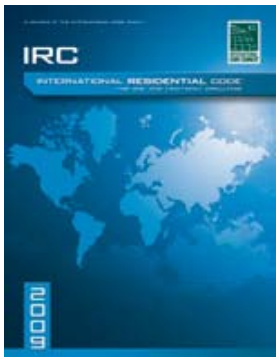
1. Are things different than before?
2. Prescriptive requirements.
3. Quick review of requirements.
4. Foam Plastics – specific approvals.
5. Test Reports and Evaluation Reports.

History…….









2012 IRC is now in the mail

More foam is being used…
…and used in new ways.

1. The IRC requirements for foam have changed a lot over the past few code cycles. This has created a lot of confusion amongst builders, contractors, architects and code officials.

2. AC-377 was in established 2008 to allow more accurate performance testing of SPF products.
   - Applies jobsite installation of spray foam
   - Establishes testing procedures for qualifying
     - Fire performance of foam -
     - Ignition barrier
     - Thermal Barrier

3. The SPF technology has advanced, especially with fire performance.

InsideICC
ICC Evaluation Service (ICC-ES)

ICC-ES Acceptance Criteria Drives Greater Building Code Acceptance for Spray-Applied Foam Plastic Insulations

By ICC-ES Staff

Application of SPF to the underside of sloped roof rafters.

In your handouts.

Over the past decade, the use of spray-applied polyurethane foam insulation has mushroomed for new construction, renovations and weatherization projects. Scores of different manufacturers vie for recognition in an ever-expanding market category, demanding new and better products. New formulations are being continually submitted to independent laboratories for testing in hopes of achieving a wide range of performance characteristics, such as easier application, improved flammability resistance, air and moisture barrier and thermal resistance (*R*-values).

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Foam plastic

3 paths to compliance

1
- R316.3 Surface Burning Characteristics
- R316.4 Thermal Barrier

2
- R316.5 Specific Requirements
  - R316.5.1 Masonry - Concrete Construction
  - R316.5.2 Roofing
  - R316.5.3 Attics
  - R316.5.4 Crawl Spaces
  - R316.5.5 Foam-filled doors
  - R316.5.7 Foam backer board
  - R316.5.8 Re-siding
  - R316.5.9 Interior trim
  - R316.5.10 Interior finish
  - R316.5.11 Sill plates & headers
  - R316.5.12 Sheathing

3
- R316.6 Specific Approval

IRC: R316

Surface burning characteristics

Unless otherwise allowed in Section R316.5 or R316.6, all foam plastic shall have:

- flame-spread index ≤ 75 (Other insulation ≤ 25)
- smoke-developed index ≤ 450

when tested in the maximum thickness for use in accordance with ASTM E84.

Exception: insulation greater than 4" thick:

- flame-spread index ≤ 75
- smoke-developed index ≤ 450, and….
- the end use is approved in accordance with Section R316.6 using the thickness and density intended for use.

IRC: R316.3

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Thermal barrier

IRC: R316.4

Unless otherwise allowed in:
- Section R316.5 or
- Section R316.6

foam plastic shall be separated from the interior of a building by an approved thermal barrier of minimum ½" gypsum wallboard or approved equivalent…..

…. **or** tested in accordance with NFPA 286…..

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IRC: R316

Specific Requirements

IRC: R316.5

The following requirements shall apply to these uses of foam plastic…

- unless specifically approved in accordance with Section 314.6
- or by other sections of the code
- or the requirements of Section R314.2 through Section R314.4 have been met.

Roofing

IRC: R316.5.2

No thermal barrier is required when foam plastic is incorporated into a roof assembly on the exterior side, over tongue and groove planks or wood structural panel sheathing $^{15}/_{32}$

Smoke developed index of the foam plastic is not limited.

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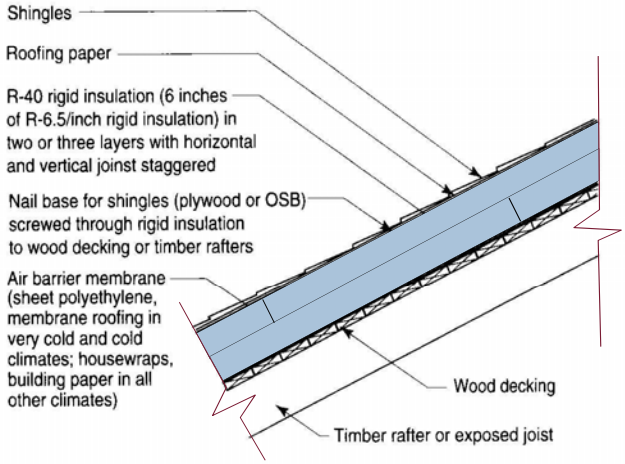
Shingles
Roofing paper
R-40 rigid insulation (6 inches of R-6.5/inch rigid insulation) in two or three layers with horizontal and vertical joinst staggered
Nail base for shingles (plywood or OSB) screwed through rigid insulation to wood decking or timber rafters
Air barrier membrane (sheet polyethylene, membrane roofing in very cold and cold climates; housewraps, building paper in all other climates)
Wood decking
Timber rafter or exposed joist

Ignition Barrier

The **reduced** provision provides a barrier whose only purpose is to prevent the direct impingement of flame on the foam plastic insulation

Attics *Crawl spaces*

IRC: R316.5.3 **IRC: R316.5.4**

The thermal barrier specified in Section 314.4 is not required where access is required by Section R807.1 (R408.3) and where entry is made only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

- 1.5-inch-thick (38 mm) mineral fiber insulation,
- 0.25-inch-thick (6.4 mm) wood structural panels,
- 0.375-inch (9.5 mm) particleboard,
- 0.25-inch (6.4 mm) hardboard,
- 0.375-inch (9.5 mm) gypsum board, or
- steel having thickness of 0.016 inch

★ The above ignition barrier is not required where the foam plastic insulation has been tested in accordance with Section R314.6.

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Attic access for appliances

Access is required when attic is:
> 30 ft^2, and
> 30" high

Rough Opening size: **22" x 30" Minimum**

IRC: R807

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Sill plates and headers

Foam plastic shall be permitted to be spray applied to a sill plate and header (AKA – band joist) without thermal barrier, subject to all of the following:

- The maximum thickness of the foam plastic shall be **3¼ inches**
- The density of the foam plastic 0.5 to 2.0 pcf.
- The foam plastic shall
  - flame spread index ≤25
  - smoke developed index ≤450

IRC: R316.5.11

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Lets review then look at some applications

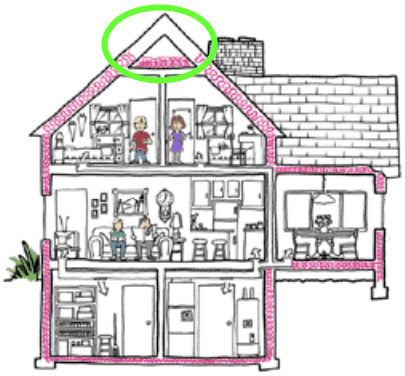
Foam shall be separated from the interior of the building by **thermal barrier**

Exception – Band joists/ headers – limited to 3¼" R316.5.11

Attics

No requirement

No access required R806
< 30" high & < 30ft^2



Attics

No requirement

No access required R806
< 30" high & < 30ft^2

Ignition Barrier required

Access required R806
≥ 30" high & ≥ 30ft^2
No Storage

Attics

No requirement	No access required R806 < 30" high & < 30ft^2
Ignition barrier required	Access required R806 ≥ 30" high & ≥ 30ft^2 No Storage
Thermal barrier required	Access required R806 ≥ 30" high & ≥ 30ft^2 With Storage

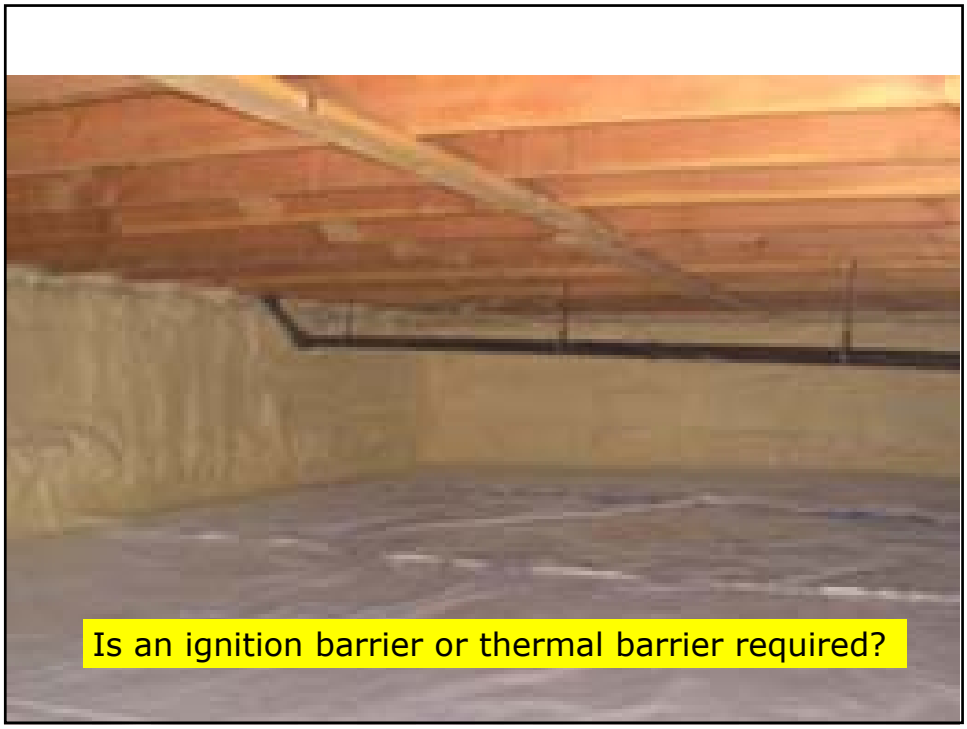
Storage Attic

- What is declared on the plan?
- Is access required?
- Is the space accessed by stairs?
- Is floor sheathed area >30"x30" (min required for mechanical equipment M1305.1)

Crawlspace

Ignition Barrier	Access required R408.4 No Storage
Thermal Barrier	Access required R408.4 With Storage

1. What is declared on the plan
2. Ease of access
3. Is flooring provided – rat slab – etc.


Is an ignition barrier or thermal barrier required?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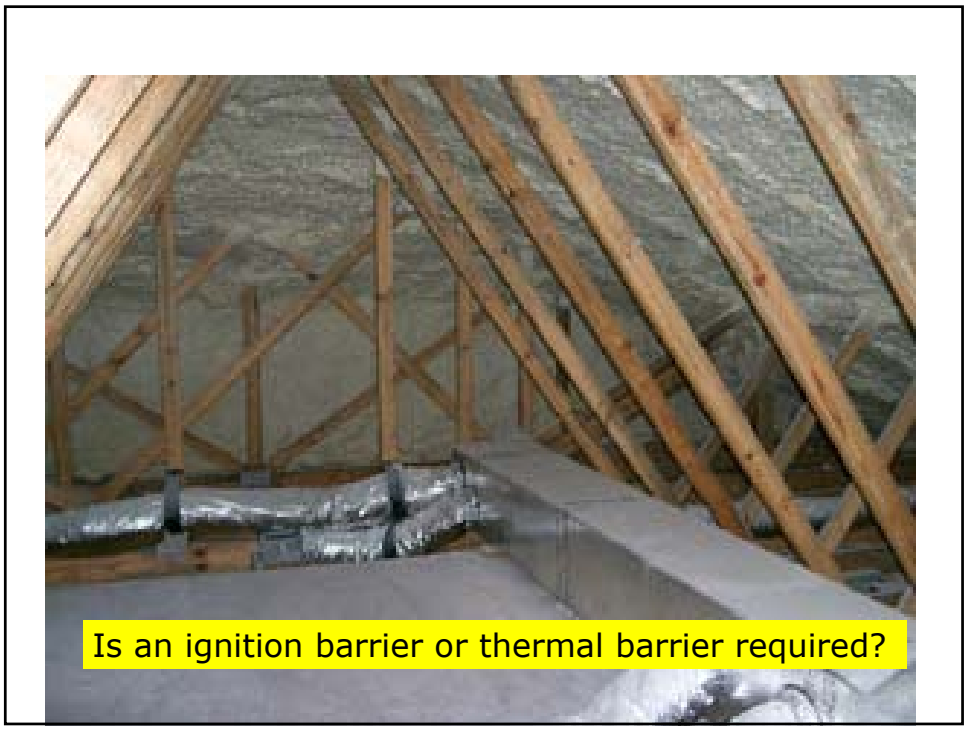
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IRC: R316

Specific approval

Foam plastic not meeting the requirements of Sections R314.3 through R314.5 shall be specifically approved on the basis of one of the approved tests.

IRC: R316.6

The specific approval shall be based on the actual end use configuration (thickness, joints, etc.) and shall be performed on the finished foam plastic assembly in the maximum thickness intended for use.

Large Scale Testing

Examples of specific large scale tests, such as:

- **FM 4880** Class 1 Insulated Wall or Wall & Roof/Ceiling Panels
- ★ **NFPA 286** Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish
- **UL 723** Test for Surface Burning Characteristics of Building Materials
- **UL 1040** Fire Test of Insulated Wall Construction
- **UL 1715** Fire Test of Interior Finish Material

Other large scale fire tests related to actual end-use configuration can be used.

Alternate test method

IRC: R302.9.4

As an alternate **…** **…**wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286, and meet the meet the following criteria:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. During the 160 kW exposure, the interior finish shall comply with the following:
   2.1. Flame shall not spread to the outer extremity of the sample on any wall or ceiling.
   2.2. Flashover, as defined in NFPA 286, shall not occur.
3. The total smoke released throughout the NFPA 286 test shall not exceed 1,000 m2.

NFPA 286 Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Wall and Ceiling Interior Finish

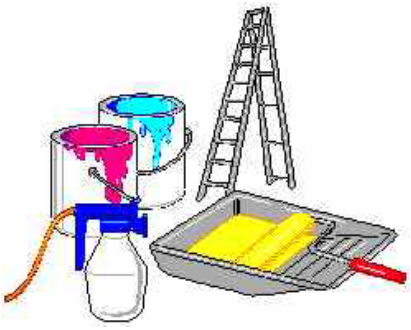
- 40 kW fire for 4:18 minuets
- Flames can not reach the ceiling
- Smoke released not exceed 1,000 m^2

- 40 kW fire for 5:00 minuets
- Flames can not reach the ceiling
- 160 kW for total from 5:00 to 15 min
- Smoke released not exceed 1,000 m^2

It is the assembly that is evaluated

Product	Thermal Barrier	Ignition Barrier
Gaco WallFoam 183M	*TRR² Fireshell F10E* 16 wet mils	None Required
	DC315 6 wet mil base, 22 wet mills top coat = 28 wet mils total	
GacoGreen 052	*TRR² Fireshell F10E* 26 wet mils	*TPR² IB4* 14 wet mils
GacoFireStop 5500	DC315 22 wet mills	None Required

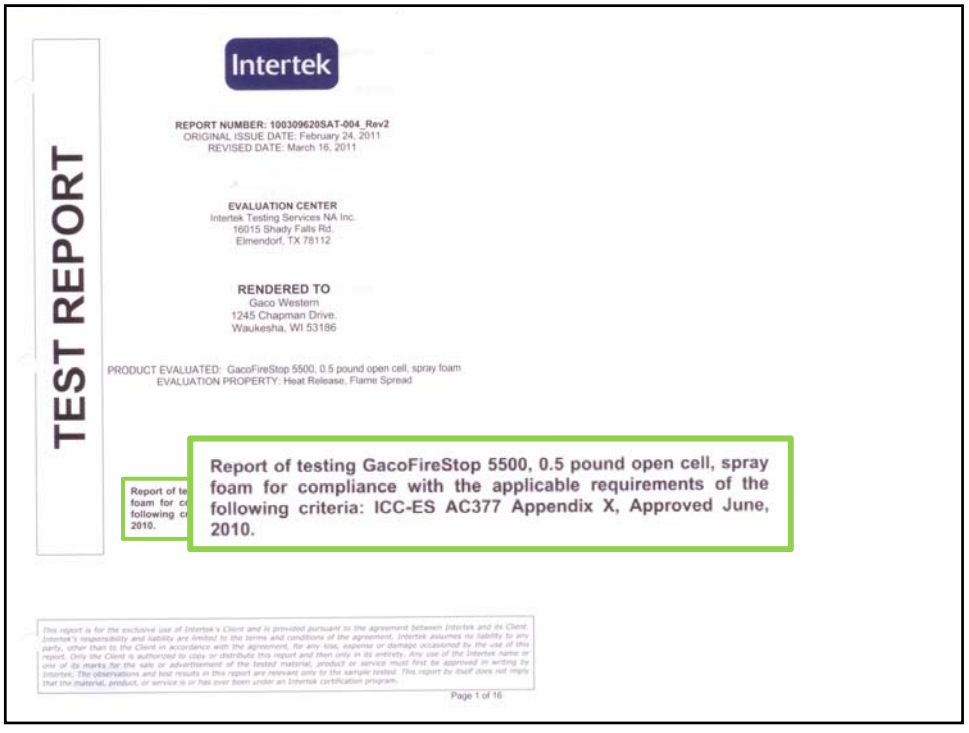
Coatings



Ways to show code compliance under Section R316.6

IRC Commentary

1. Provide the actual test report that contains a description of the assembly and test results showing that the foam plastic, in the end use application, has passed the test.
2. The second method is to obtain an evaluation report that covers the end-use application. (ICC-ES AC377)



TEST REPORT

Intertek

REPORT NUMBER: 100309620SAT-004_Rev2
ORIGINAL ISSUE DATE: February 24, 2011
REVISED DATE: March 16, 2011

EVALUATION CENTER
Intertek Testing Services NA Inc.
16015 Shady Falls Rd.
Elmendorf, TX 78112

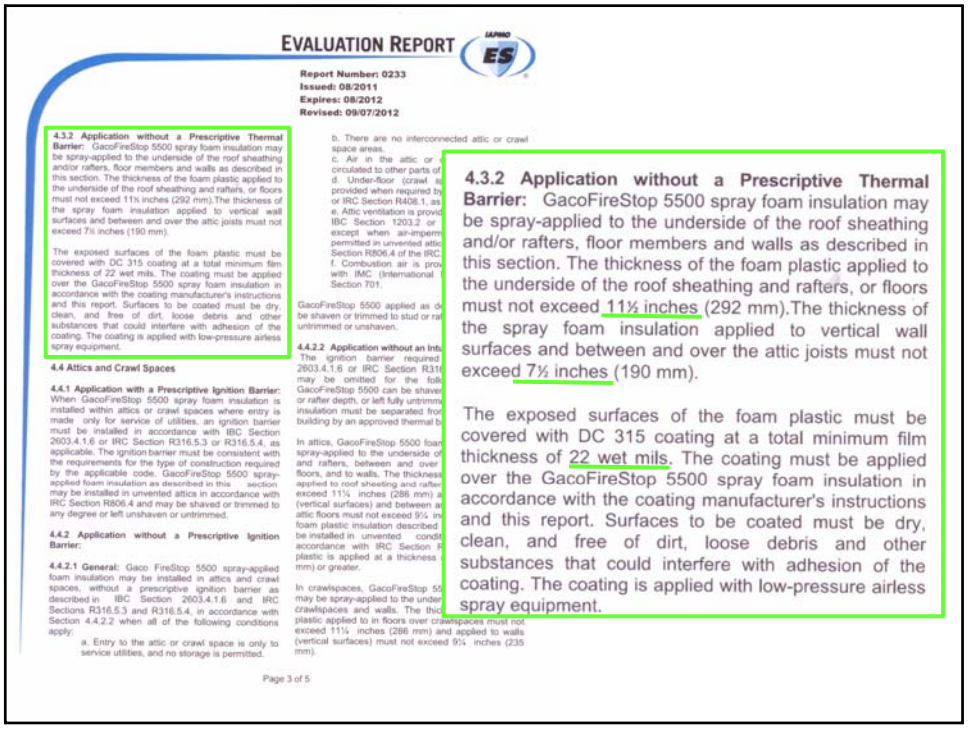
RENDERED TO
Gaco Western
1245 Chapman Drive.
Waukesha, WI 53186

PRODUCT EVALUATED: GacoFireStop 5500, 0.5 pound open cell, spray foam
EVALUATION PROPERTY: Heat Release, Flame Spread

Report of testing GacoFireStop 5500, 0.5 pound open cell, spray foam for compliance with the applicable requirements of the following criteria: ICC-ES AC377 Appendix X, Approved June, 2010.

Evaluation Reports

- Confirm that products meet code requirements.
- Technical review of data by 3rd party.
- Is not required by code….. ….but some code officials require it.



EVALUATION REPORT

Report Number: 0233
Issued: 08/2011
Expires: 08/2012
Revised: 09/07/2012

4.3.2 Application without a Prescriptive Thermal Barrier: GacoFireStop 5500 spray foam insulation may be spray-applied to the underside of the roof sheathing and/or rafters, floor members and walls as described in this section. The thickness of the foam plastic applied to the underside of the roof sheathing and rafters, or floors must not exceed 11½ inches (292 mm).The thickness of the spray foam insulation applied to vertical wall surfaces and between and over the attic joists must not exceed 7½ inches (190 mm).

The exposed surfaces of the foam plastic must be covered with DC 315 coating at a total minimum film thickness of 22 wet mils. The coating must be applied over the GacoFireStop 5500 spray foam 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.

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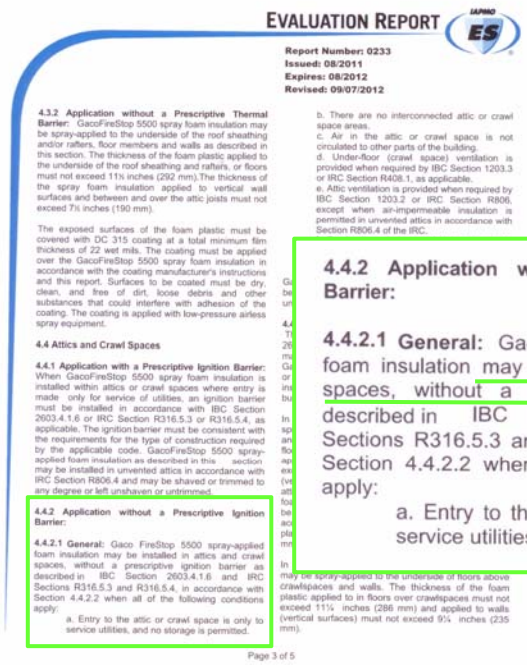

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4.4 Attics and Crawl Spaces

4.4.1 Application with a Prescriptive Ignition Barrier: When GacoFireStop 5500 spray foam insulation is installed within attics or crawl spaces 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 Section R316.5.3 or R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code. GacoFireStop 5500 spray-applied foam insulation as described in this section may be installed in unvented attics in accordance with IRC Section R806.4 and may be shaved or trimmed to any degree or left unshaven or untrimmed.

4.4.2 Application without a Prescriptive Ignition Barrier:

4.4.2.1 General: Gaco FireStop 5500 spray-applied foam insulation may be installed in attics and crawl spaces, without a prescriptive ignition barrier as described in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, in accordance with Section 4.4.2.2 when all of the following conditions apply:

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 or crawl space is not circulated to other parts of the building.
d. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
e. 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 the IRC.

may be spray-applied to the underside of floors above crawlspaces and walls. The thickness of the foam plastic applied to in floors over crawlspaces must not exceed 11¼ inches (286 mm) and applied to walls (vertical surfaces) must not exceed 9¼ inches (235 mm).

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- Comments
- Questions
- Complaints