Designation: F2561 – 17

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. (7.6 to 30.5 cm) and its connection to the main pipe having an inner diameter of 6 to 24 in. (15.2 to 61.0 cm) and up the lateral a maximum of 150 ft without excavation. The lateral pipe is accessed remotely from the main pipe and from a lateral access point. 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 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 standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 There is no similar or equivalent ISO Standard.

1.4 **Warning—**Mercury has been designated by many regulatory agencies as a hazardous substance that can cause serious medical issues. Mercury, or its vapor, has been demonstrated to be hazardous to health and corrosive to materials. Caution should be taken when handling mercury and mercury-containing products. See the applicable product Safety Data Sheet (SDS) for additional information. Users should be aware that selling mercury or mercury-containing products, or both, may be prohibited by local or national law.

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 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

F3097 Practice for Installation of an Outside Sewer Service Cleanout through a Minimally Invasive Small Bore Vacuum Excavation

[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.

***A Summary of Changes section appears at the end of this standard**

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 or a pipe opening located on the lateral pipe.

3.2.2 *bladder*—a translucent 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.

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 tube are 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 host 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, hot water, or cured UV light.

3.2.8 *resin slug*—excess resin at a terminating end of a CIPP lateral lining.

3.2.9 *sewer service lateral*—a pipe servicing a commerical, industrial or residential building.

3.2.10 *sheet*—a flat textile sheet that is formed into a 16 in. (40.6 cm) 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 lateral tube shall consist of one or more layers of absorbent textile that is, needle punched felt or circular knit that meet the requirements of Practice F1216 and Specification D5813, Sections 6 and 8. The main sheet and lateral tube shall be constructed to withstand installation pressures and to have sufficient strength to bridge missing pipe segments and flexibility to fit irregular pipe sections. The assembly of the tube and main sheet must be stitched and sealed. The interface of the main sheet and tube shall be vacuum tested with 10 in. of Mercury (Hg) by the manufacturer to verify a leak-free connection. 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 lateral tube shall have a uniform thickness and excess resin distribution that when compressed at installation pressures, the MLCIPL 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 with a lateral identification correlating to the address of the building that the lateral pipe services. In addition the manufacturers material batch codes for the liner and the resin shall be marked on the main sheet. The main sheet and lateral 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 shall include a hydrophilic O-ring attached to the interior surface at the tail end of the tube. One O-ring shall be attached four inches from the end of the liner and the other shall be attached six inches from the end of the liner. 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.

[4] NASSCO, Inc. 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117. www.nassco.org