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An American National Standard

Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner[1, 2]

This standard is issued under the fixed designation F2561; 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 covers requirements and test methods for the reconstruction of a sewer service lateral pipe having an inner diameter of 3 to 12 in. and its connection to the main pipe having an inner diameter of 6 to 24 in. without excavation. The lateral pipe is accessed remotely from the main pipe and from a lateral cleanout. This will be accomplished by the installation of a resin impregnated one-piece main and lateral cured in-place lining (MLCIPL) by means of air or water inflation and inversion. The MLCIPL is pressed against the host pipe by pressurizing a bladder and is held in place until the thermoset resins have cured. When cured, the MLCIPL shall be a continuous, one piece, tight fitting, corrosion resistant lining extending over a predetermined length of the lateral pipe and the adjacent section of the main pipe providing a verifiable non-leaking structural connection and seal.

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.3 There is no similar or equivalent ISO Standard.

1.4 *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 and health practices and determine the applicability of regulatory limitations prior to use. Particular attention is drawn to those safety regulations and requirements involving entering into and working in confined spaces.*

2. Referenced Documents

2.1 *ASTM Standards:*[3]

D618 Practice for Conditioning Plastics for Testing

D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

D1600 Terminology for Abbreviated Terms Relating to Plastics

D3681 Test Method for Chemical Resistance of "Fiberglass" (Glass–Fiber–Reinforced Thermosetting-Resin) Pipe in a Deflected Condition

D5813 Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems

F412 Terminology Relating to Plastic Piping Systems

F1216 Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

2.2 *NASSCO Guidelines:*[4]

Recommended Specifications for Sewer Collection System Rehabilitation

3. Terminology

3.1 *Definitions*—Unless otherwise indicated, definitions are in accordance with Terminology F412, and abbreviations are in accordance with Terminology D1600.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *access point*—an existing manhole at either the upstream or downstream end of a sewer main or a cleanout located on the lateral pipe.

3.2.2 *bladder*—a transparent flexible plastic hose that when pressurized, causes the main sheet to be pressed against the main pipe walls and the lateral tube to invert up into the sewer service lateral. The bladder joined with the textile lining creates a liner/bladder assembly.

[1] This practice is under the jurisdiction of ASTM Committee F17 on Plastic Piping Systems and is the direct responsibility of Subcommittee F17.67 on Trenchless Plastic Pipeline Technology.

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[2] The rehabilitation of a sewer service lateral and its connection to the main using a one-piece main and lateral cured-in-place liner is covered by patents (LMK Enterprises, Inc. 1779 Chessie Lane, Ottawa, IL 61350). Interested parties are invited to submit information regarding the identification of acceptable alternatives to this patented item to the Committee on Standards, ASTM Headquarters, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Your comments will receive careful consideration at a meeting of the responsible technical committee which may attend.

[3] 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.

[4] NASSCO, 1314 Bedford Ave., Suite 201 Baltimore, MD 21208

3.2.3 *inversion*—the process of turning a resin-impregnated tube inside out by the use of air or water pressure.

3.2.4 *launcher*—combination of a rigid elongated tube and lay-flat hose apparatus where the main bladder is attached and the main sheet is wrapped around the exterior of the rigid portion. The lateral bladder and lateral liner is drawn inside the hose. The launcher is positioned within the main pipe; air pressure is introduced into the hose causing inflation of the main bladder/ sheet and inversion of the lateral bladder tube.

3.2.5 *lift*—a portion of the MLCIPL that has cured in a position such that it has pulled away from the existing pipe wall.

3.2.6 *main and lateral cured in place lining (MLCIPL)*—a textile including plastic coating impregnated by a thermosetting resin. This pipe is formed within a portion of the existing main pipe and the lateral pipe. Therefore, it takes the shape of an existing TEE or WYE fitting and fits tightly to the existing pipes.

3.2.7 *resin*—polyester, vinyl ester, epoxy or silicate resin systems being ambient, steam, or hot water cured.

3.2.8 *resin slug*—excess resin at the upper most end of a lateral lining.

3.2.9 *sewer service lateral*—a pipe servicing a building or a side service.

3.2.10 *sheet*—a flat textile sheet that is formed into a 16 inches long tube within the main pipe. The sheet is connected to the lateral tube forming a one-piece TEE or WYE shaped fitting.

3.2.11 *transition*—the change in pipe diameter commonly found in lateral pipes.

4. Significance and Use

4.1 This practice is for use by designers and specifiers, regulatory agencies, owners, and inspection organizations who are involved in the rehabilitation of sewer service laterals and its connection to the main through the use of a resin-impregnated tube installed within an existing sewer lateral. As for any practice, modifications may be required for specific job conditions.

5. Materials

5.1 *Tube and Sheet*:

5.1.1 The main sheet and tube shall consist of one or more layers of absorbent textile i.e. needle punched felt or circular knit that meet the requirements of Practice F1216 and Specification D5813, Sections 6 and 8. The main sheet and tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe segments, and flexibility to fit irregular pipe sections. The volume of resin used should be sufficient to fill all voids in the tube material at nominal thickness and diameter. The wet-out main sheet and tube shall have a uniform thickness and excess resin distribution that when compressed at installation pressures will meet or exceed the design thickness after cure.

5.1.2 The outside layer of the tube (before inversion) and the interior of the main sheet (before inflation) shall be coated with an impermeable, translucent flexible membrane. The main sheet before insertion shall be permanently marked as a lateral identification correlating to the address of the building the lateral pipe services. The main sheet and tube shall be surrounded by a second impermeable, flexible translucent membrane (translucent bladder) that will contain the resin and facilitate vacuum impregnation and monitoring of the resin saturation during the resin impregnation (wet-out) procedure.

5.1.3 The main sheet and lateral tube shall be a one-piece assembly formed as a TEE or WYE shaped fitting. No intermediate or encapsulated elastomeric layers shall be in the textile that may cause delamination in the cured in place pipe. The main sheet will be flat with one end overlapping the second end and sized accordingly to create a circular lining equal to the inner diameter of the main pipe. The lateral tube will be continuous in length and the wall thickness shall be uniform. The lateral tube will be capable of conforming to offset joints, bells, and disfigured pipe sections.

5.2 *Resin*:

5.2.1 The resin/liner system shall conform to Test Method D3681, 10 000-h test.

5.2.2 The resin shall be a corrosion resistant polyester, vinyl ester, epoxy or silicate resin and catalyst system that when properly cured within the composite pipe assembly, meets the requirements of Practice F1216, the physical properties herein, and those, which are to be utilized in the design of the MLCIPL for this project.

5.2.3 The resin shall produce a MLCIPL, which will comply with the structural and chemical resistance requirements of Practice F1216.

6. Design Considerations

6.1 The MLCIPL shall be designed in accordance with Practice F1216, Appendix X1 in respect to the lateral and main line tubes. If the mainline pipe has been renewed with a structural lining from manhole to manhole, then the mainline portion of the MLCIPL is designed only for hydrostatic buckling.

6.1.1 The design for the main and lateral tube shall assume no bonding to the original pipe.

7. Installation Recommendations

7.1 *Access Safety*—Prior to entering access areas such as manholes or an excavation pit, performing inspection or cleaning operations, an evaluation of the atmosphere to determine the presence of toxic or flammable vapors or lack of oxygen shall be undertaken in accordance with local, state, or federal safety regulations.

7.1.1 *Cleaning and Pre-Inspection and Post Inspection*, as per NASSCO (National Association of Sewer Service Companies) Guidelines.

7.1.2 *Accessing the Lateral*—A clean-out must be located outside of the building and upstream at the upper end of the finished lateral lining. In order to access both the upstream and downstream sides of the lateral pipe, it is recommended that the cleanout is TEE shaped where the lateral and riser pipe join.

7.1.3 *Plugging*—The upstream side of the cleanout shall be plugged during insertion and curing of the MLCIPL assembly ensuring no flows enter the pipe and no air, steam or odors will enter the building. When required, the main pipe flows will be by-passed. The pumping system will be sufficiently sized for normal to peak flow conditions. The upstream manhole is