

Procedures for Sealing Water Ingress Through Concrete with Polyurethane Grout

SITE PREPARATION

Clean mineral deposits (if present) from the crack face to determine crack location and size. Crack size determination is required to decide port spacing.

Crack cleaning may be done by one or all the following methods:

- High pressure water
- Wire brush
- Light duty chipping hammer
- Grinding wheel



Fig. 1 - Grinding Wheel & Wire Brush

Remove any and all materials that are in the joint area. Clean out the joint completely if possible.

Inspect the areas to be sealed with grout to assure that the surfaces are clean and wet. Materials will not properly cure if pumped into a dry crack/joint.

INJECTION PORT LAYOUT AND INSTALLATION

Drilling Injection Holes in Concrete less than 6 inch thick

1. Concrete 6 inches thick or less may require drilling the injection holes directly into the cracks to properly seal them.
2. Drill the injection holes deeper than 2 inches, but not more than 5 inches deep, to expose a larger area of crack surface to the materials. This will allow deeper penetration and better pressure relief. More crack surface area exposed in the injection hole equals lower pump pressure required to seal the crack. Surface sealing the crack may be required.

Drilling Injection Holes in Concrete 6 Inches or Thicker

1. Determine injection hole position. Correct injection hole position allows proper injector installation and adequate material pumping. Incorrect injection hole position may prevent grout flow into the crack.
2. Drill injection holes at 45 degree angle to intersect the crack halfway through the concrete. If the wall is 12 inches thick, the hole should be drilled 6 inches away from the crack.
3. Drill injection holes deep enough to assure intersection with the crack. Drill hole depth is unpredictable because crack direction is irregular. Drill an injection hole and test for crack intersection by pumping water into the hole.
4. If the injection holes are not properly drilled, the materials may not be evenly pumped into cracks, and may not completely seal the entire crack depth.

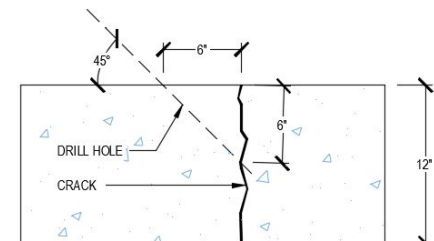


Fig. 2 - Angled Drilling at Crack

5. If fissures and honeycombs in the concrete exist behind the sealed cracks, small amounts of water may move around the sealed crack. Evidence of this will appear as damp or wet spots along the crack.

Installing Injection Ports

1. Flush drill waste from hole and install injection ports.
2. Lightly tap on the port to ensure a snug fit, proper depth.
3. Tighten the port using a deep socket and a ratchet. Tighten approximately 3 to 4 turns or until snug.

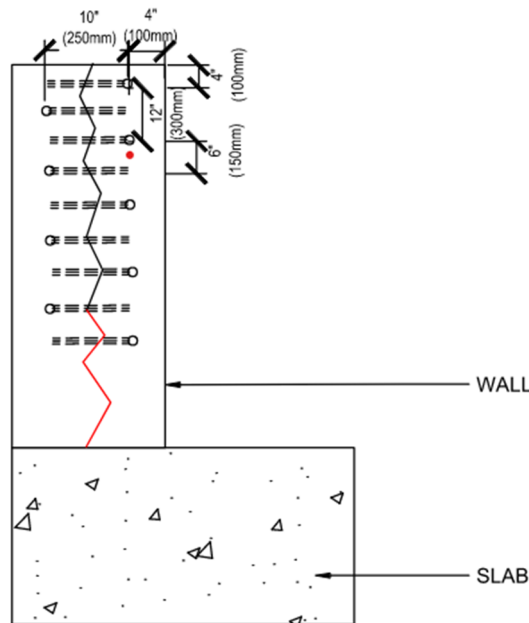


Fig. 3 – Injection Port Layout

WATER INJECTION

NOTE: Water injection is as important as grout injection itself. Therefore, proper equipment is critical. Do use the same pump and control valve (gun) for both the water and grout injection. The pump will ultimately become clogged with activated foam grout. Do not skip water injection. This may cause the material not to cure, if the crack is dry, and does not have sufficient moisture to react with the grout. Uncured grout in cracks will eventually migrate out of the crack and create an unacceptable situation.

Water must be injected into a crack prior to the injection of grout, for the following reasons:

1. Water exiting the crack indicates the injection hole has crossed the crack.
 - a. If water is not observed exiting the crack and the pump is near maximum pressure (2,500-3,000psi) the injection hole may not have crossed the crack, it may be necessary to drill deeper or drill another injection hole on the opposite side of the crack

2. Water flushes out debris, sand, silt, or anything else that will restrict the flow of grout through the crack.
3. Water wets the crack so the grout will activate.
4. Monitoring how easily water flows will help anticipate the volume of grout that will be pumped into the crack.
5. Water helps determine the distance grout will travel in each direction from the port. This helps to determine the port spacing. *A good rule of thumb: allow approximately 30% - 50% overlap between injectors.*

GROUT PREPERATION (CUP CHECK)

Perform a pre-blend of the Aussie Grout 901/902 using on-site water to ensure the desired gel time meets the application requirements. Procedure for a reactivity check of the Aussie Grout system is:

1. Add the Aussie Catalyst to the Aussie Grout and mix
2. Add water and mix thoroughly
3. Using the start time as the time mixing begins after the addition of water:
 - a. Determine the cream time: the time in which the material just begins to foam.
 - b. Determine the tack-free time: the time in which the surface of the material is no longer tacky.
4. Adjust reaction times based on flow rate and application variables by adding Aussie Grout Catalyst accordingly in the range of 2-25%. Most common crack leaks are repaired with a 5-7% solution. This is roughly 7 to 9oz. of Aussie Grout Catalyst per 1 gallon of Aussie Grout. For gushing leaks, 25% accelerator solution will provide quick results.

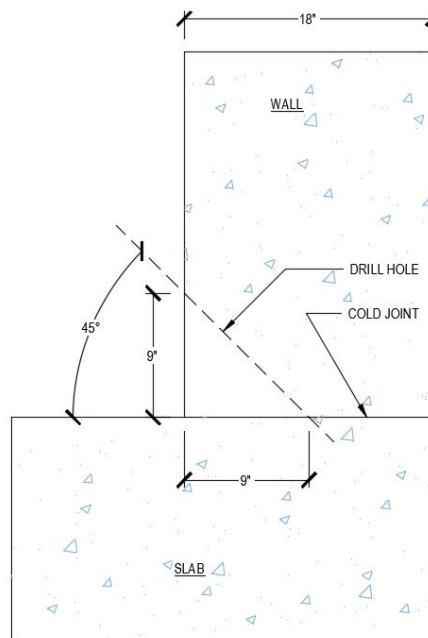


Fig. 4 - Injection at Wall/Slab Joint

GROUT INJECTION PROCEDURE

1. Begin injecting grout immediately after the cracks have been flushed with fresh water.
2. Begin injecting the grout slowly at the lowest pressure.
3. Build pressure very slowly for fine cracks. Injecting fine cracks at high pressures may cause cracking or spalling to weak concrete



Fig. 5 - Injection of Urethane Resin

4. When grout injection begins, water is displaced from the crack and injection hole and may continue to run from the crack for several minutes before grout appears.
5. Continue injecting grout until pure resin flows from the crack and until grout has traveled the desired distance between the injectors. Varying grout pump pressure will help the grout travel as far as possible.
6. If grout does not travel the required distance between injectors, it may be necessary to drill an injection hole between existing injectors.

GROUT INJECTION PROCEDURE – CURTAIN WALL GROUTING

1. Drill injection holes through the concrete wall in a diamond pattern
2. Install injection packers into holes
3. Inject grout beginning at bottom of the wall working up to the top
4. Once completed follow clean-up instructions as noted below

CLEANUP

1. Allow adequate time (approximately 24 hours) for materials to fully cure.
2. Complete touchup injections on any remaining damp areas as needed.
3. Remove injection ports.
4. Remove excess cured resin.
5. Patch injection holes with hydraulic cement