SECTION 07 19 11.11
CURTAIN GROUTING

Basis of Design: Spetec HighFoamer | Revision 1 | Issued 2026-09-24

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes formation of a continuous water barrier against the exterior face of below-grade walls, slabs, culverts, and similar structures by pressure injection of single-component, water-reactive, hydrophobic polyurethane grout through a grid of ports drilled completely through the structure into the soil or backfill behind it.

B. Work of this Section corrects water infiltration through the structure by forming a grout curtain on its exterior face. Completion is judged by cessation of visible infiltration within the structure.

C. Curtain grouting is the recommended method for leakage through masonry walls.

D. Sealing of individual cracks and joints from the face of a concrete structure is specified separately as crack injection.

1.2 RELATED REQUIREMENTS

A. Division 01 - Product Requirements, including controlled substitution procedures.

B. Division 01 - Quality Requirements.

C. Division 03 - Concrete, for repair of structural concrete and concrete surfaces.

D. Crack injection, specified separately, for sealing individual cracks and joints from the face of a concrete structure.

1.3 REFERENCES

A. ASTM International:

1. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
2. ASTM D756 - Standard Practice for Determination of Weight and Shape Changes of Plastics Under Accelerated Service Conditions.
3. ASTM D1042 - Standard Test Method for Linear Dimensional Changes of Plastics.
4. ASTM D1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
5. ASTM D3574 - Standard Test Methods for Flexible Cellular Materials: Slab, Bonded, and Molded Urethane Foams.
6. ASTM D4878 - Standard Test Methods for Polyurethane Raw Materials: Determination of Viscosity of Polyols.

B. International Organization for Standardization:

1. EN ISO 2811-1 - Paints and Varnishes: Determination of Density.

C. NSF International:

1. NSF/ANSI/CAN 61 - Drinking Water System Components: Health Effects.

1.4 PREINSTALLATION MEETINGS

A. Convene a preinstallation meeting before starting work of this Section. Review at minimum:

1. Current Technical Data Sheets and Safety Data Sheets for each product to be used.
2. The Grouting Plan required under Article 1.5.
3. Results of the obstruction survey and site examination required under Article 3.1.
4. Port grid spacing, row spacing, diamond pattern, and hole depth.

5. Catalyst selection and dosage for the water flow and temperature expected.
6. Injection pressure range and the method of monitoring grout travel.
7. Ambient and substrate temperature limits.
8. Ventilation and safety requirements for confined spaces, where applicable.

1.5 ACTION SUBMITTALS

A. Submit under provisions of Division 01.

B. Product Data: Current Technical Data Sheet for each product and accessory to be used, including revision date.

C. Safety Data Sheet for each product and accessory to be delivered to the site.

D. Grouting Plan: Drawing showing the treatment area, port grid spacing, row spacing, diamond pattern, hole depth, grout and catalyst proposed, injection equipment, injection sequence, and injection pressure range. Submit for review by the Engineer before work begins.

E. Catalyst Schedule: Catalyst proposed, dosage by volume, and the published reaction rate at that dosage and temperature.

F. Where the work occurs within a drinking water structure, submit current NSF/ANSI/CAN 61 certification of the injected material.

1.6 INFORMATIONAL SUBMITTALS

A. Obstruction Survey: Location of conduits, utilities, soldier piles, drainage mats, membranes, and other buried elements within and behind the structure.

B. Injection Record: For each port or section, location, spacing, catalyst percentage, pressure range, volume injected, material travel, and anomalies.

C. Completion Record: Confirmation of cessation of infiltration at each treated area.

D. Installer Qualification: Evidence that the Installer satisfies Article 1.7.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Installer shall have completed Alchatek contractor training, or Alchatek Technical Service shall be present at the start of the work.

B. Field Spacing Verification: Before production injection, drill test holes, flush with water, and observe travel distance to adjacent areas. Use the observed travel to confirm port spacing for the structure and soil.

C. Utility Locate: Contact the applicable one-call utility locate service before drilling.

D. Safety Data Sheets: Personnel shall review the Safety Data Sheet for each product before handling or injecting.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in unopened original containers bearing the product name and manufacturer identification.

B. Store products between 50 and 80 deg F (10 and 26 deg C). Shelf life is 24 months in unopened containers stored within this temperature range.

C. Retain empty catalyst containers for disposal.

D. Dispose of surplus material and empty containers in accordance with local regulations.

1.9 FIELD CONDITIONS

A. Application temperature range: 34 to 95 deg F (1 to 35 deg C). Confirm ambient and substrate temperatures are within this range before injection.

B. Spetec HighFoamer is water reactive. Where conditions behind the structure are dry, inject water behind the structure before injecting grout.

C. Select catalyst type and dosage for the water flow present and the ambient temperature.

D. Quantity of material depends on jobsite conditions, including the amount of water, thickness of concrete, temperature, amount of catalyst, and expansion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: Alchatek (www.alchatek.com).

B. Substitution of products from other manufacturers is governed by the controlled substitution procedures of Division 01.

2.2 BASIS-OF-DESIGN PRODUCT

A. Basis-of-Design Product: Spetec HighFoamer.

B. Description: Single-component, closed-cell, hydrophobic, water-reactive, solvent-free and phthalate-free, low-viscosity polyurethane injection resin. Semi-rigid, high strength. Up to 50 times expansion.

C. Catalyst: Spetec HighFoamer requires Alchatek Gen Cat or Alchatek Gen Cat Fast for proper foam formation and to adjust set times.

2.3 SUBSTITUTIONS

A. Spetec HighFoamer is the product specified for this Section.

B. A product proposed for substitution shall satisfy every requirement of Article 2.4 and shall be supported by current published technical data demonstrating compliance.

C. Where drinking water certification is required, a product not carrying NSF/ANSI/CAN 61 certification is not an acceptable substitution.

2.4 PERFORMANCE REQUIREMENTS

A. Injected material shall react and cure in the presence of water.

B. Injected material shall be closed cell and semi-rigid in the cured state.

C. Reaction time shall be adjustable by catalyst type and dosage.

D. Where the work occurs within a drinking water structure, injected material shall be NSF/ANSI/CAN 61 certified.

2.5 PRODUCT PROPERTIES

A. Spetec HighFoamer, uncured (Technical Data Sheet Rev. 7/30/2026):

1. Appearance: Brown liquid.
2. Viscosity at 77 deg F (25 deg C), ASTM D4878: 215 cP (215 mPa-s).
3. Density at 77 deg F (25 deg C), EN ISO 2811-1: 69.9 lb/cu ft (1.12 kg/dm3).

B. Spetec HighFoamer, cured:

1. Density, free rise, ASTM D3574: 1.2 lb/cu ft (0.019 kg/dm3).
2. Compressive strength (with fine sand), ASTM C39: Up to 1,803 psi (12.4 MPa).
3. Shrinkage, ASTM D1042 / D756: Negligible.
4. Tensile strength, ASTM D1623: 43 psi (296 kPa).
5. Tensile elongation, ASTM D1623: 3.80 percent.
6. Expansion: Up to 50 times.
7. Certification: NSF/ANSI/CAN 61 certified for contact with drinking water.

C. Alchatek Gen Cat:

1. Appearance: Yellow-orange liquid.

2. Viscosity at 77 deg F (25 deg C), ASTM D4878: 75 cP (75 mPa-s).
3. Density at 77 deg F (25 deg C), EN ISO 2811-1: 65.5 lb/cu ft (1.05 kg/dm3).
4. Flash point: 313 deg F (156 deg C).

D. Alchatek Gen Cat Fast:
1. Appearance: Yellow-orange liquid.
2. Viscosity at 77 deg F (25 deg C), ASTM D4878: 70 cP (70 mPa-s).
3. Density at 77 deg F (25 deg C), EN ISO 2811-1: 65.5 lb/cu ft (1.05 kg/dm3).
4. Flash point: 313 deg F (156 deg C).

E. Reaction rate with Alchatek Gen Cat (start / end):
1. 41 deg F (5 deg C): 5 percent, 18 / 95 seconds; 8 percent, 15 / 60 seconds; 10 percent, 15 / 48 seconds.
2. 59 deg F (15 deg C): 5 percent, 18 / 78 seconds; 8 percent, 14 / 51 seconds; 10 percent, 11 / 41 seconds.
3. 77 deg F (25 deg C): 5 percent, 14 / 55 seconds; 8 percent, 10 / 43 seconds; 10 percent, 8 / 35 seconds.

F. Reaction rate with Alchatek Gen Cat Fast (start / end):
1. 41 deg F (5 deg C): 5 percent, 19 / 75 seconds; 8 percent, 15 / 40 seconds; 10 percent, 10 / 35 seconds.
2. 59 deg F (15 deg C): 5 percent, 14 / 57 seconds; 8 percent, 10 / 35 seconds; 10 percent, 8 / 28 seconds.
3. 77 deg F (25 deg C): 5 percent, 9 / 43 seconds; 8 percent, 7 / 30 seconds; 10 percent, 5 / 22 seconds.

G. Properties will vary depending on application conditions.

2.6 ACCESSORIES

A. Catalyst: Alchatek Gen Cat or Alchatek Gen Cat Fast.
B. Oakum: Alchatek Oakum, soaked in resin, for sealing large holes before drilling the grid.
C. Hammer-In Ports: Nylon, 3/8 or 1/2 inch.
D. Mechanical Packers: 1/2 inch typical, with rubber expansion sleeves.
E. Fittings: Grease (zerk) fittings for capping ports during injection.
F. Hole Patching: Hydraulic cement, epoxy, or non-shrink grout.
G. Pump Flush: Alchatek Pump Flush.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Review project documents and confirm against field conditions: wall and slab thickness, construction type, soil conditions behind the wall or beneath the slab (clay, sand, fill, or voids), buried obstructions (conduits, utilities, soldier piles, drainage mats, or membranes), and water source.
B. Verify the pH of the water source is between 3 and 10.
C. Survey the structure and record leak locations and severity (diffuse seepage, steady flow, or gushing), widespread cracking or previous failed repairs, surface condition, exterior water sources, evidence of voids or soil loss, and the presence of drainage systems or waterproofing membranes.
D. Probe or sound the structure to locate voids, delamination, and hollow areas behind the wall.
E. Locate reinforcing steel, conduit, and utilities within and behind the structure before drilling.

F. Do not begin drilling until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces with a wire brush, grinder with wire cup wheel, or pressure washer to remove mineral deposits, efflorescence, and loose debris. Where a chemical cleaner is used, flush or neutralize before proceeding.

B. Where large holes or voids would allow grout to escape freely, seal them with epoxy or with Alchatek Oakum soaked in resin before drilling the grid.

C. Port Grid: Lay out ports in a diamond grid pattern, not linear rows. Space ports as follows, then confirm by the field verification under Article 1.7:

1. Standard walls and slabs: 18 to 24 inches.
2. Dense soil or tight conditions: 12 to 18 inches.
3. Large voids or loose soil: 24 to 36 inches.

D. Grid Layout:

1. Start the bottom row approximately 6 inches above the floor and continue across the wall at the selected spacing.
2. Position the next row above the first at the spacing selected under Paragraph C, and stagger holes to create a diamond pattern.
3. Continue upward to the top of the treatment area.

E. Drilling:

1. Drill straight through the wall, completely through the structure and 2 to 6 inches into the backfill or soil.
2. Use a sharp, straight 3/8, 1/2, or 5/8 inch carbide-tipped masonry bit to produce round, clean holes.
3. Drill the bottom row first, then proceed upward row by row.
4. Use water flush during drilling to control silica dust.

F. Flush each drilled hole with clean water to remove drill dust. Flush from top to bottom on vertical surfaces.

G. Install Ports and Packers:

1. Install ports in every other hole initially.
2. Hammer-In Ports: Drive until snug and insert the grease fitting.
3. Mechanical Packers: Insert until the rubber sleeve is just below the surface and tighten until firm. Do not over-tighten.
4. Leave fittings off to monitor grout travel between ports.

H. Flush Behind the Structure: Using the water pump, inject water through each port and behind the wall to provide water for reaction and verify each hole penetrates to the soil or void. Start at one corner of the bottom row, work across, then move up to the next row.

I. Wet down the wall surface with water to reduce grout bonding and aid cleanup.

J. Personal Protection: Provide eye and face protection, chemical-resistant gloves, long sleeves and long pants, work boots, and safety vests. Provide respiratory protection and mechanical ventilation in confined spaces. Keep a clean water source and a portable eyewash unit at the work site. Use cordless tools or GFCI protection when drilling in wet areas.

3.3 MIXING

A. Mix grout and catalyst on site no more than 30 minutes before injection.

B. Add catalyst to the resin in a plastic or metal container and mix with a stick or electric mixer for 10 seconds per gallon.

C. Select catalyst type and dosage by volume within the range published by Alchatek. Start at 5 percent and increase for cold conditions or high-flow leaks.

D. Batch small quantities to limit waste.

3.4 INSTALLATION

A. Injection Equipment:

1. Grout Pump: Injection pump with a pressure gauge visible to the operator and a high-pressure ball valve assembly on the hose, capable of the pressures in Paragraph D.
2. Water Pump: Separate pump for flushing. Never allow water into the grout pump.
3. Flush the grout pump with Alchatek Pump Flush before and after each operation.

B. Injection Sequence:

1. Start at the lowest port in one corner.
2. Work across the bottom row, injecting every other port.
3. After completing the bottom row, move up to the next row and continue.
4. Always inject the lowest level first, so upper levels overlap lower levels.

C. Injection Method:

1. Start at low pump pressure, approximately 200 psi, and increase slowly as needed.
2. Inject resin for 10 to 15 seconds, then pause to allow the material to begin activating.
3. Repeat until activated grout appears at the adjacent port.
4. When material appears at the adjacent port, cap that port with its grease fitting.
5. Connect to the adjacent port, inject water, then inject resin.
6. Continue this pattern across the row and up the wall.

D. Injection Pressure: Typical range is 200 to 1,500 psi for standard walls, and up to 3,000 psi for thick structures, dense soil, or special conditions. Do not exceed 3,000 psi. Excessive pressure causes spalling, structural damage, and port blowouts.

E. Monitor during injection for material emerging at adjacent ports, material seeping from the wall surface or floor-to-wall joints, pressure spikes, and excessive material exit rate.

F. Advance to the next port when material travels to the adjacent port, when material exits faster than it enters, or when the target volume per hole is reached.

G. Stop injection at a port when material appears at the adjacent port, when pressure indicates refusal or blockage, or when the port reaches its design volume.

H. Where material does not travel to adjacent ports, drill additional ports at 12 to 18 inch spacing and increase pressure gradually. Where material travels too far or escapes unpredictably, widen spacing to 24 to 36 inches and reduce volume per port.

3.5 FIELD QUALITY CONTROL

A. After completing injection across all rows, re-inject each port to confirm the seal. Add resin and water at ports that require it.

B. Observe the interior of the structure after cure and confirm cessation of visible infiltration. Where infiltration continues, re-inject the affected area and re-verify.

C. Record for each port or section: location, spacing, catalyst percentage, pressure range, volume injected, material travel, and anomalies.

D. Conduct a final walkthrough to confirm no leaks were missed.

3.6 CLEANING

A. Allow the injected grout to cure before removing ports.

B. Remove excess cured resin and foam from wall surfaces with a scraper, utility knife, or grinder with wire wheel.

C. Remove ports and packers by pulling them from the structure or drilling them out flush with the concrete surface. Remove metal components as required by the project.

D. Clean injection holes and fill with hydraulic cement, epoxy, or non-shrink grout. Match the surrounding finish where specified.

E. Remove used ports, packers, debris, and cured material from the site and dispose of in accordance with local regulations.

F. Flush the grout pump and lines with Alchatek Pump Flush after the operation. Never rinse the grout pump with water.

3.7 PROTECTION

A. Protect treated areas from traffic and mechanical damage until the injected material has cured.

B. Protect adjacent finishes and equipment from contact with uncured material.

END OF SECTION 07 19 11.11