KEMKO® 322 ULTRA LOW VISCOSITY IR (ULV)

INJECTION RESIN – ULTRA-LOW VISCOSITY, COLD WEATHER, EPOXY-ACRYLIC for PRESURE INJECTION

TECHNICAL DATA SHEET

PRODUCT IS ONLY AVAILABLE TO KEMKO® APPLICATORS IN U.S., CANADA, AND INTERNATIONAL CUSTOMERS

KEMKO®322 Ultra Low Viscosity IR (ULV) is a two-component, low viscosity, structural epoxy hybrid adhesive resin specifically designed for cold weather 35°F (1.7°C) pressure injection grouting using KIP™(KEMKO® Injection Process) System automatic meter, mix and dispensing application equipment. Primary uses include the structural repair of cracks and delaminations in concrete as low as 2 mils (0.05 mm), masonry, stone, and wood; filling of voids in porous and honeycombed concrete and grout; adhesive bonding of steel plates (external reinforcement); and anchoring bolts, dowels, and rebar into concrete, masonry, or stone. Use as the adhesive for CFRP (carbon fiber-reinforced polymer) applications. Applications requiring material thickness in excess of 1/4 inch (6.35 mm) may be facilitated by pre-placing aggregate in the void. It is also an excellent primer or Healer/Sealer horizontal concrete substrate flood coat placed at 80 to 125 sq. ft. (7.48 to 11.15 sq. m.) per gallon (3.79 l.). For skid-resistance broadcast a US Sieve Size 30 – 50 mesh aggregate, uniformed in size, washed, dried, and bagged. KEMKO® 322 bonds to damp, wet, and underwater substrates. It contains no VOC's (volatile organic compounds).

- Meets - ASTM C881 and AASHTO M235, Type I, II, & IV, Grade 1, Class A, Class B, & Class C (modified, it is an epoxy/acrylic)
- Meets - ACI 548.15-20 Specification for Crack Repair by Epoxy Injection
- Meets - ICRI Guide for Verifying Field Performance of Epoxy Injection of Concrete Cracks

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, high load bearing strength, and excellent adhesion under adverse application conditions, e.g., cold temperature substrate, wet concrete. KEMKO® 322 cures to a tough, resilient polymer and has excellent load transfer capability. Exceptional substrate wetting ensures penetration and filling of fine fissures and tributary cracks as narrow as 2 mils (0.051 mm) width. It has a convenient 2:1 (by vol.) mixing ratio and employs special colorants for contrasting component color.

TYPICAL USES

- Use when the substrate temperature is 35°F (1.7°C) or when rapid cure is desired at evaluated temperatures.
- Structural repair of cracks and delaminations in concrete, masonry, and wood.
- Filling of porous and honeycombed concrete and grout.
- External reinforcement of steel plate and CFRP.
- Anchoring bolts, dowels, and rebar into concrete, masonry, and stone.
- Bonding dissimilar items to concrete, masonry, and stone.
- Healer-Sealer for gravity filling and consolidation of fine cracks as well as strengthening of weak and porous surface layers.
- Primer when a fast-curing concrete consolidator is desired.

TECHNICAL DATA

7 days 73°F (23°C) unless otherwise indicated. Compressive strength of cement mortar 4,500 psi (13.0 MPa).

PHYSICAL PROPERTIES		TEST METHOD	VALUE
Mix Ratio by Volume			2:1
Mix Ratio by Weight			100:44
Color	**Mixed**	Visual	Clear Amber or Pigmented
Weight per Gallon	**Part A** **Part B** **Mixed**	ASTM D1475	9.3 lbs. (4.2 kg) 8.0 lbs. (3.6kg) 8.9 lbs. (4.0 kg)
Viscosity, CP	**Part A** **Part B** **Mixed**	ASTM D2393	95 55 72
Mixed Viscosity, CP @ 40°F (4°C)		ASTM D2393	150
Gel Time, 60 g	**@ 40° F (4°C)** **@ 73° F (23°C)**	ASTM C881	45 minutes 15 minutes
Compressive Yield Strength		ASTM D695	14,990 psi(103.4 MPa)
Tensile Strength (PSI)		ASTM D638	7,800 psi (53.8 MPa)
Elongation at Break		ASTM D638	11 %
Thin Film Tack Free Time		ASTM D1640	5.5 to 6.5 Hours
Thin Film Tack Free Time at 50 mils (1.7 mm)		ChemCo Test	5.5 Hours
Hardness, Shore D, 1 Day		ASTM D2240	74
Hardness, Shore D, 3 Day		ASTM D2240	83
Heat Deflection Temperature		ASTM D648	120
Bond Pull-Off Strength to Concrete		ASTM C1583	400 psi (2.8 MPa)

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LIMITATIONS

The minimum substrate temperature for cure Is 40°F (4.4°C).

- For installation in wider cracks ranging from 6 mils to 1/4 inch (0.15 mm to 6.35 mm) use KEMKO® 038 IR Regular.
- For installation in narrow cracks ranging from 2 mils to 1/4 inch (0.05 mm to 6.35 mm) at 60F° (15.6°C) and higher use KEMKO® 068 IR.
- For Installation temperatures above approximately 90°F (32.2°C), consider using KEMKO® 030, HiAmb IR.
- For large voids consider using KEMKO® 077.
- For cracks that cannot be sealed on the backside consider using KEMKO® 050.
- The maximum in-service temperature should be 20°F (10°C) below the HDT (Heat Deflection Temperature) in bonding structural applications subjected to substantial and sustained shear stresses that may cause creep.
- Installed thickness in excess of 1/4 inch (6.35 mm) pre-pack with uniform sized aggregate to dissipate heat generated during the cure process.
- Do not add solvents or otherwise thin this material.

PACKAGING

Standard kit sizes of Part A + Part B are 3,15, and 150 gallon (11.36, 56.78 and 567.8 l.) kits. Cartridges available.

SHELF LIFE AND SHIPPING

Three years minimum in unopened, original containers when stored between 50°F (10°C) and 90°F (32°C) in a dry place away from sunlight. Remixing of each component may be required upon prolonged storage.

COLOR SELECTION

The standard color of the mixed components is amber and it is also available in florescent pink and yellow to enhance visibility.

APPLICATIONS

Cracks, small voids, large voids, delaminations, and annular spaces larger than 1/4" (6.35 mm) with pre-placed aggregate. Can be used as a rapid setting primer and porous concrete healer sealer.

CHEMICAL RESISTANCE

KEMKO® 322 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' Technical Consultant.

SURFACE PREPARATION

Substrate surfaces must be dry or damp, sound and free of all bond-inhibiting substances for sealers used as epoxy dams. Prepare surfaces in accordance with International Concrete Repair Institute, ICRI Guideline No. 310.2R Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair, Concrete Surface Profile, CSP 2 to CSP 4. The concrete surfaces should have a minimum strength of 250 psi (1.72 mpa) in direct tension per ASTM C1583 Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method). Steel surfaces should be cleaned to "white metal" according to SSPC-SP 5/NACE No. 1 White Metal Blast Cleaning is a standard used for white metal blast cleaning put forth by the SSPC (Society for Protective Coatings) and NACE (National Association of Chemical Engineers) international standard.

MIXING

KEMKO® 322 is a two-component adhesive specifically designed for use with KIP™ System automatic meter, mix, and dispense application equipment. The resin to hardener (Part A: Part B) mix ratio is 2:1, by volume. The KIP™ System Guideline Specification includes provisions for routine periodic testing of the KIP™ System grouting equipment to determine that it is metering the components accurately and delivering thoroughly mixed material.

Premix the individual components before drawing from bulk packaging. Wear safety glasses and clean neoprene 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. Caution - Take care to not leave the mixed material in the bulk mixing container in excess of the gel time period. After mixing, immediately pour contents onto working surface. Due to the fast gel time of this product, a rapid exotherm (temperature rise) of the bulk material will otherwise occur. High ambient temperatures shorten gel time. Immediately spread onto the substrate, before the product's viscosity increases due to rapid gel times.

INSTALLATION INJECTION

The KIP™ System, its products and equipment are only available from KEMKO® applicators. KEMKO® 322 is installed in accordance with KIP™ System Guideline Specification procedures and ChemCo Systems' specific recommendations. For additional information on repair by pressure injection grouting, see ACI 503.7, Specification for Crack Repair by Epoxy Injection and ICRI Guide for Verifying Field Performance of Epoxy Injection of Concrete Cracks.

INSTALLATION "HEALER SEALER"

Pour the mixed material onto the substrate and distribute with a squeegee to a coverage rate of 80 - 125 sq. ft. (7.48 to 11.15 sq. m.) per gallon (3.79 l.). Let the sealer penetrate for 4-6 minutes and then redistribute the excess with squeegees or a broom to refill any cracks,

leaving the minimum amount of material possible on the surface. Repeat the process if the product is rapidly absorbed. Wait an additional 10 - 20 minutes, then broadcast dry, #20 mesh sand at a rate of 2 lb/yd for slip/skid resistance. Remove excess sand by vacuum or sweeper prior to opening to traffic. Do not open to traffic until the treated surface is tack-free (non-oily) and sand adheres sufficiently to resist brushing by hand. If used as a primer for elastomeric or non-flexible topcoat, apply the topcoat within the time that tack is decreasing but before it is lost (1 - 3 hours after spreading depending on substrate temperature). Minimum Temperature: Installation 35°F (1.7°C) Substrate Temperature.

Note: ChemCo Systems can recommend pre-coated aggregate when it is required for safety reasons.

SAFETY

This bulletin does not accompany the product when sold. For hazard warnings, safe handling, and first aid instructions. CAREFULLY READ THE 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 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 liquid, 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.

CLEAN-UP / DISPOSAL

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.

TECHNICAL SUPPORT

Additional information, technical assistance, and management services are also available from a ChemCo Systems' Technical Consultant at sales@chemcosystems.com or 650-261-3790.

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. This product is available only through KIP™ System (KEMKO® Injection Process) applicators.

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