

# Gaco Western

S I N C E 1 9 5 5

## GENERAL APPLICATION GUIDE:

GW 6-2 SG-Gaco Foam  
September 2017

### Spray Polyurethane Foam GENERAL APPLICATION GUIDE

#### 1. GENERAL

SCOPE: These instructions cover health and safety, storage, and application of Gaco Western's spray polyurethane foam systems.

EMPLOYEE TRAINING: All contractor personnel handling liquid polyurethane or isocyanate foam components should familiarize themselves with the dangers and health hazards associated with these chemicals. All employees handling and applying materials should take the online course, and pass the test from the ACC, High Pressure Spray Polyurethane Foam Chemical Health and Safety Training.

<https://spraypolyurethane.org/Main-Menu-Category/Professional-Contractors/Resources/Spray-Polyurethane-Foam-Chemical-Health-and-Safety-Training.html>

Employees with the following conditions should not work with these materials:

- Chronic respiratory diseases
- Asthma
- History or presence of allergic disease
- Skin allergies, eczema

#### 2. SAFETY EQUIPMENT AND VENTILATION

Gaco Western recommends following the "Guidance on Best Practices for the Installation of Spray Polyurethane Foam," American Chemistry Council, Center for the Polyurethane Industries. The design of engineered environmental controls and selection of appropriate PPE is dependent on the jobsite conditions and products being used. Please refer to the products SDS for additional guidance.

<https://polyurethane.americanchemistry.com/Spray-Foam-Coalition/Guidance-on-Best-Practices-for-the-Installation-of-Spray-Polyurethane-Foam.pdf>

##### A. Protective Equipment

- Contractors shall have a Respiratory Protection Program in accordance with OSHA 1910.134 App. A-D.
- Supplied air-breathing apparatus with full-face mask or hood is recommended, however, an air purifying respirator may be permissible under specific conditions. An employer may determine that an air purifying respirator may be used based on the respiratory hazards to which the worker is exposed and the workplace and user factors that affect respirator performance and reliability. If a determination is made by an employer that an air purifying respirator is appropriate, that employer must have a written respirator program with a cartridge change out schedule to ensure that the cartridges are changed before the end of their service life.
- Tyvek or similar coveralls.
- Protective footwear or boots.
- Impervious gloves.
- Eye and face and neck protection if a half mask respirator is used.

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B. Indoor Spraying Precautions

- 1) Isolate the environment of the area to be sprayed from the rest of the structure.
- 2) Ventilation and other engineered controls should be provided in accordance with ACC *Ventilation Considerations for Spray Polyurethane Foam*. The system should be sized to provide a minimum of 10 air changes per hour of supply and exhaust air. The ventilation system should be turned on prior to application of product and be left on until cleanup is completed or 1 hour whichever is longer.

Gaco Western recommends following the “*Ventilation Considerations for Spray Polyurethane Foam*,” American Chemistry Council, Center for the Polyurethane Industries.

<https://polyurethane.americanchemistry.com/Ventilation-Considerations-for-Spray-Polyurethane-Foam.pdf>

- 3) Keep occupants and other trades away from the spray area for the following periods:

Product	Reentry Time	Reoccupancy Time
Gaco 052N	24	24
GacoFireStop2 F5001	24	24
GacoProFill FR6500	1	24
Gaco 183M	24	24
GacoOnePass F1850	24	24
GacoPourFoam CF200		24

- 4) Smoking in the same area during spray operations shall be strictly prohibited.
- 5) Combustion equipment should be turned off and appropriate lock-out procedures should be followed to avoid accidental activation during spraying.
- 6) Be sure to take proper precautions to not spray over unprotected energized lighting or electrical outlets. Doing so could be a fire hazard. Electrical wiring and conduit can be sprayed on as long as open energized circuits are protected.

C. Outdoor Spraying Precautions

- 1) Rope off the area within 150 feet (45.72 m) of the spray site.
- 2) Seal off all ventilation intakes within the affected area.
- 3) Erect windbreaks, when necessary, to confine the spray-mist to avoid damage to any surface near the work zone due to overspray or drift.
- 4) Keep spectators away from the spray area.
- 5) Be sure to take proper precautions to not spray over unprotected energized lighting or electrical outlets. Doing so could be a fire hazard. Electrical wiring and conduit can be sprayed on as long as open energized circuits are protected. All hot work, i.e., welding, torches and open flame work, must be completed prior to commencing the installation of the polyurethane foam insulation.

**3. STORAGE**

- A. The ISO component should be kept away from caustic solutions, tertiary amines, and water, to prevent rapid polymerization and accompanying generation of heat and gasses. Dangerous pressures can develop in closed containers.
- B. Protect all materials from moisture.
- C. Both components may contain volatile ingredients; therefore, keep the containers tightly sealed and store indoors at the recommended storage temperatures. Typically, 50-70°F for closed cell foams and 50 to 100°F from open cell foams. Please consult the product data sheet for more specific storage requirements. **DO NOT STORE THE MATERIALS IN THE DIRECT SUNLIGHT.** Open the containers carefully, allowing any built-up pressure to be relieved slowly and safely.
- D. If drums are bulging they should be cooled for 24-48 hours prior to opening. Please consult Gaco Western Technical Service Department for further assistance.

**4. APPLICATION SPECIFICATIONS**

- A. Gaco Western's spray polyurethane foam systems should be applied only by qualified, experienced spray applicators.
- B. For detailed specifications for most applications, consult the appropriate Gaco Spray Guides for the applicable products. These processing instructions were developed to aid the spray contractor in obtaining a properly applied product, and **MUST** be followed within the limits specified to ensure acceptable quality foam. Failure to comply with these instructions, including the use of conventional processing techniques, may result in foam with poor cell structure, excessive and/or enlarged pinholes, poor interlayer adhesion, and/or an unacceptable rough surface texture.

**5. CLIMATE CONDITIONS**

Water (rain, fog, dew, frost, perspiration, etc.) will react chemically with the mixed components, adversely affecting the foam formation and resultant properties. **THEREFORE, THE SUBSTRATE MUST BE DRY AT THE TIME OF APPLICATION.**

The substrate must be 5°F above the dew point temperature. Do not apply when the relative humidity is greater than 85 percent.

Relative Humidity	100%	20	30	40	50	60	70	80	90	100	110
	90	18	28	37	47	57	67	77	87	97	107
	80	15	25	35	44	54	64	73	83	93	103
	70	13	22	31	41	51	60	69	79	89	99
	60	9	19	28	37	47	56	65	75	84	94
	50	6	15	24	33	42	51	60	70	79	88
	40	2	10	19	28	37	45	54	63	73	82
	30	-4	5	13	21	30	38	46	56	65	73
	20	-11	-3	5	13	21	29	37	45	54	62
	10	-23	-15	-8	-1	7	14	21	28	36	44
		20	30	40	50	60	70	80	90	100	110

Dry Bulb Temperature (°F)

To avoid excess overspray with exterior applications, **DO NOT ATTEMPT TO SPRAY WITHOUT PROPER CONTAINMENT IF THE WIND SPEED IS GREATER THAN 15-20 MILES PER HOUR.** Extreme caution must be taken to prevent overspray and fumes from contaminating other areas and properties.

**6. ELEVATIONS OVER 3,500 FEET**

At elevations over 3,500 feet, with Open Cell foams there can be adverse effects in the reaction of the foam. While yields may increase, the foam may react erratically causing poor adhesion to substrate.

**7. SUBSTRATE TEMPERATURE**

The appropriate grade Gaco Foams should be chosen by the applicator according to the substrate temperature ranges noted on the Product Data Sheet under Processing Characteristics. At the bottom of the recommended temperature range, flash coats or thin passes are to be avoided.

## 8. SUBSTRATE PREPARATION

- A. All surfaces to be sprayed, including previously applied foam or coatings, must be clean, dry, and free of dirt, grease, release agents, loose or damaged protective coatings, or other contaminants.
- B. Engineered wood components such as OSB, LVL, TJI, glue-lam beams, etc. commonly have paraffin or other waxes applied during the manufacturing process that must be removed.
- C. Concrete and concrete masonry units must be fully cured and dry. Cast in place and precast concrete must be cleaned to remove oils and release agents if present. Muriatic acid can be effective at removing some of these compounds.
- D. Dimensional lumber, plywood, OSB sheathing and other wood based building products must be below 18% moisture content.
- E. Ferro-metallic tank substrates should be sand blasted in accordance with Steel Structures Painting Council-SP6 (SSPC-SP6) or the National Association of Corrosion Engineers #3 (NACE). The surface must be carefully inspected and properly prepared prior to the application of foam, to ensure adequate bonding.
- F. GacoFlex E5320 two-part epoxy primer, or other suitable primer, may be required to enhance the adhesion of the foam insulation to the surface, and to prevent corrosion of metal substrates. Below are general recommendations for surface preparation and the proper application of the products:

<b>Substrate</b>	<b>Primer</b>
Concrete	None Required
DensGlass or other fiberglass cased Gypsum sheathing	None Required
Fiberglass panels	None Required
Metal *	
Aluminum (bare or anodized)	GacoFlex E5320
Aluminum (abraded)	None Required
Copper	GacoFlex E5320
Galvanized	None Required
Steel metal panel (painted or bare)	None required unless rust is present. If glossy abrade surface.
Stainless steel	GacoFlex E5320
OSB or Plywood	None Required
Wood	None Required

\*Gaco Western recommends sanding and/or etching metal products prior to primer application.

- E. Gaco Western recommends that applicators spray test patches to validate adhesion prior to commencing work.

## 9. SPRAYING

The spraying technique should be such that enough material is applied to cover the surface, without running or sagging. Each layer of built-up foam should be at least one-half inch thick; if one-quarter inch or less in thickness, the foam layer may be of generally poor quality, have weak, elongated cells, and have poor interlayer adhesion. The applied foam should be allowed to rise completely before another layer is applied. Successive layers should be applied within fifteen minutes for optimum interlayer adhesion, with a suggested minimum waiting period of approximately five minutes between layers. The gun's spray pattern must be well defined and properly directed to minimize overspray. Foam should be applied to cylindrical vessels with "passes" made along the vessel's axis with the gun directed normal to the surface. Spray coverage should be such that a convenient area is built up to the desired thickness before moving on to another area.

**CAUTION: Do not apply closed-cell foams in excess of the recommended pass thickness.** Open cell foams may be sprayed at greater thickness than closed cell foams without adversely affecting quality. Please check the individual Product Data Sheet for more detailed spray parameters.

The temperature of the Poly component must be above 80°F (26°C) when fed to the proportioning pump from drums. At lower temperatures, the Poly component is more viscous, and is very difficult to pump.

For closed-cell foams DO NOT exceed 85°F (29°C) as the blowing agent in the Component B boils at higher temperatures. During hot months, take care that the Poly component held on the jobsite is kept from overheating. Store or hold drums in the shade, out of the direct sun, and use supplemental cooling under extreme temperature conditions.

## 10. COMPATIBILITY WITH OTHER BUILDING PRODUCTS

There have been several studies investigating the compatibility of Spray Polyurethane Foam (SPF) and CPVC and PVC pipe. Most notably was the study that was conducted jointly by Lubrizol and the Spray Polyethylene Foam Alliance (SPFA) which found no chemical interaction between SPF and CPVC.

<http://www.sprayfoam.org/uploads/pages/4526/Industry%20Study%20of%20Compatibility%20of%20Spray%20Polyurethane%20Foam%20with%20CPVC-Part%20I%20v%202%20%20%207-21-09B.pdf>

Gaco Western supports the findings of this and other studies with our field experience that has shown no chemical compatibility problems with our SPF products. This includes fully covering the material and incidental contact from overspray when installed in accordance with Gaco Western's installation instructions and spray guides.

Additionally, our SPF products, when installed in accordance with installation instructions and spray guides, have demonstrated compatibility with other piping systems (ABS, PEX, etc.) as well as electrical and communication cables, metal fasteners and connectors.

When applying closed-cell products, plastic pipe and fittings should be encapsulated in 2 passes. The first pass should cover about ½ the pipe and allowed to cool. The second pass would then cover the pipe and fittings. If the water supply pipes are active the water supply should be turned off during foam application. Faucets and valves should be opened to relieve any pressure that may be generated as the pipe and fluids expand as they warm.

Pipes can be wrapped with polyethylene foam or similar product to protect pipes during exotherm reaction of foam and minimize noises from pipe movement caused by thermal expansion.

## 11. UV PROTECTION

Unprotected polyurethane foam insulation can be degraded by sunlight. Gaco Western closed-cell foams are approved for exposure to the sun and elements for up to six months. Foam discoloration and friable surface should be expected. If the foam may be left exposed more than 6 months, it should be coated with an exterior paint within 24 hours of application. Gaco Western open cell foams must be protected from sunlight and weather.

## 11. INTUMESCENT COATING

Most building codes require spray-applied polyurethane foam insulation be separated from the interior living space by a ½ inch gypsum or other approved 15-minute thermal barrier. Gaco Western products are also tested with numerous intumescent coatings to meet ignition barrier and thermal barrier requirements. Check with the individual product's PDS and code compliance evaluation reports for approved alternative methods and approved assemblies.

**12. VAPOR RETARDERS**

For most building application closed cell foams meet the requirement of a Class II vapor retarder at most installed thickness.

Open cell foams installed in northern climates may require a Class II or III vapor retarder coating be applied to the foam or covering gypsum. This is usually accomplished with a coating such as Sherman Williams Moisture Vapor Barrier B72W00001 or equivalent.

Class I vapor Retarders, such as GacoProFilm, are not recommended in cooling dominated climate zones.

**13. EQUIPMENT**

Spray foam equipment must be properly maintained and operated. READ AND FOLLOW THE EQUIPMENT MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

The spray equipment must be capable of metering each component within +/- 2% of the specified ratio of 1:1 by volume. A 2 to 1 transfer pump for both components is required, to adequately supply the metering pump (please consult the machine manufacturer). To produce acceptable foam, the spray gun must provide intensive and thorough mixing of the components at the operating throughput. Generally, higher mixing (impingement) pressures improve the foam yield, physical properties, cell structure, and insulation characteristics. The optimum temperatures of the components may vary with the type of equipment and the particular application. Ensure that the Iso component comes in contact only with isocyanate vessels and pumps; and the Poly component in contact only with resin vessels and pumps. Dry nitrogen, or dry air dew point -40°F (-40°C), should be used to blanket both components as moisture will adversely affect both components. The equipment manufacturer's recommendations on maximum hose lengths and the possible need for a supplemental hose heat booster must be strictly followed. Increasing the hose length and/or raising the gun high above the proportioning pump, i.e., spraying on a high elevation with the proportioning unit at ground level, will reduce the operating pressure at the gun.

NOTE: Functioning pressure gauges and thermometers will occasionally give incorrect readings. Therefore, if you note what appears to be inaccurate or unreasonable pressure and/or temperature readings, change the questionable pressure gauge or thermometer and check the reading of the new unit.

**13.1 EQUIPMENT RECOMMENDATIONS**

The following is the recommended Graco equipment and guns to dispense Gaco Foam:

	<b>Model</b>	<b>Maximum Rated Pressure</b>	<b>Heat Rating</b>	<b>Maximum Hose Length</b>	<b>LB # PM</b>
Reactor	E 20	2000	6,000 watts	210	18
Reactor	E 30	2000	10,200 watts	310	34
Reactor	H 25	2000	8,000 watts or 15,300 watts	310	22
Reactor	H 40	2000	8,000 watts or 15,300 watts	310	40
Reactor	H 50	2000	15,300 watts	310	50

**HYBRID AND CUSTOM EQUIPMENT**

Proportioners, spray guns and outputs other than the above have not been evaluated by Gaco Western. The above processing guidelines can be used as a starting point for properly processing Gaco Foam in other equipment. The manufacturer/user is responsible for determining the suitability and/or the proper operating conditions for such equipment.

The Product Data Sheet as well as the equipment manufacturer's Operation Manual, should be utilized for general troubleshooting. DO NOT CONTINUE APPLYING FOAM IF A PROBLEM EXISTS. Troubleshoot and remedy the problem before proceeding.

The aforementioned information on this product is to be used as a guide and is subject to change without notice. These suggestions and data are based on information we believe to be reliable. They are offered in good faith, but without guarantee, as conditions and methods of use of our products are beyond our control. Any obligation of the seller or manufacturer shall have no force or effect unless it is in writing and signed by officers of the manufacturer.

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