THERMAL & IGNITION BARRIER COATINGS: COMPLIANCE NUISANCE, OR OPPORTUNITY FOR PROFIT?

Ken Allison IDI
Lots of Stuff
I’ll move fast,

so there’s time for questions later
Three Parts

1. Keeping Your Profits
2. Application, Storage, Tips
3. Areas of Opportunity
Codes and Code Officials

Why Start Here?
IN THE WORDS OF ROBERT KIYOSAKI

"It's not how much money you make, but how much money you keep."

- Robert Kiyosaki
Building codes help protect public health, safety and general welfare as they relate to the construction and occupancy of buildings.

First codes 1800 BC
If the building fell the builder was put to death
1900 the insurance industry lobbied congress
Building official shall have the authority to **render interpretations** of this code and to adopt policies and procedures in order to clarify the application of its provision.
WHO’S RESPONSIBLE?

- Fire rated wall gets penetrated by cable and trays
- Hole needs fire stopped to restore rating of the wall
- Filled with standard polyurethane foam instead
When it Comes to the Scales of Justice….

In Construction you are guilty until proven innocent
NO ONE CATCHES EVERYTHING
While acting for the jurisdiction in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance, shall not thereby be rendered liable and is hereby relieved from liability for any damages accruing to persons or property as a result of any act or by reason of an act or omission in the discharge of official duties.

2009 IRC Commentary Chapter 9 R.104.8
LEAVING YOU RESPONSIBLE
Even if this inspector never focuses on your compliance with the code...

This One Will
WHY THE IMPORTANCE OF COATINGS?

FOAM IS HELD TO A HIGHER STANDARD
OVER 1000 HOUSE FIRES A DAY

- 384,000 in 2010
- NIST - 17 minutes to escape (1970's) reduced to 3 or less
- We are surrounded by synthetic materials
What Exactly Does the Code Say?

Why IB & TB?

• Thermoform vs Thermoset
• Code sees all foam the same
TB VERSUS IB

Thermal Barrier versus Ignition Barrier

For the safety of occupants and workers, the building code is clear, all spray foams must be separated from occupied space by a 15 minute thermal barrier, such as 1/2” drywall or an alternate code approved system.

To be approved, thermal barrier compliant coatings must pass a 15 minute burn test over foam as a system, requiring them to be equal to, or better than drywall in terms of fire resistance. They provide occupants additional time to exit the premises in the event of a fire in the area’s they are applied.

Ignition barriers only provide a minimal amount of time (<5 min) for someone servicing the mechanical system to escape in the event of a fire in the attic or crawl space they are working in. Because of the limited protection, they cannot be applied in a space to be used for storage or other purposes.

CAUTION: Not all foams and thermal barriers are approved together. Make sure the coating your contractor applies has been approved over the product it is being applied to.
All tests performed comply with the requirements of 2006 IBC Section 803.2.1 & 2009 IBC Section 803.1.2, and Section 2603.9; 2012 IBC Section 803.1.2 and Section 2603.10 under "Special Approvals for Thermal Barriers over Foam Plastics".

Special Approval / Alternate Thermal & Ignition Barrier Assemblies [IBC 2603.9 / IRC R316.6] Alternative 15 min Thermal Barrier Assemblies (e.g. Exposed SPF or SPF with a Thermal Barrier Protective Covering)

The assembly must remain in place for 15 minutes during specified large-scale fire tests, such as NFPA 286, UL 1715, UL 1040, or FM 4880.

Alternative Ignition Barrier Assemblies
Must meet the requirements for ignition barrier per AC 377, Appendix X
Normal Criteria?

- **Reasonable expectation of storage / auxiliary living space (judgment of code official)**
- **Ease of entry**
- **Presence of fixed stairs**
- **Presence of usable flooring (other than minimal pathways for equipment access)**
- **Ductwork prohibits reasonable storage or auxiliary living space**
- **No access exists, does not communicate with accessible areas**
MITIGATE RISKS

- IB or TB
- 3” From heat sources
- Walk in door or pull down stairs
- Decked Attic
- Duct Work
R314.5.3 Attics. The thermal barrier specified in Section 314.4 is not required where attic access is required by Section R807.1 and where the space is entered only for service of utilities and when the foam plastic insulation is protected against ignition using one of the following ignition barrier materials:

1. 1.5-inch-thick (38 mm) mineral fiber insulation;
2. 0.25-inch-thick (6.4 mm) wood structural panels;
3. 0.375-inch (9.5 mm) particleboard;
4. 0.25-inch (6.4 mm) hardboard;
5. 0.375-inch (9.5 mm) gypsum board; or
6. Corrosion-resistant steel having a base metal thickness of 0.016 inch (0.406 mm).

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

Commentary: In an attic where access is required by Section R807.1 (where attic areas exceed 30 square feet (2.8 m²) and have a vertical height of 30 inches (762 mm) or more), and entry is only for service of utilities, and when foam plastics are used, an ignition barrier may be used in place of a thermal barrier to cover the foam plastic. Multiple materials are listed which can be used as the ignition barrier. See Commentary Figure R314.5.4. The foam plastic material, covered with the ignition barrier can be on the floor, wall (often called a knee wall or gable end) or the ceiling of the attic. The phrase “where entry is only for service of utilities” applies to attics that contain only mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, gas or electric furnaces, etc. The attic space cannot be used for storage. The reduced provision (from a thermal barrier to an ignition barrier) provides a barrier whose only purpose is to prevent the direct impingement of flame on the foam plastic insulation.

If the foam plastic insulation has passed testing, in the thickness and density intended for use, in accordance with Section R314.6, no thermal barrier or ignition barrier is required over the foam plastic insulation in an attic and this section of the code does not apply. It is important to note that the actual configuration must be tested. For example, a foam plastic insulation applied to the ceiling of the attic must be tested with the foam applied to the ceiling in a room corner test or in an assembly that reflects end use. The same restrictions would apply to those insulations applied to the walls, floors or combinations of surfaces.
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Compliance

“Don’t need coating”
Only One Way

Raising the bar

- Training Owners, Code Officials, Home Inspectors
- Educated consumers make good decisions
- Mitigate your risks
DOCUMENTATION IS YOUR FRIEND

User manual
Specification
SW Design
Electronics
Compliance
Test Plan

DOCUMENT EVERYTHING
BUSY WORK
Keep Good Records
2. Must include manufacturer and product name; should include batch or lot number if available.
3. Detailed information on alternative thermal barriers, ignition barriers or bare foam assemblies is available in the referenced product listings, evaluation reports and testing reports.

SECTION D: Installer Declaration

I hereby certify that I have installed the listed spray foam thermal insulations and fire protection per manufacturers’ installation instructions and product listings, and in a manner compliant with local building codes in effect at the time of installation.

Lead Installer: Name (print): ___________________________________ SPFA Certification (opt) ____________

Signature: __________________________________________ Date: ______________

SPFA Spray Polyurethane Foam Insulation Model Certificate

This form is intended to serve as a guide or template only. It was developed by the SPFA for use by professional contractors and creates no express or implied relationship between the SPFA and the contractor or the contractor’s customer. SPFA neither warrants, represents nor guarantees the workmanship of or materials used by the contractor and disclaims any and all liability for any injuries, losses or damages arising therefrom.

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SPF IN ATTIC AND CRAWL SPACE
NO STORAGE

WARNING
STORAGE NOT PERMITTED
IN THIS AREA
As with anything,

Documentation Is Key

NO STORAGE ALLOWED

Property Address

Date

Product Installed

Thickness

Installer

Specified By

Installer Signature

STORAGE ALLOWED

Property Address

Date

Product Installed

Thickness

Installer

Specified By

Installer Signature

Documentation Is Key
Checking Mil Thickness

Metal Plates
- When using metal sample plates, remove and touch-up after application
# Ignition/Thermal Barrier Certificate

<table>
<thead>
<tr>
<th>Coated Area</th>
<th>Barrier Type</th>
<th>Evaluation/Test Report</th>
<th>Area Coated (sq ft)</th>
<th>Installed Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wet Film</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dry Film</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coverage (sf/g)</td>
</tr>
</tbody>
</table>

- Attic Area 1 [ ] TB [ ] IB
- Attic Area 2 [ ] TB [ ] IB
- Crawlspace 1 [ ] TB [ ] IB
- Other [ ] TB [ ] IB

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PLACE VALIDATION STICKERS HERE

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PLACE VALIDATION STICKERS HERE
# Thermal Barrier Installation Job Work Record

<table>
<thead>
<tr>
<th>Contractor:</th>
<th>Application Start Date:</th>
<th>Completion Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact Info:</td>
<td>Installer Name:</td>
<td></td>
</tr>
<tr>
<td>Application guide on jobsite: Yes No (Circle One)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Customer Name:</th>
<th>Occupied:</th>
<th>Unoccupied:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job Site Address:</td>
<td>Warning Signs Posted: Yes No (Circle One)</td>
<td></td>
</tr>
<tr>
<td>Building Permit #:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spray Area Isolated: Yes No (Circle One)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Scope of Job:

<table>
<thead>
<tr>
<th>Ventilated at 0.3 ACH</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A Yes (Circle One)</td>
</tr>
<tr>
<td>Coating Thickness Required</td>
</tr>
</tbody>
</table>

## DC 315 THERMAL BARRIER MATERIAL INFORMATION

<table>
<thead>
<tr>
<th>Brand and Type of Foam Used:</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 315 Batch #:</td>
</tr>
<tr>
<td>Mix Time per Bucket: mins</td>
</tr>
<tr>
<td>Material Temp: F C</td>
</tr>
</tbody>
</table>

## EQUIPMENT INFORMATION

<table>
<thead>
<tr>
<th>Quantity Used: Gals:</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Passes:</td>
</tr>
<tr>
<td>Airless Sprayer:</td>
</tr>
<tr>
<td>Pressure</td>
</tr>
<tr>
<td>Gun Type:</td>
</tr>
</tbody>
</table>

## SUBSTRATE CONDITIONS

<table>
<thead>
<tr>
<th>Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean:</td>
</tr>
<tr>
<td>Texture:</td>
</tr>
<tr>
<td>Free of Grease/Oil: Y N</td>
</tr>
<tr>
<td>Dry:</td>
</tr>
<tr>
<td>Wet:</td>
</tr>
<tr>
<td>Special Preparation:</td>
</tr>
<tr>
<td>All Areas of Foam With A Glossy or Smooth Finish Must Be Primed Prior To Applying Full Thickness Of DC315.</td>
</tr>
</tbody>
</table>

## ENVIRONMENTAL CONDITIONS

<table>
<thead>
<tr>
<th>Ambient Temp: F C (Circle one)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substrate Temp: F C (Circle One)</td>
</tr>
<tr>
<td>Type of Ventilation:</td>
</tr>
<tr>
<td>Heating Required: Yes No N/A</td>
</tr>
</tbody>
</table>

## Site Testing

<table>
<thead>
<tr>
<th>Thickness Required: (mils WFT) Were Medallions Used: Yes No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Temp and Humidity Readings: C F (Circle One)</td>
</tr>
<tr>
<td>Record Actual WFT measurements below. Minimum 1 per 400 sq. ft.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Temp</th>
<th>RH%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Temp</th>
<th>RH%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>14</td>
</tr>
</tbody>
</table>
Common Problems

Avoid Taking A Chance

Follow Manufacturers Recommendations on Every Installation
Dry Time???

Handheld Hygrometer
18-28 mil WFT can take 48-72 hours to cure
Must be less than 65% RH
Temp 50 degrees or higher
ADHESION

- >65% humidity
- Freezing
- Smooth shiny foam
- Uncured foam
Know Your Yields

One Gallon

On a glass smooth surface.

<table>
<thead>
<tr>
<th>Mils</th>
<th>Per U.S. Gallon</th>
<th>Per Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mils</td>
<td>Sq. Ft.</td>
</tr>
<tr>
<td>0.25</td>
<td>6,416.0</td>
<td>596.0</td>
</tr>
<tr>
<td>0.50</td>
<td>3,208.0</td>
<td>298.0</td>
</tr>
<tr>
<td>0.75</td>
<td>2,138.7</td>
<td>198.7</td>
</tr>
<tr>
<td>1.00</td>
<td>1,604.0</td>
<td>149.0</td>
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<tr>
<td>1.50</td>
<td>1,069.3</td>
<td>99.3</td>
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<tr>
<td>2.00</td>
<td>802.0</td>
<td>74.5</td>
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<tr>
<td>2.50</td>
<td>641.6</td>
<td>59.6</td>
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<tr>
<td>3.00</td>
<td>534.7</td>
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<tr>
<td>3.50</td>
<td>458.3</td>
<td>42.6</td>
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<tr>
<td>4.00</td>
<td>401.0</td>
<td>37.3</td>
</tr>
<tr>
<td>4.50</td>
<td>356.4</td>
<td>33.1</td>
</tr>
<tr>
<td>5.00</td>
<td>320.8</td>
<td>29.8</td>
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<tr>
<td>6.00</td>
<td>267.3</td>
<td>24.8</td>
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<tr>
<td>7.00</td>
<td>229.1</td>
<td>21.3</td>
</tr>
<tr>
<td>8.00</td>
<td>200.5</td>
<td>18.6</td>
</tr>
<tr>
<td>9.00</td>
<td>178.2</td>
<td>16.6</td>
</tr>
<tr>
<td>10.00</td>
<td>160.4</td>
<td>14.9</td>
</tr>
</tbody>
</table>
APPLICATION / OVER-APPLICATION

- Use a mil gage
- 90° Angle to the wall
APPLICATION / OVER-APPLICATION

- Use a mil gage
- 90° Angle to the wall
- Check on back of hand or other surface
- 4 mil... One sheet of writing paper.
The theoretical yield of intumescent coatings is often calculated when sprayed on gypsum board.
Theoretical Yields for Foam Surfaces

Coarse Orange Peel: Up to 25% Reduction in Yield

Verge of Popcorn: Up to 30% Reduction in Yield
**HANDLING**

- Store at 50-80°
- Ideal Application temps 65-90°
- Mix mechanically 5+ minutes
SPRAYING

- 50-65% solids
- 1-2 GPM Sprayer
- Texture gun/ no filter
- 517-525 tip
Intumescent Coatings
Why They Work

- Produce protective, fire blocking char
- Absorb heat energy
- Deplete Oxygen
- Generate noncombustible gasses
Know Your Coating

Coatings Can Be:

- Easy to apply
- Ductile
• Ductile coating
Intumescent Coatings Can Be:

- Easy to apply
- Ductile
- Washable/Scrubbable
- Water/Oil Based
- Low VOC
- Water Clean Up
- Top Coated/Not Top Coated
- Mold/Mildew Resistant
- One/Two Component
- Tinted/Colors
- Higher/Lower Viscosity
- Approved for incidental Food Contact
- Exterior/UV Stable

Know Your Coating
Is this just a Code Compliance Nuisance... or is it,

OPPORTUNITY FOR PROFIT?
Too Expensive!
Other Places They’re Found
OPPORTUNITIES ABOUND

TB’s can help turn space into usable square footage
Applications

- From attics to agriculture,
- Cold storage to crawl spaces,
- Drop ceilings to open beams,
Like Foam, The Market is Increasing in Size

- Parking Garages
- Hospitals
- Controlled Atmosphere
- Cold Storage
- Motor Pools
- Military
- Churches
- Schools
- Restaurants / Night Clubs
- Agricultural
Residential

- Attics, Crawlspace
- Sheds, Garages, Well Houses, Barns, etc
- Add usable space while increasing safety
- Add-on for model home sales team
- Feature benefit for resale

AND...
- Already foamed houses are another opportunity!
Only One Way

Raising the bar

- Training Owners, Code Officials, Home Inspectors
- Educated consumers make good decisions
- Mitigate your risks
Educated Consumers

Generally don’t compromise on Life and Safety
Manufacturers, Suppliers, Testing

- Coatings and foams are always installed and tested as a system.
- Not all coatings are approved over all foams.
- Suppliers can help with installation guidelines and scope of work questions.
- Training Code Officials & Home Inspectors.
- Compliance support in municipalities.
AC 456

- Proposed for Consideration & Comment
- 4 Main Benefits
  - 3rd Party QC / Product Listing
  - Labeling Criteria
  - Discounted Process for ICC-ES
  - Expedited Process for ICC-ES
- Creates trusted process for AHJ or Specifiers
Not On An Island
Thank You

Ken Allison