



SECTION 04525 - EPOXY INJECTION CRACK REPAIRS

PART 1 - GENERAL:

1.01 Description:

A. Work Included: all labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations of the work of this Section, complete as indicated on the Drawings and as specified herein. Work includes, but is not necessarily limited to, the following:

1. Examine all other sections for work related to those other sections and required to be included as work under this Section.
2. Submittal.
3. Generally, all buildings are experiencing cracking and spalling of the concrete walls. Work of this Section will be required when the cracks extend through the existing walls.
4. Provide staging and equipment for access to walls.
5. Prepare and seal cracks for repairs and establish injection ports.
6. Repair walls by pressure injection of structural epoxy resins.
7. Remove seals, injection ports and grind finished cracks smooth.
8. Prime repaired areas.

B. The General Contractor shall make a detailed survey of the existing conditions pertaining to the work of this Section prior to commencing the work.

1.02 Related Work Specified in Other Sections: The following item is covered by the indicated other section of these Specifications. Coordinate as required with all other trades to ensure proper and adequate provision for the installation of items described in this Section.

- | | |
|--------------|---------------|
| 1. Concrete: | Section 03315 |
|--------------|---------------|

1.03 Quality Assurance:

A. Work is subject to review of proposed methods and materials by Consulting Engineer before execution, observation by Consulting Engineer during execution, and acceptance by Structural Engineer at completion.

B. Submittal: Submit statement of procedure, description of equipment and injection method, and data sheets on injection to be used, to Structural Engineer prior to commencing work.

C. Samples and Tests: During work, Contractor shall take periodic small cup specimens of mixed resins from the injection nozzle to evaluate mixed resin systems for gel time and complete reaction and solid formation. Retain specimens until reviewed by Structural Engineer.

1. Core specimens may be taken upon request by the Structural Engineer. If required, cores shall be 4-inch diameter cores cut from designated locations and shall show 90 percent filling for the 5 inches of crack nearest the injected surface, 10 percent deviation allowed. After examination of core holes, wall areas shall be patched, repaired and finished.

1.04 Product Handling:

Use all means necessary to protect the materials before, during, and after installation and to protect the installed work of other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Structural Engineer and at no additional cost to Owner.

PART 2 - PRODUCTS:

2.01 Materials:

A. Materials specified and required shall be from the family of organic chemicals generally known as epoxies; shall be competent formulations of standard and recognized manufacture; all possessing the characteristics specified below. Appropriate chemical epoxy systems of the following manufacturer are considered acceptable for this work.

DE NEEF CONSTRUCTION CHEMICALS, INC.

B. Epoxy Characteristics Required:

1. Resistant to moisture and water when cured.
2. Able to gel and cure to strength in the presence of moisture.
3. Shall be 2-part, 100 percent solids epoxy formulation.

C. Low-Viscosity Epoxy Injection Compound:

Shall have sufficient working life to permit progressive injection procedures without premature blocking of material at previously placed injection ports, with following properties:

	Denepox I-40	Denepox I-60	Denepox 150	Denepox I-300
1. Type:				
2. Mixed Viscosity @ 77°F, cps:	40 cps	60 cps	150 cps	270 cps
3. Pot Life @ 77°F, hours:	80 min.	60 min.	18-20 min	12-15 min.
4. Shore Hardness, 70°F:	35-D-44-D	80-D	80-D	85-D
5. Tensile Strength, psi:	9,500 psi	10,000 psi	10,000 psi	10,000 psi
6. Tensile Elongation, percent:	9%	2-5%	2-5%	2%
7. Curing Time:	12-24 hours	6-7 hours	12-24 hours	3 hours
8. Gel Time, 70°F, hours:	2 to 4	1.5-3 hours	6-7 hours	30-40 min

D. Surface Sealing Materials:

Shall be strippable wax, special adhesive backed fabric or fiber tape, or for special cases, thixotropic epoxy compounds of above manufacturer used for this purpose. Capable of holding injection pressures and of being removed cleanly upon completion.

2.02 Other Materials:

All other materials not specifically described, but required for a complete installation shall be only those recommended by the manufacturer of the epoxy formulations being used and shall be subject to the review of the Structural Engineer.

PART 3 - EXECUTION:

3.01 Surface Conditions:

Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this application may commence. Verify that the epoxy formulations may be applied in accordance with the manufacturer's recommendations. In the event of discrepancy, immediately notify the Structural Engineer and proceed as he directs.

3.02 Structural Cracks to be Injected:

A. Shall be those cracks requiring structural repair; determination of cracks to be injected shall be reviewed and concurred in by Contractor and Structural Engineer. Contractor shall maintain a log of all cracks injected, to be reviewed and confirmed by the Structural Engineer.

B. All epoxy formulations shall be applied in strict accordance with the recommendations of the manufacturer for their applications, including the use of protecting clothing and other appropriate safety equipment due to the nature of epoxy chemicals.

C. For cracks extending through wall sections and appearing on the interior of the building where injection may stain and leak to the interior, sealing of the interior surfaces may be necessary and shall be done as required, using strippable wax or adhesive-backed tape of suitable composition that will, when removed, not stain, damage or deface the interior surface.

3.03 Equipment:

Specialized epoxy injection equipment consisting of self-contained pumping system, transporting both components through an integral in-line in head mixing and placing device at the injection point. Pressure pot systems using premixed chemicals may be used upon specific authorization by the Structural Engineer. Equipment shall be capable of injection pressures to 300 psi gage. Pumps and mixing equipment shall be equipped with pressure gauges at both pump and injection head. During injection, pressure and volume shall be controlled so that rate of injection is positive, but slow enough to enable liquid resins to penetrate to required depths and distances without bulking or blocking.

3.04 Injection Procedure and Sequence:

A. Procedure: shall be by direct pressure injection of epoxy into the crack surface at suitable intervals. Crack shall be sealed with strippable hot wax or pressure sensitive adhesive-backed tape for fine cracks. If cracks are 15 mils or greater in width, use epoxy gel compound for sealing, sorting nylon injection ports. Injection location or ports shall be located along the cracks.

B. Sequence: Inject progressively, injecting the first injection point until liquid resin appears at the next point, then sealing the first point and injecting the second point, proceeding progressively from one to the next adjacent point progressively until the entire crack is sealed. Provide observation at the interior of the building to determine if resin leakage into the building is occurring. If so, discontinue injection; seal the interior surfaces before continuing injection. After epoxy has gelled, surface seals may be removed.

C. Penetration: In general, penetration shall be to approximately 5 inches of depth so that reinforcing steel running through the crack will be sealed against moisture attack, and at least the exterior half of the wall thickness is bonded. Cracks shall be sealed for 90 percent of the specified depth of penetration, plus or minus 10 percent average.

3.03 Cleanup:

Clean up immediately any epoxy spillage, extrusion or other contamination of premises or adjacent surfaces with suitable solvents recommended by the manufacturer of the epoxy systems. At completion, strip all surface seals, remove injection ports, clean surfaces with solvents and grind or hone surfaces to smooth, level, uniform surfaces.

End of Section

 **de neef[®]** Construction Chemicals, Inc

5610 Brystone Drive • Houston, Texas 770441
Phone 713/896-0123 • Fax 713/849-3340 • e-mail – info@deneef.com