



DIVISION 3 -CONCRETE
Section 03930 Concrete Rehabilitation

Part 1 - General

1.01 Summary

A. This specification describes the overlay of horizontal surfaces interior and/or exterior above grade with an epoxy resin adhesive binder.

1.02 Quality Assurance

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001/9002 certified and have in existence a recognized ongoing quality assurance program independently audited on a regular basis.
- B. Contractor qualifications: Contractor shall be qualified in the field of concrete repair and protection with a successful track record of 5 years or more. Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.
- C. Install materials in accordance with all safety and weather conditions required by the manufacturer, or as modified by applicable rules and regulations of local, state and federal authorities having jurisdiction. Consult Material Safety Data Sheets for complete handling recommendations.

1.03 Delivery, Storage, and Handling

- A. All materials must be delivered in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged material must be removed from the site immediately.
- B. Store all materials off the ground and protect from rain, freezing or excessive heat until ready for use.
- C. Condition the specified product as recommended by the manufacturer.

1.04 Job Conditions

- A. Environmental Conditions: Do not apply material if it is raining or snowing or if such conditions appear to be imminent. Minimum application temperature 40°F (5°C) and rising.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified product.

1.05 Submittals

- A. Submit two copies of manufacturer's literature, to include: Product Data Sheets, and appropriate Material Safety Data Sheets (MSDS).

1.06 Warranty

- A. Provide a written warranty from the manufacturer against defects of materials for a period of one (1) year, beginning with date of substantial completion of the project.

Part 2 - Products

2.01 Manufacturers

- A. Sikadur 22, Lo-Mod, as manufactured by Sika Corporation, 1682 Marion Williamsport Road, Marion, Ohio 43302 , is considered to conform to the requirements of this specification .
- B. Any materials required for repair prior to installation of the broadcast system shall be manufactured by the same supplier of the proposed epoxy broadcast system.

2.02 Materials

- A. Epoxy resin adhesive binder
 - 1. Component "A" shall be a modified epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents. It shall not contain butyl glycidyl ether.
 - 2. Component "B" shall be a blend of aliphatic amines containing suitable viscosity control agents and accelerators.
 - 3. The ratio of Component A: Component B shall be 1:1 by volume.
- B. Aggregate for the epoxy resin broadcast shall be an oven-dried, 20-40 gradation sand approved by the Engineer.

3.02 Performance Criteria

- A. Properties of the mixed epoxy resin adhesive binder:
 - 1. Pot Life: 30 minutes
 - 2. Tack-Free Time to Touch (4-7 mil): 3.5-4.5 hours @ 73F
 - 3. Viscosity (Brookfield Viscometer, Spindle #3; Speed 100): 2,500 cps
 - 4. Color: clear, amber
- B. Properties of the mixed neat epoxy resin adhesive binder:
 - 1. Compressive Properties (ASTM D-695) at 28 days
 - a. Compressive Strength: 8,200 psi (56.5 MPa)
 - b. Compressive Modulus: 166,000 psi (1,145 MPa)
 - 2. Tensile Properties (ASTM D-638) at 14 days
 - a. Tensile Strength: 5,900 psi (41 MPa)
 - b. Elongation at Break: 30.0 % min.
 - c. Modulus of Elasticity: 190,000 psi (1,310 MPa)
 - 3. Flexural Properties (ASTM D-790) at 14 days
 - a. Flexural Strength (Modulus of Rupture): 6,800 psi (47 MPa)
 - b. Tangent Modulus of Elasticity in Bending: 270,000 psi (1,910 MPa)
 - 4. Shear Strength (ASTM D-732) at 14 days: 5,400 psi. (37.2 MPa)
 - 5. Total Water Absorption (ASTM D-570) at 7 days: 0.23% (2 hour boil)
 - 6. Bond Strength (ASTM C-882) Hardened Concrete to Hardened Concrete
 - a. 2 day (dry cure): 1,100 psi (7.5 MPa)
 - b. 14 day (moist cure): 1,600 psi.(11.0 MPa)
 - 7. Deflection Temperature (ASTM D-648) at 14 days: 111F min.(fiber stress loading = 66 psi)
 - 8. The epoxy resin adhesive binder shall be approved by the United States Department of Agriculture.

- C. Properties of the epoxy resin broadcast (epoxy resin/aggregate* = 1/2.25 by volume):
1. Compressive Properties (ASTM D-695) at 28 days
 - a. Compressive Strength: 7,850 psi (54.1 MPa)
 - b. Compressive Modulus : 600,000 psi min. (4,137 MPa)
 2. Tensile Properties (ASTM D-638) at 14 days
 - a. Tensile Strength: 2,200 psi (15.2 MPa)
 - b. Elongation at Break: 1.1%
 - c. Modulus of Elasticity: 478,000 psi (3,240 MPa)
 3. Flexural Properties (ASTM D-790) at 14 days
 - a. Flexural Strength (Modulus of Rupture): 4,300 psi (29.7 MPa)
 - b. Tangent Modulus of Elasticity in Bending: 900,000 psi (6,205 MPa)
 4. Shear Strength (ASTM D-732) at 14 days: 3,300 psi (22.7MPa)
 5. Deflection Temperature (ASTM D-648) at 14 days: 111F min. (fiber stress loading = 66 psi)
 6. Abrasion (Taber Abrader) at 14 days:
 - a. Weight Loss: 1.85 gm max. (H-22 wheel; 1000 gm weight; 1000 cycles)

*Aggregate used shall conform to ASTM C-190.

Part 3 - Execution

3.01 Surface Preparation

- A. Areas to be repaired must be clean, sound, and free of contaminants. All loose and deteriorated concrete shall be removed by mechanical means. Mechanically prepare the concrete substrate to obtain a surface profile of +/- 1/16" (CSP 4 or greater as per ICRI Guidelines) with a new exposed aggregate surface.
- B. Where reinforcing steel with active corrosion is encountered, sandblast the steel to a white metal finish to remove all contaminants and rust.

3.02 Mixing & Application

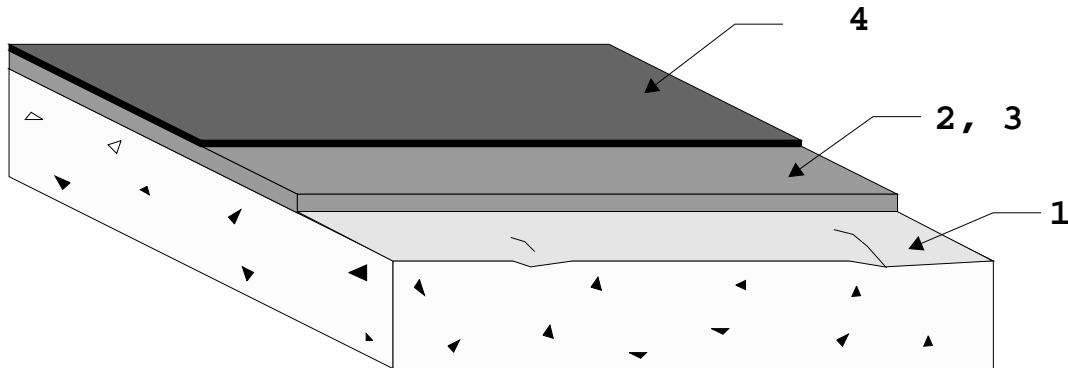
- A. Mixing the epoxy resin adhesive binder: Premix each component. Proportion equal parts by volume of Component "A" and Component "B" into a clean, dry mixing pail. Mix thoroughly for 3 minutes min. with a jiffy paddle on a low-speed (400-600 rpm) drill. Mix only that quantity of material that can be used within its pot life (25-35 minutes at 73 F).
- B. Placement Procedure: Prime the prepared substrate with the mixed epoxy resin adhesive binder with brushes, rollers, or brooms. Do not over prime or puddle. Coverage should be 300 sq ft/gal min.
- C. Apply the epoxy resin adhesive with a $\frac{3}{16}$ in. x $\frac{3}{16}$ in. notched squeegee while the primer is still tacky. Allow the binder to self-level, and then slowly broadcast an oven-dried sand in such a manner that the sand drops vertically into the binder. Broadcast lightly making several passes, allowing the binder to bleed through the sand before the next pass. Cover completely with sand before the binder becomes tack-free. Estimate oven-dried sand quantity required to broadcast to excess at 2 lbs./sq. ft. Remove excess aggregate when the broadcast overlay has reached sufficient cure as to not be damaged.
- D. Top coat the surface with the epoxy resin adhesive using a roller or flat rubber squeegee. Do not apply the top coat too heavy as to lose the slip resistant surface texture. Coverage will typically be 160 sq ft/gal. When applying the top coat, never stop the application until the entire surface has been sealed, if possible. If impossible, always discontinue at an edge, corner, or joint. Never let a previously coated film dry, always top coat into a wet film. Always apply the top coat at a 45° angle to an edge, corner, or joint.
- D. Adhere to all limitations and cautions for the epoxy resin adhesive binder in the manufacturers current printed literature.

3.03 Cleaning

- A. The uncured epoxy resin adhesive can be cleaned from tools with an approved solvent. The cured epoxy resin adhesive can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

Note: Tests above were performed with material and curing conditions at 71-75 F and 45-55% relative humidity.

Sikadur[®] 22, Lo-Mod Balcony System



1. Using a roller prime prepared substrate with neat Sikadur 21 Lo-Mod LV.
2. Apply binder coat of Sikadur 22 Lo-Mod (16-20 mils) with a roller or $\frac{3}{16}$ " x $\frac{3}{16}$ " notched rubber squeegee while primer is still wet. Allow the binder to self-level.
3. Slowly broadcast an oven-dried aggregate such as Este's Broadcast Medium into the binder, making several passes, allow the binder to bleed through the sand before making the next pass, cover completely. (Aggregate color and gradation shall be approved by the owner)
4. After broadcast has reached sufficient cure, remove excess sand. Top coat with a thin neat coat of Sikafloor 90 using a roller or flat squeegee. Sikafloor 90 may be extended up to 10% maximum with Sika Epoxy Thinner. Backroll using a dry roller to remove all excess.

Material coverages may vary, sample areas are recommended prior to the start of any project

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