

# KEMKO<sup>®</sup> 112 UW Binder

Flexible Epoxy  
Adhesive for  
Underwater Grouting

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- Type:** Two-component, low viscosity, flexible epoxy resin / hardener.
- Primary Use:** Underwater applications (fresh and salt water) such as:  
Repair of cracks and delaminations in concrete, masonry and wood.  
Filling of porous and honeycombed concrete and grout.  
Adhesive bonding of steel and fiberglass jackets (external reinforcement).  
Sand-filled grouts using mortar mixers.
- Substrates:** Concrete, masonry, stone, steel and sealed wood (dry, damp, wet or submerged).
- Minimum Temp:** Installation: 50° F, Cure: 45° F (substrate temperature).
- Applications:** Cracks, delaminations and annular spaces up to 1/4" width; greater than 1/4" with pre-placed aggregate.
- Shelf Life:** Three years minimum in sealed containers (see below for conditions).
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*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) licensee/applicators.*

**Description:** KEMKO® 112, UW Binder is a two-component, low viscosity, epoxy adhesive specifically designed for grouting particularly when long pot life and low exothermic properties are required. Primary uses include the repair of cracks and delaminations in concrete, masonry, stone and wood; filling of voids in porous and honeycombed concrete and grout; adhesive bonding of steel plates (external reinforcement); and repair of wood and concrete piers and pile caps using steel or fiberglass jackets when immersed or submerged in water. Applications requiring material thickness in excess of 3/4 inch may be facilitated by pre-placing aggregate in the void. KEMKO 112 bonds to dry, damp and wet substrates and to substrates immersed or submerged in fresh or salt water. The components do not contain volatile organic compounds (VOC's).

**Features:** The physical properties of the product allow its use in applications requiring resistance to creep and stress relaxation, maintenance of mechanical properties at high ambient temperatures and high load bearing strength. Excellent substrate wetting and water displacement properties provide adhesion and high bond strength under adverse application conditions, e.g., cold, submerged concrete.

**Limitations:** The recommended minimum substrate temperature during installation is 50 deg F. The minimum substrate temperature for cure is 45 deg F. Colder temperatures will substantially increase cure times; for every 18F decrease in temperature, the gel time and useful life of the mixed product will double. Installed thicknesses in excess of 3/4 inch are possible with neat epoxy unless there is a potential concern over linear shrinkage. Pre-placing aggregate will minimize shrinkage. 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 60 and 90 deg F in a dry place away from sunlight. Remixing of components may be required upon prolonged storage.

**Chemical Resistance:** KEMKO 112 has excellent resistance to a wide range of commonly encountered chemicals including acids and bases, aircraft and automotive fluids, petroleum fuels, cutting oils, etc. It has limited resistance to hydrocarbon solvents. Performance is a function of the specific chemical and concentration, ambient and solution temperatures, exposure times and housekeeping procedures. For information on specific chemicals and exposure conditions, contact a ChemCo Systems, Inc., technical representative.

**Color Selection** The standard color of the mixed components is amber. Other colors are available and may require minimum quantities and/or slightly higher cost.

**Surface Preparation:** Substrate surfaces may be dry, damp, wet, immersed or submerged but must be sound and free of all bond-inhibiting substances. Prepare cracks by blowing clean with oil-free compressed air or by flushing clean with an appropriate cleansing solution as required to remove foreign substances and contaminants. Prepare exposed 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. In underwater and tidal zone applications where cleaning of the substrate is possible, the product may have to be applied within a relatively short period of time (30 minutes to several hours) after substrate preparation to achieve a strong bond. Contamination of the concrete surface may negatively affect the bonding capability of the product.

**Mixing:** KEMKO 112 is a two-component adhesive designed specifically for use by KIP System licensed trained applicators with proper mixing equipment. The resin to hardener (Part A: Part B) mix ratio is 2:1, by volume. KEMKO 112 can be used neat or in conjunction with a kiln-dried sand or aggregate blend. When using aggregate, the neat resin and hardener should be mixed first and then the aggregate added in a plaster or mortar mixer last. Up to 4-5 parts aggregate can be mixed with 1 part epoxy. Consult ChemCo technical staff for aggregate recommendations.



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## Typical Properties (1)

Property		Test Method	Value
Mix Ratio, A:B,	by vol		2 : 1
	by wt		100 : 47
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		8.0
	Mixed		8.8
Viscosity, cp:	Part A	ASTM D 2393	290
	Part B		1400
Gel Time, 100 g, minutes:	@ 50° F	ASTM D 2471	95
	@ 73° F		50
Tensile Strength, psi		ASTM D 638	2200
Elongation at Break, %		ASTM D 638	69
Compressive Yield Strength, psi		ASTM D 695	5,000
Compressive Modulus, psi		ASTM D 695	--
Wet Slant Shear Strength, psi (Cure schedule, 3 days @ 40° F)		AASHTO T-237	> 400, Cement mortar failure (2)

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

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

**Installing:** The KIP System, its products and equipment are only available from KEMKO licensee/applicators. KEMKO 112 is installed in accordance with KIP System Guideline Specification procedures and ChemCo Systems, Inc.'s specific recommendations. For additional information on repair by pressure injection grouting, 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. **READ CAREFULLY 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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