

**THERMAL BARRIERS FOR THE
SPRAY POLYURETHANE FOAM INDUSTRY**

Spray Polyurethane Foam Alliance
The American Plastics Council
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TECHNICAL COMMITTEE

MISSION STATEMENT

The mission of the Technical Committee is to provide a wide range of technical service to the Spray Polyurethane Foam Industry such as, but not limited to:

1. Review existing documents and serve as a clearing house to endure the “Continuity of Value” of technical information published by SPFA and others concerning the products and services to the SPF industry;
2. Review, research, develop and issue documents concerning new products, systems and services and;
3. To identify, explore, develop and communicate an understanding of technical issues facing the SPF industry.

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THERMAL BARRIERS FOR THE SPRAY POLYURETHANE FOAM INDUSTRY

POLICY STATEMENT

It is the policy and recommendation of the Spray Polyurethane Foam Alliance that all interior applied spray polyurethane foams receive a thermal barrier having an index of 15, as soon as possible after the initial application, except when specifically approved by a building code official based on fire tests specific to the application.

What Is A Thermal Barrier?

A thermal barrier is a material, applied over polyurethane foam, designed to slow the temperature rise of the foam during a fire situation, and to delay the foam's involvement in a fire. A building code definition of an approved thermal barrier is one which is equal in fire resistance to 12.7mm (1/2 inch) gypsum board. Such thermal barriers limit the temperature rise of the underlying polyurethane foam to not more than 121°C (250°F) after 15 minutes of fire exposure complying with the standard time temperature curve of ASTM E 119 (Test Methods for Fire Tests of Building Construction Materials). Thermal barriers meeting this criterion are termed a "15 minute thermal barrier" or classified as having an "index of 15".

Where Is A Thermal Barrier Needed?

All model building codes require an approved thermal barrier on the habitable side of a structure between the interior of the structure and the polyurethane foam. Spray polyurethane foam should not be applied to the interior of a building without an approved thermal barrier as defined by the applicable building code. For spray polyurethane foam applied on the exterior of the structure (i.e., roof insulation), a thermal barrier is not normally required.

Building codes may exclude the installation of a thermal barrier over certain application of spray polyurethane foam. Review the specific code requirements on a case-by-case basis.

Why Do Codes Require Thermal Barriers?

Spray Polyurethane Foam, like most other organic materials, is combustible. Spray polyurethane foams are formulated with flame retardants to decrease the flame spread as measure by ASTM E-84 (Test for Surface Burning Characteristics for Building Materials) and other tests. However, these flame spread ratings are used solely to measure and describe properties of products in response to heat and flame under controlled laboratory conditions. The numerical flame spread ratings are not intended to reflect hazards presented by spray polyurethane foams or any other material under actual fire conditions.

When exposed to fire sources, such as welding arcs, cutting torches, or red-hot metal, unprotected spray polyurethane may ignite resulting in a flash fire. The burning will be brief, forming a layer of less flammable surface char. This initial burning produces combustible gases and black smoke. In confined interiors, combustible gases can accumulate and ignite resulting in flashover, a dangerous fire situation. Under these conditions, additional combustibles can become involved in the fire giving off additional combustible gases and feeding the fire. If the heat and gases are not dissipated and the temperature of the foam rises above approximately 379°C (700°F), the surface char will no longer be able to protect the foam and the foam will fuel the fire as it degrades under these extreme temperatures. Most sprayed polyurethane foam fires will involve other flammable materials. However, in a limited number of situations, when other flammable materials are not involved, sprayed polyurethane foam fires tend to be flash fires of relatively short duration.

Codes require thermal barriers for interiors to reduce the risk of a flash fire and to extend the time at which the foam would reach its auto-ignition temperature should a fire originate from other sources.

(**Note:** These fire scenarios depend on the accumulation of combustible gases. Exterior applications of spray polyurethane foam, such as roof systems, where combustible gases can dissipate, are less likely to become involved in flash fires and are treated differently under the building codes.)

Selection of Thermal Barriers

Many types of thermal barriers are available on the market today including but not limited to:

1. Gypsum wall board
2. Spray applied cementitious materials
3. Spray applied cellulose materials
4. Portland cement plaster
5. Various proprietary materials

The thermal barrier should have a currently valid building code certification that lists a report number and date. In some cases, a local building code official will allow the use of a thermal barrier which has been tested to the satisfaction of the official but is not certified by a code agency.

Generally accepted diversified fire tests for building assemblies and thermal barriers include:

- *UL 1715 Fire Test of Interior Finish Material
- *UL 1040 Insulated Wall Construction
- *FM 4880 Building Corner Fire Test
- *U.B.C. Standard 26-2 Test Method for the Evaluation of Thermal Barriers.

Caution: Just because a material is advertised as a “thermal barrier” does not mean that it has been approved by a code agency or a local code official. Ask for test data and code body approvals, listings, or other written indication of acceptability under code to be sure that the product selected offers the fire protection that the code demands.

Spray Polyurethane Foam Alliance
4400 Fair Lakes Court Suite 105
Fairfax, VA 22033
800-523-6154

