Guide Specification

*Note: The paragraphs below are meant to be incorporated into Parts 2 and 3 of a standard CSI 3 Part Format specification, the General Structural Notes, or directly onto the plans. They must be carefully reviewed by a qualified design professional and edited to meet the requirements of the project and governing building codes. Coordinate with other specification sections and drawings. In no case shall these Guide Specifications be considered to be Contract Documents or serve as installation instructions for the product being discussed. In any cases of discrepancy the manufacturer's most recently published data sheet shall take precedent.*

SECTION 03 64 00 EPOXY INJECTION

PART 1: GENERAL

1.01 REFERENCES

A. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:

1. ACI 301-Standard Specifications for Structural Concrete," by American Concrete Institute

2. ACI 318 -Building Code Requirements for Reinforced Concrete by American Concrete Institute

3. ACI 503.7-07- Specification for Crack Repair by Epoxy Injection by American Concrete Institute.

1.02 QUALITY ASSURANCE

A. Epoxy Injection Contractor Qualifications:

1. Epoxy injection contractor shall have completed a minimum of **<3>** epoxy injection repairs within last 3 years similar in type and scope to Work of this Contract.

2. Assign experienced mechanics from previous applications including lead mechanic. These personnel shall be on site at all times while work is being performed.

B. Epoxy Injection Equipment: Epoxy injection unit shall be portable and equipped with positive displacement type pumps with interlock to provide positive ration control of epoxy injection resin components. Pumps shall be air or electric powered and shall provide in line mixing and metering system and shall be equipped with drain back plugs.

1. Equipment used to inject epoxy shall be capable of following:

a. Automatic proportioning of materials within mix ratio tolerances of +/- 3 percent over full range of operating pressures and temperatures.

b. Delivery of components, resin and hardeners, from separate reservoirs to mixing type discharge head.

c. Complete and uniform mixing of components at discharge head.

d. Minimum operating pressure of 50 psi (344 kPa).

e. Demonstrate that the injection equipment does not have more than a 5 psi (35 kPa) drop in pressure in either of the two component lines after operating with no flow for 3 minutes with at least 80% or more of the operating pressure.

B. Job Site Testing:

1. Prior to commencement of epoxy injection cap all ports and inject air at high pressure through every tenth port minimum to test for leaks. Mark any leaks that can be felt with a bare hand and repair with Capping Adhesive.

2. Metering accuracy of Epoxy Injection Equipment shall be tested in accordance with ACI 503.7-07 prior to start of work the first time any two component continuous metering and mixing equipment is used in the Work and any time each piece of equipment is used after a 4 hour or longer shutdown period.

3. Core Testing: Perform core testing in accordance with ACI 503.7-07

C. Acceptance Criteria:

1. Core testing shall demonstrate that at least 90 percent of the crack in each core is filled with Epoxy Injection Resin and splitting tensile strength of core taken from that location is 90 percent of splitting tensile strength of core taken from uncracked area within 12 inches (305 mm) of repaired crack; or splitting tensile strength of core indicates that no more than 10 percent of the bonded area of the crack in each core exhibits combined areas of separation of adhesive from concrete or cohesive failure within Epoxy Injection Resin.

1.03 DELIVERY AND STORAGE

A. Crack injection materials shall be delivered to job site in their original unopened containers with labels clearly attached.

B. Store crack injection materials indoors, protected from moisture, at temperatures between 50°F and 90°F (10°C and 32°C).

1.04 JOB SITE CONDITIONS

A. Surface and ambient temperature during applications should be between 50°F and 90°F (10°C and 32°C).

B. Material temperatures should be at least 50°F (10°C) and rising at time of application.

C. Do not inject Epoxy Injection Resin into cracks if water is leaking from crack.

PART 2 PRODUCT

2.01 EPOXY INJECTION MATERIALS

A. Epoxy Injection Resin: Two component, high modulus, pre-proportioned, moisture insensitive, VOC compliant, 100% solids epoxy adhesive. Product shall conform to ASTM C 881 Types I, and IV, Grade 1, Class C. Material shall have the following properties:

1. Minimum 12,000 psi (82.7 MPa) Compressive Strength

2. Minimum 2,200 psi (15.2 MPa) Bond Strength

3. Mixed Viscosity of 350 cp

4. Basis of Design Product:

a. Euclid Chemical Company (The); Dural 452 LV Epoxy www.euclidchemical.com

B. Epoxy Injection Capping Adhesive: Two component, high modulus, pre-proportioned, moisture insensitive, VOC compliant, 100% solids epoxy adhesive. Products shall conform to ASTM C 881 Types I, II, IV, and V, Grade 3, Class C. Material shall have the following properties:

1. Minimum 10,000 psi (68.9 MPa) Compressive Strength

2. Minimum 2,800 psi (19.3 MPa) Bond Strength

3. Basis of Design Product:

a. Euclid Chemical Company (The); Dural 452 Gel Epoxy www.euclidchemical.com

PART 3 EXECUTION

3.01 SURFACE PREPARATION

A. New concrete surfaces must be a minimum 28 days old at time of application.

B. Clean areas to receive Capping Adhesive of laitance, loose or unsound materials, oil, dirt, and other substances that would interfere with bond. Mechanically abrade surface to receive Capping Adhesive as necessary to achieve a Concrete Surface Profile (CSP) of 2 to 5 per ICRI Guideline 310.2.

C. Clean cracks with oil-free compressed air to remove loose particles and any water.

D. Place one-way polyethylene valves or injection ports at spacing no farther apart than thickness of member being injected. Spacing of the port devices shall be as required to achieve travel of Epoxy Injection Resin between ports and fill the cracks completely. Seal injection ports in place with capping adhesive. If concrete member being injected is exposed on multiple sides provide injection ports on opposite sides at staggered intervals.

E. Seal cracks at exposed surfaces with a ribbon of Capping Adhesive at least 1/4 inch (6 mm) thick by 1 inch (25 mm) wider than crack.

3.02 EPOXY INJECTION

A. Dispense Epoxy Injection Resin under constant pressure as required to achieve maximum filling and penetration of crack without air voids.

B. Begin at widest part(s) of crack and work toward narrower parts.

C. When adjacent ports extrude Epoxy Injection Resin cap and continue injecting to refusal. Cap injected port(s) and inject through adjacent ports until crack is filled.

D. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

END OF SECTION