

Instructional Guideline:

Manhole Groundwater Infiltration Repair Using Chemical Grouts



Overview

Infiltration of groundwater through open joints, cracks, and pipe penetrations in manholes can significantly increase the volume of effluent entering the collection system, raising the cost of wastewater treatment. Additionally, the inflow of groundwater often carries fine soils into the system, leading to exterior void formation. This may result in sinkholes, roadway collapse, or even total structural failure. Chemical grouting provides a long-term solution that, when properly applied, can exceed the service life of the manhole itself.

1. Safety Precautions

- Always follow confined space entry protocols and procedures.
- Use all required PPE and ensure proper ventilation.

2. Pipe Penetration Sealing Procedure

- 1) Mix a small quantity of chemical grout according to the manufacturer's instructions in a clean pail.
- 2) Cut a 12"–18" length of unroiled dry oakum.
- 3) Saturate the oakum by submerging it in clean water, then wring out excess moisture.
- 4) Place the damp oakum into the grout mixture and allow it to soak thoroughly.
- 5) Quickly insert the grout-soaked oakum into the annular space around the pipe. If needed, use a screwdriver and hammer to "chink" it into tight spaces.
 - Alternate method: In tight or delayed applications, skip the pre-wet step. Soak dry oakum in grout, place it around the pipe, then mist with clean water to trigger the reaction.
- 6) Repeat as necessary to completely seal all pipe penetrations.
- 7) Identify and control high-flow leaks using grout-treated oakum.
- 8) If needed, inject additional grout behind the oakum using a grout needle

3. Sealing Precast Manhole Joints

- 1) Address any high-flow leaks using the method described in Section 2.
- 2) Drill four evenly spaced holes at each precast joint to be sealed (positions: 12:00, 3:00, 6:00, and 9:00).
- 3) Holes should intersect the joint just above the tongue of the tongue-and-groove interface.
- 4) Install a mechanical packer in the drilled hole at the 12:00 position.
- 5) Prepare the chemical grout per the manufacturer's instructions.
- 6) Inject grout into the first packer until it becomes visible at adjacent holes (3:00 or 9:00).
- 7) Once grout is seen at a hole, install a packer in that hole and start injection through the packer.
- 8) Continue injection until a continuous seal is created all the way around the ring to ensure full circumferential coverage.
 - Note: If grout fails to appear at adjacent holes, drill additional holes till continuous grout travel is confirmed.
- 9) After the grouts are cured completely, remove all packers and seal the holes with hydraulic cement.

4. Sealing Brick Manholes

- 1) Address any high-flow leaks using the method described in Section 2.
- 2) Starting just above the bench of the manhole, drill four injection holes at 12:00, 3:00, 6:00, and 9:00 positions.
- 3) Drill the next row approximately 1 foot higher at 1:30, 4:30, 7:30, and 10:30 positions.
- 4) Repeat steps 2 & 3, continue drilling holes upward in 1-foot increments to the top of the manhole.
- 5) Install a mechanical packer in the drilled hole at the 12:00 location of the lowest row of holes.

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- 6) Prepare the chemical grout per the manufacturer's instructions.
- 7) Begin injection at the lowest 12:00 position.
- 8) When grout is observed at the next hole, install a new packer in that hole.
- 9) Proceed to the next row of holes only after completing the lower row.
- 10) Monitor the flow of the grout and prevent excessive grout from entering the mainline. Plug excessive and overactive points using dry oakum.
- 11) Once the grouts are completely cured, remove all packers and seal the injection holes with hydraulic cement.

5. Recommended Products and Accessories

Chemical Grouts:

- MasterRoc MP 300 – acrylic system
- MasterRoc MP 351 LV – low viscosity, single-component polyurethane resin
- MasterRoc MP 355 1K – single-component polyurethane resin for rigid foam
- MasterRoc MP 355 1K DW – high viscosity, single-component polyurethane resin for flexible foam
- MasterRoc MP 355 – multi-purpose two-component polyurethane resin with different accelerators for various cured properties

Cleaners and Preparation:

- MasterRoc MP 231 CLN – Non-flammable cleaning agent

Accessories:

- MasterRoc EQ 250 OR – dry Oakum rope
- MasterRoc EQ 510 PL – 1/2" x 10" aluminum mechanical packer
- MasterRoc EQ 512 PK – 1/2" x 5 3/4" aluminum mechanical packer
- MasterRoc EQ 538 PK – 3/8" x 3" nylon drive-in port
- MasterRoc EQ 558 PK – 5/8" x 4" steel mechanical packer

For additional support or technical questions, contact your local Master Builders Solutions technical representative.

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Master Builders Solutions is a leading global manufacturer of concrete admixtures, underground construction products, and other innovative solutions for the construction industry. Driven by its vision - **Inspiring people to build better** - the company provides value-added technologies and market-leading R&D capabilities to enhance the

performance of construction materials and reduce CO₂ emissions in concrete production. Founded in 1909, Master Builders Solutions employs ca. 1,800 people and operates 38 production sites worldwide. Master Builders Solutions is committed to supporting customers in overcoming today's construction challenges – for a decarbonised future.

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