



## Phoscrete SG Installation Guidelines

*Proper preparation of crews, equipment, forms, and vessels is key to successful Phoscrete installations. Due to the relatively short working times of Phoscrete products, it is highly recommended that a complete review of the job setup and procedure is done before installing Phoscrete SG.*

### Material Composition

Phoscrete SG is a **MALP Concrete**. The dry mix in the Phoscrete bag is a magnesium and an aggregate blend containing FRP composite macrofibers. The Activator in the drum is Aluminum Phosphate liquid. Do not confuse MALP (Magnesium-Alumino Liquid Phosphate) with MAPC (Magnesium-Ammonia Phosphate Cement – mag-phos) materials. Phoscrete is a neat mix, do not extend, and do not add water to the mix.

### Pre-Installation Checklist

#### **Experience and Anticipated Support**

- Do installers have experience with a project like this?
- Do installers have experience using Phoscrete on a similar project?
- Will Phoscrete On-Site Installation Support be required?

#### **Material Handling & Mixing**

- Where will material be stored?
  - Risk of moisture contamination?
  - Temperature of material above 80°F or below 50°F?
- What mixing equipment is being used?
  - Is equipment suitable for type of mix? Clean & good condition?
  - Location of mixing equipment relative to where it is being applied?
  - What are expected ambient conditions – temperature & humidity?

#### **Dry Shotcrete/Gunite**

- Do installers have experience gunning Phoscrete SG?
  - Type and quality of gunite machine?
  - Bowl or barrel size, air pressures, material flow rates?
  - Good quality seals and pads? Spares?
- What size compressor will be available?
- Distance material will travel from gun to nozzle?
  - How high is the placement relative to the gun machine? Booster?
- Will a Phoscrete Pump & Nozzle Assembly be rented and used?



## Installation Equipment

Phoscrete SG is a dry shotcrete (gunitite) mix. The dry mix is pneumatically conveyed via a gunnite machine. All equipment must be free of contaminants prior to installing Phoscrete products.

### **Gunning Machine**

Install Phoscrete SG using a gunnite machine with a shallow bowl and minimum 1.25" hose. For best results we recommend the maximum output of the gunning machine be less than 2.7 cubic yards/hour (2 cubic meters/hour). Phoscrete has experience using a Blastcrete Model AA O20 "Genuine Piccola" rotary gunnite machine, and the Reed Lova Gunitite Machine. Please verify compatibility with Phoscrete installation support if you plan to use another brand or model.

### **Air Compressor**

Minimum 750cfm @ 100 psi air compressor is required. The compressor requires dedicated air to the gunning machine plus additional air ports for running the activator pump and auxiliary air to the nozzle. A fourth air hose is recommended for larger installations to pump activator from backup drum into the main drum.

### **Phoscrete Gunning Set**

Phoscrete both sells and rents a "Phoscrete Gunning Set" that includes a nozzle assembly with a specialized wetting ring, 2 activator pumps, and coupling for both the gunning and liquid line hoses. Liquid Activator is also conveyed pneumatically from the drum with a 1/2" hose. The nozzle connection diagram is included with the assembly.

## Health and Safety

Phoscrete Activator is an ortho-phosphoric-acid based solution. It is corrosive to pumps and metals. All assembly parts must be thoroughly cleaned and flushed with water after use to avoid damage to equipment.

The nozzleman must wear appropriate Personal Protective Equipment (PPE) including full face mask, breathing apparatus, chemical resistant gloves, and protective outerwear and shoes. Workers involved in finishing or in proximity to the rebound of the material must wear PPE including hard hat, goggles, mask, gloves and protective outerwear and shoes.

**Have plenty of water and an emergency eyewash station on-site.** In case of accidental contact with activator or mixture, flush eyes for 5 minutes and/or wash skin with water.

## Site Preparation

Successful installations require proper site preparation. Demolish down to clean, dry, sound concrete. Phoscrete will not bond to damp, oily, or contaminated concrete.

The substrate must be rough, CSP-7 per ICRI Guidelines. If it appears smooth, or "glassy," then scarify the surface prior to attempting to bond to it. If the surface is too smooth, the



strength of the chemical bond may be inhibited by a mechanical bond-plane or it may lack the necessary porosity for a good chemical bond, ultimately causing a delamination.

Sandblasting of corroded rebar is not required. Use a wire brush to remove loose rust and scale. Demolition under the rebar is necessary to fully encapsulate the rebar for maximum corrosion inhibition. For deep installations, install anchors and/or wire mesh to grab and hold the Phoscrete SG during build out.

Blow off any dust prior to installation of Phoscrete SG. If the surface is damp, use a propane torch and gently evaporate any surface moisture prior to installation.

Use polystyrene (foam) board or urethane-painted plywood as a bond-breaker prior to installation of forms, and to establish any control joints. Phoscrete sticks to concrete, metal and to itself (wet or cured). Phoscrete does not stick to petroleum-based products including plastic, urethane, oils and asphalt. When using oil-based release agents, be careful to avoid spraying on the concrete.

Phoscrete sets fast, achieving 4,000 psi (27 MPa) compressive strength in 30 minutes at 73°F, 23°C. Work fast to get a good finish. Install Phoscrete SG in lifts, especially on overhead surfaces. In colder temperatures (below 50°F, 10°C), use Phoscrete Fast-Set Admix in accordance with Phoscrete's Cold Temperature Guidelines to speed setting time. In hotter temperatures (above 85°F, 30°C) use refrigeration (or ice) to keep the dry mix and/or activator cool prior to installation in accordance with Phoscrete's Warm Temperature Guidelines. Do not leave materials in direct sun even in moderate temperatures. For best finish, allow time for the material to cool prior to gunning the final lift.

## Mixing and Placing Phoscrete SG

*The following instructions are important. Please review carefully, noting the order of each step.*

### **Communication**

Communication between the nozzleman and the crew loading and operating the gunning machine is very important. Proper communication will increase efficiency and quality significantly.

### **Equipment Startup and Testing**

- Confirm nozzle gate valve and air valve on the Liquid Activator pump are shut.
- Start air compressor and check if the air supply is a minimum 100psi.
- Place suction pipe/hose from the pump into the Phoscrete Liquid Activator drum.
- Turn on air control lever to provide pressure to the liquid pump. Check pump pressure on dial gauge and set to 85 psi. Adjust if necessary.
- Open air valve on pump to pressurize Activator feed line to nozzle.
- Open and set the additional air supply to approximately 100 psi to supply the gunning nozzle body. Keep this valve open throughout the gunning operation. This



air provides a better dispersion of the material and prevents the Liquid Activator from flowing back into the dry material hose.

- When the nozzleman is in position with the nozzle assembly in his control, the gunite machine operator opens the main air valve on the gunite machine to obtain the desired air exiting the nozzle tip (as determined by the nozzleman).
- Open the gunning nozzle valve to ensure Liquid Activator is being supplied to the nozzle tip.
- Check all fittings and lines for leaks. This is important since the Liquid Activator can damage some finished surfaces. **Do not use water with Phoscrete products as this will cause failure of the material!**
- Close the nozzle valve once the surge is started. The pump should stop. If it continues, then the nozzle gate valve was left open or there is a leak in the Liquid Activator line.
- Run the pump at approximately 100 psi. **Do not exceed 120 psi!**
- Make sure that all functions of the gunning machine are operating prior to placing any material in the hopper.
- **Gunning may now begin.**

### **GUNNING PROCEDURES**

1. Open the additional air supply to the nozzle and ensure pressure is set at approximately 100 psi.
2. Open the gunning machine main air valve that controls the air supply to the nozzle tip.
3. Open the valve on the gunning nozzle to supply activator to the nozzle tip.
4. Turn on air to rotate the feed wheel, rotor or bowl that supplies the dry material through the hose. Begin adding dry mix into the bowl at this point.
5. Adjust liquid nozzle valve to obtain the proper wet-to-dry ratio. This valve is the nozzle man's adjustment. If the liquid level is too high, excessive slumping & liquid will be evident on the surface. If the liquid level is too low, excessive dust and high rebound will be evident. **Do not start the installation until proper consistencies are achieved!**
6. To reduce rebound and maximize yield, always hold nozzle approximately 3-4 feet from the substrate. Maintain this position whether gunning horizontally, vertically, or overhead.
7. Move nozzle assembly in a circular motion until the desired thickness is achieved.
8. **When stopping, always make sure that the entire nozzle assembly stays pointed downward to prevent liquid activator from seeping back into the dry material feed hose.**
9. To confirm that a proper bond has been achieved, sound out the surface after gunning. Hollow sounds indicate an improper bond.



## TROUBLESHOOTING

<b>INSUFFICIENT LIQUID ACTIVATOR AT NOZZLE</b>	<b>INSUFFICIENT DRY MATERIAL AT NOZZLE</b>
No air supply or air hose is obstructed	Air pressure is too low
Pump has air lock and is not priming	Material clogging hose
Strainer not clean or not submerged in liquid	Hose connection is split, loose or leaking
Liquid drum is empty, or riser tube is plugged/broken	Compressor CFM is too low
Activator ring in nozzle assembly is not clean	Gunning machine pockets plugging or material bridging

*If at any time, you experience any problems gunning Phoscrete SG, please contact Phoscrete Technical Support at 561.420.0595 or email [info@phoscrete.com](mailto:info@phoscrete.com)*

## SHUT DOWN PROCEDURES

1. Turn off air to gunning machine feed wheel/bowl to stop dry material flow.
2. When dry material stops flowing, allow activator to run through the nozzle for approximately 10 seconds to clean nozzle internals of any material debris then turn off nozzle valve to stop the Activator supply.
3. Crimp the hose on the special pre-dampening nozzle assembly and allow the air to build up in the line and carefully release quickly. Do this several times to purge the line of any dry material. **Use extreme caution when doing this procedure to avoid allowing the hose to kick back and injure the operator!**
4. Turn off the gunning machine main air valve that controls the air supply to the nozzle. When laying down the nozzle assembly, **always make sure that the discharge end is pointing downward and is lower than the inlet!** Place the nozzle assembly in a location where it will not be damaged. It is advisable to place the nozzle into a drum of water.
5. Turn off the activator pump air valve when shutting down. When stopping for the day, **purge out the pump and lines with water and clean nozzle assembly.** There is a Schrader type relief valve located at the base of the pump air regulator assembly. If this valve is pressed upwards it will release air pressure on the activator feedline allowing the operator to disconnect the hoses safely. **CAUTION: In the event of the activator feedline still being pressurized we strongly recommend covering the hose connection fittings with a cloth during dismantling.**
6. When stopping the gunning operation for several hours, or at the end of the day, never leave dry material in the hopper. **Continue operating the machine until hopper is empty.** Leaving the hopper empty will allow the operator to visually inspect the machine for foreign objects prior to the next start-up. This will prevent unnecessary damage to the machine when resuming gunning operations.



## Finishing

When finishing Phoscrete SG, remember that Phoscrete sets fast and is only workable for approximately 10 minutes following placement. It is recommended to install in lifts: place to completely cover the rebar on the first lift. Finish for the final thin lift only (1 inch min.). Use magnesium floats, steel trowels, or screeds. While working, regularly wipe Phoscrete off the surface of the finishing tools using a cloth rinsed in a pail of water. A dampened stucco sponge may also be used to smooth the final surface. Again, do not introduce water into the mix and do not pour directly on the surface to get the best finish.

Because MALP concrete materials bond strong to themselves wet or cured, consider having small pails or patch kits of Phoscrete VO on hand to patch small imperfections.

## Curing

The curing is finished once the exothermic reaction is complete and material cools to ambient temperature. The time the material takes to cure depends upon the ambient temperature, temperature of materials in direct contact and the casting geometry. Typically, when the thinnest section of the application is hard enough so that it cannot be dented with trowel or similar tool, the material is fully cured.

## Cleanup

Clean all tools and nozzle equipment with water at the end of the day. Purge out the pump and lines with water. Rented equipment not cleaned properly may be subject to a \$500 cleaning fee, and customer may be billed for damaged parts.

## Contact

*Phoscrete highly recommends that the nozzleman and installation supervisor call and speak with Phoscrete prior to installation to answer any questions and review the equipment and procedures the crew is planning to use.*

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