

# TECH TIPS

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## CURTAIN GROUTING MANHOLES AND UNDER- GROUND STRUCTURES

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Picture this: You're standing in a brick manhole that is 50 years old and leaking extensively all around you. You've already been working for over an hour and for every leak you stop, several new leaks pop up. Now what?

When it comes to stopping leaks in manholes or underground structures there are two schools of thought: "crack injection" and "curtain grouting". In **crack injection** the contractor injects a resin into the leaking hole, crack, or joint that reacts to moisture by creating a strong mechanical, compressive, and adhesive seal that will move with any future movement of the structure. In **curtain grouting** the contractor drills through the structure and injects grout into the soil which surrounds it creating a gel/soil matrix that prevents water from getting to the structure – permanently. While both methods can be effective, this Tech Tip will focus on the Curtain Grouting technique.



THE CURTAIN GROUTING  
TECHNIQUE ENABLES  
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STRUCTURE LONG-TERM

If there are multiple cracks or leaks in a wall or underground structure, simply filling the individual crack may have you spending a great deal of time chasing the water from crack to crack.

The curtain grouting technique enables you to stop several leaks at the same time and protect the structure long-term by encapsulating it and/or preventing groundwater from touching the structure in the future. It is an especially useful technique on brick/block manholes where you have a significant amount of joints through which water can penetrate.

**Curtain grouting can be done successfully with expansive foams or with non-expansive acrylic gel grouts. To Curtain Grout a structure you will need:**

1. The chemical grout, catalyst, initiator and/or water.
2. A grout pump: acrylic grouts typically use a dual component, stainless steel pump (air powered) while expansive foams utilize single component electric airless spray equipment. Each pump should be fitted with hoses rated for the specific type of pump/grout.
3. Tanks or buckets for mixing.
4. Proper Personal Protective Equipment (PPE's) according to the manufacturer's MSDS.
5. Confined space equipment as needed for entering the underground structure.
6. Injection tools: wand, wall spears or injection ports.
7. Quick setting non-shrink mortar.
8. Cleaning solutions – soap & water for gels and solvents for foams.
9. Hammer drill.

**Here is a quick glance at the steps you would take to curtain grout a structure:**

1. Drill holes through the wall of the structure to the soil. Holes should be spaced equally around the entire structure, typically drilled 2-3 feet above, below and to the sides of the initial hole so that movement of the grout will be evident.
2. For acrylic grouts consider adding different colored dyes to the grout tanks A & B: The most common combination is blue dye in Tank A (the grout tank) and yellow dye in Tank B (the catalyst tank). The dyes enable the grouter to quickly discern if liquids coming into the structure are from Tank A, Tank B, a combination of both, or merely ground water. The gel will also be easier to see as a green color.
3. Keep the tank and the hoses out of direct sunlight and away from heat to avoid pre-polymerization.
4. Inject the grout at the appropriate ratio into the lowest injection hole.
5. When material comes out of the nearby hole to the left or right, move to that hole and repeat process for all holes at the lowest level.
6. Move up to the next row of holes and repeat.
7. After all the holes are grouted, patch each one with a small handful of quick set mortar.
8. When finished, be sure to clean your equipment and hoses for storage.

Curtain Grouting is simply another effective technique in the contractor's arsenal of tools for fighting water intrusion. Among other benefits, it will save time from having to chase water and will protect the outside of the structure for the long term.

For more helpful information, please visit NASSCO's website at [www.nassco.org](http://www.nassco.org).