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

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 established in 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.
### 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
   - R316.5.6 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**

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### 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**
**Thermal barrier**

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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**Foam plastic**

3 paths to compliance

1. **R316.3 Surface Burning Characteristics**
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   - 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

3. **R316.6 Specific Approval**
   - IRC: R316
Specific Requirements

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

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.
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 joint 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**

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.
Attic access for appliances

Access is required when attic is:
> 30 ft\(^2\), and
> 30” high

Rough Opening size: 22” x 30” Minimum

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 \(3\frac{1}{4}\) inches
- The density of the foam plastic 0.5 to 2.0 pcf.
- The foam plastic shall
  - flame spread index \(\leq 25\)
  - smoke developed index \(\leq 450\)
Let's 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 & < 30ft²

Ignition Barrier  Access required R806
required  ≥ 30” high & ≥ 30ft²
                       No Storage
Attics

No requirement | No access required R806 | < 30" high & < 30ft²
---|---|---
Ignition barrier required | Access required R806 | ≥ 30” high & ≥ 30ft²
| No Storage |
Thermal barrier required | Access required R806 | ≥ 30” high & ≥ 30ft²
| 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

<table>
<thead>
<tr>
<th>Description</th>
<th>Access Required</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ignition Barrier</td>
<td>R408.4</td>
<td>No Storage</td>
</tr>
<tr>
<td>Thermal Barrier</td>
<td>R408.4</td>
<td>With Storage</td>
</tr>
</tbody>
</table>

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

**Is an ignition arrier or thermal barrier required?**
Is an ignition barrier or thermal barrier required?
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**Foam plastic**

3 paths to compliance

1. R316.3 Surface Burning Characteristics
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     - R316.5.12 Sheathing

2. 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. 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.

 IRC: R316.6

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

As an alternate wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286, and 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.
• 40 kW fire for 4:18 minutes
• Flames can not reach the ceiling
• Smoke released not exceed 1,000 m²

• 40 kW fire for 5:00 minutes
• Flames can not reach the ceiling
• 160 kW for total from 5:00 to 15 min
• Smoke released not exceed 1,000 m²
It is the assembly that is evaluated

<table>
<thead>
<tr>
<th>Product</th>
<th>Thermal Barrier</th>
<th>Ignition Barrier</th>
</tr>
</thead>
</table>
| Gaco WallFoam 183M     | **TRR** <sup>2</sup> *Fireshell F10E*  
16 wet mils        | None Required        |
| **DC315**             | 6 wet mil base,  
22 wet mils top coat  
= 28 wet mils total |                  |
| GacoGreen 052         | **TRR** <sup>2</sup> *Fireshell F10E*  
26 wet mils        | **TPR** <sup>2</sup> *IB4*  
14 wet mils        |
| GacoFireStop 5500      | **DC315**              | None Required    |
|                        | 22 wet mils            |                  |

Coatings
Ways to show code compliance under Section R316.6

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)
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.
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 203.3.1.6 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.

4.4.2.2 When all of the following conditions apply:

a. There are no interconnecting attic or crawl space floors.

b. The attic or crawl space is not excluded to other parts of the building.

c. Underfloor (floor slab) ventilation is provided, when required by IFC Section 1001.3.

d. Any ventilation is provided when required by IFC Section 1001.4 or IRC Section R806.9.2.

4.4.2.3 General: Gaco FireStop 5500 spray-applied foam insulation is installed within attics or crawl spaces where entry is made, only for service of utilities or storage purposes, according to Section 403.4.1 or IRC Section R316.5.3 and R316.5.4, as applicable. The spray-applied foam insulation must be installed and maintained in accordance with Section 403.4.1 and IRC Section R316.5.3 and R316.5.4, as applicable. The spray-applied foam insulation must be installed and maintained in accordance with Section 403.4.1 and IRC Section R316.5.3 and R316.5.4, as applicable.