



## PSI Crack Injection Repair Guide

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### Surface Preparation for Crack Injection



Clean the crack and the surrounding surface to allow the **TuffPoxy 3FS** to bond to sound concrete. Lightly sandblast the areas to be repaired to highlight the cracks and gives a clearer picture of what cracks need be injected. At a minimum, brush the surface with a wire brush or a wire wheel on a grinder to mechanically clean and open the face of the crack to be injected. Use high pressure water to clean dust from the crack left by grinding. Oil, grease or other surface contaminates must be removed

in order to allow the pasting of the **TuffPoxy 3FS** to bond properly. Take care not to impact any debris into the crack during cleaning. Use clean, oil free compressed air to blow out the crack and remove any dust, debris or water. Best results will be obtained if the crack is dry at the time of injection. If water is seeping from the crack, the flow must be stopped in order for the epoxy injection to yield a suitable repair. In the case of very narrow cracks at the surface of the concrete, it is common practice to drill a small pilot hole to create a “capillary” for the epoxy to travel into the crack effectively.

If a coating, sealant or paint has been applied to the concrete it must be removed before spreading the paste. Under the pressure of injection, these materials may lift and cause a leak. If a coating breaches the crack, rout the crack in a "V" shape using a grinder in order to get past the surface film.

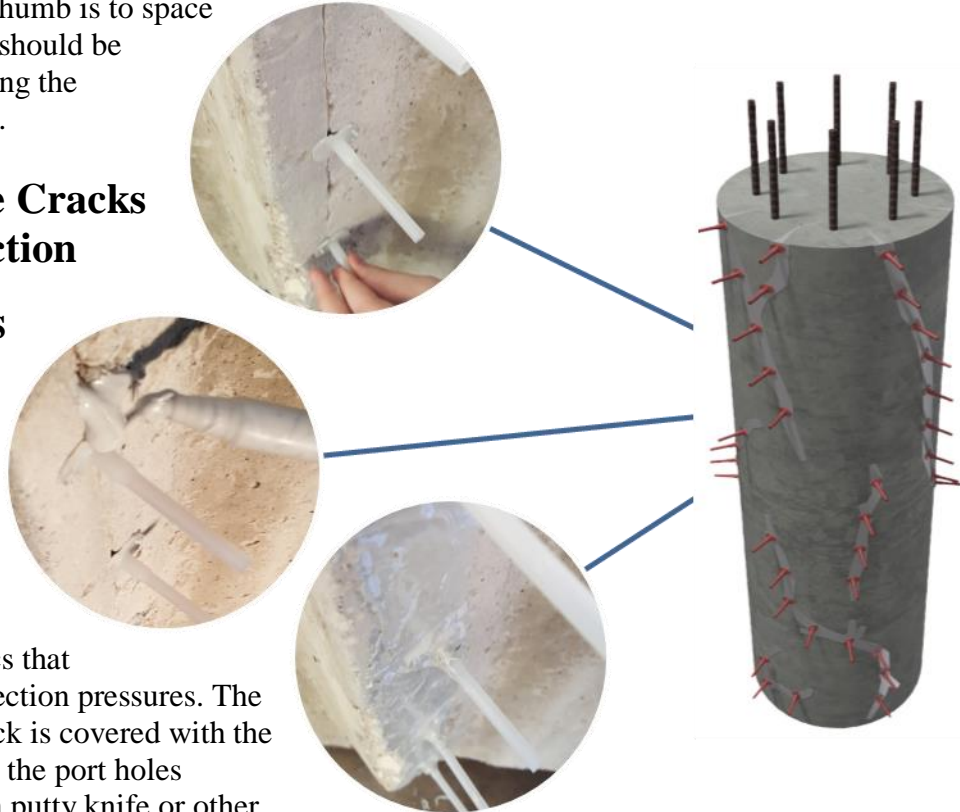
Sometimes additional preparation is necessary in order to seal the crack. If a surfacing material has been removed using an acid or chemical solvent, remove residue by high-pressure washing or steam cleaning. Use clean, compressed air to blow out any remaining debris and liquid.

## Install Injection Ports

**PSI Surface Ports** (short rigid-plastic tubes with a flat base & caps) serve as handy entryways for getting the repair material into the crack. They eliminate the need to drill into the concrete, reducing labor time and cleanup. To adhere the port to the concrete, apply a small amount of **TuffPoxy 3FS** around the bottom of the port base. The base of the port is placed directly over the crack and bonded to the surface with an epoxy paste. Ensure the port tube is clear throughout. A general rule-of-thumb is to space the injection ports should be placed 8" apart along the length of the crack.

## Sealing of the Cracks Prior to Injection

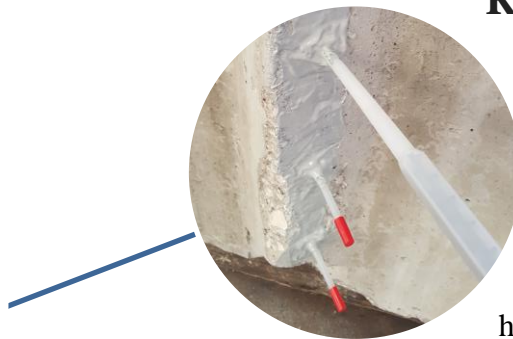
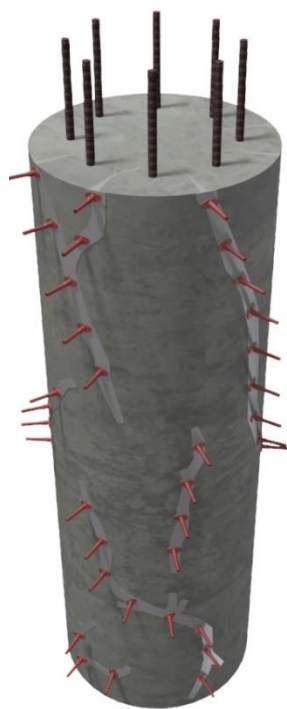
Use **TuffPoxy 3FS** to seal over the surface ports and exposed cracks. The paste cures in about 20 to 45 minutes to provide a surface seal with excellent bond characteristics that holds up under injection pressures. The entire exposed crack is covered with the paste, leaving only the port holes uncovered. Using a putty knife or other buttering tool, generously work epoxy along the entire length of the crack. Take care to **mound the epoxy** around the base of the port to approximately 1/4" thick extending 1" out from the base of the port. It is recommended that the paste-over should be a minimum of 3/16" thick and 2" wide along the crack. Insufficient paste-over will result in leaks under the pressure of injection. If the crack passes completely through the concrete element, seal the back of the crack, if possible. If not, epoxy may be able to run out the back side of the crack, resulting in an ineffective repair. The **TuffPoxy 3FS** may be applied with twin cartridge unit or the hand-mixed kit, and finished with a margin trowel or putty knife. If the crack runs completely through the concrete, then both sides will need to be pasted with **TuffPoxy 3FS**. Once accomplished, the only way into the crack is through the ports. Before proceeding, allow the rapid setting epoxy gel to harden fully prior to injecting the epoxy through the ports. If this is not done correctly, there is potential risk that the seal or ports will blow out, even with low pressure injection. Allow the paste-over to harden before beginning injection.



## Crack Injection Procedure

The injection process begins using the **TuffPoxy 9** epoxy in **vertical** applications starting at the lowest point. Place the tip of the static mixing nozzle of **TuffPoxy 9** into the surface port and let the compression spring on the dispensing tool push the material into the crack using slow, constant pressure to inject the epoxy resin through the port and into the crack. This will reduce the possibility of leaks or blow-outs and allow time for the repair material to fully penetrate the crack. Slowly inject the resin through the lowest port until the **TuffPoxy 9** begins to escape through the port immediately above the one being injected. Remove the static mixing nozzle from the port; cap the port to prevent epoxy resin from leaking out, and attach the static mixing nozzle to the next port from where epoxy just emerged. Continue this process until epoxy emerges from the last port, and then inject a small amount of epoxy into the last port to make certain that the entire crack has been filled. All cracks are different however as you progress through this process the applicator should get a feel for how much epoxy will be dispensed. Once the last port is capped, allow the epoxy to harden sufficiently.

In **horizontal** applications, the procedure is the same as vertical applications except that it should start from one end and proceeds across to the other end; never start in the middle and proceed outward. If epoxy is still able to be injected into a port, while coming out of another uncapped port, then cap the port that is not being injected and continue to inject epoxy. Continue closing ports whenever material comes out. While this may mean that some ports are not injected, it provides maximum pressure to force the injection resin the smallest areas of the crack.



### Removal of Ports & Paste Epoxy

Allow at least 24 hours at room temperature for the epoxy to cure and penetrate into the cracks.

Once the epoxy resin system has cured inside of the crack, the ports and surface sealing epoxy may be removed. The injection ports can be removed by striking them with a trowel or hammer, and the surface sealing epoxy may be removed through grinding with an abrasive disc until flush with the concrete.

## **Injection Repair Tips**

- If using a pneumatic dispensing tool, set the tool at a low setting when beginning injection and increase pressure if necessary to get the epoxy to flow.
- For narrow cracks it may be necessary to increase the pressure gradually until the epoxy begins to flow. It may also be necessary to wait a few minutes for the epoxy to fill the crack and travel to the next port.
- If desired, once the injection epoxy has cured, remove the injection ports and paste-over epoxy.
- Mixing nozzles can be used for multiple cartridges as long as the epoxy does not harden in the nozzle.
- When using epoxy cartridge systems, discard the initial flow until the epoxy is a uniform gray color.

**If back pressure is preventing the injection resin from flowing into the crack, it might be due to:**

- The crack is not continuous and the portion being injected is full.
- The port is not placed over the crack and/or pilot hole.
- The crack is blocked by dust or debris.
- The epoxy in the static mixer has set up and is therefore not able to be injected.

If the epoxy is flowing into the crack, but not appearing at the next port, this can indicate that the crack branches off under the surface of the concrete, where it is not visible. This commonly occurs when the crack goes all the way through the concrete, and the backside has not or cannot be sealed. In these instances, if exaction is not possible to properly seal the backside, it may be necessary to use a different type of injection system.

### **Table to follow for TuffPoxy 3 FS Usage**

#### **Consumption of Crack Injection Paste on a crack**

##### **Length (in) Width (in) Depth (in) - # of Tubes**

**1" Wide Strip - 10 ft. Long and 1/8" thick - 0.8 Cartridge**

**1" Wide Strip - 10 ft. Long and 1/4" thick - 1.6 Cartridge**

**1.5" Wide Strip - 10 ft. Long and 1/8" thick - 1.2 Cartridge**

**1.5" Wide Strip - 10 ft. Long and 1/4" thick - 2.4 Cartridge**

**2.0" Wide Strip - 10 ft. Long and 1/8" thick - 1.6 Cartridge**

**2.0" Wide Strip - 10 ft. Long and 1/4" thick -3.2 Cartridge**

## TuffPoxy 9 Estimating Guide

Width of Crack (in.)	Concrete Thickness (in.)	Coverage per 22 oz Cartridge (lin ft.)	Coverage per gallon (lin ft.)
1/64	4	47.7	277.1
	6	31.8	184.8
	8	23.8	138.3
	10	19.1	111.0
1/32	4	23.8	138.3
	6	15.9	92.4
	8	11.9	69.1
	10	9.5	55.2
1/16	4	11.9	69.1
	6	7.9	45.9
	8	6.0	34.9
	10	4.8	27.9
1/8	4	6.0	34.9
	6	4.0	23.2
	8	3.0	17.4
	10	2.4	13.9
3/16	4	4.0	23.2
	6	2.6	15.1
	8	2.0	11.6
	10	1.6	9.3
1/4	4	3.0	17.4
	6	2.0	11.6
	8	1.5	8.7
	10	1.2	7.0

Temp (°F)	Gel Time (min)	Ready for Injection (min)
40	18	145
50	10	85
68	6	50
77	5	40
86	4	35

**Types of application Equipment:**

