



Section 07920 - Fluid Applied Waterproofing

Part 1 - General

1.01 Summary

- A. This specification describes the injection of a crack or joint with infiltrating water with a hydrophobic polyurethane resin chemical grout.

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: Contractors 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 the 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. Deliver the specified product in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers.
- B. Store and 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 they appear to be imminent.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the specified repair material.

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 - Surface Preparation

A. Expanding polyurethane chemical grout - When crack (s) is contaminated on the outside it will be necessary to clean the crack surface to exactly locate the crack. If the crack encounter high water flow, it will be necessary to seal the surface of the crack with a surface sealing material. The surface sealing can be done before or after drilling the injection holes. Then, begin drilling $\frac{5}{8}$ " diameter holes along the side of the crack at 45 angles. Drill the hole to intersect the crack midway through the substrate. Install the injection packers in holes. Prior to product application moisture must be present. If concrete being injected contains insufficient moisture to activate the grout, inject the crack with a small amount of water prior to the application of the chemical grout.

Part 3 - Scope: Product and Application

3.01 Acceptable Manufacturers

- A. Hydrophobic Polyurethane Chemical Grout:
 - a. SikaFix HH Plus as manufactured for Sika Corporation, Lyndhurst, New Jersey, is considered to conform to the requirements of this specification.
- B. Substitution: The use of other than the specified products will be considered providing the contractor requests their use in writing to the Engineer. This request shall be accompanied by (a) A certificate of compliance from an approved independent testing laboratory that the proposed substitute products meet or exceed the specified performance criteria, tested in accordance with the specified test standards; and (b) Documented proof that the proposed substitute products have a two year proven record of performance of the chemical injection grouting of a crack, confirmed by actual field tests and five successful installations that the Engineer can investigate.

3.02 Performance Criteria

- A. Properties of the mixed polyurethane chemical grout.
 - 1. Pot Life: approximately 5 hours, providing no moisture enters the system
 - 2. Mixed Viscosity: 500 - 700 cps ASTM D- 2369 B
 - 3. Color: pale yellow
 - 4. Flash point 325 F
 - 5. Density 8.75 – 9.17 lbs./gal. ASTM D 1475
 - 6. Solids 100%
 - 7. Corrosiveness - non- corrosive
- B. Properties of the cured polyurethane chemical grout
 - 1. Tensile Strength: 89 psi ASTM D 3574
 - a. Elongation: 35%
 - 2. Absorption 12% After 6 months immersion
 - 3. Shrinkage: Less than 4% ASTM D-1042
 - 4. Density 8.75 – 9.17 lbs./gal ASTM D3574

3.03 Materials

A. Expanding Polyurethane Chemical Grout

1. The grouting compound shall be a non- toxic, non-flammable, high flash point (325 F) hydrophilic polymer of the type which is applied in a crack or open joint by use of a packer. When the grout is mixed with water the material will expand up to 15 times its original volume and cure to a pale yellow closed cell polyurethane foam.

B. The use of injection packers is usually required for the application of the polyurethane chemical grout.

3.04 Mixing and Application

A. Mixing the polyurethane chemical grout for the injection of cracks:

1. The material can be agitated vigorously shaking the 5 gallon pail or by mixing thoroughly for about 2 minutes max. with low speed (400-600 rpm), drill and paddle, bung mixer.

Caution: Do not allow water to enter this mix and avoid “whipping” air into the material.

B. Placement procedure: set packers as required by the manufacturer.

1. Begin by drilling 5/8" diameter holes along the side of the crack at a 45° degree angle. Drill the hole to intersect the crack midway through the substrate. Spacing of the injection ports depends on crack width, but normal spacing varies from 6" to 36". It is necessary to flush the drilled holes with water to remove drill dust from the holes and cracks, and insure that the crack is wet enough to react with the grout when introduced to the crack. On structures open on both sides, provide packers on opposite sides at staggered elevations. Install the injection packers in the holes.

If the crack or joint to be injected is 1/2" or greater at surface, pack an open cell polyurethane foam saturated with the mixed polyurethane chemical grout into the crack/ joints. Spray the saturated foam with a small amount of water to activate the grout and create a surface seal.

Injection pressure will vary from 200 psi to 2500 psi depending on the width of the crack, thickness of the concrete and condition of the concrete.

C. Placement Procedure: The polyurethane chemical grout for the pressure injection grouting.

1. Inject the prepared cracks with a minimum of 250 psi in order to achieve maximum filling and penetration without the inclusion of air pockets or voids in the polyurethane chemical grout. Begin the pressure injection at the lowest packer and continue until there is the appearance of the polyurethane chemical grout at an adjacent packer, thus indicating travel. When travel is indicated, a decision to discontinue or continue the pressure injection from that packer should be made by the contractor, based on his experience, with the approval of the engineer. Continue the procedure until all pressure-inject able cracks have been filled.
2. Pump polyurethane chemical grout for 45 seconds and then pause to allow the material to flow into all of the cracks and crevices. Watch for material flow and water movement to appear on the surface. When movement stops, begin injection into the next packer. When sealing vertical cracks, begin injecting at the bottom of the crack and work vertically. If site temperatures are extremely low, heat bands or heated water baths may be used on the pails, before and during use to maintain the products temperature. Re-inject to assure that all voids are properly sealed off.
3. If penetration of any cracks is impossible, consult the engineer before discontinuing the injection procedure. If modification of the proposed procedure is required to fill the cracks, submit said modification in writing to the engineer for acceptance prior to proceeding.
4. Adhere to all limitations and cautions for the polyurethane chemical grout as stated in the manufacturers current printed literature.

Caution: Expanding chemical grout is exerting outward pressures of up to 230 psi depending on crack width. The review of drawings of the area to be repaired is desirable.

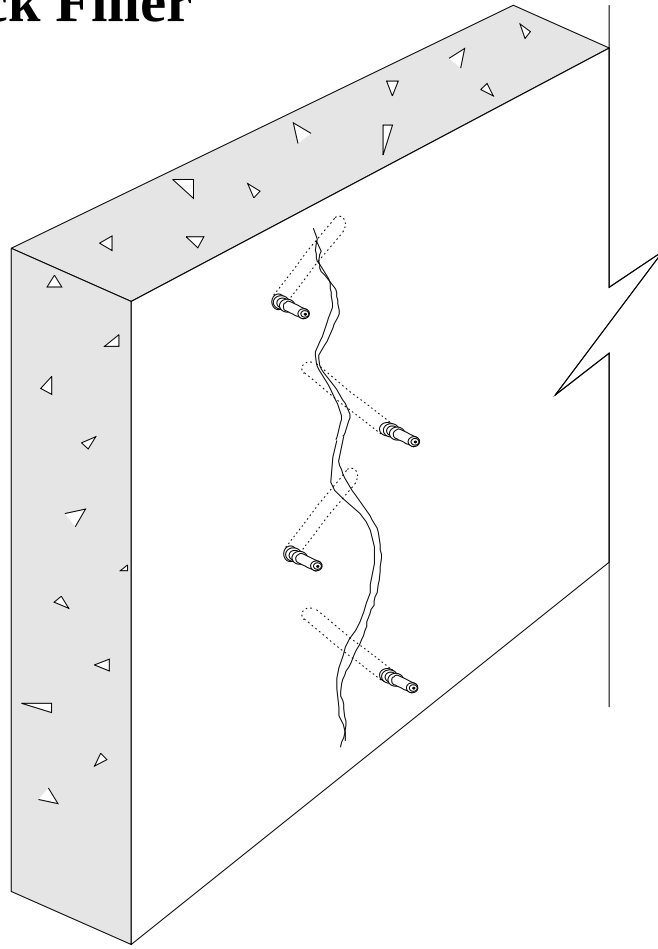
3.05 Cleaning

- A. Clean-up: Completely flush pump and hoses with SikaFix Pump Flush. Use sharp sided tool such as putty knife or trowel to remove excess material from walls, floors, etc. Wait for material to cure before removing. May be sanded off if necessary.
- B. The uncured polyurethane chemical grout can be cleaned from tools with an approved solvent. The cured polyurethane chemical grout can only be removed mechanically.
- C. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

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

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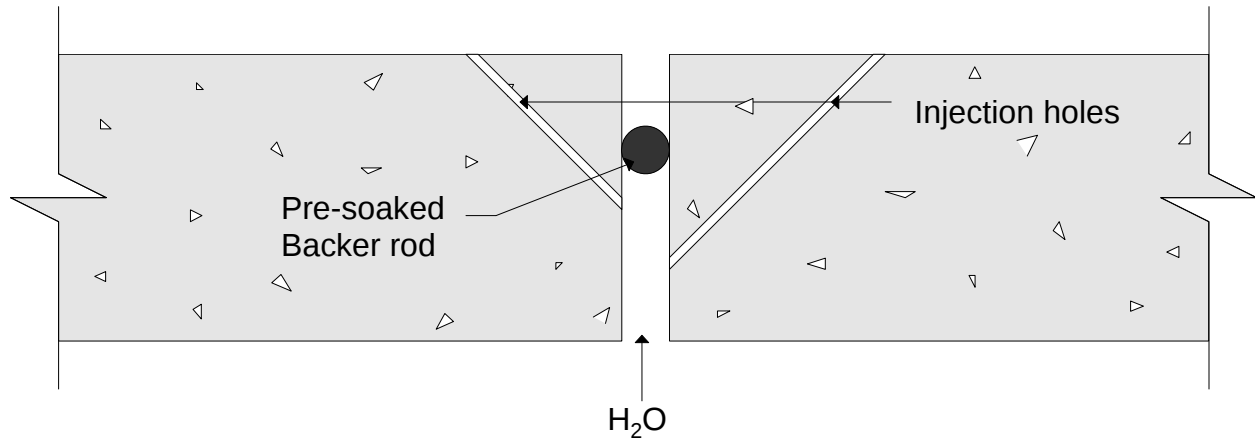
SikaFix® HH Plus Crack Filler



1. Pump SikaFix HH Plus for 45 seconds and then pause to allow the material to react and flow into all of the cracks and crevices.
2. Watch for material flow and water movement to appear on the surface. When movement stops, begin injecting into the next packer.
3. When sealing vertical cracks, begin injecting at the bottom of the crack and work vertically.
4. Where heavy water flow is present begin injecting the crack at the part where the slowest flow is apparent and work vertically towards the area of heavy flow following application procedures above.

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SikaFix® HH Plus Water Stop



1. Pump SikaFix HH Plus for 45 seconds and then pause to allow the material to react and flow into all of the cracks and crevices.
2. Watch for material flow and water movement to appear on the surface. When movement stops, begin injecting into the next packer.
3. When sealing vertical cracks, begin injecting at the bottom of the crack and work vertically.
4. Where heavy water flow is present begin injecting the crack at the part where the slowest flow is apparent and work vertically towards the area of heavy flow following application procedures above.

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