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New and Retrofit Application Guidelines of Spray Polyurethane Foam Insulation

Introduction:

These guidelines are intended to provide contractors, who are installing PROFOAM's open or closed-cell spray polyurethane foam (SPF) into new or existing buildings, with helpful techniques to avoid overspray, dirt and damage during application and to safely ventilate the area to protect workers and building occupants. These recommendations are not intended to be a complete project specification or complete instructions in applying PROFOAM'S SPF.

Installing spray foam will decrease the air leakage in a building creating a more air-tight structure, which may result in increased humidity levels and affect the indoor air quality. PROFOAM recommends consulting with an HVAC contractor when spray foam is to be installed to ensure the house will be properly ventilated to control indoor air quality. For more information on ventilation after SPF installation, see our point paper on HVAC systems.

Prior to Application:

General:

- Before starting any job, persons handling foam system chemicals, or involved in the foam application, should always read and understand the required Material Safety Data Sheet and Technical Data Sheets for the SPF system being applied.
- Any debris, trash, etc. should be removed from the area being sprayed before application begins.
- Schedule the job so that any hot work including soldering, welding, etc. is completed before foam application. Post signs warning that polyurethane foam insulation is combustible and must be protected from ignition and excess heat when any hot work is required. Inform the building owner and/or general contractor that these signs should be left in place permanently and that hot work permit guidelines should be followed.
- Smoking or any other ignition source should not be permitted while foam is being applied.
- No flammable chemicals, such as wasp and hornet killer or paint stripper, should be sprayed in the area of the foam application 24 hours before or after foam application, and only then if the area is well ventilated.

- A qualified electrician should conduct a complete electrical inspection in retrofit applications (especially when a fuse box is present instead of a breaker panel) to be sure application is safe and risk of electrical fire is avoided due to substandard, damaged, and/or improper electrical systems.
- At least one approved fire extinguisher should be present in the immediate area of the applicators while preparation and application occurs. One should also be located in the trailer or truck where the foam equipment and chemical is stored.
- Foam when applied as exterior insulation should only be applied as specified to the building envelope enclosing the conditioned space.

Set up the jobsite as to minimize the potential for overspray. Establish traffic paths and if outside access is not available, hose routing paths from the entry way(s) to the application area. For finished and occupied buildings, close off other areas of the building by masking with plastic film to prevent any air interchange into the occupied space and shut down and mask vents to HVAC equipment with appropriate lock out/tag out procedures to keep fumes and overspray isolated and properly vented to the building exterior.

Floors:

Protect floors from dirt or damage from hose movement and foot traffic. One option is to cover hard flooring (hardwood, linoleum, etc.) with masking paper held in place with masking tape. Cover soft flooring (carpeting, etc.) with drop cloths over polyethylene sheeting. When working on an occupied residence or commercial space, always wear boot covers.

Personal Property:

Within the spray zone, keep overspray off of personal property and fixtures. Cover tubs, windows, vanities, toilets, office furniture, electrical fixtures, switches and receptacles, wall surfaces, doors, etc. with polyethylene film or similar material secured with masking tape. Install polyethylene or air impermeable material film over all entries to the area being sprayed to create a negative pressure work zone to prevent fumes and overspray from drifting outside that area.

Unfloored Attics:

Install temporary planking on the attic floor to provide attic traffic paths and working platforms. Cover recessed lighting fixtures, wiring and other fixtures with masking to protect from overspray and damage. Do not apply foam directly to any recessed lighting fixtures. In many cases, Fall Protection Devices will be required for the sprayer.

Soffits and Vents in Ventilated Attics:

Unless the attic is to be converted to an unvented attic, protect the soffits and vents from overspray and do not block ventilation pathways.

Unvented attic conversion:

Electrically powered roof mounted attic fans should be fully disconnected and blocked before foam is applied. Existing batt or loose fill insulation on the attic floor should be removed and ensure that exhaust vents from kitchen and bathrooms as well as plumbing stack vents are properly sealed and routed to the building exterior to avoid moisture buildup or entrapment of odors from the drain/waste vent piping. Often small animal carcasses or evidence of their residence (droppings or urine) can be found which may leave behind unwanted odors which are no longer vented to outside. These areas should be thoroughly cleaned and neutralized.

Extended ventilation:

Active ventilation can be extended until all residual odors are cleared. Use of cleaners, paints, coatings or stains as well as existing odors from animals or misrouted vents may require some additional time to suit an individual situation.

Open combustion appliances and fireplaces:

In tightly insulated structures, outside air should be the only source of oxygen for appliances or fireplaces. Appliances and fireplaces drawing combustion air from the interior can build unhealthy levels of carbon monoxide and risk creating a backdraft condition.

OSHA guidelines for attics (and crawlspaces) in construction:

Depending on configuration, some spaces may be classified by OSHA as a confined or permit-required confined space and must be addressed accordingly.

Hose Routing in Finished Buildings:

If the spray hose has to be routed through the building to access the spray zone, it should be brought in only after floors, personal property, and the foam application area has been properly protected as previously stated. When routing the hose through the building, caution should be exercised to avoid contact with any unprotected surfaces outside the application area; for example, floors, doors, door frames, walls and furniture. It is best to hand carry the hose (not pulling and dragging it), thereby avoiding contact with door frames, wall corners and base boards, etc. A good practice is to wrap the hose in extra sheathing where it rounds corners and could contact doors, door frames, walls and furniture as shown on the following page.

**Application:**

In single family houses and similar smaller buildings, all building occupants and tradesmen except for the spray foam contractors equipped with proper personal protective equipment, shall vacate the building and remain at least 50 feet away from the building during the spray application and for 24 hours after completion with active ventilation running to remove any remaining odors from the air space. For larger buildings, a spray zone may be created by sectioning off the active spray area with air impermeable membranes and/or air blocking doors or openings to the area. Each job will require a ventilation plan including posting warning signs to prevent unprotected persons from entering the spray zone during application and for the post spray ventilation period of 24 hours.

Spraying foam will generate heat. Foam which is applied too thick in a single passes can buildup temperatures, which can degrade cell structure resulting in poor foam quality. Individual formulations will differ in how thick the foam may be applied and how it will react if sprayed excessively thick. In the most extreme case, some systems could reach dangerously high temperatures inside the curing foam, which could lead to splitting, charring, or even spontaneous combustion.

When applying closed-cell insulating spray foam, do not exceed 2 inches per pass and allow 10 minutes between each pass. Open-cell foam can be applied in thicknesses from a minimum of 3 inches to a maximum of 12 inches per pass. Spray foam applicators must know the limitations of the system being applied and adhere to the limitations provided on that system technical data reports and application procedures.

Any substandard foam, applied for any reason (due to operator error, improper chemical storage, equipment malfunction, etc.), should be removed immediately and disposed of properly.

After Application:

A forced air exhaust system capable of 30 ACH (air changes/hour) should be utilized by using at least one fan running continuously during and 24 hours after completion of spraying. An additional fan running at lower flow rate on the inlet can be utilized to maximize airflow within the spray zone, taking care that the exhaust fan is always moving air at a greater rate, creating a negative pressure within the area. This is to prevent fumes from entering the other areas of the building or home and to completely remove any residual SPF fumes and odors. Exhaust fan(s) can be placed in building opening (doors, windows, gables) or use of flexible duct attached to the fan can be used to make sure that the outlet is far enough away from the inlet opening to avoid recirculation of isocyanate vapors back into the building.

Any foam shavings or trimmings should be removed from the jobsite and disposed of properly.

After post spray ventilation is complete and all equipment has been removed from the premises, take down all warning signs and barrier tape used to restrict entry carefully remove masking materials from all surfaces (especially light fixtures), taking care to avoid any damage to existing finishes and finally, remove lock out/tag of any devices or appliances that were de-energized for the job.

Refer to the following documents for further details:

SFC Ventilation Considerations for Spray Polyurethane Foam
SFC Guidance on Best Practices for the Installation of Spray Polyurethane Foam
PROFOAM Applicator Bulletin: Jobsite Safety & Ventilation
PROFOAM Health & Safety for Homeowners
PROFOAM Product Stewardship Manual
Applicable PROFOAM SDS and technical data sheet for system being applied
NCFI Point Paper – HVAC Systems in SPF Insulated Homes