Construction

Product Data Sheet
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SikaRepair® 224

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One-component, cementitious, sprayable mortar for structural repairs

Description	SikaRepair® 224 is a one-component, pre-packaged, ready-to-use, cementitious, silica fume, fiber reinforced, high strength shrinkage-compensated mortar. Formulated for application by trowel or low pressure spray. It is designed especially for repair of overhead and vertical surfaces.
Where to Use	A high performance repair mortar for wet spray application. Suitable for new construction, repairs, and maintenance work. Typical applications include: ■ Structural repair material for water and wastewater treatment plants, parking structures, industrial plants, bridges, tunnels and dams, etc. ■ Use on vertical and overhead surfaces. ■ Use on grade, above, and below grade on concrete and mortar. ■ Potable water tank. (NSF approved in Marion, OH and Santa Fe Springs, CA)
Advantages	■ Ready-for-use, one-component material. ■ Easy to use; just add water. ■ Sprayable system. ■ Potable water approved. ■ Superior workability. Can be trowelled and screeded after application. ■ Labor-saving system. ■ Superior abrasion resistance over conventional Portland cement mortar. ■ Bond strength ensures superior adhesion. ■ Not a vapor barrier. ■ Compatible with coefficient of thermal expansion of concrete. ■ Increased resistance to de-icing salts. ■ Good freeze/thaw resistance. ■ High early strengths. ■ Very low shrinkage. ■ Silica Fume enhanced. ■ Fiber reinforced.
Coverage	Yield in service will vary. Average yield is approximately 0.40 cu. ft./bag. Estimating should be based on prior experience or actual field evaluation.
Packaging	50-lb. (22.7 kg) multi-wall bags.

Typical Data *(Material and curing conditions @ 73°F and 100% R.H.)*

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life	1 year in original, unopened bags.	
Storage Conditions	Store dry at 40°-95°F (4°-35°C). Condition material to 65°-75°F before using.	
Color	Dark gray.	
Mixing Ratio	3/4 gallon to 7/8 gallon liquid per 50 lb. bag of material	
Density (wet mix)	125 lbs./cu. ft. (2.0 kg./l.)	
Compressive Strength (ASTM C-109)	**73°F**	
	1 day	4,500 psi (31 MPa)
	7 day	8,000 psi (55 MPa)
	28 day	10,000 psi (69 MPa)
Flexural Strength (ASTM C-348)	**28 day**	1,100 psi (7.6 MPa)
Tensile Strength (ASTM C-496)	**28 day**	735 psi (5.0 MPa)
Direct Tensile Pull off (ACI 503)	**28 day**	greater than 350 psi (Failure in substrate. Substrate prepared with 20,000 psi hydroblasting)
Slant Shear (ASTM C -882 modified)	**28 day**	>2,500 psi (24.1 MPa)
Chloride Permeability (ASTM C1202/AASHTO T277)	**28 day**	less than 500 coulombs
Sulfate Resistance (ASTM C-1012)	**1 year**	less than 0.06%
Setting Time (ASTM C 266)	**Initial:** 2 to 3 hours. **Final:** 5 to 6.5 hours.	

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How to Use

Surface Preparation

Substrate must be sound, clean, and free from oil, grease, loose material, surface contaminants and other bond-inhibiting materials. Steel reinforcement must be clean and free from any rust. Be sure repair area is not less than 3/8 in. in depth. Preparation work should be done by high pressure water blast, or other appropriate mechanical means, to obtain an exposed aggregate surface (CSP-6). Saturate surface with clean water. Substrate should be saturated surface dry (SSD) with no standing water during application. Reinforcing Steel: Steel reinforcement should be thoroughly prepared by mechanical cleaning to remove all traces of rust. Where corrosion has occurred due to the presence of chlorides, the steel should be high-pressure washed with clean water after mechanical cleaning. For priming of reinforcing steel, use Sika® Armatec® 110 EpoCem (consult Technical Data Sheet).

Priming

Concrete Substrate: Prime the prepared substrate with a brush or sprayed applied coat of Sika® Armatec® 110 EpoCem (consult Technical Data Sheet). Alternately, a scrub coat of Sika Repair 224 can be applied prior to placement of the mortar. The repair mortar has to be applied into the wet scrub coat before it dries

Mixing

With water: Add the water (approx. 3/4 gal.) directly into mixer. Start the mixer in motion and add the SikaRepair® 224 mortar while continuing to mix. Mix to uniform consistency using a maximum of 7/8 gallons of water per 50 lb. (22.7 kg.) bag (approx. 3 minutes).

With Latex R: Pour 6-7 pints of SikaLatex® R into the mixing container. Slowly add powder and mix as above. **With diluted Latex R:** SikaLatex® R may be diluted up to 5:1 (water: SikaLatex® R) for projects requiring minimal polymer-modification. Pour 6-7 pints of the mixture into the mixing container. Slowly add powder and mix as above **SikaRepair 224 Concrete:** For horizontal applications greater than 1 inch deep, add 3/8 inch coarse aggregate. Aggregate must be non-reactive (reference ASTMC1260, C227 and C289), clean, well-graded, saturated surface dry (SSD), have low absorption and high density, and comply with ASTM C33 size number 8 per Table 2. Addition rate must not exceed 25 lbs. of aggregate/bag of SikaRepair® 224 (25 lbs. of 3/8 in. aggregate is approximately 2.0 to 2.5 gal. by loose volume of aggregate). If the placement is vertical or overhead, temporary support of the material is required. Contact Sika Technical Service for application details.

Application

Conventional wet-process shotcreting equipment such as a low-pressure or a high-pressure machine should be used. At time of application, surfaces should be saturated surface dry but hold no standing water. Apply SikaRepair® 224 mortar by low pressure spraying or trowelling for repairing vertical or overhead surfaces. Shoot the shotcrete perpendicular to the surface. This minimizes rebound, creates the smoothest pattern (reduces 'bumps') and properly encases the rebars. The velocity of the shotcrete is sufficient if, at a distance of 18 to 24 in., the shotcrete pattern flattens out on contact with the surface and the rebars are encased. After applying the shotcrete, allow it to stiffen for about 10 minutes before removing bumpy areas with a trowel. Before applying the next layer, allow the shotcrete to reach initial set. This will take anywhere from 45 minutes to several hours, depending on mix consistency, mix and ambient temperature, wind conditions and humidity. Begin and finish a given patch on the same day.

Tooling and Finishing

As per ACI recommendations for portland cement mortar, curing is required when jobsite conditions warrant. Moist cure with wet burlap and polyethylene, a fine mist of water or a water based* compatible curing compound. Curing compounds adversely affect the adhesion of following layers of mortar, leveling mortar or protective coatings. Moist curing should commence immediately after finishing. Protect newly applied material from direct sunlight, wind, rain and frost.

*Pretesting of curing compound is recommended.

Limitations

Application thickness:

- Minimum 3/8 inch (9 mm).

Vertical applications:

- SikaRepair® 224 can be spray applied up to 2" thickness in one lift.

Overhead applications:

- The thickness should be no more than 1 to 1.5" per pass. If repair requires several lifts (over 1.5"), each lift should be applied as soon as the previous lift will support it.

General:

- For additional information, consult Technical Service.
- Minimum ambient and surface temperatures 40°F (4°C) and rising at the time of application.
- As with all cement based materials, avoid contact with aluminum to prevent adverse chemical reaction and possible product failure. Insulate potential areas of contact by coating aluminum bars, rails, posts etc. with an appropriate epoxy such as Sikadur® Hi-Mod 32.

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Regional Information and Sales Centers. For the location of your nearest Sika sales office, contact your regional center.

Sika Corporation
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: 800-933-7452
Fax: 201-933-6225

Sika Canada Inc.
601 Delmar Avenue
Pointe Claire
Quebec H9R 4A9
Phone: 514-697-2610
Fax: 514-694-2792

Sika Mexicana S.A. de C.V.
Carretera Libre Celaya Km. 8.5
Fracc. Industrial Balvanera
Corregidora, Queretaro
C.P. 76920
Phone: 52 442 2385800
Fax: 52 442 2250537