

Spray Polyurethane Foam:

GUIDANCE ON THE REMOVAL AND DISPOSAL OF HIGH-PRESSURE SPF INSULATION

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Spray Foam
Coalition

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The Spray Foam Coalition (SFC) champions the use of spray polyurethane foam in U.S. building and construction applications and promotes its economic, environmental and societal benefits while supporting the safe manufacture, transport, and application of spray polyurethane foam. SFC consists of manufacturers of spray polyurethane foam systems as well as suppliers of raw materials and machinery used to apply the foam.

A. Scope

This guidance document is intended to help individuals understand what factors to consider when removing high-pressure spray polyurethane foam^a (SPF). It discusses practices to help ensure SPF is removed properly, techniques for removal, and SPF disposal/clean-up considerations. This guidance document does not include an overview of all regulatory requirements that may apply to the removal and disposal of SPF products. Always verify with your SPF manufacturer what steps to take on a specific project.

This document directs you to resources and references to help the removal process proceed more smoothly. This document is not a substitute for the extensive training provided by manufacturers and industry organizations associated with the manufacture and installation of SPF. It is designed only to outline considerations during the removal of SPF and to provide helpful information to professional practitioners in the field, including:

- SPF insulation contractors;
- General construction and demolition contractors;
- Restoration and remediation contractors;
- Building owners; and
- Third-party remediation specialists.

B. SPF Removal from a Building

SPF may need to be removed from a building for various reasons. For example, removal may be necessary due to additional construction or building modifications, which may require partial or full removal of the building envelope assembly containing SPF. SPF damaged by an external factor - such as a fire, flood, or mold and/or mildew contamination - may also require removal.

After SPF is applied and cured, the U.S. Environmental Protection Agency considers it to be relatively inert.^b Cured SPF may, however, present a respirable dust hazard during removal. Dust produced from cured SPF is considered a nuisance particulate or dust. Exposure to nuisance dust may cause skin, eye, and respiratory irritation. SPF manufacturers may provide Safety Data Sheets (SDSs) for reacted and cured SPF products.

The condition of the SPF to be removed may vary. Certain situations, including damage caused by external factors like fires and floods, may require specific removal or remediation techniques that are beyond the scope of this document. Consider contacting the SPF manufacturer for additional assistance in removing SPF under unique conditions.

^a This guidance may be applicable to the removal of low-pressure two-component SPF products as well. Visit www.spraypolyurethane.org for more information on the types of SPF products.

^b See e.g., <http://www.epa.gov/saferchoice/potential-chemical-exposures-spray-polyurethane-foam>.

Decisions related to the need for specific removal techniques, personal protective equipment (PPE), and disposal techniques should be made by a “Competent Person”^c present onsite. It is beyond the scope of this document to determine the condition of the SPF to be removed. Determining the precise condition of SPF is often product-dependent and may require examination or testing by a representative from the SPF manufacturer or a Competent Person. Furthermore, remediation specialists may be consulted for evaluation and removal in projects where the SPF is believed to have been contaminated (e.g., due to external factors like fire or mold contamination).

C. Personal Protective Equipment, Workplace Containment, and Ventilation

In order to minimize exposure to nuisance dust, and to minimize the spread of dust and debris, select appropriate PPE as well as adequate workspace containment (e.g., plastic sheeting and masking to create negative pressure containment for dust control) and ventilation controls (i.e., exhaust ventilation).

PPE may include:^d

- Respiratory protection to protect workers from nuisance dust and other non-chemical hazards (e.g., mechanical irritation from direct skin or eye contact). An Air Purifying Respirator (APR) with N95 particulate cartridge for nuisance dust and a chemical vapor cartridge may be deemed necessary. In some situations (i.e., poorly ventilated or enclosed work spaces), a Supplied Air Respirator (full-face mask or hood) may be necessary.
- Safety glasses with side shields or safety goggles (if not part of the APR).
- Gloves. Disposable gloves are not recommended because they are most likely not durable enough for the work required. Therefore, leather work gloves or fabric coated chemical resistant gloves are likely to provide better protection. Fabric coated chemical resistant gloves (such as abrasion-resistant nitrile, neoprene, butyl or PVC gloves) may be required if any other hazards are present.
- Disposable coveralls. Coveralls should be worn to primarily keep dust and debris from contacting the skin. If other hazards are present, chemical-resistant disposable overalls providing full skin coverage may be required.
- Hearing protection when power tools are used.
- Hardhat.
- Safety shoes.

^c OSHA defines a “Competent Person” as “one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them” (29 CFR 1926.32(f)). Available at: <https://www.osha.gov/SLTC/competentperson/>. This may include, for example, an SPF manufacturer representative or certified industrial hygienist.

^d See OSHA Guidelines for Building Demolition: <https://www.osha.gov/doc/topics/demolition/osharesources.html>.

Other variations in PPE, containment, and ventilation may be necessary; for example, due to damage, such as mold and/or mildew contamination, or fire or flood restoration.^e A Competent Person should be consulted prior to starting the removal work for final PPE recommendations.

D. What to Consider when Choosing Removal Techniques and Tools for SPF

This section provides general guidance on techniques and tools to consider when removing SPF.

Jobsite Preparation

Before starting SPF removal, have appropriate ventilation and containment systems in place, post signs, and communicate with other trade workers and people in the vicinity. The ventilation and containment systems needed may vary for each jobsite based on the existing or natural ventilation and dimensions of the work space. Follow proper procedures as required by OSHA and other applicable state and local laws and regulations.^f In addition to ventilation and containment, understand what objects, such as fasteners, wires, conduits, plumbing, cross-bracing and ductwork, may be under the SPF. For example, removal of SPF from the underside of a roof deck with asphalt shingles above may mean that there are numerous nails protruding below the roof deck. When removing SPF from frame walls, check to see if electrical wires or conduits are embedded in the SPF. Additionally, plumbing and ductwork may be inside the wall cavities. All of the items listed above - and others - may be present when removing SPF from the underside of a floor.

Before beginning SPF removal, review the building plans to identify potential electrical, plumbing, and mechanical fixtures/equipment. Use visual inspections to help identify the likely location of AC wires connected to wall switches and outlets. There are special tools, such as professional-grade stud-finders with pipe and AC wire detection that can be used to identify hidden metal objects such as wire, conduits, and metal piping. Map, trace, and mark the locations of these metal objects prior to SPF removal.

Plastic piping, such as PVC and PEX, cannot be detected by stud-finder devices. For plastic drain pipes, a metal wire snake can be run into the water drain lines and vent stacks, and a metal-detecting stud finder can be used to locate the metal snake. This is not possible with plastic water supply lines. Trace the location of these supply lines by observing where water fixtures, such as toilets, sinks and radiators, are located.

^e See OSHA guidelines for Mold and Mildew Remediation: <https://www.osha.gov/dts/shib/shib101003.html>; and see Restoration Industry Association (RIA) Guidelines for Fire and Smoke Damage Repair: <http://www.restorationindustry.org>.

^f OSHA Construction Industry Regulations 1926.20 General, 1926.21 Training and Education, 1926.28 PPE, 1926.59 HazCom, 1926.55 Gases, Vapors, Fumes, Dusts, Mists, 1926.57 Ventilation, 1926.200 Signs.

It is also important to turn off, at the breaker, any electrical circuits passing through the SPF being removed. Use OSHA's lockout-tagout (LOTO) procedures[§] to de-energize and secure the breakers or sub-panel, or use a sign/tape over the switch (Figure 1). If the generation of dust is possible during the removal process you may want to block off any local ventilation grates or registers (Figure 2).



FIGURE 1: Deactivate and mark HVAC system at electrical panel (use LOTO procedure and indicate date, time and name of person applying the tag).

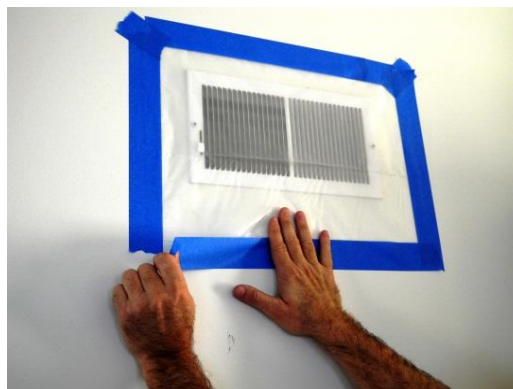


FIGURE 2: Cover and tape all grate and register openings into containment.

After all objects have been located and prior to removing SPF, again, remember to turn off the breakers to the AC circuits and power to other wiring. Turn off and depressurize plumbing and gas lines. It is up to each person inspecting these items to determine the proper timing of their actions.

SPF Product Types

There are generally two types of SPF as defined by their cellular structure: open-cell and closed-cell. Open-cell SPF is a low density, relatively flexible material that has lower strength and stiffness than closed-cell SPF. Closed-cell SPF, such as medium density insulation, is more rigid and has greater strength compared to open-cell SPF. The different properties of open and closed-cell SPF mean different tools and techniques may be required for removal.

Open-Cell, Low Density SPF Removal

Due to its lower tensile strength and stiffness, open-cell, low density SPF can be easily removed from walls and other areas. Typically, a long handled serrated trowel (Figure 3) or drywall saw (Figure 4) can be used to cut the SPF from the sides of the studs, joists, or rafters. Then, a long-handled, wide-blade putty knife (Figure 5) or sidewalk ice scraper may

[§] See OSHA website for more information on lockout-tagout procedures:
www.osha.gov/SLTC/controlhazardousenergy/.

be used to remove the SPF from the sheathing, subfloor, or roof deck. Use these tools carefully, especially around embedded objects. Remaining chunks of SPF may be removed with a hand scraper or powered wire brush (Figure 6). Below are a few example images for tools described above. Additional tools and options are available. Wear proper PPE when using each type of tool.



FIGURES 3-6: Examples of tools that may be used for the removal of open-cell, low density SPF include a long handled serrated trowel, drywall saw, wide-blade putty knife, and powered wire brush.

Closed-Cell, Medium Density SPF Removal

The rigid closed-cell structure of medium density SPF creates a material with higher strength and stiffness which makes cutting and removal more difficult than that required for low-density SPF. Power hand tools may be necessary, except for very small removals. Begin by separating the SPF from the sides of the studs, joists, or rafters. For example, a reciprocating saw (Figure 7) or circular saw (Figure 8) may be used. Then, separate the SPF from the sheathing, subfloor, or roof deck with a sidewalk ice-scraper or spud bar (Figure 9). A hand-held electric power scraper, like those used for tile removal, may be needed. Below are a few example images for tools described above. Additional tools and options are available. Wear proper PPE when using each type of tool.



FIGURES 7-9: Examples of tools that may be used for the removal of closed-cell, medium density SPF include a reciprocating saw, circular saw, and spud bars.

E. Surface Removal and Repair Considerations

SPF generally adheres well to most substrates. When SPF is removed it may tear apart and leave a very thin layer of SPF on the substrate. This layer may be removed according to the practices described above (see Section D).

Occasionally a residual layer of SPF may need additional attention. A Competent Person can help you make this determination. Removal techniques may vary by situation and could include mechanical removal, discussed below.

Mechanical Removal Considerations

If a decision is made to remove the residual layer of SPF, one option to consider is mechanically removing it. The use of abrasive equipment, such as grinding, brushing or sand/bean blasting, may be considered. This may generate significant levels of dust and secondary waste to be removed. A technique called cryogenic blasting (often used for mold removal) can be considered as well. Cryogenic blasting is an air blasting procedure that uses crushed dry ice in place of sand to mechanically remove the residual SPF. Typically, the removal of residual SPF results in the removal of a thin layer of the substrate.

F. Cleanup and Disposal Considerations

Wear appropriate PPE. Remove the chunks of removed SPF and other scraps from the work site. Place SPF scraps, particulates, and dust into heavy-gauge plastic garbage bags. Use a shop vacuum to pick up residual particles and SPF dust. Use of a vacuum equipped with a HEPA filter can help reduce the amount of dust generated during cleanup.

Take the removed SPF from the property at the completion of the work and dispose of it properly as required by relevant federal, state, and local laws. While the components of SPF are generally not considered a hazardous waste, it is the responsibility of the waste generator to determine whether waste materials that result from the removal activities are a hazardous waste pursuant to 40 CFR § 262.11.

G. Glossary

Definitions for industry terminology used in this document can be found at:

www.sprayfoam.org/technical/glossary.



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