Insulating Attics & Crawlspace

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Unvented vs. Vented

- **Vented**
  - Space is vented to the outside
  - Space is unconditioned

- **Unvented**
  - Space does not communicate with outside
  - Space is “somewhat” conditioned
Un-Vented Attic

- SPF
- Ignition Barrier
- Thermal Barrier
Vented Crawlspace

Thermal Barrier

Ignition Barrier

Vent

SPF

Vent
Un-Vented Crawlspace

Thermal Barrier

“Vents”

SPF

Vapor Retarder

SPF

Thermal?
Ignition?
Barrier
Unvented Attics
Code Requirements

• No vapor retarder on attic floor
• Air-impermeable insulation installed to underside of roof deck
• Warm-humid locations: Special roof considerations
• Climate Zones 3-8: Special condensation considerations
Unvented Crawlspace Code Requirements

- Exposed earth covered with continuous vapor retarder
- Perimeter walls insulated
- “Ventilation”
  - Mechanical ventilation to exterior with makeup from common area
  - Conditioned air supply with return to common area
Fire Protection

• Building Code Requirements: 2006 IRC

• Thermal Barrier
  – “…foam plastic shall be separated from the interior of a building by an approved thermal barrier….”
  – ½” gypsum board or approved equivalent
Fire Protection (continued)

• Exceptions to thermal barrier requirements
• Attics & Crawlspace
• Protection from Ignition
  - "Ignition Barriers"
    • 1.5” mineral fiber insulation
    • 0.25” wood structural panel
    • 0.375” particleboard
    • 0.25” hardboard
    • 0.375” gypsum board
    • Corrosion resistant steel, base metal 0.016”
Fire Protection (continued)

• “The above ignition barrier is not required...[where tested per] Section R314.6.”

• R314.6: Specific Approval
  – Fire tests related to actual end-use configurations
  – “…based on the actual end use configuration ...[where testing is] performed on the finished foam plastic...in the maximum thickness intended for use.”
Fire Protection (continued)

• Summary:

SPF separated from interior with thermal barrier (1/2” gypsum board)

SPF separated from attic/crawlspace space with ignition barrier
Ignition Barriers

• Attics and Crawlspace Only (per the building code)

• Prescriptive
  – Specifically identified in the code
  – 1.5” mineral fiber, ¼” wood panel, etc.

• Non-Prescriptive
  – Tested in accordance with Specific Approval section
Ignition Barriers (continued)

2 important points!
Ignition Barriers (continued)

1. Ignition Barriers are NOT Thermal Barriers

Thermal Barriers may be used in place of an ignition barrier but not vice versa.
Ignition Barrier Test

- “Fire tests related to actual end-use configurations.”

- Southwest Research Institute Test Procedure 99-02
Test "module"
Two modules are burned:
- Baseline (fiberglass)
- Test Assembly

Test Assembly must take longer to:
- Burn out the front
- Burn through the top
0 min

Fiberglass Baseline

2# SPF with intumescent coating
1 min

Fiberglass Baseline

2# SPF with intumescent coating
1:45 min

Burn Out Front 1:38

Fiberglass Baseline
2 min

Fiberglass Baseline

2# SPF with intumescent coating
Fiberglass Baseline

2# SPF with intumescent coating
4 min

Fiberglass Baseline

2# SPF with intumescent coating

Burn Out Front 3:21
5 min

Fiberglass Baseline

2# SPF with intumescent coating
6 min

Fiberglass Baseline

2# SPF with intumescent coating
7 min

Fiberglass Baseline

2# SPF with intumescent coating
8 min

Burn Through 7:32

Fiberglass Baseline

2# SPF with intumescent coating
9 min

2# SPF with intumescent coating
10 min

2# SPF with intumescent coating
11 min

2# SPF with intumescent coating
12 min

2# SPF with intumescent coating
13 min

2# SPF with intumescent coating
14 min

2# SPF with intumescent coating
15 min

2# SPF with intumescent coating
2# SPF with intumescent coating

16 min
17 min

2# SPF with intumescent coating
18 min

2# SPF with intumescent coating
19 min

2# SPF with intumescent coating
20 min

2# SPF with intumescent coating
21 min

2# SPF with intumescent coating
22 min

2# SPF with intumescent coating
23 min

2# SPF with intumescent coating
24 min

Burn Through 24:09

2# SPF with intumescent coating
Attic & Crawlspace Fire Testing

- Revisions being considered
- Foam Plastic Stakeholders
- Possible outcomes:
  - Interim Test Protocol
    - New Pass/Fail Criteria
    - Different Baseline
  - Separate Attic & Crawlspace Geometry
  - Small Scale qualification test for Ignition Barriers
Review

• Vented AND Unvented Attics and Crawlspace are permitted by code
• Unvented attics & crawlspace have special requirements
• Thermal Barriers required
• Ignition Barriers required
  – Prescriptive or Non-prescriptive (tested)
QUESTIONS?