



SPECIFICATION FOR PIPELINE RECONSTRUCTION BY CITYLINER®

1. Intent

1.1 It is the intent of this specification to provide for the reconstruction of existing underground pipe lines, by forming a new pipe within an existing deteriorated pipe, which has generally maintained its original shape. This will be accomplished by the installation of a resin impregnated flexible felt tube inverted into the existing pipe utilizing a head pressure from a water column. Curing shall be accomplished by circulating hot water, which will cure the resin into a hard, impermeable cured –in-place-pipe (CIPP). When cured, CityLiner® should extend over the length of the installation in a continuous, tight-fitting, structural, corrosion resistant and watertight CIPP pipe-within-a-pipe.

2. Materials

2.1 Resin - The resin used shall be a 100% solids epoxy and hardener system specifically designed for the cured-in-place-pipe (CIPP) being installed.

1. The resin shall be MaxPox 15 base resin with the MaxPox 180 hardener.
2. The Resin and Liner system shall be ANSI/NSF 14 certified.
3. The resin shall contain no styrene or other chemicals that have extreme malicious odors.

Liner Materials – Liner material must be approved CityLiner® plain felt with polymer coating provided by RS Lining, LLC.

2.2 General Requirements of CIPP – The finished pipe must be such that when the thermosetting resin cures, the total wall thickness will be a homogeneous and monolithic felt and resin composite matrix that will be chemically resistant to withstand internal exposure to domestic sewerage.

1. The minimum length shall be that deemed necessary by the engineer to affectively span the pipelining distance of the necessary sectional repair unless otherwise specified. The line length shall be verified in the field before impregnation of the tube with resin.
2. The outside of the tube, before installation, shall have an impermeable polymer coating. This coating will form the inner layer of the finished pipe and is required for enhancement of corrosion, flow and abrasion properties.

3. Reference Specifications

3.1 - Installation and material tests of cured-in-place-pipe (CIPP) must meet the minimum requirements demonstrated in the following ASTM standards:

ASTM F-1216-03	Standard Practice for the Installation of Cured-in-Place-Pipe by Inversion Lining.
ASTM D-638	Test Method for Tensile Properties of Plastics. Tensile Strength 3,000 psi..
ASTM D-790	Test Method of Flexural Properties of Plastics. Flexural Strength 4,500 psi. Flexural Modulus 250,000 psi.

3.2 - National Association of Sewer Service Companies (NASSCO)

Wastewater Collection Systems Maintenance and Rehabilitation- 10th Edition:
Chapters titled “TV Inspection” and “Sewer Line Cleaning.”

4. Pipe Design

4.1 - The MaxLiner™ pipe shall be designed to a minimum wall thickness based on the individual project parameters and the condition of the existing conduit. Prior to installation of the liner, design calculations, per ASTM F1216-03, shall be submitted to determine the minimum thickness of the liner to be installed. The pipe design shall have sufficient strength to support all dead loads, live loads and groundwater loads imposed.

4.2 - The contractor shall submit his price proposal based on the appropriate length, size, and existing pipe parameters designated in the Bid Item or Bid Proposal Section. The deterioration of sewers is an ongoing process. Should preconstruction inspections reveal the sewers to be in substantially different conditions than those in the design considerations, the contractor shall request such changes in reconstruction liner thickness, supporting such requests with design data. The deviation, if approved, shall be reflected by the appropriate addition or reduction in the unit cost for that size as agreed to by the owner or engineer.

5. Installation Responsibilities and Procedures

5.1 - It shall be the responsibility of the Owner to locate and designate all access points open and accessible for the work, and provide rights of access to these points. The Owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

5.2 Cleaning - Pipelines shall be cleaned of all debris, roots and other materials that would block proper inversion of the cured-in-place-pipe. Utilizing high-pressure jet cleaning equipment, several passes are completed to assure all debris is removed from the pipe.

5.3 TV Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks and obstacles by closed circuit television (CCTV). The interior of the pipeline shall be carefully inspected to determine the location of any conditions

that may prevent proper installation of MaxLiner™ into the pipelines, and it shall be noted so that these conditions can be corrected. A videotape and suitable log shall be kept for later reference by the Owner.

5.4 Resin Impregnated of CIPP Tube - The CityLiner® equipment performs the impregnated or “wet out” with MaxPox® resin. The wet-out equipment provides 100% impregnation of the resin into the felt by using vacuum, powered pinch rollers and the CityLiner resin mixing system. The impregnated tube shall be free of pinholes, resin voids and other defects after impregnation is completed.

5.5 Inversion of CIPP Tube - The wet-out tube shall be inverted into the pipe by using water or air pressure. The inversion head will be adjusted to be of sufficient pressure to cause the impregnated tube to invert completely in the host pipe.

5.6 CIPP Processing (Curing) - The Installer shall supply a suitable heat source and water recirculation equipment. The requirement shall be capable of delivering hot water or other approved heat source throughout the section by means of a pre-strung hose to uniformly raise the water temperature above the temperature required to affect a cure of the resin. This temperature shall be determined by the resin/catalyst system employed.

1. Cure shall be deemed to be completed when the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the CityLiner® process.
2. Cool-down – The Installer shall cool the hardened CityLiner® to a temperature below 100°F before relieving the internal pressure. Cool-down may be accomplished by the introduction of cool air or water to replace water being forced out of the cured liner. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

5.7 Finish – The finished CIPP shall be continuous over the entire length of an inversion length and be free of dry spots and lifts.

5.8 - After the work is completed, the Installer will provide the Owner with a videotape showing the completed.

6. Clean-Up

6.1 - Upon acceptance of the installation work, the Installer shall reinstate the project area affected by his operations.