



PHOSCRETE VO [Vertical/Overhead]

TECHNICAL DATA GUIDE

Very Rapid Hardening MPC (Magnesium Phosphate Cement) mortar for hand-packed and trowel-applied concrete repairs.

DESCRIPTION

Phoscrete VO is a two-part cementitious concrete repair mortar composed of magnesium oxide, aluminosilicates, and reinforcing fibers (Dry Mix), plus a liquid phosphate activator. (Liquid Activator) Phoscrete VO is very rapid hardening with high early strength gain. It mixes to a putty consistency, is easy to apply by hand or trowel, and can be feather-finished. Phoscrete VO allows fast completion of concrete repairs. Phoscrete VO meets ASTM C 928, Type R3.

PROVEN APPLICATIONS

- Vertical and overhead: above grade and below grade concrete structures
- New construction concrete's defects, including pre-cast shapes
- Small spalls on concrete pavements and floors
- Bridge structural elements, such as beams, caps, piers, and columns
- Marine structures such as seawalls, navigation locks, guide walls, and discharge tunnels
- Sidewalks, stairs, sills, and culverts
- Building facades, parking garages and tilt-up walls

ADVANTAGES

- Labor and time-saving - no sandblasting of steel bars, no anti-corrosion primer, no sacrificial anodes, no curing.
- Easy and accurate mixing: two components, dry mix in a bag and liquid activator in a jug. No water, pre-extended mix. self-consolidating, fast setting, easy clean up with water.
- Easy to apply: high-build, non-sag, easy clean-up with water.
- Easy to finish using a trowel or a stucco sponge: can be feather-finished.
- High compressive and bond strength for lasting repairs.
- Durable: freeze-thaw and salt scaling resistant.
- Fiber reinforced: high flexural strength and ductility
- Strong mechanical and chemical bond to clean cured concrete and to itself with no cold joints.
- Stops rust and inhibits corrosion: converts iron oxide to metal phosphate.
- Does not out-gas after cure: accepts sealers and polymer coatings as soon as 15 minutes following initial set.
- Chemically stable: no added chlorides, resists chloride penetration.
- Environmentally friendly - no odor, no free silica.
- All temperature use – sets in temperatures cold as -5°F (-20°C)
-use Phoscrete Fast-Set/Slow-Set Admixture to manage setting/working time.

Packaging

Full Kit: [2] bags + [1] jug

Dry Mix bag: 30 lb. (13.6 kg) each
polyethylene-lined paper bag

Liquid Activator jug:

10.4 lb. (4.7 kg), by volume: 108 oz
(3.2 l) HDPE plastic jug

Kit Yield: 0.5 ft³ (6 bf, 0.014 m³)
36 kits per full pallet.

Small Pail: 13.5 lb. (6.1 kg)

HDPE pail contains Dry Mix
paper bag and HDPE Liquid
Activator jar.

Small Pail Yield: 1.0 bf
(144 in³, 0.0024 m³)

Patch Kit tub: 0.8 lb. (0.4 kg)

HDPE Patch Kit tub contains
plastic Dry Mix zip bag
HDPE Liquid Activator jar
plus plastic mixing stick.

Patch Kit Yield: (8 in³, 131 mm³)

Mixing Ratio

Neat mix. Do not extend with sand or aggregate.

Wet-To-Dry Ratio: 17.33%

Mix Entire Patch Kit: [1] jar + [1] bag

Mix Entire Small Pail: [1] jar + [1] bag

Mix Entire Full Kit: [2] jugs + [1] bag

*Full Kit may be split: measure 54 oz
(1.6 l) of Liquid Activator by volume
for each 30 lb. bag.*

Storage

Store in clean, dry conditions in
unopened, original packaging.

Shelf Life

Dry Mix: 24 months

Liquid Activator: 12 months
(when properly stored)

VOC Content

0 g/L: Less exempt solvents

Fresh Properties					
Test	Specification	Description	Time	Typical Results	
Set Time	ASTM C191	Time of Setting by Vicat Needles	lab temp supercooled [†]	<u>Initial</u> 5 min 9 min	<u>Final</u> 6 min 11 min
Density	ASTM C138	Density (Unit Weight) of Concrete)		153 lb/ft³	2450 kg/m³
Air Content	ASTM C231	Air Content (Pressure Method)		8.3%	
Strength Properties					
Test	Specification	Description	Time	Typical Results	
				psi	MPa
Compressiv e Strength	ASTM C109	Compressive Strength of Hydraulic Cement Mortars Using 2-in. Cube Specimens	1 hour	7000	48.3
			1 day	9000	62.1
			28 days	11500	79.3
Flexural Strength	ASTM C78	Flexural Strength of Concrete Using Simple Beam with Third-Point Loading	1 day	600	4.1
			7 days	650	4.5
			28 days	750	5.2
Bond Strength	ASTM C882	Bond Strength by Slant Shear Phoscrete - Concrete	1 hour	2500	17.2
			7 days	3500	24.1
			28 days	4000	27.6
Tensile Strength	ASTM C496	Splitting Tensile Strength of Cylindrical Concrete Specimens	1 day	850	5.9
			28 days	900	6.2
Modulus of Elasticity	ASTM C469	Static Modulus of Elasticity [Chord Modulus] Poisson’s Ratio of Concrete in Compression	28 days	4.24 E ⁺⁰⁶	2,92 E ⁺⁰⁴
				0.243	
Durability Properties					
Test	Specification	Description	Test	Typical Results	
Free Shrinkage	ASTM C157	Length of change of hardened Concrete	28 Days Wet Dry	0.006%	-0.085%
Freeze Thaw	ASTM C666-A	Resistance of Concrete to Rapid Freezing and Thawing in a Saturated Condition (300 cycles)	Durability Factor	96%	
Chlorides	ASTM C1202	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration (Coulombs)	28 days	437 C (very low)	
	AASHTO T358	Cure Time Surface Resistivity Cl Penetrability Equivalent (kΩ-cm)	28 days: Air Cure	> 1000	Negligible
			28 days Wet Cure	123	Very Low

[†]Time of Set reported for lab temp 68°F (20°C) for dry mix and activator. Supercooled Activator at 17°F (-8°C) and lab temp dry mix.



GENERAL INSTALLATION GUIDELINES

- Refer to [Phoscrete Formula 1 \[MALP Series\] Full Installation Guide](#), for the most complete documentation on best installation practices.
- Refer to [Phoscrete Warm Temperature Guidelines](#) and [Phoscrete Cold Temperature Guidelines](#), for information on how to mix Phoscrete materials in warm (>70°F/20°C) and cold climates (<50°F/10°C). The Guidelines contain information about the use of Phoscrete Fast- and Slow-Set Admixtures, and best practices for cooling or supercooling the Liquid Activator. Cooling the Liquid Activator can be achieved on ice at 40°F (4°C), supercooling in a freezer at 10°F (-12°C). Liquid Activator's freezing point is -20°F (-29°C).
- Refer to [Phoscrete Best Practices for Endure Admix Usage Chart](#) for details on working with Phoscrete Admixtures (Endure, Fast-Set, Slow-Set)

SURFACE PREPARATION

- Concrete surface must be sound and fully cured.
- Concrete profile should reach minimum CSP of 7-9 per ICRI Guidelines. Water-blasting is not recommended.
- No saw-cutting of the edges of the repair is necessary. Phoscrete VO can be feather-finished.
- Clean the surface of the area to be repaired from oil, grease, and other bond-inhibiting materials.
- Surface must be frost-free, dry, and free of standing water. Use heat (torch) to eliminate surface moisture.
- Remove loose scale (rust) from steel bars with a wire brush. Sandblasting is not required.

PRIMER COAT

For challenging applications, where maximum bond strength is required, use Phoscrete Primer. Using a cooled Liquid Activator, apply a scrub coat of Phoscrete Primer to the prepared concrete substrate. Be sure to fill all voids. Complete the primer coat by placing a ¼ in. (1.5 cm) thin layer of Phoscrete Primer over the scrub coat, either wet or dry. Wait at least 15 minutes for Phoscrete Primer to set and bond prior to proceeding with Phoscrete HC full repair installation. If Phoscrete Primer is not available, Phoscrete VO can be used as an alternative, with cooled Liquid Activator.

MIXING

- Mix Phoscrete VO at the placement site.
- Full Kit mixing: [2] 30 lb. bags into [1] jug of Liquid Activator.
- Half Kit mixing: [1] bag into [½] jug - measure exactly 54 ounces of Liquid Activator. The mix ratio is 17.33% Liquid Activator to Dry Mix. On-site dry mix measurement for partial unit mixing is NOT recommended. Inaccurate measurements will lead to poor material performance.
- When mixing Full Kits, use a heavy-duty five [5] gallon bucket for mixing. Mix with a paddle (Phoscrete's urethane auger is highly recommended), using a dual or variable speed drill suitable for mixing (min. 7-amp, ½" chuck, side handle).
- When mixing Small Pails, use a minimum 18v variable speed drill on the high torque setting. For professional use, Phoscrete's small urethane auger is highly recommended.
- When mixing Patch Kit tubs, use the provided stirrer and mix by hand until the material is completely wetted out.
- Pour the Liquid Activator into a clean bucket first. Next add admixtures (Endure, and/or Fast-Set/Slow-Set). Then add the Dry Mix into the bucket, preferably while slowly running the mixer.
- Mix for about 1 minute, until the material is fully wetted out and shows a uniform consistency. Do not over-mix.
- A batch of Phoscrete MPC must be mixed, placed, and finished within 5 - 15 minutes depending on ambient temperature.

APPLICATION

- Install immediately after mixing. Discard material that begins to setup in the pail.
- Using a trowel or with a gloved hand, scrub Phoscrete into the bottom and sides of the area to be repaired, being careful to fill all voids. Force the material against the edges of the repair.
- Apply Phoscrete VO in lifts until the patch is completed. On overhead surfaces, the average thickness of a lift should not exceed 2 in. (5 cm). On vertical surfaces, lift thickness can be up to 3 in. (7.5 cm)
- Phoscrete can be applied both fresh-on-fresh (or fresh-on-cured). Scarify the surface of the previous lift by scratching crisscross lines in the layer with a trowel prior to set for best adhesion bond. Wait at least one-minute in-between lifts, depending on ambient temperature and total depth of the repair.
- To prevent Phoscrete from sticking to the trowel, wipe the trowel with a water-dampened glove or a cloth during application. Rinse nitrile-coated gloves in water and shake off excess when hand packing Phoscrete VO.



FINISHING

- Use a margin trowel edge to saw away excess material until flush with surface.
- Smooth finished surface with a clean trowel or a slightly dampened stucco sponge.
- No curing is required. Phoscrete VO sets in approximately 15 minutes depending on ambient temperatures.
- If the hardened material finishes higher than the adjacent surface, use a diamond grinder to level the repair surface within required tolerances as soon as 15 minutes after the final set.
- If rain occurs prior to initial set, cover the surface with plastic sheeting for at least 15 minutes following initial set.

CLEANING

- In-between batches, clean tools with water and wipe off excess water prior to contact with Phoscrete VO.
- When the job is completed, clean tools and gloves with water. Wash hands with soap and water.

LIMITATIONS

- Do not use any primer or admixtures other than those provided by Phoscrete.
- Do not extend Phoscrete VO with aggregate. Do not add sand or any type of cement.
- Do not mix partial units unless accurately pre-measured.
- Minimum application thickness: none. Phoscrete VO-ENDURE can be feather-finished. However, for best results, 1 in. minimum thickness is recommended.
- Maximum application thickness (per lift): 2 in. (5 cm) for overhead applications, 3 in. (7.5 cm) for vertical applications.
- Minimum ambient temperature: -5°F (-20°C)
- Do not use water when mixing, placing, or finishing Phoscrete VO
- When wet, Phoscrete cannot be in direct contact with galvanized steel (zinc).
- Proper application is the responsibility of the user. Field visits by Phoscrete personnel are for the purpose of making technical recommendations, not for supervising or providing quality control on the jobsite.

LIMITED WARRANTY NOTICE

Phoscrete Corporation (Phoscrete) warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, when used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond Phoscrete's control. PHOSCRETE MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is the replacement of product or refund of the purchase price, at the sole option of Phoscrete. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. PHOSCRETE WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND. Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on Phoscrete's present knowledge and experience. However, Phoscrete assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third-party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. Phoscrete reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

HEALTH, SAFETY, AND ENVIRONMENTAL

Read, understand, and follow all Installation Instructions, Safety Data Sheets, and product label information for this product prior to use. The latest SDS can be obtained by visiting phoscrete.com, emailing your request to safety@phoscrete.com, or calling 561-420-0595. Use only as directed. 24 Hour Emergency: Chemtrec® 800-424-9300 Contracted by Phoscrete Corporation, Account #866520.