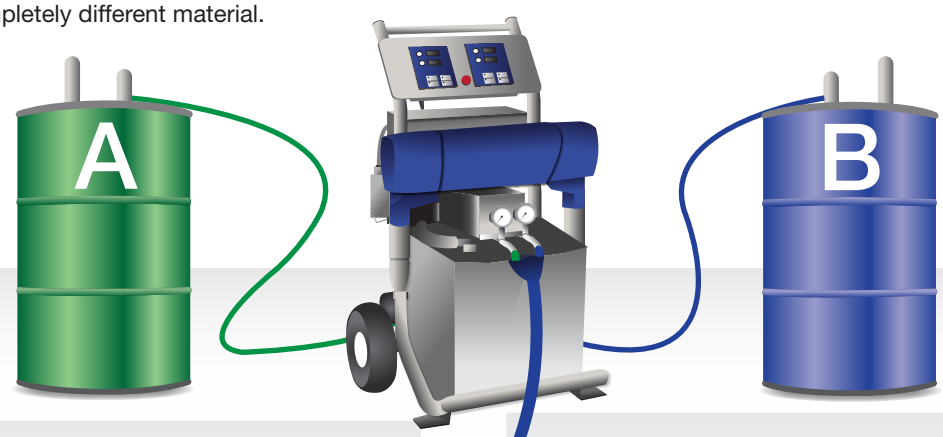
What is Spray Polyurethane Foam?

Spray polyurethane foam (SPF) is a spray-applied material that is widely used to insulate buildings and seal cracks and gaps, making the building more energy-efficient and comfortable.

How Does SPF Work? Contractors combine two liquids to initiate a chemical reaction that creates foam. These liquids arrive at the job site in separate containers and are typically referred to as the "A" side and "B" side. Just like sodium and chlorine compounds combine to form a new substance – table salt – the "A" side and "B" side ingredients mix together to form a third, completely different material.



The "A" side is commonly a mixture of methylene diphenyl diisocyanate (MDI) and polymeric methylene diphenyl diisocyanate (pMDI).

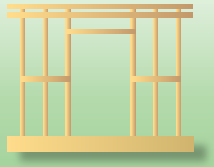
MDI is widely used in the production of rigid polyurethane foams for home or refrigerator insulation, but is also used in the production of some footwear, sports equipment, paints and glues.

After SPF is applied and cured, it is considered to be relatively inert, according to EPA. This means the chemicals are finished reacting.

The "B" side is typically a polyol and smaller amounts of other liquids:

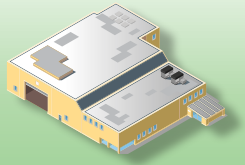
- **Polyols** react with MDI to make foam. Polyols are a building block of polyurethane. Some SPFs replace a portion of their polyols with recycled plastic bottles or renewable polyols made with soybean or castor oil.
- **Catalysts** speed up the chemical reaction. There are many different catalysts with numerous industrial applications, from reducing car emissions to making paper.
- **Blowing Agents** help the foam expand. Some SPFs use water as a reactive blowing agent, while others use a non-reactive type.
- **Surfactants** lower the surface tension of liquids, much like dish soap does to dissolve grease.
- **Flame Retardants** increase the fire resistance of the finished product to help protect homeowners and other building occupants.

SPF's Many Common Uses and Benefits



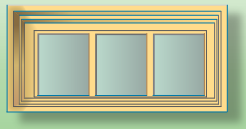
Wall Insulation

Maintains indoor air temperature, seals cracks and improves energy efficiency



Roofing

Protects against moisture, improves energy efficiency and increases wind resistance



Sealant

Minimizes air leaks, reduces sound, seals windows and doors, and helps keep out insects, rodents and allergens

Manufactured Homes

Serves as an adhesive for wall and ceiling panels

Containers

Insulates tanks or vessels for liquids that need to maintain a consistent temperature

Warehouses

Insulates refrigerated warehouses, meat and dairy processing plants, and distribution centers for frozen foods and fresh produce

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Source: Argonne National Lab, U.S. EPA, Spray Foam Coalition and Spray Polyurethane Foam Alliance.