



PHOSCRETE FORMULA 3 [MKP-SERIES]

MIXING INSTRUCTIONS FOR MATERIALS LABS

The cementitious product you are about to mix is not a traditional Portland cement-based material and cannot be mixed exactly per ASTM protocols.

Phoscrete Corporation manufactures **MKP Series** concretes (Magnesium Potassium Phosphate) that require mixing the dry component (Dry Mix) with water, or with water plus an admixture (PHOSCRETE® ENDURE™).

The Dry Mix is composed of magnesium oxide, potassium phosphate, aluminosilicates, aggregates, and reinforcing fibers.

PHOSCRETE ENDURE™ is a bio-based soy-methyl-ester polystyrene liquid (SME-PS) admixture that works as a concrete durability enhancer that improves freeze thaw durability and salt scaling resistance without sacrificing performance of hardened properties, including bond strength.

When mixing Dry Mix with water, the product is called **PHOSCRETE FORMULA 3**. When mixing Dry Mix with water and Endure admixture, the product is called **PHOSCRETE FORMULA 3E**.

PHOSCRETE MKP Series concretes are pre-extended concrete mixes. Do not extend with aggregates or sand.

PHOSCRETE MKP Series concretes are easy to mix, place, and finish.

PHOSCRETE MKP Series concretes are fast setting. Working time at lab temperature (68°F, 20°C) is approximately 20 minutes with initial set almost immediately thereafter. MKP concretes will harden sooner at the surface once you stop vibrating or working the material with a trowel.

PHOSCRETE MKP Series concretes gain strength suitable to vehicular traffic in two [2] hours at moderate ambient temperatures. In three [3] hours, PHOSCRETE MKP Series concretes typically exceed compressive, flexural and bonds strengths specified at 28 days by most US state DOT materials offices.



Mixing Procedure: , Always mix at the specified water-to-Dry Mix ratio (13% for both PHOSCRETE FORMULA 3 and FORMULA 3E) per Phoscrete's Technical Data Guides.

When mixing full units in a bucket, use a dual or variable speed drill suitable for mixing (minimum 7-amp drill, ½" chuck) and Phoscrete's urethane mixing auger for best results.

When mixing partial units with lab equipment use the appropriate water-to-dry ratios and ensure no dry material remains in the bowl. Clean metal mixing tools immediately with water.

The manufacturer specifies that water be placed in the mixing container first, with the ENDURE admixture added second. Begin mixing as you introduce the Dry Mix.

The product only requires the wetting of the powder/aggregates. Using a sufficiently powered mixer, this typically takes one minute or less. Do not overmix.

Sample immediately once product is fully wetted out and shows a uniform consistency.

PHOSCRETE MKP Series concretes are self-consolidating and thixotropic. For best performance, use vibration (vibrating table or pencil vibrator) to increase flow and reduce air bubbles when casting forms and bonding to substrates.

Best to use plastic molds (HDPE, Plexiglas, etc.) because MKP Series concretes bond and react to metals. If you are using metal molds, do not use galvanized metal because MKP Series concretes reacts with zinc, producing H₂ gas. Metal molds must be coated with an appropriate release agent. Improper coating may cause damage to the molds. Phoscrete recommends [Super Lubeⁱ](#), a food grade multipurpose synthetic grease. *Do not use release agents for bond tests!* Contact Phoscrete to verify compatibility if you have a different release agent you wish to use.

Cube molds for compressive strength tests: The largest aggregate in PHOSCRETE FORMULA 3 is 0.1 mm, however the FRP macro-fibers are 20-30 mm. Due to length of the fibers, using 2" (50 mm) cube for compressive strength testing may result in anomaly readings. The recommended compressive strength test for Phoscrete EKO is ASTM C-39. If 2" cubes are required for testing per ASTM C-109, it is recommended that a larger form is cast and samples are saw-cut to the desired cube size. Otherwise prepare additional cubes and discard low (anomaly) readings.

Prism molds for free shrinkage tests: When testing ASTM C-157 (dry and wet shrinkage) 1" x 1" prisms are designed for mortar only. Per ASTM C-157 use 3x3 prisms for concretes containing aggregates (Phoscrete Formula 3) for accurate results.

Cylinder molds for bond and compressive strength tests: PHOSCRETE MKP Series concretes bond strongest to a dry concrete substrate. Do not apply to an SSD substrate surface unless required by the Materials Testing Office Standard Specifications.

Phoscrete can be sawcut or ground to tolerance as soon as 15 minutes following final set.



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Unless otherwise specified by the material testing office, produce substrates for bond tests such as ASTM C882 and ASTM C1583 with dry Ottawa sand mortars. Prepare the substrate to CSP-7 per ICRI specifications and vibrate Phoscrete into place.

Do not wet cure or moist cure PHOSCRETE MKP concretes before 3 days air cure.

The manufacturer recommends the Lab Manager call and speak with Phoscrete's General Manager or Phoscrete's Installation Support Manager (see below) prior to mixing to answer any questions and review the mixing/handling procedures the Lab plans to use.

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URLs for Referenced Hyperlinks in this Document

This document is published at phoscrete.com where you can click on the referenced hyperlinks in the document. If you have a printed version, full URLs are end-noted below.

Refer to the latest published Phoscrete Technical and Safety Data Guides Phoscrete Quick Start Guides, Full Installation Guides, Best Practices, and Videos: <https://www.phoscrete.com/technical/>

ⁱ <https://www.super-lube.com/multi-purpose-synthetic-grease-with-syncolon-ptfe/>