

Low Modulus,
Toughened Epoxy
Binder for Mortars,
Concretes and Overlays

KEMKO® 047 LoMod Binder

Type:	Two-component, solvent-free, epoxy resin / hardener.
Primary Use:	Impact and abrasion resistant binder for repair mortars and concretes, overlays, joint nosing and aggregate broadcast systems. Toughened for mechanical shock resistance. Meets ASTM C881, Type III, Grade 1.
Substrates:	Concrete, masonry, stone, steel, wood and flexible elastomers.
Minimum Temp:	Installation: 40° F (substrate temperature).
Thickness:	Mortars and concretes up to approx. 1 1/2 inches per lift.
Colors:	Clear amber (unpigmented).
Coverage:	Varies with aggregate selection and loading. Check trial mix for yield.

The properties listed in this bulletin are typical and descriptive of the product and should not be used for specification purposes. For specification preparation, reference the specification of this product available from ChemCo Systems, Inc. This product is available only through KIP System (KEMKO® Injection Process) license/applicators.

Description: KEMKO® 047, LoMod Binder is a two-component, low viscosity, low modulus, epoxy binder designed specifically for exterior use. Blended with suitable aggregate, KEMKO 047 mortars, concretes and overlays may be used for protecting concrete surfaces, rebuilding damaged joint nosing, repairing spalls and replacing deteriorated concrete. Its short cure cycle, tolerance of surface dampness, resistance to most automotive and aircraft fluids and pavement deicing compounds make it ideally suited for a variety of repairs. Can also be used to bond flexible elastomers to rigid substrates. Evaluation of trial mixes particularly under low temperature, damp conditions prior to installation is recommended.

Features: Unlike many other exterior use epoxy binders, KEMKO 047 does not embrittle when exposed to sunlight for long periods of time and is environmentally safe. The product has a convenient 2:1 (by vol.) mixing ratio and a fast cure cycle for short downtimes. KEMKO 047 is formulated for high aggregate loading and freeze-thaw resistance. The components do not contain volatile solvents (VOC's).

Limitations: The minimum temperature for cure is 40 °F. Apply the material after the daily substrate temperature cycle has reached its peak. The recommended maximum installed thickness of mortar and concrete mixes is an approx. 1 ½ inch lift. Do not add solvents or otherwise thin this material.

Packaging: Standard package sizes of Part A + Part B are 3, 15 and 150 gallon units.

Shelf Life: Three years minimum in unopened, original containers when stored between 50 and 90 °F in a dry place away from sunlight.

Color Selection: The standard color is clear amber. Custom colors are available, but may be subject to minimum quantities and/or slightly higher price.

Chemical Resistance: Resistant to a wide range of commonly used deicing chemicals and aircraft and automotive chemicals. It has limited resistance to hydrocarbon solvents. Performance is a function of the specific chemical and concentration, ambient and solution temperature, exposure time and housekeeping procedures. For information on specific chemicals and exposure conditions, contact a ChemCo Systems, Inc., technical representative.

Surface Preparation: Concrete surfaces may be dry, damp or wet but must be sound and free of all bond-inhibiting substances. Prepare surfaces for bonding in accordance with *ASTM D 4259, "Standard Practice for Abrading Concrete,"* or *ACI 503R, Chapter 5, "Preparing Surfaces for Epoxy Compound Application,"* and ChemCo Systems, Inc.'s specific recommendations. Properly prepared concrete surfaces should have a minimum strength of 250 psi in direct tension. Steel surfaces should be cleaned to white metal according to SSPC SP 5.

Aggregate Selection:

Overlay and Repair Mortars: The preferred aggregate for most applications is high silica sand (>85% SiO₂), washed, kiln-dried, graded and bagged. The sand particles should be round to sub-angular in shape. A good gradation for low void content is a 2:1 or 3:1 blend of #12 or 15 mesh and #70 or 90 mesh. If using a single sand fraction, a #20 or 30 mesh is recommended.

Multiple Layer Broadcast and Slurry Systems: The recommended aggregate size is #6x12; 8x16, 12x20 or 20x40 mesh depending on the installed thickness.

Concretes: A dense graded aggregate typical of ASTM C 33 (Gradation #8, 3/8 in. max.) may be used.

Vehicular Surfaces: For maintenance of long-term skid resistance, consider use of polish resistant aggregate such as aluminum oxide, silicon carbide, blast furnace slag, trap rock, etc. For all applications, the maximum particle size of the aggregate selected should not exceed 1/3 of the installed thickness.

Mixing: KEMKO 047 is a two-component adhesive. The resin to hardener (Part A: Part B) mix ratio is 2:1, by volume. Premix the individual components before drawing from bulk packaging. Wear safety glasses and rubber gloves when handling the material. Transfer the appropriate quantities of Part A and Part B into a mixing container. Use quantities that can be applied before the potlife of the mixed material expires. Blend thoroughly using a Jiffy mixer blade attached to a low speed (350 - 750 rpm) electric or pneumatic drill. Proper mixing will take 2 - 3 minutes. For fluid, epoxy-rich mixtures continue mixing and slowly add aggregate to the mixing vessel. For less fluid, epoxy-lean mixtures, transfer the mixed binder into a mortar or plaster mixer, add aggregate (coarse first, fine last) and mix an additional 1-2 minutes.



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Typical Properties (1)

Property		Test Method	Value
Mix Ratio, A : B,	by vol		2 : 1
	by wt		100: 43
Color:	Part A	VISUAL	Clear amber
	Part B		Clear amber
	Mixed		Clear amber
Weight per Gallon, lb:	Part A	ASTM D 1475	9.2
	Part B		7.8
	Mixed		8.7
Viscosity, cp:	Part A	ASTM D 2393	300
	Part B		250
	Mixed		275
Gel Time, 1 quart, minutes		ASTM D 2471	30
Tensile Strength, psi		ASTM D 638	2200
Tensile Modulus, psi		ASTM D 638	16,000
Elongation at Break, %		ASTM D 638	70
Bond Strength to ASTM C 109		ASTM D 4541	
Cement Mortar, psi:	dry		500 (2)
	damp		430 (2)

(1) Cure schedule, 7 days at 73° ± 4° F and test temperature, 73° ± 4° F.

(2) Compressive strength of cement mortar, 4500 psi.

Install: Mortars/Concretes - Prime the substrate with mixed binder components at a thickness of 8 - 10 mils (100 - 125 sq ft/gal). Apply the epoxy mortar or concrete to the primed substrate while the primer is still tacky. The mortar or concrete may be rodded, tamped, screeded or troweled into place. Clean application tools frequently.

Multiple Layer Broadcasts - Apply mixed binder at a rate of approx. 45 sq ft/gal by roller, squeegee or spray. Uniformly broadcast aggregate (8 - 10 lb/sq yd) until no wet spots are visible. Allow curing for 2 - 5 hours. Remove excess aggregate by sweeping. Apply the second coat at approx. 30 sq ft/gal. Broadcast aggregate at 12 - 14 lb/sq yd. Remove excess after 2 - 5 hour cure. Repeat process, if necessary to build-up to the specified thickness. Allow extra cure time for top layer (4 - 6 hours). Remove all excess aggregate by sweeping and open to traffic.

Slurry Coats - Blend 1 part by volume of premixed binder and 2 - 2.5 parts by volume of aggregate in a mortar mixer for 2 - 3 minutes. Apply the slurry in a thickness of 3/8 inch and strike-off with a screed bar. Broadcast additional aggregate (10 - 14 lb/sq yd) into the surfacing until all wet spots are gone. Allow curing 6 - 8 hours, removing excess aggregate by sweeping and open to traffic. For additional application information, see *ACI 503R, Chapter 7, "Applying Epoxy Compounds."*

Clean up: All tools and equipment must be cleaned before the mixed material cures. Cleaning can be facilitated with a solvent such as acetone or heavy-duty detergents. Cured material may be removed from equipment and tools by soaking in an epoxy stripper.

Handling and Toxicity: This bulletin does not accompany the product when sold. For hazard warnings, safe handling and first aid instructions.

CAREFULLY READ THE MATERIAL SAFETY DATA SHEETS AND CONTAINER WARNING LABELS.

Part A: Liquid epoxy resin, HMIS Health Hazard Rating- 2 (Moderate Hazard). Warning! Causes eye and skin irritation. May cause allergic skin reaction. Harmful if swallowed. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin.

Part B: Liquid epoxy hardener, HMIS Health Hazard Rating- 3 (Serious Hazard). Contains alkaline amines. Danger! Causes severe eye and skin burns. May cause allergic skin and respiratory reaction. Combustible, corrosive. Do not get in eyes or skin or on clothing. Avoid breathing vapor. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Keep away from heat and open flame.

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