

Epoxy Crack Injection

Scope of This Guide

The polymers discussed in this guide are Thermal-Chem Epoxy Injection Resin Systems and Surface Sealers with additional references made to the equipment and parts needed to complete these systems.

Typical Product Applications

Structural crack injection in concrete or wood, anchoring in concrete and masonry, narrow void grouting of concrete, masonry, wood, steel and other structural materials. Other uses include filling of honeycombed sections, sand streaked areas, and hollow-plane delaminations in concrete structures.

Product Cautions and Limitations



- Do not use materials when the temperature drops below Thermal-Chem's recommendation for proper placement and cure of the specific material being used.
- Do not alter the product by adding solvents of any kind to the epoxy.

Conditioning of Materials

The epoxy must be protected from adverse weather conditions before and during use on the project. All materials must be kept dry and in their closed containers. During hot temperature projects the epoxy components must be kept from overheating. During cold temperature projects the epoxy must be preconditioned up to the proper temperature.

The desirable temperature range for the epoxy injection is based on the substrate temperature. When the substrate temperature is above 70°F (21°C) no warming of the epoxy is required. With colder temperatures, preheat each component to 90°F (32°C).

Preparing the Crack for Injection

Surface Preparation

Clean the surface of the crack down to sound substrate, using a grinder, wire brush or other appropriate abrasion methods. Remove all dust, efflorescence, unsound concrete or patching materials and other contaminants detrimental to the adhesion of the surface sealant. When cleaning wet cracks, use caution so as not to accidentally create a paste in the process, which would plug the crack.

Placement of Tees or Ports

Tees are used on the majority of injection projects, horizontal or vertical. Ports are used when the crack is blocked at the surface and will not allow the injection resin to enter the crack. The hole for the port is drilled to below the level of blockage, usually not more than 1/2 inch. Tees cannot be used on a wet or weeping crack.

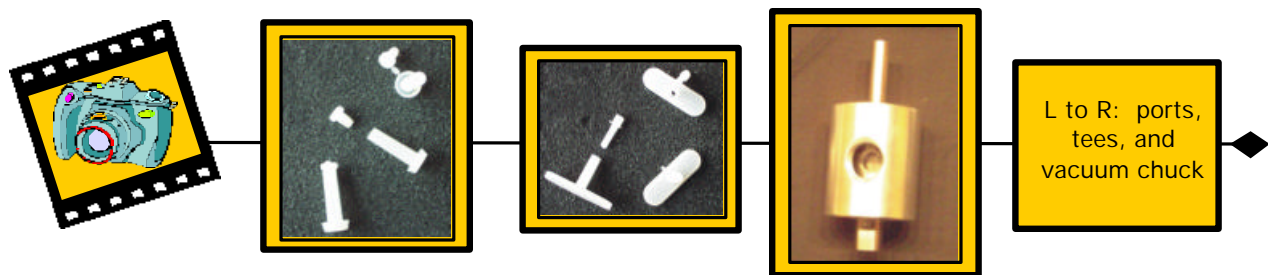
Also available are specially designed tees for overhead injection and tees for corner injection.

NOTE: Drilling for setting injection ports shall only be done with a vacuum chuck and hollow core bit, as approved by the epoxy manufacturer, to assure removal of all concrete dust and chips during the drilling process.



Spacing of Tees or Ports for Concrete or Wood Injection

The injection resin will be pumped through injection ports or tees into the crack of the concrete structure. Proper spacing of the ports/tees is very important to assure proper resin penetration into the crack and also to prevent the loss of resin from a blowout on the backside of the structure.



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On concrete or wood, up to 12 inches in thickness, space ports or tees approximately equal to the thickness of the substrate receiving the injection material, less 1/2" to 1". Resin will flow in all directions from the point being injected. When injection resin begins to flow from the next adjacent tee or port, it has penetrated the structure to a depth equal to the spacing of the tees/ports.

For substrate with an injection thickness greater than 12 inches, contact your Thermal-Chem representative for proper spacing.

On vertical cracks, set the first tee as close to the floor as possible, centered lengthwise over the crack.

Sealing the Surface of the Crack

An epoxy surface sealer is used to seal the surface of the cracks and attach and seal entry ports or tees. Place the tee or port and apply the surface sealer liberally to completely cover the base of the entry tees/ports and open crack to prevent leaking. Repairing leaking surface sealer during the injection process is time consuming and costly and can be prevented by properly sealing the tees/ports and crack. Allow the surface seal to become tack-free before continuing the injection process.

- For the fastest tack-free times on dry surfaces use **Super Rapid Surface Sealer Product #421**
- For moist surfaces or longer open time use **Bonder Product #4, Normal or Rapid Cure**

When using rapid cure surface sealers, place the proper amount of A and B components separately on a piece of cardboard or other disposable material. Mix together and apply immediately. Super Rapid Surface Sealer has a pot life of approximately 5 to 6 minutes.

Injection Equipment

Epoxy injection is generally performed using one of the following methods.

- A dual-cartridge dispensing tool using pre-filled biaxial cartridges. Refer to the Injection Resin Cartridge Systems Product Description Sheets for proper cartridge preparation.
- Self-contained air or electric-powered injection pump designed solely for the purpose of metering, mixing, and dispensing bulk injection resin.
- A pressure pot pressurized with clean air. The pressure pot method is typically used with bulk injection resin gel when the crack or void width exceeds 0.125 in. in width.

Injection

Always inject slowly with low pressure. This allows the injection resin to fill all small fissures, encapsulate the reinforcement steel and helps prevent surface sealer blowouts. If injecting with adjustable pressure equipment, set injection pressure for 14 psi at the point of injection.

On vertical surfaces, the lowest port or tee will always be the first port or tee injected and pumping will continue until clean (without debris, air or water) injection resin has passed from the next closest port or tee. The port or tee being pumped is then plugged and the port or tee that has just passed clean resin is pumped until clean (without debris, air or water) injection resin has passed out of the next closest port or tee. This procedure continues until all ports and tees have been injected.

On horizontal surfaces, one end of the crack is chosen to be the first port or tee to be injected and is pumped until clean (without air or water) injection resin has passed out of the next closest port or tee. This procedure continues, as above, until all ports and tees have been injected. Injection tees/ports must be plugged after pumping; creating a small vacuum that helps prevent the injection resin from draining out of the crack.

Removal of the ports or tees and surface sealer is optional once the epoxy injection resin has cured. If Bonder was used as a surface sealer, it will require grinding for removal. Super Rapid Surface Sealer may be substantially removed using a hammer and chisel. Wear appropriate eye protection when removing surface sealers.

Frequently Asked Questions (FAQ's)

WHAT IF... the concrete has been previously patched?

Using a hammer, tap the patch lightly and listen for a ringing or hollow sound. If a hollow sound occurs, remove all patches sounding hollow, and follow the above directions. Patch the concrete with an appropriate Thermal-Chem EPC patching material.

WHAT IF...the concrete is irregular or has previously been v'd-out or spalled?

Do not try to rebuild the surface. Set tees into the cavity at the proper spacing before filling the cavity. A plastic tube may be attached to the tee for deep cavity areas.

WHAT IF...two cracks come together?

Set one tee directly over the intersection of the two cracks even if it means spacing two tees closer together.

WHAT IF...the injection tees or ports are plugged?

If a port or tee will not receive injection resin, plug that tee or port and proceed to the next closest port or tee and continue the injection procedure. When the injection process has been completed, return to the blocked tee or port and follow one of the procedures shown below:

- For a tee, remove the plugged tee, clean out the crack reseal the tee into place and inject.
- For a port, re-drill, place and seal another port, then re-inject.

WHAT IF...the resin starts to leak out of a hole in the surface sealer?

Immediately stop pumping. Clean all liquid epoxy from the area and re-seal with the surface sealer, allowing it to become tack-free before continuing.

Clean-Up

Tools: Before epoxy becomes tack-free wipe tools with paper towels or rags and wash with cleaning solvent.

Hands: Wash with soap and water or waterless hand cleaner.

Personal Protection

Read all literature and Material Safety Data Sheets supplied by Thermal-Chem Corporation before using the product.

Call Thermal-Chem Corporation for injection projects outside the scope of this guide, such as: Actively Leaking Cracks, Underwater Crack Injection, Hollow Plane Delamination Injection or for any clarification of instructions or data in the Material Safety Data Sheets.

Manufacturer

Any questions or comments regarding the contents of this *Installation Guide*, for technical questions or assistance, and/or questions with regard to specific installation procedures, contact the manufacturer:

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