Low Exotherm Epoxy Adhesive for Grouting

KEMKO® 222 High HDT – Lg. Void Grout

Type:	Two-component, solvent-free, epoxy resin / hardener.
Primary Use:	Filling of wide cracks, gaps, voids and inadequate consolidations in concrete. Large void application in high temperature environments. Can be used underwater.
Substrates:	Concrete, masonry, steel, stone (dry, damp and wet) and sealed wood.
Minimum Temp:	Installation: 40° F (substrate temperature).
Applications:	Cracks, voids, delaminations and annular spaces greater than 1/8" width; used in conjunction with pre-placed aggregate when possible. Suitable for pier and pile applications in fresh and salt water. Use with fiberglass and steel jackets. Structural repair load-bearing uses under ASTM C881, Type IV.
Shelf Life:	Three years minimum in sealed containers (see below for conditions).

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 222, High HDT - Large Void is a two-component, medium viscosity, low exothermic, epoxy adhesive specifically designed for grout applications on concrete, steel and wood substrates. Primary uses include filling wide cracks, gaps, void spaces and delaminations in concrete, masonry, stone and steel. The product is designed for applications requiring material thickness in excess of 1/8 inch or where large masses of mixed epoxy might be required such as voids and rock pockets. Where possible, use dry, pre-placed aggregate in conjunction with the adhesive. KEMKO 222 bonds to dry, damp, wet and underwater substrates. The components do not contain volatile organic compounds (VOC's).

***Features*:** KEMKO 222 has a long working life and a low exothermic reaction (minimal heat generation during cure) that make it suitable for applications where a relatively large mass of adhesive is employed. The low exothermic cure characteristics, particularly when used in conjunction with pre-placed aggregate, minimizes heat build-up and the attendant material shrinkage upon cooling. The long working life and exceptional substrate wetting allows deep penetration into structures where voids and honeycombs may be located and ensures the filling of fine tributary cracks. Kemko 222 also features a high ambient cure HDT as well as a much improved HDT if an elevated temperature post cure is used. KEMKO 222 has a convenient 2:1 (by vol.) mixing ratio.

***Limitations*:** The recommended minimum substrate temperature during installation is 40 °F. 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 °F in a dry place away from sunlight. Remixing of components may be required upon prolonged storage.

***Chemical Resistance*:** KEMKO 222 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*:** The standard color of the mixed components is clear amber.

***Surface Preparation*:** Surfaces may be dry, damp or wet 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.

***Mixing*:** 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.

***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.

***Installing*:** The KIP System™, its products and equipment are only available from KEMKO licensee/applicators. KEMKO 222 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.

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TYPICAL PROPERTIES (1)

PROPERTY		TEST METHOD	VALUE
Mix Ratio, A:B,	by vol		2:1
	by wt		100:42
Color:	Part A	VISUAL	Clear amber
	Part B		Amber
	Mixed		Amber
Weight per Gallon, lb:	Mixed		9.25
Viscosity, cp:	Mixed	ASTM D 2393	3100
Slant Shear, psi, wet		AASHTO T-237	4000
Slant Shear, psi, dry		AASHTO T-237	Cement mortar failure
Compressive Yield, psi		ASTM D 695	14,700
Compressive Modulus, psi		ASTM D 695	350,000
Tensile Strength, psi		ASTM D 638	9980
Elongation at Break, %		ASTM D 638	2
Gel Time, 100 g, minutes@ 73°F		ASTM D 2471	92
Heat Deflection Temperature, °F		ASTM D 648	
Cure schedule (1):			
7 days @73° F			145
1 months @ 73° F			155
8 hours @ 150° F			205

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

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

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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Publication Number: 6 EP KEM-222, High HDT and Large Void Grout Publication Date: Nov 2010