



Technical Bulletin

Subject: Foam Insulation

Sub-Category: Thermal and Ignition Barrier Requirements

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Topic: Fire Barrier Requirements for 2 Part Foam Plastic Insulation and Rigid Foam Board Insulation

The increased use of foam plastic insulation in CSG's Home Performance programs makes it necessary to clarify what types of fire barriers are needed to cover this material, as required by code. Code requirements for fire barriers fall into three categories: Not required, thermal barrier and ignition barrier. The definition of not required is clear. The definitions of thermal barrier and ignition barrier when applied to foam plastic insulation follow:

Thermal Barrier: A ½ inch thickness of gypsum wallboard or an equivalent thermal barrier material that will limit the average temperature rise of the unexposed surface to no more than 250 ° F after 15 minutes of fire exposure complying with the ASTM E 119 or UL263 standard time temperature curve. There is a list of alternative thermal barriers at the end of this document.

Ignition Barrier: A fire resistant barrier that can be used in place of a thermal barrier if these two conditions exist.

1. Attic or crawl space access is required by code.
2. The space is entered only for the purpose of repairs or maintenance.
3. If the two above conditions exist, the following are approved ignition barriers that can replace the thermal barrier. (Note: there are other acceptable materials, but this list is expressly identified in the IRC.)

1 ½ inch mineral fiber insulation

¼ inch wood structural panels

3/8 inch particle board

¼ inch hardboard

3/8 inch gypsum board

.016 inch thick corrosion resistant steel

In practice this means that any attic or crawl space that can be accessed will need some type of fire barrier installed over the foam plastic insulation unless the insulation itself is rated as a thermal barrier. It should be noted that spray foam insulation applied to the joist header and sill plate in crawl spaces is not required by the 2009 IRC to have a thermal barrier.

Some uncertainty is introduced when deciding whether a space is being entered only for "repairs and maintenance" vs. storage. The Spray Polyurethane Foam Alliance (SPFA) provides clear guidance on this issue in their publication entitled "Thermal Barriers and Ignition Barriers

for the Spray Polyurethane Foam Industry” which is attached to this document. The following excerpt from this document clarifies how to classify a space.

While the ultimate decision is left to the discretion of the local code authority, ICC Staff and ICC-ES engineers offer the following conditions that would determine if the space is entered only for repairs, maintenance or service of utilities:

- *Limited access (hatch, small door, etc)*
- *Utilities within space including, but not limited to, HVAC equipment, ductwork, electrical lines, plumbing, wiring of any type (telephone, internet, cable, security, etc), radiant heating, etc*
- *Possibility that any utility as described above may be installed in the future*

Based on this interpretation of the building code, the following criteria are often applied to determine appropriate fire protection for SPF surfaces in attics and crawlspaces:

- *Thermal Barrier: Whenever the attic or crawlspace is used or could reasonably be used as an auxiliary living space or for storage. Criteria for such space may include: ease of entry, or fixed stairs, and presence of usable flooring (other than minimal pathways for equipment access). It should be noted that the presence of any of the previous criteria does not automatically require thermal barrier protection, but rather offers guidance on what a code official might consider when determining the use of the space.*
- *Ignition Barrier: Whenever the attic or crawlspace is not or could not be used as an auxiliary living space or for storage. Criteria include difficulty of entry (for example a hatch or opening not easily accessible) and lack of flooring.*
- *Neither Barriers: Whenever no access exists to the space and the space is not connected and does not communicate with other spaces.*

The difference in requirement of thermal barrier vs. ignition barrier is clearly defined along the lines of occupant safety. If there is any chance that a space will be occupied for any reason, even for short periods of time, the space must have the 15 minute protection that a thermal barrier affords. This should allow safe evacuation of the space should the foam be part of a fire. If a space is clearly not going to be occupied for any reason except maintenance, a step down to an ignition barrier is permitted. In the event of a fire, an ignition barrier should afford sufficient time for a technician to exit the space. If a space will never be occupied because there is no permanent access and this space does not communicate with any other spaces in the building either by obvious means or by thermal bypasses then no protection is required.

Final Note: When choosing alternative thermal barriers if installing a ½ inch of gypsum board is not feasible, this guidance is offered:

Selection of Thermal Barriers

Generally, SPF installers have two choices:

(1) Prescriptive thermal barrier: The IBC and IRC specifically name ½-inch gypsum wallboard as an “approved” thermal barrier.

(2) Equivalent thermal barriers: Materials equivalent to ½-inch gypsum wallboard can be used as thermal barriers provided they have been tested in accordance with the IBC or IRC to limit temperature rise and remain in place for 15 minutes as described above in the “What is a Thermal Barrier” section. Typical equivalent thermal barriers include:

a. Spray-applied cementitious materials

b. Spray-applied cellulose materials

c. Portland cement plaster

d. Intumescent coatings

e. Other various proprietary materials; look for the test report and/or ICC-ES report to document equivalence for a particular product and thickness..

Other various proprietary materials generally fall into two categories. They are either rigid foam board insulation or 2 part spray foam. At present, Thermax is the only rigid foam board manufacturer that has a rigid board insulation that meets the requirements to be a thermal barrier. Not all Thermax rigid board products meet the criteria, so it is important to check the ICC-ES report for the particular board that is being installed. When referring to an ICC-ES report it is important to pay attention to the following details:

1) They often specify alternatives to standard ignition barriers and/or thermal barriers that may include specific rated materials, specific products, or may negate the need for one or the other type of fire barrier.

(2) They are also very specific about the application for which the alternate applies (both the location – e.g. attic rafters, attic gable wall, crawlspace wall/ceiling, basement wall/ceiling; and the details of the material application—product, thickness, attachment, and accessories such as foil tape on seams of Dow Thermax®, etc).

(3) Code officials are not obligated to accept ICC-ES results as equivalent, but they *may* do so if they believe the report is applicable to the intended application.

There are several 2 part spray foam insulations that meet the requirements to be rated as a thermal barrier. Any 2-part spray foam product that is installed must have the required fire protection installed over it or have an ICC-ES report stating that it is a thermal barrier.

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