



2018 SANITARY SEWER MANHOLE REPAIR PROJECT 2018-PW-05 PROJECT SPECIFICATIONS

PROJECT SAFETY

- A. The Contractor shall conform to all work safety requirements of pertinent regulatory agencies, and shall secure the site for working conditions in compliance with the same. The Contractor shall erect such signs and other devices as are necessary for the safety of the work site. The Contractor is solely responsible for insuring safe working conditions and proper equipment for the execution of the project.
- B. The Contractor shall perform all of the Work in accordance with applicable OSHA safety standards. Emphasis shall be placed upon the requirements for entering confined spaces and with the equipment being utilized for manhole rehabilitation components. Confined space, defined as any space having one or more of the following characteristics:
1. Limited openings for entry and exit.
 2. Unfavorable natural ventilation.
 3. Not designed for continuous worker occupancy.
- C. The Contractor shall have on the job site at all times at a minimum the following safety equipment:
1. Gas monitor capable of testing and detecting for combustible gas, oxygen deficiency and hydrogen sulfide.
 2. Confined space access and retrieval winch system.
 3. Ventilating fans with large diameter ventilating hose.
 4. Supplied air respirator, MSHA/NIOSH approved type.
 5. Safety harness and life lines.
 6. Other equipment as may be required for a specific project
 7. All equipment to be available for use, in sufficient quantity, by the Contractor, Engineer and Owner for the duration of the project.
- D. All entries into or work within confined spaces shall be conducted in accordance with the U.S. Department of Health and Human Services/National Institute for Occupational Safety and Health [DHHS (NIOSH)] Publication No. 87-113, A Guide to Safety in Confined Spaces.
- E. The grouting material installed shall cause no adverse effects to any of the Owner's processes or facilities either during or after application. The use of the product, by the Contractor, shall not result in the formation or production of any detrimental compounds or by-products at the wastewater treatment plant. The Contractor shall notify the Owner and identify any by-products produced as a result of the installation

operations, test and monitor the levels, and comply with any and all local waste discharge requirements. The Contractor shall cleanup, restore existing surface conditions and structures, and repair any of the grouting material installed and determined to be defective. The Contractor shall conduct installation operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, businesses, and property owners or tenants.

REHABILITATION COMPONENT SYSTEM PRODUCTS

- A. The grouting material defined herein include those identified as commercially accepted methods for manhole rehabilitation. Methods or products not defined herein must be pre-approved by the Owner before use on this project under these specifications.

CHEMICAL GROUTS

A. REFERENCES

ASTM F2414-04 Standard Practice for Sealing Sewer Manholes Using Chemical Grouting

B. CHEMICAL GROUT TYPES

1. The Contractor shall specifically define the type of chemical grout that will be furnished for the project. Depending on the specific application either Acrylic or Acrylate Based Grout or Urethane Based Grout shall be furnished. The type of grout to be used shall be in accordance with the manufacturer's recommendation for the specific application area of the project.
2. Contractor shall deliver materials to job site in undamaged, unopened containers bearing manufacturer's original labels. Materials used as chemical grout shall be transported, stored, mixed and applied in manner prescribed by the manufacturer of the specified materials, as detailed in published data provided by manufacturer.

C. MATERIALS

1. Contractor shall provide a chemical sealant solution containing principal chemical sealant constituent, initiator (trigger) and catalyst specifically recommended for the purpose of sealing leaks in manholes. Chemical sealant constituent, initiator (trigger) and catalyst shall be compatible when mixed. Solution shall have ability to tolerate dilution and react in moving water. After final reaction, it shall be a stiff, impermeable, yet flexible gel. The grout proportions shall be such that dilute aqueous solutions, when properly catalyzed will form stiff gels. Materials provided shall gel in a predetermined time period when exposed to normal groundwater pH ranges, and be capable of formula adjustments to compensate for changing conditions. Final reaction shall produce a continuous, irreversible, impermeable stiff Gel and shall not be rigid or brittle.
2. The grout shall exhibit the following properties:
 - a. 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 is achieved.

- b. Resistance to chemicals, to most organic solvents, mild acids and alkali.
 - c. The grout shall be non-toxic in its cured form.
 - d. Sealing material shall not become rigid or brittle when subjected to a dry environment. The material shall be able to withstand freeze/thaw and moving load conditions as verified by third party testing.
3. The Contractor shall identify the type of grout and additives used on the contract and furnish references of successful use in similar applications. The Contractor shall select the choice of materials based on chemical and physical properties and expected performance for the requirements of the contract documents.
 4. Grout conditions may be adjusted for catalyzing the reaction, inhibiting the reaction, lowering the freezing temperature the grout solution, adding fillers, providing strength or for inhibiting root growth according to the instructions of the grout manufacturer and in the specified quantities as recommended by the grout manufacturer.

D. MIXING & HANDLING

1. Mixing and handling of chemical grout, which may be toxic under certain conditions, shall be done in such a manner as to minimize any hazard to personnel and shall be in accordance with the manufacturer's recommendations. It is the responsibility of the Contractor to provide appropriate protective measures to ensure that chemicals are handled only by trained and authorized personnel. All equipment used to install the grout shall be as recommended by the manufacturer and only personnel thoroughly familiar with all aspects of the grouting material and meeting the qualification requirements specified herein, shall perform the actual grouting operation.

INSTALLATION REQUIREMENTS

A. GENERAL

1. Maintain all flow in the manhole throughout duration of project to the maximum extent practical. When necessary, by-pass pumping may be performed by the Contractor. Contractor shall notify the City 24-hours prior to work beginning.
2. Provide 48 hour notice to the Owner prior to start of work for Inspector to review and document materials and equipment to be used, for Quality Assurance and testing requirements.

B. CONTRACTOR EXPERIENCE

1. Current documentation, from the grouting material product manufacturer, certifying that the Contractor's training, the Contractor's personnel and equipment comply completely with their product Quality Assurance requirements.
2. For grouting products, to be considered for this project, a minimum of a three (3) year successful installation history must be documented.
3. In all cases a minimum of five (5) recent verifiable references of the Contractor's work is required, indicating the successful application of the grouting products of the same material type as specified herein or to be furnished by the Contractor and applied in a similar project environment as included in these contract specifications.

C. MANHOLE PREPARATION

1. Grout incoming and/or outgoing pipes as specified.
2. Remove debris from manhole and incoming sewer connections.
 - a. Handle cleaning water to prevent water and residue from causing damage.
 - b. Do not discharge debris downstream through the sanitary sewer system.
 - c. Filter solids-laden water through a de-silting device.
 - d. Properly dispose of debris and residue from cleaning and other construction operations in a manner satisfactory to Owner.

D. CHEMICAL GROUT

1. GENERAL

- a. Normal grouting operations shall be performed at the temperatures as recommended by the manufacturer.

2. DRILLING AND GROUT INJECTION

- a. Drilling grout injection holes in the manhole in strategic locations to re-direct flow coming through cracks and other defects in the wall shall be in accordance with the recommendations of the grout manufacturer.
- b. Grout shall be injected through the drilled holes using the recommended probe and applying pressures that will effectively inject the grout but, not cause damage to the manhole structure or the surrounding area.
- c. Grout typically, shall be injected through the lowest holes first, working the grout higher until the manhole is externally sealed with grout. Additional holes may be required to verify that the grout has encompassed the entire outside of the manhole.
- d. The injection holes shall be cleaned and patched as recommended by the manufacture.

3. TESTING AND ACCEPTANCE

- a. Visual inspection – all leakage into the manhole must be eliminated.