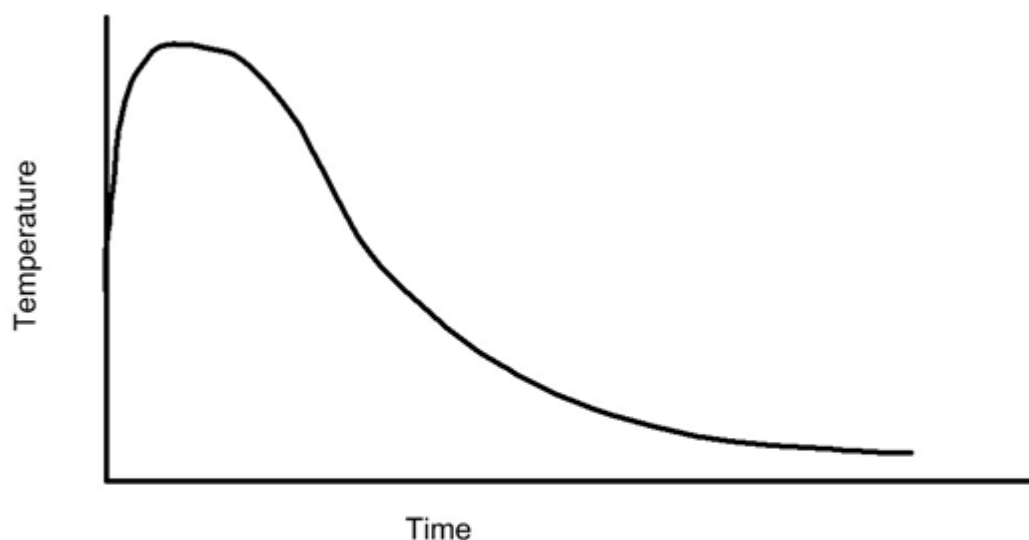


## TechTip I2 – Exothermic Temperatures in SPF

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.



Typical SPF  
Exotherm / Temperature Decay Curve

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 ensure that the final product is one that you can be proud of and that you know will perform as designed.

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## ABOUT THE SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)

Founded in 1987, the Spray Polyurethane Foam Alliance (SPFA) is the voice, educational and technical resource, for the spray polyurethane foam industry. A 501(c)6 trade association, the alliance is composed of contractors; manufacturers and distributors of polyurethane foam, related equipment and protective coatings; and consultants who provide inspections and other services. The organization supports the best practices and the growth of the industry through several core initiatives, which include educational programs and events, the SPFA Professional Installer Certification Program, technical literature and guidelines, legislative advocacy, research, and networking opportunities. For more information, please use the contact information and links provided in this document. [www.sprayfoam.org](http://www.sprayfoam.org)

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## **DOCUMENT HISTORY**

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