

ITEM 18555.80 M - CRACK REPAIR BY EPOXY INJECTION

DESCRIPTION:

Install injection ports, seal the crack opening, inject the crack with epoxy, and restore the sealed surface to a flush condition in areas visible to the public. Perform the work at locations indicated on the contract plans or where directed by the Engineer.

MATERIAL REQUIREMENTS:

1. Crack Sealant - epoxy paste that completely cures in 4 hours or less and retains the injected epoxy. Any other type of crack sealant is subject to a project demonstration and approval by the Engineer.
2. Low Viscosity Injection Epoxy §721-04 (Contact the NYSDOT Materials Bureau for this specification.)

INJECTION EQUIPMENT:

Use equipment in good working order, as approved by the Engineer, with the following features:

- Separate feed lines to the mixing chamber
- Automatic mixing and metering pump
- Ability to thoroughly mix the epoxy components in the mixing chamber
- Operator control of the epoxy flow from the mixing chamber
- Clean, legible, accurate pressure gauges easily viewable by the operator
- Ability to provide an uninterrupted pressure head to continually force epoxy into the cracks
- Injection pressure capacity up to 1.4 MPa
- Capable of metering each epoxy component to within 3.0% of the epoxy manufacturer's mix ratio

Unreacted epoxy components may be stored overnight in separate reservoirs and feed lines.

Before starting the work, demonstrate to the Engineer the ability of the equipment to meter and mix epoxy components to the required mix ratio. Ratio accuracy may be determined by simultaneously metering each component into separate, clean, accurately graduated, volumetric containers, or another procedure approved by the Engineer. Also, activate the automatic mixing and metering pump, mix a small amount of injection epoxy, and waste it into a disposable container. The Engineer will observe this trial operation and be satisfied the equipment is working properly, and the epoxy is mixed with no streaks.

CONSTRUCTION DETAILS:

1. Surface Preparation. Remove all debris or contaminants accessible within the cracks by using hand tools, water blasting or oil-free high pressure air blasting, vacuuming, or other methods suitable to the Engineer. Remove all materials, including moisture, from the surface adjacent to the crack which might interfere with crack sealant bonding.

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2. Injection Port Installation. Attach injection ports to the prepared surface by placing them into or onto the cracks and affixing with crack sealant. Other injection port designs and attachment methods require approval by the Engineer.

Use the following general guidelines for spacing injection ports when cracks are uniform in width through the structure. For cracks that get tighter with depth, double this spacing.

- A. Cracks accessible from one side - space the ports not less than the thickness of the member.
- B. Cracks accessible from both sides - space the ports not less than twice the thickness of the member and stagger them relative to the ports on the opposite side. Make the stagger between ports (on opposite sides of the member) at least the thickness of the member.

Place the end-most ports at the ends of the crack so as to insure complete filling of the crack. When these guidelines cannot be followed, use port locations approved by the Engineer.

3. Crack Seal. After port installation, seal the crack opening with crack sealant, being careful not to plug the injection ports. Allow the crack sealant to cure completely before injecting epoxy.

Apply crack sealant only when surface and ambient temperatures are above 10°C.

4. Water Flush. Prior to any epoxy injection, unless prohibited by the epoxy manufacturer, flush the crack with pressurized water using the epoxy injection procedure, or a similar procedure, to clean out any remaining debris, verify that water exits from all the installed ports, check for leaks, and dampen the walls of the crack. The Engineer will decide whether this procedure is unsuitable for a particular crack. Remove excess water in the crack with oil-free compressed air.

5. Epoxy Injection. Perform epoxy injection only when the surface and ambient temperatures are above 7°C and are not expected to fall below 7°C during the next 24 hours.

Start at either end of a horizontal crack, or at the lowest point of a sloping or vertical crack. Secure the feed line to the first port. Initiate and continue flow until epoxy exits from the adjacent port. Temporarily stop the injection process, remove the feed line, and seal the port. Attach the feed line to the adjacent port and repeat this procedure along the crack until the last port is sealed. Exercise care to assure a continuous operation. When warranted, adjacent ports may be plugged and injection continued through the same port.

Replenish the epoxy supply in the mixing equipment before it is exhausted. Thoroughly stir each epoxy component both before and after adding it to its respective component in the mixing equipment. Exercise care to assure a continuous injection operation.

Allow the epoxy to fully cure prior to performing subsequent work in the repaired area.

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In the event of leakage from a crack, stop the injection process until the leak is sealed. When any work stoppage exceeds 15 minutes, clean the mixing chamber and flush the line that carries mixed epoxy. Accomplish flushing with a suitable solvent, followed by air.

6. Clean Up. In all areas visible to the public, remove spillage, the ports and crack sealant until flush with the adjacent surface. Remove stains and repair any damage to the satisfaction of the Engineer at no additional cost.

METHOD OF MEASUREMENT:

The work will be measured as the number of linear meters of crack repaired as required.

BASIS OF PAYMENT:

Include the cost of all labor, materials, and equipment necessary to complete the work in the unit price bid per linear meter.

The Engineer will authorize payment after the measured length of crack has been repaired, and surface cleaned, as required.