Contractor Checklist: Guide to Safer Workplace Practices for Installing High-Pressure, Two-Component Spray Polyurethane Foam (SPF) Insulation

This checklist is aimed at helping spray polyurethane foam (SPF) professional contractors protect themselves, workers and others. This checklist was prepared as a voluntary aid to protect against potential risks from SPF; it is not a regulatory compliance tool. However, some of the best practices included in the checklist may be required under local, state or federal worker protection or other regulations.

Name of Firm:_____ Date: _____

Brief description of work, locations where SPF will be installed, and SPF insulation products to be used. Include manufacturer, product names, system numbers, seasonal blends, and lot numbers:

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Worker name(s) and job title(s) on site i.e., project manager, installers, and assistants:

_____

Accreditation, training, and certification credentials:

_____

To ensure that the SPF project manager, installers, and assistants discuss the following health and safety, training, and hazard communication practices, check all that apply:

Ongoing Activities

❑ Ensure that all workers have completed the appropriate training for health and safety, equipment, and installation prior to beginning work on site and that they carry wallet-size cards to demonstrate that they have passed testing and certification requirements. For example, SPF training is provided by the Spray Polyurethane Foam Association (SPFA) Professional Certification Program, the Center for Polyurethanes Industry (CPI), Air Barrier Association of America (ABAA), Building Performance Institute (BPI), and individual SPF producers.

❑ Maintain onsite a binder of Safety Data Sheets (SDSs), equipment operating manuals, contracts, technical product sheets, emergency contacts, and best practices materials e.g., bulletins, fact sheets, or posters. Ensure that workers are familiar with the information contained in them. A written hazard communication program should be in place for the worksite and included in the binder.

❑ Maintain an on-site copy of the contractor's written safety plan. Meet all OSHA, state, and local safety requirements for installers and for other workers.

❑ Retain records of equipment maintenance, settings used, material names, system numbers, seasonal formulations, lot numbers, and product samples for quality assurance purposes.

❑ Implement safe storage and handling practices for chemicals to prevent spills, leaks, and explosions. Establish procedures to prevent and respond to spills. Have spill containment materials and equipment at the job site. Keep and/or store at the site only the amount of chemicals needed for the job.

❑ Plan for collection and removal of debris and trash, and establish worksite cleaning practices.

❑ Ensure that workers do not eat, drink, smoke, use other tobacco products, or chew gum in the work zone to avoid ingestion of chemicals. Ensure that workers wash hands before eating, drinking, or smoking.

Pre-Application

❑ Conduct a pre-job assessment so that health and safety risks can be identified and managed. Special consideration should be given to confined or restricted spaces and extremely hot or cold working conditions.

❑ Review environmental conditions, (i.e., air and surface temperature, relative humidity, surface moisture, and wind speed) to ensure that they are appropriate for SPF application. Adjustments to work environments and/or project schedules may be needed.

❑ Establish a safe work zone around the SPF application to isolate the work area; post warning signage, including signs for proper personal protective equipment (PPE), and establish barriers. The size of the work zone (e.g., safe distance from the point of spray application) will vary based on the size and layout of the jobsite. Identify and provide PPE needed within the work zone and vicinity. Only protected workers should be present during application, foam curing, and cleanup.

❑ The contractor should provide a portable eyewash and consider providing a portable foot-pedal-style hand-washing sink or disposable cleaning wipes if tap water is not accessible at the jobsite.

❑ Implement depressurization and control of mechanical systems. Make sure HVAC systems are turned off, or HVAC branches are isolated, if occupied spaces in larger commercial buildings require air conditioning during SPF work.

❑ Securely cover air handlers and vents with plastic sheeting to prevent migration of chemicals, vapors, and/or dust.

❑ Consider Combustion Appliance Zones. Determine whether temporary supplemental supply air may be needed during SPF application.

❑ Ensure that chemical drums, hoses, and other equipment are warmed up to the proper temperature before use, as per manufacturer guidelines. Ensure that proper equipment settings (e.g., pressure, temperature, proportioning) are used.

❑ Perform a small test spray and check foam quality after five minutes. Make any necessary equipment adjustments.

❑ Use the client communication checklist as a guide to talk to the client about safety, health, and hazard communication practices, including the need to vacate during application and safe re-occupancy times.

Application

❑ Vacate other trade workers from the work zone during application, foam curing, trimming, and cleanup. **Exercise caution when determining a safe re-entry time for other workers.**

❑ Use equipment that is clean and well maintained, as per guidance from product suppliers and product manuals. For additional information, refer to SPFA Equipment Guidelines AY-137: http://www.sprayfoam.org/technical/spfa-technical-documents.

❑ Use appropriate respiratory protection for indoor and outdoor applications.

❑ Use chemically resistant (e.g., synthetic rubber) gloves, protective coveralls, eye protection, head coverings, and foot protection.

❑ Work with an assistant. Assistants are important in ensuring that site and equipment preparation, ventilation, PPE maintenance, and application (movement of hoses) are carried out safely. For very small jobs, the rig tender may also serve as the assistant.

❑ Maintain line of sight or communication contact with workers in the spray zone.

❑ Make sure workers wear appropriate PPE during any cutting and scraping of foam to avoid exposure to product surfaces, dust, or particles that may contain isocyanates, amines, or other substances from product that has not had time to fully cure.

❑ Ensure that no "hot work" (i.e., welding or plumbing) involving a cutting torch is performed in area.

❑ Follow manufacturer instructions and product specifications for foam application.

❑ Apply foam in layers ("lifts") of the proper thickness in accordance with manufacturer specifications. Two inches or less is a typical industry recommendation for lift thickness for medium-density, closed-cell SPF, depending on product specifications and substrate temperature conditions. With a lift at 2 inches, the core temperature may be 130 to 150 degrees F; if lifts are too thick, overheating may occur, which can degrade the structure; char the foam; and result in scorching, igniting, off-gassing, and shrinkage.

❑ Allow adequate cooling time before applying additional lifts, particularly for closed cell foam. Follow the manufacturer's installation instructions regarding cooling time between passes. Some manufacturers suggest 20 minutes between passes or (longer if applying multiple passes) to allow heat to dissipate.

❑ Implement ventilation strategies to ventilate the spray zone uniformly, reduce exposures, and prevent migration of chemical contaminants. Use exhaust fans to maintain negative pressure in the work zone during spray-foam application.

❑ Qualitatively verify the direction of airflow through doorways and other openings (e.g., using visual smoke or a narrow strip of single-ply tissue paper). When using both supply and exhaust fans (recommended practice for larger jobs), ensure that the exhaust fan capacity is at least 10 percent greater than the supply fan.

- For more guidance on ventilation see: http://www.epa.gov/dfe/pubs/projects/spf/ventilation-guidance.html.
- Additional ventilation guidance can be found at the Center for the Polyurethanes Industry "Ventilation Considerations for Spray Polyurethane Foam": http://polyurethane.americanchemistry.com/Spray-Foam-Coalition/Guidance-on-Ventilation-During-Installation-of-Interior-Applications-of-High-Pressure-SPF.pdf.
- Consult SPF product manufacturer's technical information for recommendations on ventilation and re-occupancy.

❑ Ensure that ventilation exhaust areas are clear of bystanders, workers, and objects (e.g., vehicles) that could become contaminated by spray.

Post-Application

❑ After completing application, continue running exhaust fans while the foam cures.

❑ Remove masking and isolation provisions, and return HVAC system controls to normal operating settings. Confirm that the air-sealing characteristics of SPF are not creating backdraft for combustion appliances.

❑ Decontaminate surfaces that have come in contact with isocyanates or other SPF chemicals (e.g., remove dust and trimmings). Clean equipment, tools, work surfaces, and reusable PPE. Store items that will be cleaned off site in sealed containers. Colorimetric "swipes," which turn red on contact, are a good method for detecting isocyanate surface contamination and can be used for housekeeping checks and training.

❑ Perform post-cleanup inspection to ensure that the work area is clean. Properly contain waste on site and while being transported off site.

❑ Refer to product labels and SDSs for handling and disposing of generated waste foam. For requirements regarding disposal of waste chemicals and other building debris, consult federal, state, and local permits, licensing, and rules.

❑ Determine safe re-entry times for workers (i.e., when protective clothing and equipment are no longer needed). Air quality testing/monitoring for workers may also be used to determine safe re-entry times.

❑ Regarding re-occupancy for residents and building occupants, clients should be restricted from the job

site while the product is being installed, while the product is undergoing curing and until the building has been adequately ventilated and thoroughly cleaned of dust and debris.

❑ Some manufacturers recommend 24 hours after application for worker re-entry without the use of PPE and for re-occupancy by residents and other building occupants, but the recommended time may vary. Contact your manufacturer or supplier for specific guidance on ventilation time, re-entry time, and re-occupancy time for your specific product and scenario. Get more information on ongoing research on re-occupancy times, product emissions, and ventilation rates through ASTM International Subcommittee D 22.05 on Indoor Air Quality: http://www.astm.org/Standards/D7859.htm.

Quality Assurance

❑ Verify and record: material temperatures, pressures, and ratios; ambient and substrate temperatures; and pass thickness and minimum material thickness (specify intervals).

❑ Perform and record: industry standard adhesion and density checks, and thermal shock and slit tests to assure product dimension stability (specify intervals).