KEMKO® 211 FiberSEAL

Fiber Reinforced Epoxy Adhesive for Crack Sealing

Type:	Two-component, solvent-free, non-sag, epoxy paste resin / hardener.
Primary Use:	Surface sealing of cracks and delaminations in rigid construction materials in preparation for repair by pressure injection grouting.
Substrates:	Concrete, masonry, stone (dry, damp or wet), steel and sealed wood.
Minimum Temp:	Installation: 40° F, Cure: 40° F (substrate temperature).
Color:	Concrete gray (blue-gray).
Coverage:	200 - 350 lineal feet/gallon (approx.) in crack sealing applications
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® 211, FiberSEAL is a Kevlar™ fiber reinforced two-component, non-sag, epoxy paste adhesive designed for sealing cracks and delaminations in concrete, masonry, stone and sealed wood in preparation for repair with KIP System pressure injection grouting. It is ideally suited for applications in cool and cold environments. KEMKO 211 bonds to dry and damp substrates and can be applied up to 1/2 inch thick without sag or flow. The components do not contain volatile organic compounds (VOC's).

***Features*:** The fast cure and excellent handling characteristics of KEMKO 211, FiberSEAL makes possible application over a wide range of substrate temperatures and minimizes the interval between crack sealing and pressure injection grouting. It has a convenient 1:1 (by vol.) mixing ratio and is formulated for similar A and B component viscosities for ease of mixing. Contrasting component colors provides a visual key to proper proportioning and thorough mixing. The non-sag consistency facilitates the measuring and mixing of small quantities and enhances applicator production rates. KEMKO 211 is low in odor and may be considered for interior applications with adequate ventilation. The cured material exhibits generally good color stability with typical epoxy yellowing and chalking when exposed to direct sunlight.

***Limitations*:** The recommended minimum substrate temperature during installation is 40 deg F. The minimum substrate temperature for cure is 40 deg F. The maximum in-service temperature should not exceed 20 deg F below the HDT in bonding applications subjected to substantial and sustained shear stresses that may cause creep. Do not add solvents or otherwise thin this material.

***Packaging*:** Standard package size of Part A + Part B is a 2 and 10 gallon unit.

***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 211 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 concrete gray (blue-gray). Custom colors are available and may require minimum quantities and/or slightly higher cost.

***Surface Preparation*:** Substrate surfaces may be dry or damp 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.

***Mixing*:** KEMKO 211, FiberSEAL is a two-component adhesive. The resin to hardener (Part A: Part B) mix ratio is 1:1, by volume. KEMKO® 211 is a short working life/fast-curing material; use quantities that can be applied before the working life of the mixed material expires. For bonding applications, transfer the appropriate quantities of Part A and Part B into a mixing container. 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 crack sealing, transfer the appropriate quantities of Part A and Part B onto a palette and manually mix with a margin trowel until streak-free and uniform in color. Wear safety glasses and clean neoprene rubber gloves when handling the material.

***Installing*:** The KIP System™, its products and equipment are only available from KEMKO licensee/applicators. For crack sealing applications, spread a thin layer of KEMKO 211, FiberSEAL over the crack taking care to force material into the crack. Allow for adequate cure of the adhesive before beginning pressure injection Grouting. For additional information on adhesive bonding, see *ACI 503R, Chapter 7*, "Applying Epoxy Compounds."

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Typical Properties (1)

Property		Test Method	Value
Mix Ratio, A: B,	by vol		1: 1
	by wt		100 : 128
Color:	Part A	VISUAL	White
	Part B		Black
	Mixed		Concrete blue-gray
Weight per Gallon, lb:	Part A	ASTM D 1475	10.1
	Part B		12.9
	Mixed		11.5
Viscosity, p:	Part A	ASTM D 2393	1600
	Part B		2000
	Mixed		1800
Non-Sag Thickness, inches		ASTM D 2730	1/2
Gel Time, 100 g, minutes: @ 40° F		ASTM D 2471	20
@ 73° F			5
Compressive Yield Strength, psi		ASTM D 695	13,000
Compressive Modulus, psi		ASTM D 695	450,000
Time To Bond Strength		ASTM D 4541	
Greater than Mortar, hours: @ 40° F			5.0 (2)
(ASTM C 109) @ 73 F			1.4 (2)
Heat Deflection Temp., deg F		ASTM D 648	133
Wet Slant Shear Strength, psi		AASHTO T-237	Cement mortar failure (2)
(Cure schedule, 24 hours @ 73° F)			

(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.

***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- 2 (Moderate Hazard). Contains alkaline amines. Warning! Causes eye and skin irritation. 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-211, FiberSEAL Publication Date: Mar 2000