Designation: F2304 – 22

Standard Practice for Sealing of Sewers Using Chemical Grouting[1]

This standard is issued under the fixed designation F2304; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice describes the procedures for testing and sealing individual sewer pipe joints with appropriate chemical grouts using the packer method. Sewer systems shall include sanitary, storm, and combined and their appurtenances. Chemical grouting is a soil sealing process, which seals the voids within the soil surrounding the exterior of the pipe at the point of leakage. Chemical grouting is not considered a structural repair.

1.2 This practice applies to sewers 6 in. to 42 in. (18 cm to 107 cm) in diameter. Larger diameter pipe may be grouted with specialized packers or man entry methods. Host pipe interior surfaces must be adequate to create an effective seal for the packer elements.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 Worker safety training should include reviewing the hazards associated with hoses, pumps, tanks, couplers, compressors, bottles, motors, and all other related application apparatus. Additional safety considerations including safely handling, mixing, and transporting of chemical grouts should be provided by the chemical grout manufacturer or supplier or both. Their safe operating practices and procedures should describe in detail appropriate personal protective equipment (PPE) for the various grouting operations. Operations covered should include the proper storage, transportation, mixing, and disposal of chemical grouts, additives, and their associated containers.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.6 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standard:*[2]

C1920 Practice for Cleaning of Vitrified Clay Sanitary Sewer Pipelines

2.2 *NASSCO Standards:*[3]

NASSCO Specifications Guidelines Wastewater Collection Systems Maintenance and Rehabilitation

NASSCO Specifications Guideline—Sewer Line Cleaning Wastewater Collections Systems Maintenance and Rehab, Sewer Line Cleaning

NASSCO Specifications Guidelines—Television Inspection, Main Sewers Wastewater Collections Systems Maintenance and Rehab, Television Inspection, Main Sewers

3. Summary of Practice

3.1 The work required by this practice shall consist of furnishing all labor, materials, equipment and supervising and performing all work necessary to rehabilitate the designated sanitary or storm sewer lines or both, all in accordance with the procedures. The work shall consist of, but not necessarily be limited to, performing the following tasks where specified:

3.1.1 *Sewer Line Cleaning,* shall be performed with hydraulically propelled high-velocity jet or mechanically powered equipment. Selection of equipment shall be based on field conditions such as access to manholes, quantity of debris, size of sewer, depth of flow, and so forth. NASSCO Specifications Guideline—Sewer Line Cleaning section adequately addresses the sewer line cleaning process in the current edition.

3.1.2 *Sewer Flow Control,* shall be performed as required to comply with this practice.

[1] This practice is under the jurisdiction of ASTM Committee F36 on Technology and Underground Utilities and is the direct responsibility of Subcommittee F36.20 on Inspection and Renewal of Water and Wastewater Infrastructure.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from National Association of Sewer Service Companies (NASSCO), 5285 Westview Dr., Suite 202, Frederick, MD 21703, http://www.nassco.org.

3.1.3 *Television Inspection,* shall be required to reveal and document sewer line conditions and be performed in advance of or in conjunction with pipe joint testing and sealing sewer pipe joints. NASSCO Specifications Guidelines—Television Inspection, Main Sewers section adequately addresses sewer line television inspection processes in the current edition.

3.1.4 *Sewer Pipe Joint Testing,* shall be performed to identify defective (infiltrating/exfiltrating) pipe joints and shall be accomplished by applying a positive test pressure to each individual sewer pipe joint, monitoring the test pressure and any test pressure decay, or through visual observation of the leaking joint.

3.1.5 *Sewer Pipe Joint Sealing,* shall be accomplished by the pressure injection of chemical grout (chemical sealing material) into the soils encompassing the pipe joint. Chemical grouts are designed to be injected into the soil surrounding the pipe, which stabilizes the soil and forms a permanent impermeable seal called a soil ring. Because the chemical grout is placed outside the pipe, adequate volumes must be injected to form an effective seal. This application will be through structurally sound joints from within the pipe (packer method) in tandem with a closed-circuit television inspection system.

4. Significance and Use

4.1 The inspection, testing, and repair of sewer pipe joints is a practice that can assist in maintaining and optimizing sewer performance. It is important to identify methods that use the most current compounds and technology to ensure the reduction of infiltration and exfiltration. The method selected should utilize environmentally safe grout and minimize the disruption of traffic.

4.2 This practice serves as a means to inspect, test, and seal sewer pipe joints, having selected the appropriate chemical grouts, using the packer method. Television inspection and joint testing are used to identify sewer line conditions, defective joints, and document the repairs undertaken. Instruction on joint sealing, if necessary, is then detailed, using pressure injection into the soils encompassing the pipe joint with a chemical grout (chemical sealing material).

4.3 This practice should not be used for longitudinally cracked pipe, severely corroded pipe, structurally unsound pipe, flattened, or out-of-roundpipe. In areas with high groundwater pressure, greater than 10 psi (68.9 ksi) at the test point, consult equipment manufacturers.

5. Contract Responsibilities

5.1 Sewer system sealing contracts should define or affix responsibility or make provisions for the following items:

5.1.1 *Notice of Client/Owner Requirements,* which are relevant to and within the scope of work to be performed under the contract.

5.1.2 *Municipal and Other Licenses and Permits,* and assistance in obtaining approvals or consent from utilities or carriers or other persons or organizations upon whose property or authority performance of work under the contract might impinge; or a written release from responsibility for the performance of work under the contract if and to the extent such work is precluded by the inability to obtain approvals or consent.

5.1.3 *Access to Site of Work,* to be provided to the extent that the owner is legally able to so provide or, if not so able, a written release from responsibility for the performance of work at sites where access cannot be made available.

5.1.4 *Clearances of Blockages or Obstructions,* in the sewer system, if any, if such clearance is required for performance of work under the contract and if such clearance is not otherwise provided for within the contract.

5.1.5 *Location and Exposure of All Manholes,* unless otherwise provided for in the contract.

5.1.6 *Manhole Numbering System,* for all areas of the project and accurate manhole invert elevations when required for performance of the work.

5.1.7 *Shutdown or Manual Operation of Certain Pump Stations,* if such becomes necessary for performance of the work.

5.1.8 *Water,* necessary for performance of work under the contract, from fire hydrants or other sources must be obtained in accordance with local ordinances.

5.1.9 *Disposal Area,* for all materials removed from the sewers during the performance of the work and the unencumbered right of the contractor to transport and expeditiously dispose of such materials at a location designated by the owner.

5.1.10 *Secure Storage Area,* of a size adequate to accommodate the required vehicles, equipment, and materials for the period of the contract.

5.1.11 *Notice to Third Parties,* (such as utilities and affected residents) of the contractor's intent to perform work in an area where such parties may have rights to underground property or facilities. Request for maps or other descriptive information as to the nature and location of such underground facilities or property and assurance of the contractor's ability to enter upon any public or private lands to which access is required for performance of the work under the contract.

5.1.12 *Information Pertinent to the Site* of the project including reports prepared under previously accomplished studies or surveys and other data relative to the project, including maps, drawings, construction specifications sewer system records, and so forth.

5.1.13 *Authorization* to perform work that must be performed during nighttime hours, on weekends, or on holidays.

5.1.14 *Traffic Control,* as specified by the agency with jurisdiction over the roadway or by uniformed officers when the safety of workers or the public requires such protection.

5.1.15 The contractor shall certify that backup equipment is available and can be delivered to the site within 48 h.

5.1.16 Submit work schedule to the owner's representative for review and approval before commencement of the project.

5.1.17 Submit equipment operating procedures and systems to the owner's representative for review and approval before commencement of the project.

6. Chemical Grout (Chemical Sealing Materials)

6.1 The intent of this section is to define the properties that a chemical sealing material must have to perform effectively in