SPFA gets calls regularly from customers, designers, architects and others looking for straight answers to their questions on SPF. Here are two of the questions received recently that our panel of experts addressed:

Question? I have read that closed-cell sprayfoam can be sprayed too thick causing problems. What problems are we talking about and how do I know how thick to install the foam?

Scorched foam shows this foam came close to auto-ignition.

Spray polyurethane closed cell foam is applied in the field through proportioning spray equipment combining A and B components under pressure to create a rigid polyurethane foam insulation. The chemical reaction that occurs in seconds gives off heat (observed as exothermic temperature increase) as a result of this chemical reaction. The more foam mass (e.g., greater foam density and/or greater pass thickness) there is, the more heat is given off.

This column is the product of the new **SPFA Consultant Committee** members:

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The article was also reviewed by the Technical Committee.

Since polyurethane foam is an excellent insulator this exothermic heat is retained in the foam mass and, therefore, the more insulation there is the more heat is retained. This exothermic heat is necessary for the foam to form and obtain the physical properties needed for its performance.

This temperature within the curing foam product can get to be excessive if the foam is sprayed too thick in one pass (typically greater than 2 inches) or if multiple passes are applied without sufficient cooling between each pass. Spray polyurethane foam manufacturers usually indicate the range of pass thickness for their products and these limits should be followed. The foam can deteriorate exhibiting blowholes, fissures, voids, gaps, discoloration and may produce odors if applied too thick. In extreme excessive lift or pass thicknesses where the temperature becomes very high, the closed-cell foam can auto-ignite if the core is exposed to air. (A lift is a layer of sprayfoam installed in a specific area using multiple passes at one time. Multiple lifts are typically installed in an insulation application.)

The best way to avoid problems due to excessive heat is to review the manufacturer's guidelines and then test the

Numerous blowholes and the darker color in the center of the samples indicate excessive exothermic heat developed within the foam. This sample also exhibited strong odors.

foam before you begin spraying on the job. The following steps can be used to determine from day to day how thick to install the foam and how soon you can spray the next lift.

1. Spray test sections of foam at various lift thickness on a substrate similar to the one you would be applying the foam. We suggest a lift at 0.5 inch, 1.0 inches and 1.5 inches (or at the maximum thickness recommended by the manufacturer).
2. Wait 5–15 minutes (depending on thickness of lift) and insert a thermometer into the middle of the foam mass (a small meat thermometer works well). Leave the thermometer in the foam until it reaches its maximum temperature.
3. If the thermometer exceeds the manufacturers' temperature recommendations, the foam was sprayed too thick. Continue to measure the foam temperature on the sample that was below the recommended temperature. When the temperature recedes to the maximum substrate temperature for application as provided by your supplier, an additional lift can be installed.
4. After the second lift is sprayed, check the internal temperatures again to verify the foam has not exceeded the recommended temperature. (Note: You may find that a thinner second lift is required to keep the temperature below the limit).

The applicator should not just rely on the temperature readings of the foam. After the foam has cooled, take a core sample of the various lifts and check out the cell structure. The foam should have tight, small cell structure with consistent color, and no voids, gaps, fissures, blowholes or other signs of high exothermic heat. (Note: If no thermometer is available, cut out a core sample of the foam at various lift thickness and visually look for foam deterioration as described above to determine the maximum thickness that can be sprayed.)

This simple procedure can reduce call backs due to odor or suspicion of poor insulation quality, saving reputation, time and money along with gaining new customers through referral. o

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