

# Foamfrax® RG Insulation Machine Operation Guide



## Foamfrax® RG Insulation Machine Operation

### I. Before operating the Foamfrax RG Insulation machine/equipment, the following precautions and/or training must occur:

- A. The machine operator must fully review and understand the Owner's Manual for the Insul 8-2000 provided by Ark Seal Inc.
- B. The MSDS's for Foamfrax RG Insulation and Binders must be read and understood.
- C. Sections I-XII of this document must be fully read and understood for safe operation of the Foamfrax RG Insulation equipment and a successful installation.

Note that Foamfrax RG Insulation should be installed by fully trained operators. Operator training has two components: instruction in the proper operation of the Insul 8-2000 machine and training in Foamfrax RG Installation procedures.

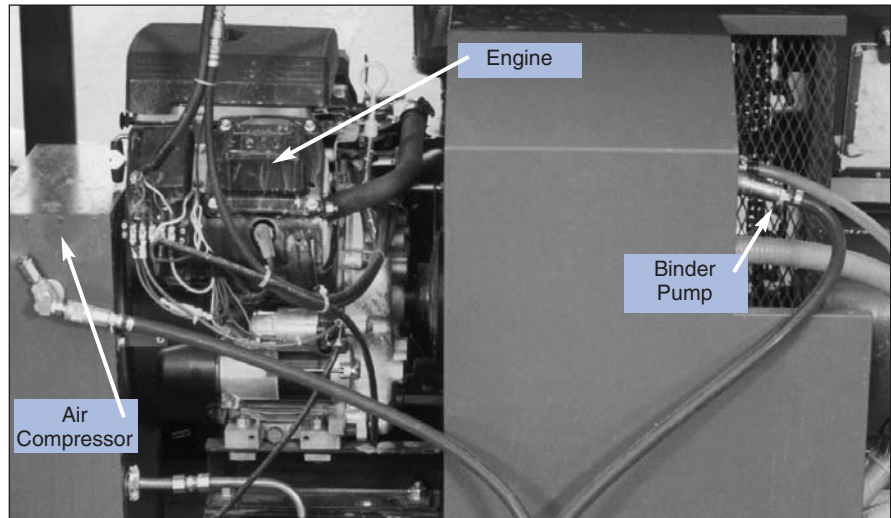
This guide is a technical reference which does not take the place of the Foamfrax RG operator training program.

The pictures on the right represent the front and back of the Foamfrax RG Insulation machine. The respective parts of the machine are identified and their part in the Foamfrax RG Insulation process are further detailed in this document.

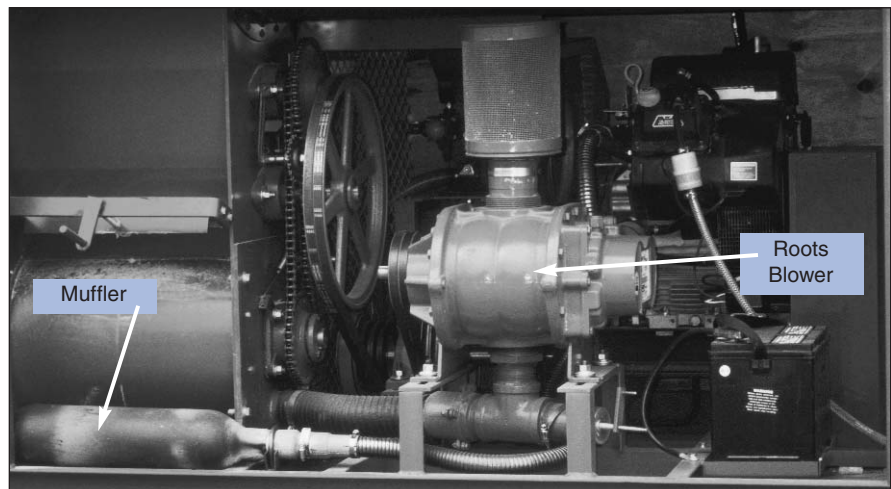
### II. Machine Precheck List

This document pertains to gasoline powered machines. Refer to the Ark Seal Inc. Owner's Manual for either diesel or electrically powered units.

1. Hoppers and drive components are free of foreign objects.
2. Belts are aligned and tight ( $\frac{1}{2}$ " deflection).



Foamfrax Machine Front View



Foamfrax Machine Back View

3. Chains are snug and sprockets are aligned.
4. All guards are in place.
5. Blower and compressor filters are clean.
6. Check all oil levels.
7. Ensure all Foamfrax RG Fiber, Cements, and Binders are on site.
8. Ensure you have adequate fuel.
9. Ensure you have access to 110V electrical power.

### III. Basic Guidelines For Trouble-Free Operation

Do not permit foreign particles to enter the hoppers.

Do not use jump leads to start the engine if the battery is dead. Instead, replace the battery with a fully charged unit.

Do not run the engine with the battery disconnected.

Do not attempt to start the engine with the clutch engaged.

Do not feed any wet materials into the hoppers.

Do not run the engine with the air cleaner removed.

Do not let binder freeze.

Flush lines, fittings, and nozzles before getting started.

Clean inside of Foamfrax RG Insulation mixing chamber with water.

Keep binder barrel covered.

Keep blowing hose as straight as possible, no loops.

Make sure to use Foamfrax RG Insulation stand with mixing chamber.

## IV. Recommended Maintenance Schedule

### DAILY

Check all oil levels, (engine, blower, compressor, pump).

Check pulley and sprocket alignment.

Check blower and compressor filters.

### EVERY 25 HOURS

- Service the air filter.

### EVERY 50 HOURS

- Check hoses on machine.
- Check torque on clutch retaining bolt.
- Check belt and chain tension.
- Clean cooling fins on engine and compressor.
- Change engine oil.

### EVERY 100 HOURS

- Clean or replace spark plugs in engine.
- Check torque on engine head bolts (18-20 ft lbs.).
- Check compressor oil.
- Change engine filter.

### EVERY 200 HOURS

- Check paddle wheel seals.
- Change pump oil.
- Change engine filter.
- Change engine points and condenser.

### EVERY 1000 HOURS

- Change blower oil.
- Lightly grease all bearings.

## V. Safety Guidelines

- Do not put your hands inside the hoppers before disconnecting the on/off control lead and switching off the engine.

- Do not operate the machine unless all the guards are securely fixed in their correct positions.
- Do not smoke or use naked lights in the vicinity of the fuel tank.
- Do not install fibrous cement materials without wearing suitable respiratory protection.
- Do not put your hand through the inspection window without first switching off the engine.
- Do not leave the battery on the machine when carrying out repairs with electric arc welding equipment.
- Do not fill the fuel tank when the engine is running. Petrol fumes can ignite causing fire and explosion.
- Leave space in the fuel tank for expansion.

## VI. Periodic Maintenance Procedures

### Never Work On Machine Unless Spark Plug Cable Has Been Disconnected.

1. Check oil level regularly.
2. Change oil after first 5 hours of operation, then after every 50 hours of operation.
3. Clean and re-oil foam element in air cleaner after every 25 hours of operation. Remove foam element. Wash in liquid detergent and water. Squeeze dry. Soak in engine oil and squeeze to remove excess. Reassemble air cleaner.
4. Replace or clean paper cartridge in air cleaner after every 100 hours of operation.
5. Clean and check spark plug gap after every 100 hours of operation.
6. Clean exterior and all accessible areas of machine thoroughly using HEPA vacuum, brush or rag.

## VII. Troubleshooting

### ENGINE

Refer to the engine manual. Remember, for service under warranty the unit must be taken to an authorized service dealer.

### BLOWER

Blowers are known for giving excellent service for many years. They are guaranteed by the manufacturer. Should your blower unit become

unusually noisy or show other indication of being defective within a short period of time, we suggest you contact us. **DO NOT ATTEMPT ANY REPAIRS YOURSELF.** Special training and special tools are required to repair these units.

### ELECTRIC CLUTCH

Should you encounter slippage or observe the clutch running hot, check for:

1. Low battery.
2. Short or break in wiring.
3. Charging system not functioning.

Should you encounter failure to engage, check for:

1. Faulty wiring or connections.
2. Short or break in remote control cord.
3. Dead battery.
4. Broken switch or receptacle.

### EXCESS AIR

Should you encounter too much air pressure, check for:

1. Plugged air by-pass valve.
2. Engine running too fast.

### PUMP

Check operation manual for diaphragm pump. See the specific section in the pump manual for troubleshooting giving probable causes and corrective action.

### GENERAL

Should you encounter sudden reduction or loss of air, check for:

1. A broken butterfly plate inside the air line check valve.
2. A loose hose connection.
3. Plugged hose.
4. Broken engine or blower belts.
5. Open bypass valve.
6. Inoperative clutch.
7. Slow engine rpm.

Should you encounter sudden stoppage of the material flow, check for:

1. Slow engine rpm.
2. Correct opening of the material control slide (open too far).
3. Slippage of the belt.
4. Worn feeder seals.
5. Worn or leaking hose.
6. Overcompression of the Fiber in the feed hopper by the material loader.
7. Improperly opened air bypass.

## VIII. Machine Set-Up

### Tools Required

- Flat Head Screwdriver
- Lid off for opening pails
- Sharp Knife
- Flat trowel (optional)

### Job Site Requirements

- Water source and hose
- Personal protective equipment
- 110V electrical power
- Proper ventilation for engine exhaust

### A. FIBER HOSES

1

Connect the 3" (76mm) diameter hose to the machine outlet. All hoses that will carry dry fiber must be double clamped and the fasteners checked for tightness.



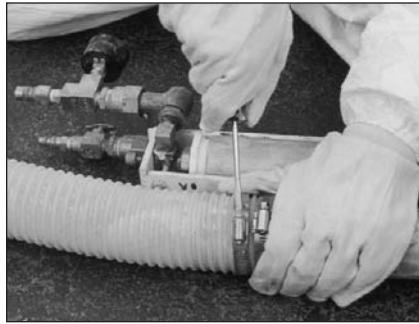
2

Connect the 2½" (64mm) diameter hose to 3" (76mm) diameter hose using the reducer provided. Ensure that both connections are double clamped and fasteners checked for tightness. For complete conditioning of the fiber, at least 25' (7.6m) of each hose size should be used.



3

Connect the 2½" (64mm) diameter hose to the mixing chamber fiber inlet. Note that this connection must be double clamped as well.



4

Connect the mixing chamber to the mixing chamber stand. It is imperative that the mixing chamber remains on a downward slant, with the shooting hose side at the lowest elevation.



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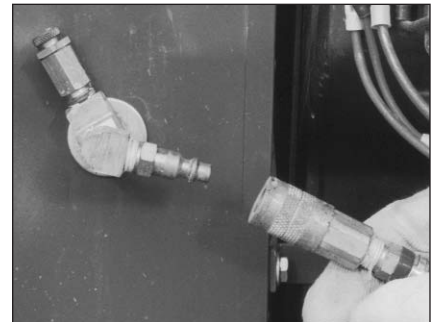
Connect the 2" (51mm) diameter working hose to the outlet of the mixing chamber. This hose will be used to gun the Foamfrax RG material and must be fitted with an approximate 2' (610mm) length of PVC pipe on the terminal end for use as a nozzle.



### B. BINDER AND AIR HOSES

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Connect the red binder/air hose to the machine. Note that each hose has a different size fitting, so the hose can only fit the binder and air connections in one way.



7

Connect the red binder/air hose to the mixing chamber. Note that the use of two different fittings prevents crossing the air and binder lines.



### C. OTHER CONNECTIONS

8

Connect the fuel container. Note that for proper fuel delivery, the container vent must be opened. This vent must be closed at the completion of each day.



**9**  
Connect the on/off switch (black cord) into the lower plug on the front of the machine. **Note that pulling this plug at any time will immediately stop the equipment.**



**10**  
Connect the vacuum system to the machine hood. Note that the vacuum must be run at all times while fiber is being loaded and when the fiber feed mechanism is engaged.



#### D. MIXING CHAMBER SETTINGS

**11**  
Completely close the air pressure valve, then open it  $\frac{1}{16}$  of a turn.



**12**  
Completely close the binder flow needle valve, then open 3 turns. This valve is either opened or closed to adjust the Foamfrax RG Insulation consistency. **The binder flow is the only variable to be adjusted to change the Foamfrax RG Insulation consistency.**



**13**  
The pressure gauge is used to confirm binder pressure at the mixing chamber. When the motor/engine is running, binder pressure should be greater than 150 psi.



#### E. MACHINE SETTINGS

**14**  
The front gate which controls fiber flow is completely closed. For proper material flow rates, open this gate 13 full turns to allow fiber to exit the machine.



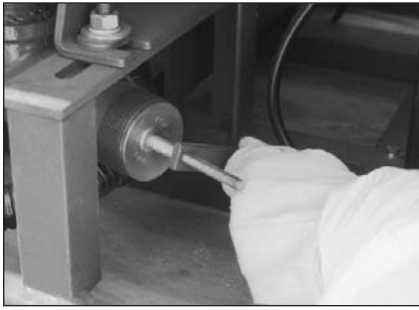
**15**  
The back gate for fiber flow is completely closed. For proper material flow rates, open this gate 17 full turns to allow fiber to exit the machine.



**16**  
Rods are supplied in the fiber conditioning chamber to control the fiber dwell time (the time the fiber is conditioned within the machine). With the Foamfrax RG Insulation process, 5 rods are used. Starting at the end, put one rod in every other opening.



**17**  
The Roots blower that moves the fiber can be adjusted to control air volume. With the Foamfrax RG Insulation process, this valve must be completely closed for maximum pressure.



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Check the air compressor oil. The compressor uses 10W-30 **non-detergent oil**.



## F. CEMENT HOPPER SETTINGS

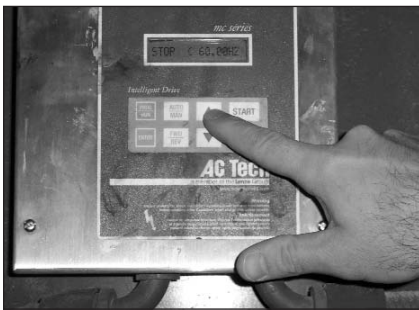
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Plug the cement hopper control box into 110V power supply and turn switch from off to on.



19

Using the up or down arrows, set the cement hopper control box to 60Hz.



## G. MISCELLANEOUS

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Check the engine oil. The gasoline engine uses 10W-30 oil and should be checked at the start of each job and once more throughout the day.



## IX. Binder Preparation

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The binder for Foamfrax RG Insulation is field mixed and consists of water, Foamfrax "RG" Binder, and Foamfrax "B" Binder. The mix ratio is:

3.5 gallons water (13.2L)  
1 pint (1/8 gallon) "B" Binder (.47L)  
.83 gallon "RG" Binder (3.2L)

To utilize a full 55-gallon (208L) binder container, this ratio is multiplied by 12. Therefore, it requires 42.5 gallons (161L) of water, 1.5 gallons (5.7L) of "B" Binder, and 10 gallons (37.9L) of "RG" Binder.

Hot water, if available, works best to make binder. In all cases, it is recommended that the binder temperature be above 50°F. The mix sequence is to fill the tank with water, add the "B" Binder and stir, then add the "RG" Binder and stir. The binder tank should be covered to keep out any particulate.



23

After the binder mix is complete, the binder intake hose may be submerged into the tank. The binder hose will be supplied weighted; however, some additional weight may be required at the end of the intake hose to keep it at the bottom of the binder tank. The screened intake of the binder hose must remain free and clear of all particulate to maintain the optimal binder flow.



## X. Machine Start Up

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Once steps 1-23 have been completed, the machine can be started. Using the ignition switch and choke, start the engine. The engine should be adjusted so it operates at an idle RPM of 2800.



25

Once the machine is running and the choke is disengaged, binder pressure will build. Check the binder pump pressure gauge and adjust to 150 psi or 11 – 12 bar. If there is no pressure, flip the re-circulate switch at the pump to gain prime, then toggle the recirculate switch back to pressurize the binder hose.



## XI. Fiber Loading

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The Foamfrax RG Insulation machine has been modified to minimize potential airborne fiber exposure while loading the bulk fiber. These modifications include the hood enclosure and vacuum exhaust system. **While the Foamfrax RG Insulation machinery is in operation, the vacuum exhaust system must be on.**



27

The proper way to load the bulk fiber in order to minimize airborne fiber potential is to use a sharp knife and cut 3 sides at one end of the bag. When properly cut, the end of the fiber bag will hinge up as illustrated in the photograph.



28

Next, the bag is rested onto the edge of the machine hood and a diagonal cut is made across the bag face.



29

The fiber is then pushed into the machine hopper and the hood enclosure door is closed. **When not loading fiber into the machine, this door must remain closed.**



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If the upper hopper chamber is attached, remove and set aside. Once the hopper is removed, add cement to the lower cement chamber. Plug the powder injector drive controller into 110V power and set at 60HZ.

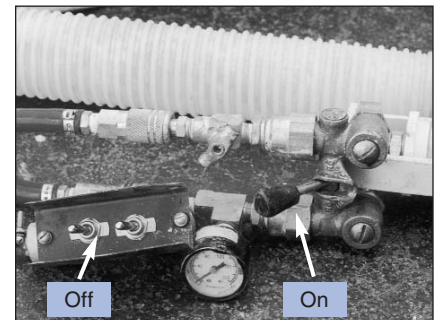


## XII. Machine Operation

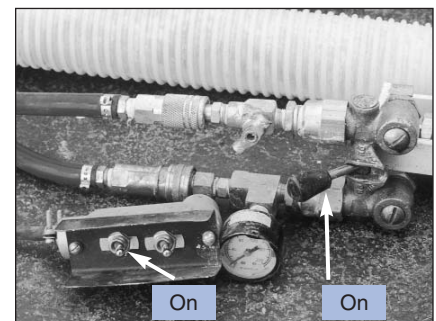
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The sequence for gunning Foamfrax RG Insulation is to first turn on the binder at the mixing chamber (32). Next, energize the blower clutch to deliver the fiber to the mixing chamber (33). The control for the machinery has two on/off switches; one controls the blower clutch only, the other controls the moving components to deliver fiber. Press the start button on the cement hopper control panel once material begins to flow through the shooting hose to engage cement feed (34). To stop the Foamfrax RG Insulation gunning process, press the stop button on the cement hopper control panel to disengage the cement feed (35). Turn off the blower clutch (36), then turn off the binder at the mixing chamber (37). Note that a special air piston has been wired/plumbed into the equipment, which only allows the delivery of fiber if the liquid binder is flowing into the mixing chamber. The blower motor will not turn on to deliver dry fiber only.

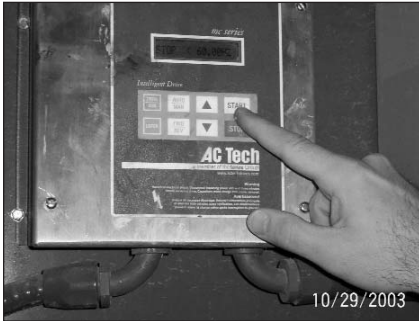
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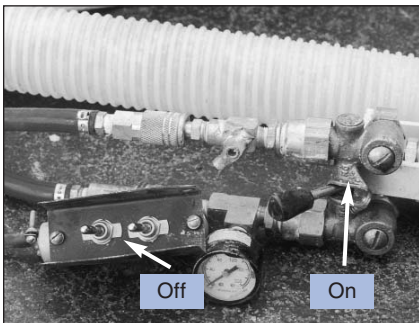
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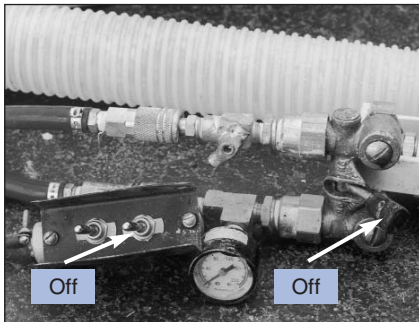
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In order to adjust the Foamfrax RG Insulation consistency, material should be gunned into an empty pail or garbage can to establish a consistent flow. The amount of binder introduced into the system should be adjusted to yield a product which is homogeneous and neither too foamy nor too dry.

With experience, a feel for the proper Foamfrax RG Insulation consistency is established by the operator.



39

Once material is flowing consistently, a density check is required. Also, a check to ensure the fiber/cement/binder ratio is correct is required. Weigh an empty 5 gallon pail. Note that an empty "RG" Binder pail must be used for this density check. A bathroom-type scale works well for this.



40

Fill lower cement hopper full and trowel smooth.



41

Pour some of the binder solution into a Foamfrax RG Binder pail, filling it 3/4 full. Mark the starting level of the binder.



42

Keeping the nozzle end 3 feet from the impact surface, begin gunning Foamfrax RG Insulation into the pail and completely fill it. Time how long it takes to fill the bucket. The bucket should take 100 seconds  $\pm$  15 seconds to fill.



43

Use a trowel or straightedge to scrape off any excess material.



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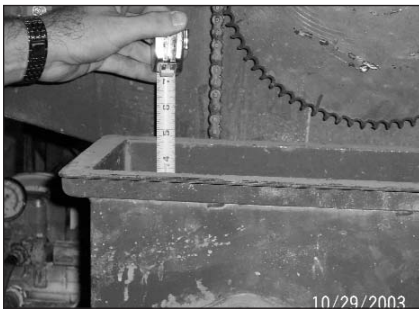
Re-weigh the pail with the Foamfrax RG Insulation in it, and subtract the weight of the empty pail. The target weight of this material is 30 lbs (480 kg) nominal,  $\pm$  3 lbs (48 kg). If the weight does not fall in this range, adjust the binder amount (more binder = lower density, less binder = higher density) and retest until the target weight is achieved.

Note that the Foamfrax RG Insulation System has been developed for optimal performance at a specified

dry density of 22-28 lbs/ft<sup>3</sup> (352-448 kg/m<sup>3</sup>). Installation of Foamfrax RG Insulation at densities above or below this specification range will effect the thermal and mechanical performance of the product, and may increase airborne fiber levels on the jobsite.



45 46



Once the density check is complete, measure the drops in the cement hopper (45) and binder pail (46). The cement drop should be 1 1/16" (40mm) ± 5/32" (14mm). The binder drop should be 4 1/8" (105mm) ± 3/8" (10mm). These are the amounts for filling one 5-gallon RG Binder pail with finished product.

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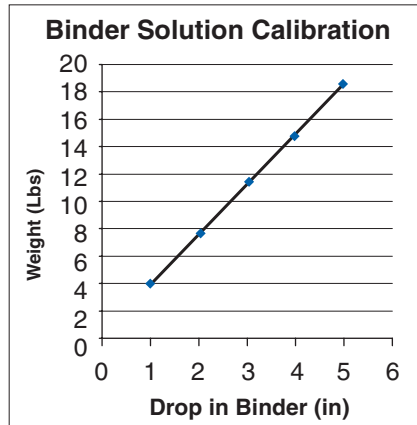


The correct dry ratio for fiber:binder is 2:1 by weight. To determine the amount of fiber, use the following formula:

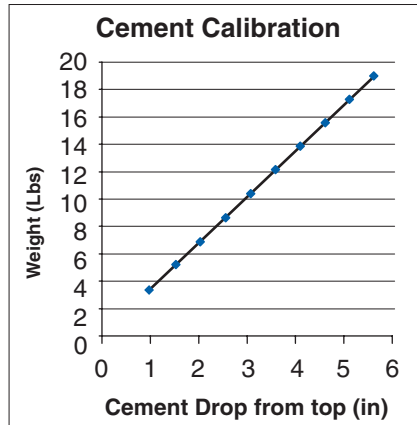
$$\text{Fiber (lbs)} = \text{Finished RG Product } 44 \text{ (lbs)} - \text{Binder Solution } 47 \text{ (lbs)} - \text{Cement } 48 \text{ (lbs)}$$

The calculated amount of Fiber to Cement should be 2:1 ± 10%.

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48



Once steps 1-48 have been completed, the Foamfrax RG Insulation is ready for installation. Please refer to the Foamfrax Insulation Installation Guidelines Document for specific installation techniques.

49 50

Reattach upper cement hopper and refill with cement. Note that Foamfrax RG Cement is supplied in 94 lb bags. A scoop or some other means must be used to load the Foamfrax RG Cement so that the load weight remains within OSHA guidelines.



To answer additional questions about Foamfrax RG Insulation machine operations, material handling procedures, or Foamfrax RG Insulation lining design, please contact the Unifrax Corporation Application Engineering Department at 716-278-3888. For specific machine repair issues, replacement parts, etc., please contact Ark Seal LLC at 1-800-525-8992.

