

Installation Specifications
for
Cured in-Place Lateral Lining
(as provided by LMK Enterprises)

1. **INTENT**

It is the intent of this specification to provide materials and a standard practice for installing a cured-in-place pipe to renew a sewer service lateral that enters a collector pipe through means of minimal or no excavation.

2. **GENERAL**

The reconstruction will be accomplished using a non-woven fabric tube of particular length and a thermo-set resin with physical and chemical properties appropriate for the application. The tube is vacuum-impregnated with the resin within a translucent bladder and then inserted a mobile launching device. The mobile launching device shall rotate on its axis from the 6 O'clock to the 12 O'clock position and shall include a camera port for viewing the liner during inversion and visually verifying the liner has been fully deployed and open ended. Access to an upstream end of the service lateral is achieved by use of an existing clean out or by a small excavation.

The mobile launching device is aligned with the access point of the service lateral pipe (manhole, excavated pit, inside clean out or outside clean out). When the mobile launching device is properly positioned, the resin-saturated tube and inflation bladder are inverted as an assembly with air pressure accomplishing a one-step inversion. The inversion is complete when the liner/bladder assembly is fully extended within the lateral pipe. A camera port shall be used to insert a lateral camera during inversion allowing visual verification that the end of the lining tube is fully deployed, open ended and that the liner has not extended into the municipal main pipe. Once the tube/resin composite is cured, the inflation bladder and the mobile launching device are removed.

The composite of the materials above will, upon installation inside the host pipe, exceed the minimum test standards specified by the ASTM F1216-07.

3. **MATERIAL**

The fabric tube will consist of one or more layers of flexible needled felt, knitted tube or an equivalent non-woven material. The tube is constructed by longitudinal stitching and thermal tape seal bonding. The tube will be capable of conforming to bends, offset joints, bells, and disfigured pipe sections. A hydrophilic O-ring shall be positioned at the lower end of the tube providing a compression gasket seal.

The thermo-set resins will be polyester, vinyl ester, silicate or epoxy with proper catalysts as designed for the specific application.

The translucent bladder and the liner within enable visual inspection of resin impregnation. This allows for a one-step controlled inversion while keeping the liner inflated and pressurized against the host pipe until final cure.

The composite of the materials above, will upon installation inside the host Pipe, exceed the minimum test standards specified in ASTM F1216-07.

Test Standards for CIPP

FLEXURAL STRENGTH (ASTM D-790)-----4,500PSI
FLEXURAL MODULUS (ASTM D-790)----- 250,000 PSI

4. INSTALLATION PROCEDURE (ASTM F 1216-07) Standard practice for the Installation of Cured In-Place Pipe by Inversion Lining.

4.1 If a cleanout does not exist, the Installer will excavate an access pit or install an outside clean out at the appropriate location to gain access to the lateral pipe.

4.2 Installer shall clean and inspect, by means of CCTV, the lateral line immediately prior to rehabilitation and determine the overall structural condition of the pipeline. All roots, debris, and protruding service connections should be removed prior to inserting the liner.

4.3 The tube is inspected for torn or frayed sections. The tube in good condition will then be vacuum impregnated with a thermo-set resin.

All resin will be contained within a translucent bladder during vacuum impregnation and insertion. Installer shall ensure that no public property is exposed to contamination by liquid resin compounds or components.

4.4 The resin impregnated tube within the inflation bladder will be inserted into the mobile launching device. The mobile launching device is positioned at the clean out or pipe opening.

The resin and tube are completely protected during the placement. The resin shall not be contaminated or diluted by exposure to dirt, debris, or water during the placement.

4.5 The liner/bladder assembly shall be inverted out of the mobile launching device by controlled air pressure. The inversion shall be complete when the tube is fully deployed and terminates short of the municipal main pipe. The tube is held tightly in place against the wall of the host pipe until the cure is complete in accordance with ASTM F1216-07 Section 7.4.2 *Using Air Pressure*—The inversion air pressure should be adjusted to be of sufficient pressure to cause the impregnated tube to invert from point of inversion to point of termination and hold the tube tight to the pipe wall, producing dimples at side connections. Care should be taken during the inversion so as not to overstress the woven and nonwoven materials. Section 7.4.3 *Required Pressures*—*Before* the inversion begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing conduit, and the maximum allowable pressure so as not to damage the tube. Once the inversion has started, the pressure shall be maintained between the minimum and maximum pressures until the inversion has been completed. Should the pressure deviate from within the range of the minimum and maximum pressures, the installed tube shall be removed from the existing conduit.

4.6 When the curing process is complete, the pressure is released and the inversion bladder is reverted back into the mobile launching device. The mobile launching device is then removed from the clean out or the excavation pit.

No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, is to be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite are to be removed from the pipe by the installer.

4.7 Any cured liner that protrudes into the municipal main pipe will be robotically trimmed flush.

4.8 A second CCTV inspection is performed to verify the proper cure of the material, the proper trim of service connection, and the integrity of the seamless pipe. Owner will receive a video recording of the inspections and a written report documenting the project.

4.9 Any necessary excavations are restored and the lateral pipe returned to normal service.

5. **CLEAN-UP**

The site will always be left clean and the property returned to original condition.

6. **PAYMENT**

Payment for the work will be in accordance with the prices as set forth in the proposal for the scope of work performed.

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