

# Specification



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## CHEMICAL GROUTING OF MANHOLES

### PART 1 – GENERAL

#### 1.01 SCOPE OF WORK

This section governs all work, materials and testing required for the chemical grouting of manhole defects. Manholes or sections of manholes with active leaks shall be repaired as indicated in the Manhole Rehabilitation Schedule as shown on the Plans.

#### 1.02 DESCRIPTION

The CONTRACTOR shall be responsible for furnishing all labor, supervision, materials, equipment, and testing required for the completion of chemical grouting of manhole defects in accordance with the Contract Documents.

#### 1.03 MANUFACTURER’S RECOMMENDATIONS

Materials, additives, mixture ratios, and procedures utilized for the grouting process shall be in accordance with manufacturer’s recommendations.

#### 1.04 MANHOLES

Manholes to be grouted are of brick, concrete, or fiberglass construction.

### PART 2 – PRODUCTS

#### 2.01 GROUTING MATERIALS

<b>Chemical Sealing Material</b>	<b>Suggested Additive if Required</b>
AV-100 Acrylamide Gel	Icoset AV-257
AV-118 Acrylic Gel	
AV-202 Multigrout Urethane Resin	
AV-219 Oil-Free Oakum	

The following properties shall be exhibited by the grout.

1. Documented service of satisfactory performance in similar usage.
2. Controllable reaction times and shrinkage through the use of chemicals supplied by the same manufacturer. The minimum set time shall be established so that adequate grout travel achieved.
3. Resistance to chemicals; to most organic solvents. Mild acids and alkali.
4. The chemical shall be essentially non-toxic in a cured form.
5. Sealing material shall not be rigid or brittle when subjected to dry atmosphere. The material shall be able to withstand freeze/thaw and moving load conditions.
6. Acrylate grouts may not be used.

## **2.02 ADDITIVES**

Grout conditions may be utilized for catalyzing the reaction, inhibiting the reaction, buffering the solution, lowering the freezing temperature of the solution, acting as filler, providing strength or for inhibition of root growth.

## **2.03 MATERIAL IDENTIFICATION**

The CONTRACTOR shall completely identify the types of grout, mortar, sealant, and/or root control chemicals used and provide case histories of successful use or defend the choice of grouting materials based on chemical and physical properties, ease of application, and expected performance, to the satisfaction of the Engineer.

## **2.04 MIXING AND HANDLING**

Mixing and handling of chemical grout, which may be toxic under certain conditions shall be in accordance with the recommendations of the manufacturer and in such a manner to minimize hazard to personnel. It is the responsibility of the CONTRACTOR to provide appropriate protective measures to ensure that chemicals or gels are handled by authorized personnel in the proper manner. All equipment shall be subjected to the approval of the Engineer. Only personnel thoroughly familiar with the handling of the grout material and additives shall perform the grouting operations.

## **PART 3 – EXECUTION**

### **3.01 GENERAL**

Manhole grouting shall not be performed until the repair of the manhole frame and grade rings or any other structural manhole repairs are complete.

### 3.02 PRELIMINARY REPAIRS

- A. The CONTRACTOR shall cut and trim all roots within the manhole.
- B. The CONTRACTOR shall seal all unsealed lifting holes, unsealed step holes, voids larger than approximately one-half (1/2) inch in thickness. All cracked or deteriorated material shall be removed from the area to be patched and replace with a waterproof quick setting mortar in accordance with manufacturer's specifications.
- C. The CONTRACTOR shall perform the Expanded Gasket Procedure (EGP) to control in flowing water in larger cracks, joints or pipe to manhole boots by soaking dry Oil Free Oakum (AV-219) with (AV-202) Multigrout and forcing the Oakum/Resin plug into opening until it sets. (See: Avanti EGP Manual for details.)
- D. The CONTRACTOR shall perform the EGP to seal intruding drop or lateral connections, slip line terminal seals and open joints in RCP manholes.
- E. The CONTRACTOR shall perform the EGP to seal between the corbel and grade rings, and between the manhole frame and grade rings, (See Avanti EGP Manuel for details.)

### 3.03 TEMPERATURE

Normal grouting operations shall be performed in accordance with manufacturer's recommendations.

### 3.04 GROUTING MATERIAL USAGE

Grouting to a manhole may include corbel, wall, pipe seals, manhole joints, well to flattop joint, and/or bench/trough. The Engineer will direct areas of the manhole designated to be grouted. If entire manhole is scheduled for grouting, grouting shall include corbel, wall, pipe seals, and bench/trough. Pipe seal grouting shall include all pipe seals in the specified manhole and grouting of the specified manhole including the bench/trough to the maximum height of 18 inches from the crown.

### 3.05 DRILLING AND INJECTION

- A. Injection holes shall be drilled through the manhole wall at locations as recommended by the manufacturer.
- B. Grout shall be injected through the holes under pressure with a suitable probe. Injection pressure shall not cause damage to the manhole structure or surrounding surface features. Grout shall be injected through the lowest holes first. The procedure shall be repeated until the manhole is externally sealed with grout.
- C. Grouting from the ground surface shall not be allowed.
- D. Grout travel shall be verified by observation of grout to defects or adjacent injection holes. Provide additional injection holes, if necessary to ensure grout travel.
- E. Injection holes shall be cleaned with a drill and patched with a waterproof quick setting mortar for brick and concrete manholes.

### 3.06 TESTING OF REHABILITATED MANHOLES

If exfiltration or vacuum testing is used, usually 10 percent of the sealed manholes, as chosen by the inspector, are tested. Manholes that fail are reworked and retested by the CONTRACTOR. If more than 5 percent of the manholes tested fail the initial test, an additional 10 percent of the sealed manholes are tested. This process continues until the testing is satisfactory, or until all manholes have been tested.

Limitations and considerations include recognizing that exfiltration and vacuum testing may be impractical or cost-prohibitive for all manholes; therefore, the use of either method is subject to the following limitations and considerations.

- A. Complete Sealing: These methods are used only when the entire manhole has been sealed or rehabilitated. The lack of sealing or rehabilitation of some portions of the manhole may prevent passage of either of these tests. Spot repairs and partial sealing or rehabilitation are therefore subject to infiltration and visual testing only.
- B. Inlet and Outlet Sewers: Manholes built over a large diameter sewers may be impractical and uneconomical to test using either of these methods due to bypassing requirements, availability of plugs, and high forces that are generated on the plugs. Consideration must be given to these factors when determining the method of acceptance testing to be used.
- C. Structural Condition: The structural condition of some manholes may be such that testing with these methods is impractical and destructive. The Owner's Representative and CONTRACTOR shall therefore deem as structurally sound, prior to testing and using these methods, those manholes that have not been structurally lined.

END OF SECTION