

Tech Tip: Spray Polyurethane Foam - Exotherm vs. Thickness

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SPRAY POLYURETHANE FOAM ALLIANCE
SPFA

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Spray Polyurethane Foam - Exotherm vs. Thickness

Spray polyurethane foam (SPF) can be formulated for application in a wide variety of physical and environmental situations. SPF manufacturers often adjust the reaction rate (“speed”) of their foam systems to accommodate different application conditions. Spray foams designed for cold weather applications, for example, will be formulated to react faster than an equivalent foam for use during warm or hot weather.

The SPF reaction is exothermic: heat is generated during the foam reaction. The heat is a natural consequence of the chemical reaction and is necessary for the vaporization or phase change of some blowing agents. Minimum SPF application pass thickness is normally specified at ½-inch to provide enough reacting material (and exotherm) to activate the blowing agent and initiate the cure.

The heat of reaction is highly dependent on the SPF formulation and is also based upon the overall intended application or lift thickness installed.

As a result of the exotherm, the internal temperature of the SPF will rise, in most cases, the first 15 minutes after the SPF is sprayed. The SPF will start to gradually cool off from this point. This may take a few minutes to several hours. Open cell foams will cool off quicker than closed cell spray foams. Obtain a meat thermometer at the grocery store and use it to determine internal temperatures and time factors for your spray applications. It will help you understand exothermic reactions and SPF formulations.

Generally speaking, SPF internal temperatures should be kept at or below about 180° F during the application/ reaction process. Extended periods of time above 180° F may result in a reduction of physical properties. In extreme cases, the SPF may actually scorch or ignite when installed too quickly to build up thick applications or when installing in too thick of a lift. .

A prudent spray application technique to avoid high internal temperatures is to apply SPF in controlled pass thicknesses, permitting the SPF mass to cool somewhat (15 to 30 minutes) before applying the next pass. The minimum pass thickness, as mentioned above, is typically ½-inch (this minimum pass thickness is more important in roofing applications where blister formation is a concern, than in interior wall applications where the service conditions are less severe). The maximum pass thickness is formulation dependent and varies from system to system. Thus some SPF systems may be applied thicker than others. Check with your manufacturer for recommendations and limitations pertinent to the specific SPF system you are using.

Always understand and follow your supplier’s recommendations regarding minimum and maximum SPF pass thickness and the time between passes to insure that the final product is one that you can be proud of and that

