

CP-24G **Potassium Silicate Gunite**

PRODUCT DESCRIPTION

Blome CP-24G is a two-component, potassium silicate concrete that is designed for installation by the gunite method. CP-24G is installed as an acid resistant, monolithic lining for chimneys, stacks and molten sulfur pits. CP-24G is also used as a gunited, monolithic lining in various tank, vessel and hot gas ductwork applications. CP-24G is well suited for high temperature, refractory applications that also require resistance to acidic condensate and vapors. CP-24G resists 98% sulfuric acid, 70% nitric acid 37% hydrochloric, oleum, as well as many aggressive solvents. CP-24G resists all acids (except HF) over a pH range of 0.0–7.0 and withstands process temperatures up to 1,800°F.

TYPICAL USES

Blome CP-24G Potassium Silicate Concrete is suitable for use in a variety of industrial process applications including:

- Chimneys, Stacks and Ductwork
- Incinerator quench chambers
- Molten sulfur pit linings
- Sulfur recovery units

HANDLING CHARACTERISTICS

Blome CP-24G is installed using the “dry gunite” method. CP-24G Powder is pneumatically conveyed through the dry powder hose, while CP-24G Liquid is pumped through the water line and the material is mixed at the gunite nozzle as it is applied to substrate. CP-24G is specially formulated to have excellent gunning properties and minimal rebound. Rebound loss on vertical surfaces typically less than 15%. Blome CP-24G cures rapidly, offering quick turnaround with minimal downtime for maintenance and new construction applications.

Vertical installations should be anchored to substrate with studs or mesh to mechanically secure CP-24G Gunite to substrates. Blome CP-24G is typically installed at a two inch (2”) minimum thickness.

TYPICAL PROPERTIES WET

Components:	Two (2) – Powder and Liquid
Wet density:	128 lbs./ft ³
Mixed consistency:	appropriate for gunite
Initial set:	50°F 12 - 18 hours 77°F 8 - 10 hours
Final cure	50°F 7 days minimum 77°F 5 days minimum

Please refer to Curing/Dry Out Schedule below

CURED

Absorption	7.4%
Coefficient of Thermal Expansion (ASTM C-531)	7×10^{-6} in/in/°F
Color	Light Gray
Compressive Strength (ASTM C-579)	3,500 psi
Flexural Strength (ASTM C-580)	800 psi
Tensile Strength (ASTM C-307)	350 psi
Temperature Limit	1800°F
Thermal Conductivity	5.5 – 6.5 BTU in/ft ² /hr/°F

PACKAGING & STORAGE

Blome CP-24G is supplied as a two (2) component product, with an Aggregate and Liquid. CP-24G Components are packaged as follows:

Unit Size	<u>3,600 lbs.</u>
Aggregate (Part A)	3,000 lbs. (60 x 50 lb. bags)*
Liquid (Part B)	600 lbs. (1 x 600 lb. pail)

*3000-LB super sacks are available for large projects.

Shelf life for CP-24G components is one (1) year. Keep CP-24G components tightly sealed in original containers until ready for use. Store components in a cool, dry place, out of direct sunlight, and on pallets at temperatures between 50°F – 80°F.

Protect Blome CP-24G Aggregate from water and weather while in storage and on jobsite. Protect Blome CP-24G Liquid from freezing. If Liquid does freeze, thaw frozen material back to a liquid solution and then thoroughly remix prior to use, as settling will occur during the thawing procedure. It is important to completely remix thawed liquid to achieve a uniform solution for use. **Make a small mix with the thawed, mixed solution and aggregate to ensure that the material will achieve an initial set no more than 8-10 hours at 77°F. If it does not, then the solution must not be used.**

ESTIMATED COVERAGE

Blome Polymer Concretes and Silicate Concretes are estimated and sold by the cubic foot. One cubic foot of CP-24G covers the following areas at stated thicknesses:

2" thickness	6 ft ² /cubic foot
4" thickness	3 ft ² /cubic foot

One 28 cubic foot unit (3600 LBS) will cover 168 ft² at 2" and 84 ft² at 4"

BID SPECIFICATION GUIDE

Use Blome CP-24G Potassium Silicate Gunite as manufactured by Blome International, O'Fallon, MO.

JOB SITE ENVIRONMENTAL CONDITIONS

Blome CP-24G must be applied while ambient temperatures are between 50F and 90F. Blome CP-24G components and substrate temperatures must also be maintained in this range. For best results, store CP-24G components at 75F minimum, for 24 – 36 hours prior to installation. Installations of CP-24G should be protected from water and weather during installation and for a minimum of 48 hours after placement to allow proper curing.

SURFACE PREPARATION

While Blome CP-24G provides excellent physical properties and chemical resistance, the material provides only a minimal bond to concrete and steel substrates. Therefore, gunited vertical installations should be anchored to the substrate with studs or mesh to mechanically secure CP-24G Gunitite. Some interface areas with concrete and steel substrates are best treated using an appropriate primer or membrane system such as Membrane 68 prior to installation of CP-24G. Blome CP-24G is typically installed by guniting at a two inch (2") minimum thickness.

If CP-24G is being gunited over a membrane system, install appropriate membrane system to prepared substrate and to anchoring system, as specified. All applied membrane surfaces should be fully cured, clean and dry prior to installation of Blome CP-24G. These surfaces should be swept clean and be free of dirt, dust, water or other jobsite contaminants immediately prior to placing CP-24G.

SAFETY PRECAUTIONS

Blome CP-24G Aggregate, Liquid, and mixes of them present various health hazards if handled improperly. CP-24G Aggregate contains silica dust, CP-24G Liquid and mixed silicate concrete are alkaline solutions that cause severe eye injury and irritate skin. Wear respirator suitable for silica dust, safety glasses with side shields, gloves and long sleeve shirts to prevent all contact with skin and eyes. After working with Blome CP-24G, wash thoroughly before eating, drinking, smoking or other activities.

APPLICATION EQUIPMENT

Blome CP-24G is applied using a gunite machine that is designed for the dry gunite method. This machine should be equipped to pre-dampen powder, prior to conveying it through the powder hose (see details below). Typically, a minimum 650 cfm air compressor is used to feed dry or predampened gunite powder to the nozzle. CP-24G Liquid is pumped through the water line using an air operated booster pump, such as diaphragm pump or other pressurized liquid pumping system.

The Powder and Liquid are mixed at the gunite nozzle just prior to application onto substrate. For maximum mixing efficiency, a "Spirolet" nozzle should be used. It is recommended that the water holes in the water ring at the gunite nozzle should be enlarged to a size approximately twice that of standard water rings (especially in cooler weather, when the solution is noticeably more viscous than water). This will better accommodate mixing at the nozzle, when using the CP-24G Liquid. All mixing, predampening, application equipment and hoses must be clean, dry and free of contaminants including Portland cement, refractories or other shotcrete materials.

EQUIPMENT DETAILS/TIPS

The following details are specific to Reed equipment, but the principles will apply to other brands of equipment.

Feed Wheel (or feed bowl) – A 21-pocket rotary feed wheel is preferred for feeding powder into the system. This wheel is considered a medium pocket wheel. It gives the most flexibility in running speeds. It can be run at higher or lower speeds, which allows for greater versatility for the nozzleman. With a deeper pocket (i.e., 12-15 pockets), you get big charges of powder all at once. This allows for a higher application rate, but it is harder to fine-tune. A shallower pocket permits finer detail work, but this requires the wheel to be run at higher speed.

Powder Hose – A 1.5 or 2” ID hose should be used. The number of pockets in the feed wheel will determine the best diameter. The 1.5” hose is better suited for the 21-pocket feed wheel. This combination of pockets and hose diameter is more responsive to changes in pressure, allowing for better fine tuning of the powder feed. The larger hose is used for wheels with less (larger) pockets.

Silicate Solution Hose – 0.5” Hydraulic hose

Liquid Pump – 10:1 Graco pump or equivalent

Compressor – Capable of delivering 120 psi for liquid. Powder will also feed off of this compressor, but exact pressure feed to powder depends on many variables, including nozzleman’s preference.

Nozzle – Spirolet nozzle (this is analogous to a rifled barrel)

Pre-dampener – Pre-dampened powder allows for a faster wetting rate when the silicate solution is introduced during gunning (it also reduces the chances for static electricity build up). Use a pre-dampening unit from Reed, or use a paddle-type mixer and spray water onto powder. For the latter, the pre-dampened powder would be shoveled or conveyed to the pockets. Pre-dampening is covered in the next section.

Valve type (to the nozzle) – A “needle” valve is preferred for silicate gunites (over a “gate” or “ball” valve).

Water Ring (holes) – Though it is recommended that the holes be enlarged in the water ring, this is normally not necessary in the summer. The viscosity of the solution is close to that of water in the summer.

MIXING AND APPLICATION

The two components of CP-24G are mixed at the gunite nozzle during application. The mix ratio is adjusted by varying powder and liquid flow rates from the air compressor and by a water valve at the nozzle. CP-24G should only be applied by an experienced nozzleman and gunite crew, who are familiar with applying specialty, gunite linings. If the material is shot too wet, gunite will sag and run on walls. If the material is shot too dry, excessive rebound will occur and overall physical properties will be adversely affected. Carefully adjust gunite consistency during application and monitor the prescribed 5:1 mix ratio throughout application period. Do NOT use rebound material.

While applying CP-24G gunite nozzle should be held 18”-24” from substrate and should remain perpendicular to substrate. Apply gunite over reinforcement, moving nozzle in a circular motion, building thickness of the lining slowly to the specified thickness. It is best to go in approximately 1” passes instead of trying to build the entire thickness in one area. Minimum thickness for CP-24G is two inches (2”). Do not build thickness by applying gunite on top of cured layers.

Cold joints – Minimize cold joints to the fullest extent. When applying gunite to the surface of existing gunite, liberally apply CP-24G Solution to the surface. Do not allow the solution to dry before applying gunite.

Pre-dampening details/tips – Only add enough clean water to keep the dust down (approximately 16 fl. oz. per 50 LB bag should be sufficient). Water is preferred over silicate solution for pre-dampening. Properly pre-dampened liquid will clump together when squeezed in the hand, but the clump will easily fall apart with minimal shaking. Use a pre-dampener with the gunite equipment or use a paddle mixer, dump the dampened powder on a tarp, and shovel into the machine as needed.

ANCHOR DETAILS

Anchors must be stainless steel (304) or a material that is suitable for the intended environment. V-anchors are recommended. Tines must be bent to more than 90 but less than 180, and the high point of the tine should be at least $\frac{3}{4}$ " below the surface of the gunite. Recommended spacing is shown in the table below.

Surface	Gunite Thickness	Anchor Centers	Opened Tine Length
Vertical walls, cylinders, sloping surfaces	2-3"	6"	3"
	4-5"	9"	4"
	6-8"	12"	4"
Roofs and overhangs	Up to 2"	4"	2.5"
	2-3"	5"	3"
	3-6"	6"	4"
Floors and other horizontal surfaces	Up to 6"	9"	3-4"
	Over 6"	12"	4"

CURING AND DRY-OUT SCHEDULE

Proper curing and dry out of CP-24G is critical. After an initial, 24 hour cure period at a minimum temperature of 70°F, installations that will operate above 212°F should be raised to a temperature of 200°F and held at 200°F for a period of six (6) hours per inch of lining thickness. This holding period will force-dry the gunite installation and remove any remaining excess water in the gunited lining. The temperature should then be elevated at a rate of 50-100°F per hour up to proposed operating temperature and held for a six (6) hour period.

CLEANUP

All tools, mixing equipment, gloves and application equipment should be cleaned up immediately using hot, soapy water. Any material that is allowed to cure prior to clean up should be chiseled or chipped off, then dirty items should be soaked in hot, soapy water overnight and then cleaned and dried.

WARRANTY

We warrant that our goods will conform to the description contained in the order and that we have good title to all goods sold. Our material data sheets and other literature are to be considered accurate and reliable, but are used as guides only. WE GIVE NO WARRANTY OR GUARANTEE, WHETHER OF MERCHANT ABILITY OR FITNESS OF PURPOSE OR OTHERWISE, AND WE ASSUME NO LIABILITY IN CONNECTION THEREWITH. We are happy to give suggestions for applications; however, the user assumes all risks and liabilities in connection therewith regardless of any suggestion, we may give. We assume no liability for consequential or incidental damages. Our liability, in law and equity, shall be expressly limited to the replacement of non-conforming goods at our factory, or at our sole option, to repayment of the purchase price of the non-conforming goods.

Revised: November 14, 2017
Supersedes: March 13, 2013