

# GacoProFill®

## Installation Behind Roughed-In Drywall

### EQUIPMENT AND ACCESSORIES

#### Required Equipment and Accessories

**Same Proportioner, Hoses and Gun** as used for Gaco's Open Cell and Closed Cell Foam.

**Pour Nozzle/Air-Cap Kit Assembly for Gun** – recommended models include the following:

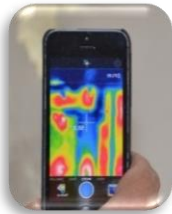
**Graco Fusion Air-Purge (AP) Pour Adapter Kit, Part # 248528.** This kit includes an Air Cap, 2 Teflon Rings (1 for flat mixing chamber and 1 for round mixing chamber), and 2 feet of hose.

Pour kits are also available for the P2, Probler and PMC guns.

Tips and Kits are available from your regular parts supplier.

**Plastic Tubing** – recommended size: 1/4" interior diameter & 3/8" exterior diameter; recommended length is 4" to 6" but can be adjusted longer or shorter depending on the wall thickness, wall depth and type of application. The shorter the tube the better the process performs. Tubing is available at your local hardware store.

**Drill and Bits** – recommended hole size is 3/4" to 1" in diameter (or larger).



#### **InfraRed Thermal Imaging Camera, i.e. FLIR**

A thermal imaging camera is required to check the reliability and consistency of installation and to provide traceability and documented proof of the installation.

GacoProFill can reach temperatures up to 180°F (82°C) in a wall cavity during the installation and curing process.

#### **Proper PPE**

Ensure all workers involved in the installation of GacoProFill Open Cell Foam are assigned the appropriate PPE and have it available when arriving on jobsite. Applicators and Assistants should wear:



- A NIOSH-approved full face or hood-type supplied air respirator (SAR)
- MDI-resistant chemical gloves (e.g., nitrile), or fabric gloves coated in nitrile, neoprene, butyl, or PVC
- Chemically resistant long-sleeve coveralls or chemically resistant full body suit with hood
- MDI-resistant fitted boots/booties

Please visit [www.spraypolyurethane.org](http://www.spraypolyurethane.org) for additional information.

## GENERAL PROCEDURES

### Installation of Drywall – Coordination with Drywall Contractor

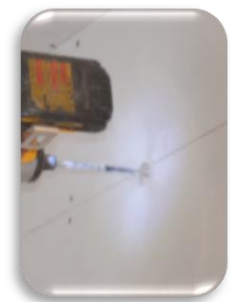
The spray foam applicator and drywall contractor should both fully understand they are working together to accomplish a quality installation of both the drywall and the insulation. **Scheduling is of prime importance.** Close attention should be paid to the amount of time required to get a full cure on the drywall adhesive if one is used.

- Before hanging drywall that is going to be insulated with GacoProFill, a visual inspection should be made noting the location of any fire-blocking, electrical, plumbing or other obstructions in the wall. Mistakes can be avoided by locating these areas before the wall is injected. Location of fill holes may need to be adjusted to properly fill the wall cavity. This can be documented using a camera to define these locations.
- Any gaps, holes or openings in any part of the wall cavities that may allow foam to enter should be taped, caulked or sealed before any drywall is installed. GacoProFill foam will follow the path of least resistance and go through any opening.
- Drywall should be installed using recommended installation procedures that a drywall contractor typically uses for a reliable installation. Using the appropriate screws and fasteners with the correct spacing is vitally important. Drywall installations should always be screwed and never nailed when using GacoProFill foam. Glues and adhesives should be applied appropriately for a strong installation. Cutting corners and trying to use GacoProFill when the drywall installation is substandard can be costly.

### Drilling Fill Holes

Locating and drilling holes is required before the foam can be injected into the wall cavities. The amount of fill holes and their location should be as consistent as possible so the applicator can get into a fill rhythm, timing his fill sequences and determining what amount of foam is required for filling each wall cavity.

Fill hole location should be on drywall seams whenever possible as these are easy to tape over and repair. Some prefer locating the fill hole in the center of a cavity and others prefer working the foam from an edge or corner hole.



On an 8-foot wall, we recommend placing one hole at 4-foot high level on drywall seam and one hole near top section of drywall near double upper plate.

Holes should be  $\frac{3}{4}$ " to 1" in diameter (or larger) to allow free movement of the gun and fill tubing as well as to allow space for foam pressure release in case of overfilling. More holes can be added as necessary.

NOTE: More fill holes may be required if obstructions present themselves in the wall. Keeping the number of fill holes to a minimum typically makes for fewer repairs, however not enough fill holes may increase the amount of repairs if fill hole placement is not considered when working around obstacles like firestops and fire blocking in the wall cavity.

### **Installation of GacoProFill Polyurethane Foam**

Trial and error fills will help the applicator get a feel for wall thickness, substrate temperature and ambient temperature to help develop a timing sequence that fills the wall quickly and efficiently without applying too much pressure to the drywall.

It is important to know your equipment, nozzle sizes, temperatures and pressure settings and from there, getting to know the fill rates and just having a general feel for processing the chemical and performing the application will improve over time with experience.

**Before filling any wall cavities**, the foam should be sprayed out into a trash bag to check the *cream time* of the product. Cream time is the time it takes before the product actually begins to rise and expand to its final thickness.

- Spray 30 to 60 seconds' worth of foam into a trash bag to ensure that you are getting warm material to the gun before testing for cream time.
- Then, spray a 3 second blast of foam into the trash bag – the foam should start reacting and expanding just after you stop spraying.
- If the foam reacts prior to the end of the 3 second spray, it is reacting too fast and the temperatures should be reduced.
- If the foam is taking more than a second to react after the 3 second spray, then the temperature must be increased due to cold foam or cold substrate.
- Proper set up of GacoProFill cream time is required to obtain the best yields. A starting point for GacoProFill would be 105°F in summer cavities and 130°F in winter cavities. Checking the cream time will help you make these adjustments to the machine's A, B and hose heat settings.



### **Installation of GacoProFill Polyurethane Foam (cont.)**

**Now, you are ready to begin installing the foam.**



When spraying 2x4 wall cavities, you should be injecting using an AR4242 (01) Mixing Chamber and pressures between 1,000 and 1,200 psi to obtain a good mix at the bottom of the wall cavity. Make sure that the length of your tubing (4" to 6") allows you to be able to direct the injected foam towards the bottom of the stud cavity.

When spraying 2x6 wall cavities, you should be injecting using an AR5252 (02) Mixing Chamber and pressures between 1,100 and 1,400 psi to obtain a good mix at the bottom of the wall cavity. Make sure that the length of your tubing allows you to be able to direct the injected foam towards the bottom of the cavity.

- The rate of rise in these cavities is usually 1 foot of rise for every second of trigger pull in a 16" stud cavity.
- The object is to start applying the foam in 3 to 4 second trigger time cycles starting at the bottom of the cavity.
- It is wise to skip a cavity after injecting a cavity. This allows for a minimum amount of stress to be placed on the stud cavity adjacent to the one being injected.
- After the initial fill inside of the stud cavity, all subsequent fills will be on top of each preceding fill.
- It should take 2-3 trigger cycles to bring the foam up to the first fill hole. Repeat the process until all cavities are filled to the first fill hole level.

The fill process now moves up to the second hole that is located near the top of the double upper plate. Follow the same fill sequence as the lower 4 feet of wall, skipping a cavity in the fill process until all cavities are completely filled.

Extreme care must be taken when finishing the last fill shot in each cavity so as not to overfill. It is best to use short 1 to 2 second bursts to minimize cavity overfill.

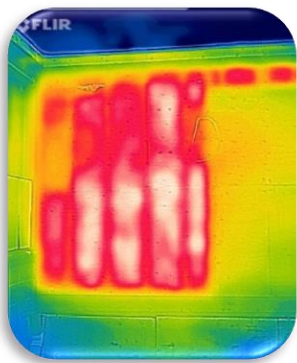
NOTE: The applicator should make sure that the fill holes are clean enough for repair by the drywall contractor. Again, checking with the drywall contractor on this will save additional time and labor later.

## **Thermal Imaging**

Thermal imaging cameras are required as part of this application:

- They help the spray foam contractor ensure that the entire cavity is being filled.
- They provide a photographic record of the job proving that every cavity is filled.

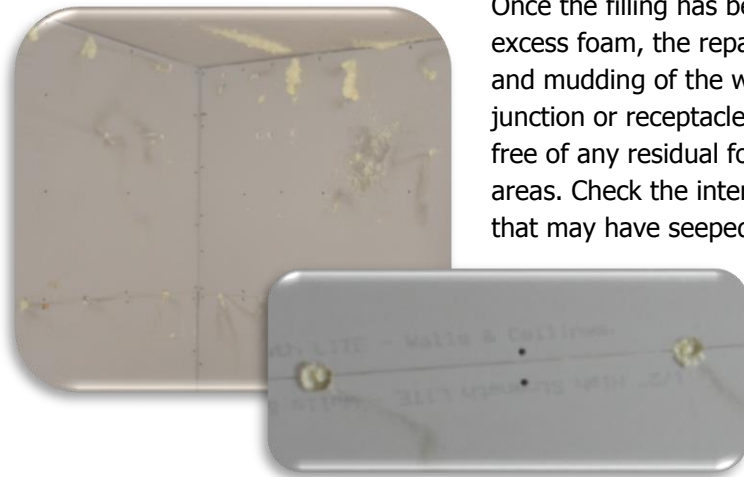
*This will be a requirement for Building Code Officials since there will be no insulation inspection. This is currently going through the approval process with code officials in all code jurisdictions but should not be difficult to get approved once the process is accepted by architects and building designers.*



A documented folder of the thermal imaging of all walls, floors and ceilings should be completed when using GacoProFill behind drywall as it provides a permanent record for each project.

Thermal imaging should be done immediately after the completion of each wall as the foam exotherms heat showing the contrast that can be documented. Polyurethane foam is a warm-applied product allowing you to use thermal imaging as an inspection tool. Cold-applied aminoplast foams cannot be checked immediately as they are cold-applied products and can only be inspected using thermal imaging when there is a temperature differential of 20 degrees or more from ambient temperature.

## **Finishing the Wall and Completing the Job**



Once the filling has been completed and the fill holes are cleaned of any excess foam, the repairs can be made on the fill holes and the taping and mudding of the wall can now be completed. Any electrical switch, junction or receptacle boxes should be checked to make sure they are free of any residual foam that may have made their way into these areas. Check the interior and exterior of the structure for any GacoProFill that may have seeped out of any holes or gaps in the wall system.

## APPLICATION PROCEDURES

### **Drum Storage**

**Store GacoProFill Poly drums at 50°F to 100°F (10°C to 38°C)** when not in use.

### **Drum Prep**

**Prep GacoProFill Poly drums to 60°F to 80°F (16°C to 27°C).** In order for the drum to be ready to use, it must be in a temperature range where the proportioner can take it the rest of the way to spray temperature.

*Example: If your drum temperature is 80°F and you have an E-20 with a delta T of 50°F, your maximum spray temperature can only be 130°F. With this information it is important to know the delta T of your proportioner and drum temperature to achieve the proper spray temperature. For those of you with Recirc capabilities, you can recirculate GacoProFill Poly to raise the drum temperature, but do not recirculate the product over 100°F.*

### **Mixing**

**GacoProFill Poly must be mixed** on high speed to achieve a milky solution prior to application or recirculation. It must be continuously mixed during application. If GacoProFill Poly is in the line from the previous spray day, it must be recirculated into the drum and mixed before spraying can take place.

### **Flushing**

**When changing from a closed cell product to GacoProFill, pre-mix the GacoProFill Poly drum prior to flushing.** Purge the Poly side of the system with water to get the closed cell product out of the system, then come in behind with pre-mixed GacoProFill Poly to flush out the water. Remember to flush the entire Poly system including recirc lines, proportioner and spray hose. Use water again to flush the GacoProFill Poly out of the system before you go back to the closed cell product. Follow steps 1-5 on Tech Tip 028, *Eliminate Cross Contamination by Flushing with Water*. For a more detailed step by step flushing procedure refer to Tech Tip 045, *12 Proper Flushing Techniques*. Tech Tips can be found on **gaco.com**.

### **Substrate Limitations**

**Substrates should be clean, dry and warm.** While clean and dry offers the best success for adhesion, warmer substrates provide better yields. The colder the substrate the lower the yields we can expect. Do not spray if surface temperatures are within 5 degrees of the dew point. Substrate moisture levels should be below 18%. Use Psychrometer for exact measurement of temperature, humidity and dew point.

### **Spray Pressures**

**1,000 to 1,400 psi for optimal performance.**

**At 70°F (21°C) ambient temperature:**

- **Recommended starting pressure setting is 1,000 psi using an AR-4242 (01) mixing chamber.**
- **Recommended starting pressure setting is 1,100 psi using an AR-5252 (02) mixing chamber**

### **Spray Temperatures**

**105°F to 135°F (41°C to 57°C).** The lower temperature spectrums are used in warmer climates/seasons and the higher temperature spectrums are used in colder climates/seasons. If the foam is reacting too fast, then it is too warm and temperatures need to be dialed down and possibly the pressure reduced if needed. If the foam is reacting too slowly, then you need to increase temperatures and possibly pressures.

**At 70°F (21°C) ambient temperature:**

- **Recommended starting temperature setting for A, B & Hose Heat is 120°F (48°C).**

<b><u>Equipment Settings</u></b>		<b><u>Reactivity Time</u></b>	
Pre-Heaters - Iso (A):	105°F to 135°F (41°C - 57°C)	Cream Time:	3 seconds
Pre-Heaters - Poly (B):	105°F to 135°F (41°C - 57°C)	Tack Free Time:	6 - 10 seconds
Hose Heat:	105°F to 135°F (41°C - 57°C)	Cure Time:	4 hours
Recommended Spray Pressure:	1,000 to 1,400 psi (dynamic)		