PHOSCRETE FORMULA 1 [MALP-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 PHOSCRETE FORMULA 1 (**F1**) MALP Series concretes (Magnesium Aluminum Liquid Phosphate that require mixing the dry component (Formula 1 Dry Mix) with a pre-measured liquid activator (F1 Activator).

Important things to know when working with PHOSCRETE FORMULA 1 [MALP Series]

Phoscrete MALP Series concretes are fast setting. Working time with materials conditioned to lab temperature is less than 10 minutes with initial set almost immediately thereafter. Working time and set time can be easily extended in warmer temperatures with no modification of Phoscrete's hardened material properties by cooling or supercooling the Activator. The freezing point of Activator is -10°F (-17°C) allowing F1 to be mixed and installed in sub-freezing temperatures.

The manufacturer recommends Materials Labs condition Phoscrete Dry Mix and Activator below 40°F (5°C), or supercool Phoscrete Activator below 10°F (-12°C) in all testing other than set time and 1 hour breaks to ensure sufficient time to place mixed material in molds.

- **Always mix the appropriate color-matched and labeled, pre-measured F1 Activator with the F1-Dry Mix.** Formula 1 is packaged in large & small bags plus jugs.
- **Do NOT mix partial bags and jugs of Phoscrete F1.** Phoscrete activator contains liquids with different densities. Jugs and jars must be completely emptied for use with the matching pre-measured dry mix.
  If your materials office prefers to use smaller quantities with lab mixing equipment, contact Phoscrete so we can provide you with the appropriate measure of F1 Activator in jars.
- **Always add F1 Activator first into an empty pail** when mixing. Next add Phoscrete Admixtures, including Fast-Set, Slow-Set, or Fibers. Then blend in the matching F1 Dry Mix powder.
- **Do NOT extend Phoscrete F1 with aggregates or sand.** Phoscrete is pre-extended. F1-HC contains 24mm rigid fibers.
- **Use a sufficiently powered heavy-duty drill or mixer designed for mixing concrete materials in a bucket**. Phoscrete recommends the Bosch GBM9-16 mixing drill (9-amp, ½" chuck with side handle).
- **Use Phoscrete Urethane Mixing Augers** (Small and Large). They are excellent tools for fast and easy mixing of Phoscrete in a bucket.
- **Larger buckets mix large bag kits of Phoscrete faster**. Phoscrete recommends the Collomix 8-gallon tall bucket. Collomix products are available from Phoscrete.
- **Do not under-mix Phoscrete F1**. Mix for at least [1] minute and until fully wetted out (no dry material remains). F1-HC is flowable, and F1-VO mixes to a putty consistency. Then, place and finish immediately.

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

- **Clean tools, buckets, clothing, and boots with water. Clean hands with soap and water.**
- **Apply Phoscrete Primer to cover the substrate interface** prior to bond tests to reactive aggregates (e.g. limestone). This prevents bubbling that may result in voids at the bond line and loss of bond strength. Refer to Phoscrete Formula 1 [MALP Series] Full Installation Guide[i] for Primer application instructions with F1.

PHOSCRETE F1 concretes are self-consolidating and thixotropic. 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 react with zinc, producing H_2 gas. Metal molds can enhance consistency in sample formation and yield higher compressive strengths owing to their heat retention properties. However, it is imperative to coat them with a suitable release agent to facilitate proper demolding and prevent damage to both the cubes and molds. Improper coating may cause damage to the mold. Phoscrete recommends Super Lube[ii], a food grade multipurpose synthetic grease. *Do not use release agents for bond tests!* Contact Phoscrete to verify compatibility if you wish to use a different release agent.

Cylinder vs. Cube molds for compressive strength tests: The largest aggregate in F1 is 4.75 mm, however the FRP macro-fibers are 20-35 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 F1 products is ASTM C-39. If 2" cubes are required for testing per ASTM C-109, it is recommended that additional cubes are prepared, and discard low (anomaly) readings.

Use 3x3 molds for F1-HC length change tests: When testing ASTM C-157 (dry and wet) use 3x3 prisms for Phoscrete materials containing rigid fibers for accurate results. 1" x 1" prisms are designed for mortar.

Cylinder molds for bond and compressive strength tests: Phoscrete MALP Series concretes bond strongest to a dry concrete substrate. Always use Phoscrete Primer before applying F1 to an SSD substrate surface when required by the Materials Testing Office Standard Specifications.

Grinding Edges to Remove Fins or Thinning—Guidelines: Grinding edges of mortar or concrete specimens to remove fins or thin sections is acceptable for both lab testing and field repair. ASTM C109 recommends that cube specimen faces should be ground or remade to ensure flat, uniform surfaces for accurate compressive strength testing. This practice ensures that the results reflect true material strength without weak or poorly formed sections compromising integrity.

On set, Phoscrete F1 products may exhibit slight expansion. Grind or wet sawcut the top of the hardened sample until level. Otherwise, the testing machine will not exert a uniform stress over the contact surface of the sample, resulting in potentially inaccurate readings. This is particularly true for slant shear bond (C882). Phoscrete can be sawcut or ground as soon as 15 minutes following final set.

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 minimum CSP-6 per ICRI specifications and vibrate Phoscrete into place.

Do not wet cure or moist cure PHOSCRETE F1 concretes before 3 days air cure.

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

Brian Mintz, *General Manager*
Phoscrete Corporation
561-420-0595 ext. 719
brian.mintz@phoscrete.com

Jorge Giro, *Quality Control Manager*
Phoscrete Corporation
561-420-0595 ext. 919
jorge.giro@phoscrete.com

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.

[i] https://www.phoscrete.com/phoscrete-formula-1-malp-series-full-installation-guide/
[ii] https://www.super-lube.com/multi-purpose-synthetic-grease-with-syncolon-ptfe/