



DIVISION 7 - THERMAL AND MOISTURE PROTECTION
Section 07900 Joint Sealers
Elastomeric and non-Elastomeric sealant

Part 1 - General

1.01 Summary

- A. This specification describes the sealing of joints and cracks subject to normal to very large movement with an epoxy resin adhesive sealing system.

1.02 Quality Assurance

- A. Manufacturing qualifications: The manufacturer of the specified product shall be ISO 9001:2008 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 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 coating.

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 Combiflex**, as manufactured by Sika Corporation, 1682 Marion Williamsport Road, Marion, OH 43302 is considered to conform to the requirements of this specification.

2.02 Materials

- A. Sikadur 31 Hi-Mod Gel resin adhesive:
 - 1. Component A shall be a modified epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents and pigments. It shall not contain butyl glycidyl ether.
 - 2. Component B shall be primarily a reaction product of a selected amine blend with an epoxy resin of the epichlorohydrin bisphenol A type containing suitable viscosity control agents, pigments, and accelerators.
 - 3. The ratio of component A: Component B shall be 1:1 by volume.
- B. Combiflex Hypalon sheeting:
 - 1. Hypalon sheeting shall be composed of Hypalon rubber. It shall be perforated along the bonding edge to provide a mechanical key. It shall have the ability to be vulcanized with an aromatic hydrocarbon solvent to permit its adhesion to an epoxy resin adhesive.
 - 2. The sheeting shall be supplied in 20 ft. rolls or 82 ft. rolls. It shall be available in 4, 8, and 12 in. widths, at 40 mils in thickness.
 - 3. The sheeting shall be supplied with a removable center expansion strip.
- C. Activating solvent:
 - 1. The activating solvent shall be an aromatic hydrocarbon with a specific gravity of 0.86.

2.03 Performance Criteria

- A. Properties of the mixed uncured epoxy resin adhesive:
 - 1. Potlife: 30 minutes
 - 2. Consistency: non-sag (1/2 in. thick)
 - 3. Color: Gray
 - 4. Tack-Free Time to Touch: 2-3 hours (73F)
- B. Properties of the cured epoxy resin adhesive:
 - 1. Tensile Properties (ASTM D-638) at 14 days
 - a. Tensile Strength: 3,300 psi (22.7 Mpa)
 - b. Elongation at break: 0.9%
 - 2. Compressive Properties (ASTM D-695) at 28 days
 - a. Compressive strength: 16,000 psi (82.8Mpa)
 - b. Compressive Modulus of Elasticity, psi: 795,000 psi (5,485 MPa)
 - 3. Flexural Properties (ASTM D-790) at 14 days
 - a. Flexural strength (Modulus of Rupture): 6,100 psi (42Mpa)
 - b. Tangent Modulus of Elasticity in Bending: 1.67×10^6 psi (11,520 MPa)
 - 4. Shear Strength (ASTM D-732) at 7 days: 4,600 psi (31.7 Mpa)
 - 5. Water Absorption (ASTM D-570), 7 day, (24 hr. immersion) : 0.07%

6. Bond Strength (ASTM C-882) Hardened Concrete to Hardened Concrete
 - a. 2 day (dry cure) Bond Strength: 2,200 psi (22.7Mpa)
 - b. 14 day (moist cure) Bond Strength: 2,900 psi (16.6 Mpa)
7. The epoxy resin shall conform to ASTM C-881, and AASHTO M235.

C. Properties of the Hypalon Sheeting:

1. Tensile Properties (ASTM D-412)
 - a. Tensile Strength: 1,000 psi (6.8 Mpa)
 - b. Elongation at Break: 800%
 - c. Tensile Set after Break: 400%
2. Tear Resistance (ASTM D-624) Die C
 - a. Resistance to Tear: 250lb. /in.
3. Low Temperature of Performance: Maintained to -40F
3. Ozone Resistance (3 month Exposure)
 - a. water/ozone (3 ppm) – no effect
 - b. air/ozone (2-300 ppm) – no effect

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

Part 3 - Execution

3.01 Surface Preparation

- A. The concrete or steel substrate must be clean, dry, sound and free of surface contaminants. Remove dust, laitance, grease, oils, curing compounds, form release agents and foreign particles by mechanical means, i.e. – sandblasting, etc., as approved by the engineer.

3.02 Mixing and Application

- A.
 1. Placement Procedure: Wipe hypalon sheeting with Activator a minimum 1 hour and maximum of 8 hours before installation. If job conditions allow, do all lapping of sheeting at the time of activating the hypalon sheeting. Laps (welds) shall be a minimum 2 in. overlap of each hypalon sheet welded together by the activator or by heat with an approved apparatus by the engineer.
 2. Mixing of the epoxy resin adhesive: Premix each component. Proportion 2 parts of Component A to 1 part Component B by volume into a clean, dry mixing pail. Mix for 3 minutes with a low-speed (400-600 rpm) drill and jiffy paddle until uniform in color. Mix only that quantity that can be used within its potlife (25-45 minutes).
 3. Joints shall be masked to prevent discoloration or application on unwanted areas, as directed by the engineer. If masking tape is used, it shall be removed before the epoxy resin adhesive has set. Do not apply the masking tape until just prior to the epoxy resin adhesive application.
 4. Apply the mixed Sikadur 31 Hi-Mod Gel in a 1-1/2 – 2 in. wide band on each side of the joint to a thickness of approximately 1/32 in. to max. 1/8 in. Set the sheeting into the epoxy. Using a hard roller, force the sheeting down into the epoxy. Take precautions not to allow the epoxy resin adhesive to enter the joint or crack. Place the Hypalon sheeting flat over the crack or joint, or drape it into the joint or crack, as directed by the engineer. Apply a top layer of the epoxy resin adhesive on the same 1-1/2 - 2 in. wide band over the sheeting. The epoxy resin adhesive should extend 1/8 – 1/4 in. beyond the edge of the sheeting. Remove the expansion strip from the sheeting before the epoxy resin adhesive has set.
 5. Adhere to all limitations and cautions for the epoxy resin adhesive as stated in the manufacturers printed literatures.

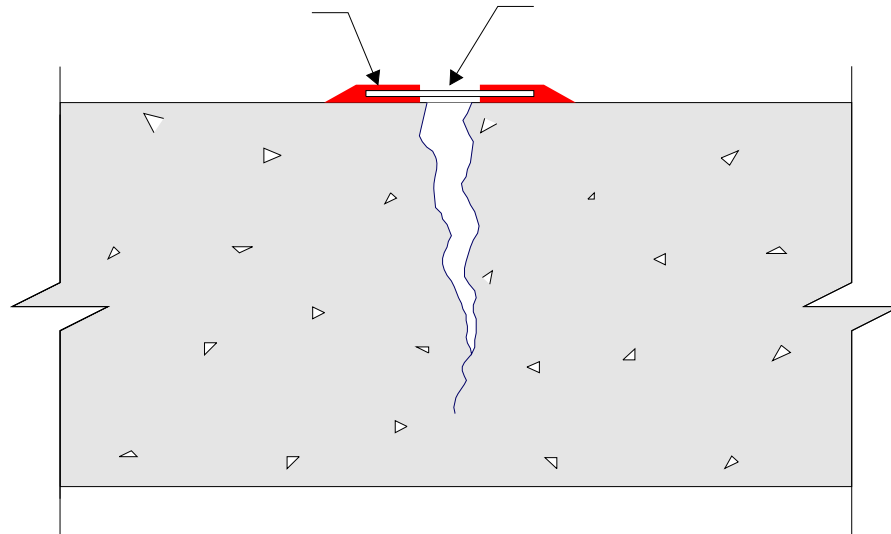
3.03 Cleaning

- A. The uncured epoxy resin adhesive can be cleaned 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.

SC-073 Sikadur[®] Combiflex Sealing System

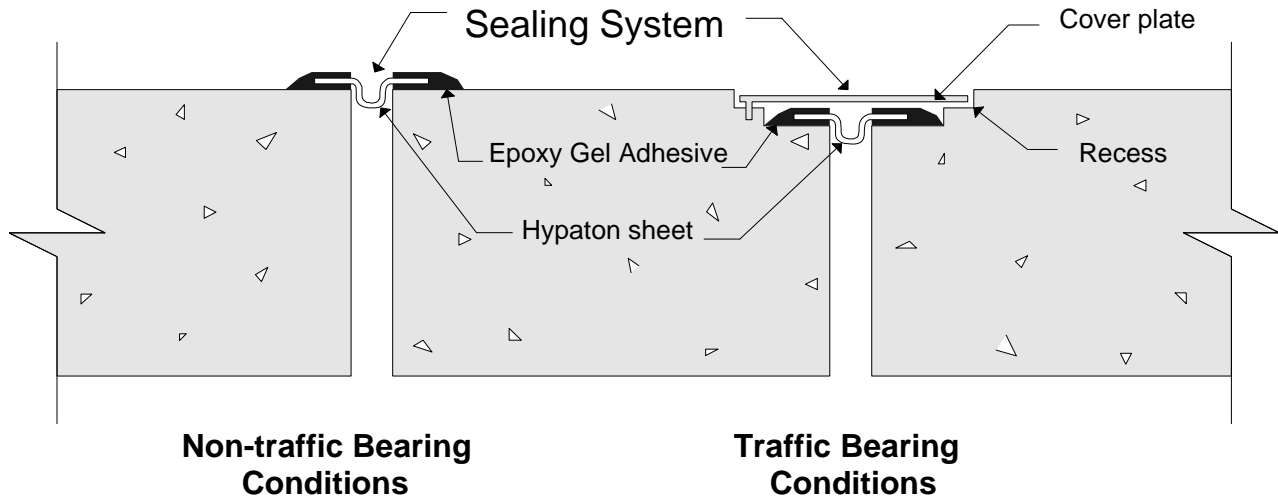
Sikadur 31, Hi-Mod Gel
Sheeting

Combiflex Hypalon



1. Wipe Hypalon sheeting with Combiflex Activator a minimum of 1 hour and a maximum of 8 hours before installation.
2. Apply the mixed Sikadur 31 Hi-Mod Gel epoxy resin adhesive on each side of the crack to a thickness of approximately $\frac{1}{32}$ ". Sikadur 31 Hi-Mod Gel should not be applied greater than $\frac{1}{8}$ " thick. Work into the substrate for positive adhesion. Bond area should be a minimum of $1\frac{1}{2}$ " on both sides of crack.
3. Set the sheeting into the epoxy resin adhesive. Using a hard roller, force the sheeting down into the epoxy.
4. Apply an additional $\frac{1}{32}$ " layer of epoxy as a top coat to the Hypalon sheeting. The epoxy resin adhesive should extend $\frac{1}{8}$ " - $\frac{1}{4}$ " beyond the edge of the sheeting
5. Remove the red expansion strip from the sheeting before the epoxy resin adhesive has set.

SC-073 Sikadur Combiflex Expansion Joint- Special Condition



1. Wipe Hypalon sheeting with Combiflex Activator a minimum of 1 hour and a maximum of 8 hours before installation.
2. Apply the mixed Sikadur 31, Hi-Mod Gel epoxy resin adhesive on each side of the crack to a thickness of approximately $\frac{1}{32}$ ". Sikadur 31 Hi-Mod Gel should not be applied greater than an $\frac{1}{8}$ " thick. The epoxy resin adhesive should extend $\frac{1}{8}$ " – $\frac{1}{4}$ " beyond the edge of the sheeting. Work into the substrate for positive adhesion. Bond area should be a minimum of $\frac{1}{2}$ " on both sides of crack.
3. Set the sheeting into the epoxy resin adhesive. Using a hard roller, force the sheeting down into the epoxy.
4. Apply an additional $\frac{1}{32}$ " layer of epoxy as a top coat to the Hypalon sheeting.
5. Remove the red expansion strip from the sheeting before the epoxy resin adhesive has set.

Note: When applied over a traffic-bearing joint Sikadur Combiflex should be protected from damage by installing a cover plate which is bolted at one side and allows for proper expansion and contraction of the joint.

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