



PHOSCRETE® VO (Vertical/Overhead)

Very Rapid Hardening MALP (Magnesium Alumino Liquid Phosphate) Concrete for trowel-applied concrete repairs.

DESCRIPTION

Phoscrete VO is a cementitious two-part system of a Dry Mix composed of magnesium and alumino aggregates, and reinforcing fibers, plus a Liquid Phosphate Activator.

Phoscrete is very rapid hardening with high early strength gain, allowing fast completion of repairs to concrete structures. Phoscrete VO mixes to a putty consistency, is easy to apply by trowel, and can be feather-edge-finished strong. Phoscrete VO is ideal for vertical and overhead applications, plus fixes small spalls on concrete pavements and floors. Phoscrete VO exceeds ASTM C928 R2; Specification for Very Rapid Hardening Cementitious Repair Materials

PROVEN APPLICATIONS

- Fast set repair for above grade and below grade concrete structures
- Repair of bridge beams, caps, piers and columns
- Repair of marine structures such as seawalls, piles, pile caps, beams, piers, navigation locks, guide walls, dams, powerhouses, and discharge tunnels
- Rapid repair of sidewalks, stairs, sills, and culverts
- Repair of building facades, parking garages and industrial plants
- Repair of new construction concrete's defects, including pre-cast shapes

ADVANTAGES

- Labor and time-saving - no primer for concrete substrate and steel bars, no sandblasting of steel bars, no saw-cutting of the edges, no curing
- Easy to apply - fast setting, high-build, non-sag, easy clean-up with water
- Easy to finish using trowels or stucco sponge - can be feather-edged
- High early and ultimate compressive and bond strengths
- Fiber reinforced - high flexural strength, ductility, and durability
- High adhesion to concrete surfaces - forms a both mechanical and chemical bond to cured concrete
- No cold joints - bonds to itself, wet or cured
- Shrinkage crack free
- Stops rust - converts iron oxide to metal phosphate and inhibits corrosion
- Freeze-thaw and salt scaling resistant, even when exposed to $MgCl_2$ and $CaCl_2$
- Durable in marine environments - resists chloride penetration
- Chemically stable - no added chlorides, no added sand or aggregates
- Not a vapor barrier
- Does not out-gas after cure - accepts sealers and coatings as soon as one hour following initial set
- Environmentally friendly - no odor, no free silica
- All temperature use - same formula works from $-5^{\circ}F$ ($-21^{\circ}C$) to $+85^{\circ}F$ ($30^{\circ}C$)
 - when used with Phoscrete Fast Setting Admixture in cold temperatures
 - contact Phoscrete technical support to discuss your specific application

PACKAGING

Pail: 13.4 lb. (6 kg)

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

Pail Yield: 1.0 bf
(144 in³, 0,0024 m³)

Patch Kit Tub: 1.1 lb. (0,5 g)

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

Fast-Set Admix

Pail: 0.7 oz. (20 g) per dose
(two tablespoons by volume)

Tub: 0.12 oz. (3,3 g) per dose
(two ½ teaspoons by volume)

Mixing Ratio

Mix Entire Kit: 1 jar+1 bag

Wet-To-Dry Ratio: 17%

Storage

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

Shelf Life

Dry Mix: 24 months

Liquid Activator: 12 months
(when properly stored)

VOC Content

0 g/L- less exempt solvents

Color

Concrete Grey

Fresh Properties					
Test	Specification	Description	Time	Typical Results	
Set Time	ASTM C191	Time of Setting by Vicat Needles	Initial Final	14 min	16 min
Yield and Density	ASTM C185/C138	Yield and Density (Unit Weight) of Concrete (Pail)	ft ³ lb./ft ³ (m ³ kg/m ³)	0.41 (0,0024)	157.1 (2517)
Air Content	ASTM C231	Air Content (Pressure Method)		10.5%	
Free Shrinkage	ASTM C157	Length Change of Hardened Concrete (Std)	28 Days Wet Dry	0.011%	-0.054%
Strength Properties					
Test	Specification	Description	Time	Typical Results	
				psi	MPa
Compressive Strength	ASTM C109	Compressive Strength of Hydraulic Cement Mortars Using 2-in. Cube Specimens	1 hour	5000	34,5
			1 day	7500	51,7
			28 days	10000	68,9
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	650	4,5
Bond Strength	ASTM C882	Bond Strength by Slant Shear Phoscrete - Concrete	1 hour	1000	6,9
			7 days	2000	13,8
			28 days	2000	13,8
Tensile Strength	ASTM C496	Splitting Tensile Strength of Cylindrical Concrete Specimens	1 day	700	4,8
			28 days	800	5,5
Modulus of Elasticity	ASTM C469	Static Modulus of Elasticity [Chord Modulus] Poisson's Ratio of Concrete in Compression	7 days	2.82 E+06	1.9 E+04
				0.282	
Durability Properties					
Test	Specification	Description	Test	Typical Results	
Freeze Thaw	ASTM C666-A	Resistance of Concrete to Rapid Freezing and Thawing in a Saturated Condition (300 cycles)	Durability Factor	91%	
Scaling	ASTM C672	Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals (25 cycles)	Visual	Loss lbs./ft ²	
			NaCl	2	0.42
			CaCl ₂ & MgCl ₂	0	0.00
Chlorides	ASTM C1202	Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration (Current @5 min)	28 days	1913 Coulombs	
	ASTM C1543	Penetration of Chloride Ion into Concrete by Ponding	90 days	10-20 mm	Cl Level: 613
				55-65 mm	Cl Level: 558
			180 days	10-20 mm	Cl Level: 333
				55-65 mm	Cl Level: 540

SURFACE PREPARATION

- Concrete surface must be sound and fully cured.
- Loose, damaged and contaminated concrete must be removed.
- No saw-cutting of the edges of the repair is necessary. Phoscrete VO can be feather-edged.
- Clean all the surfaces of the area to be repaired from oil, grease, and other bond-inhibiting materials.
- Use a wire brush to remove loose scale (rust) from steel bars. Sandblasting is not required.
- Clean the surface of the area to be repaired from oil, grease, and other bond-inhibiting materials.
- Surface must be dry, free of standing water. Use heat (torch) to eliminate surface moisture.
- In winter, concrete substrate must be frost free and dry before the application.
- Concrete profile should reach minimum CSP of 5 per ICRI Guidelines. Use appropriate technical means. Water-blasting is not recommended.

PRIMER COAT

- No primer is required if the surface is dry.
- In case of SSD concrete surfaces, Phoscrete Primer may be used as a scrub coat for improved adhesion.
- Application of primer to steel bars is not required.

MIXING

- Mix Phoscrete VO at the placement site.
- Pour the Liquid Activator into Phoscrete VO pail or any other clean plastic container. Add the Dry Mix component to the Liquid Activator, preferably while mixing.
- Mix Phoscrete VO Dry Mix into the Liquid Activator for about 1 minute, until the material is fully wetted out and shows a uniform consistency. Do not over-mix.
- A batch of Phoscrete VO must be mixed, placed and finished within 5 - 15 minutes depending on ambient temperature.
- Be sure to mix the entire bag of Dry Mix with the full content of Liquid Activator. The mix ratio is 17% wet to dry. On-site measurement for partial unit mixing is NOT recommended.
- When mixing pails of VO, mix with a paddle, using a minimum 18v portable drill on the low speed setting. For professional use, Phoscrete's small urethane auger is highly recommended.
- When mixing tubs of VO Patch Kits, use the provided stirrer and mix by hand until the material is completely wetted out.
- In cold climates, when ambient temperature is below 50°F (10°C), add scoops of Phoscrete Fast-Set Admixture into the Liquid Activator [Refer to cold temperature guidelines at phoscrete.com]. Then add Phoscrete VO Dry Mix and mix as usual.
- In hot climates above 75°F, chill the jar of Phoscrete VO Liquid Activator on ice to extend working time. Be sure to store the pail of Dry Mix and Liquid Activator in a cold place. Refer to warm temperature guidelines at phoscrete.com.

APPLICATION

- Install immediately after mixing. Discard material that begins to setup in the pail.
- Using a lightly moistened (with water) gloved hand or clean trowel, apply a scrub coat of Phoscrete VO against the prepared substrate, being careful to fill all voids.
- When using Phoscrete Primer, wait until hard (approx. fifteen [15] minutes) then apply Phoscrete VO.
- Apply Phoscrete VO in lifts until the patch is completed. On overhead surfaces, the average thickness of a lift should be no more than 2 inches. On vertical surfaces, lift thickness can be more. When multiple lifts are applied, scarify the surface of the previous lift for best bond. Wait approximately one-minute in-between lifts, depending on ambient temperature and total depth of the repair.
- To prevent Phoscrete VO from sticking to the trowel, wipe the trowel with a water-dampened cloth during application. Rinse 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.
- 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.
- If the repair includes steel reinforcing bars, sacrificial zinc-based anodes are not required because Phoscrete VO does not create the so-called halo effect.

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 with water.

LIMITATIONS

- Minimum application thickness: none (can be feather-edge finished)
- Maximum application thickness (per lift): 2 inches for overhead applications, 3 inches for vertical applications.
- Do not use water when mixing and/or placing Phoscrete VO
- Do not extend Phoscrete VO with aggregate.
- Do not add sand or any type of cement.
- Do not pour water on surface when finishing Phoscrete VO.
- Do not use any primer other than Phoscrete Primer.
- No direct contact with galvanized steel (zinc) or aluminum
- 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

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

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