



TECHNICAL SPECIFICATIONS BLD “Top Hat” & BLD “Top Hat Plus”

CURED-IN-PLACE LATERAL RECONSTRUCTION FROM MAINLINE

- **INTENT**

It is the intent of this portion of the specification to provide for the reconstruction of service lateral sanitary sewer lines, normally without excavation, by the installation of a resin impregnated, flexible, non-woven felt tube inverted into the existing service lateral utilizing a pressure apparatus positioned in the mainline pipe. Curing shall be accomplished by circulating hot water or other approved method to cure the resin into a hard impermeable cured-in-place pipe liner. When cured, the liner should extend over the length of the inversion in a continuous tight-fitting, watertight pipe-within-a-pipe to affect a junction with the mainline reconstructed pipe.

- **REFERENCE SPECIFICATIONS:**

This specification references ASTM test methods which are made a part hereof by such reference and shall be the latest edition and revision thereof.

- **GENERAL CORROSION REQUIREMENTS:**

The finished cured-in-place pipe shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage.

All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life.

In industrial areas subject to possible flows other than domestic sewage, the Owner shall obtain samples of the dry weather sewage flow to be analyzed for chemical content. This analysis shall be supplied to the Installer for his information.

- **CIPP LATERAL MATERIALS:**

The liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the conduit specified by the Owner. Allowance shall be made for circumferential stretching during insertion. The liner shall be a one piece joint-less tube that will seal at the mainline interface.

The minimum length shall be that deemed necessary by the Installer to effectively span the distance from the lateral connection at the main to the desired termination location in the service lateral pipe. For the purpose of this specification, the termination point shall be a distance within 18 inches of the intersection of the resident cleanout at the property line. The Installer shall verify the lengths in the field before impregnation.

Unless otherwise specified, the Installer shall furnish a specially designed, unsaturated, polyester resin and catalyst system compatible with the cured-in-place process that provides cured physical strengths specified herein.

- **PHYSICAL STRENGTH:**

The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life. No cured-in-place pipe reconstruction technology will be allowed that requires bonding to the existing pipe for any part of its structural strength. Only resin vacuum impregnation will be allowed. If reinforcing materials (fiberglass, etc.) are used, the reinforcing material must be fully encapsulated within the resin to assure that the reinforcement is not exposed, either to the inside of the pipe or at the interface of the CIPP and the existing pipe.

Design methods are to be derived from traditionally accepted pipe formulae for various loading parameters and modes of failure. All equations will be modified to include ovality as a design parameter. The design method shall be submitted to the Engineer for approval prior to the pre-bid conference.

The cured-in-place pipe shall conform to the minimum structural standards as listed below:

PROPERTY	ASTM Standard	RESULTS
Flexural Stress	ASTM D 790	4,500 psi
Flexural Modulus or Elasticity	ASTM D 790	250,000 psi

NOTE TO DESIGNER:

Values shown in 5.1 are for commonly used polyester resins in the United States at the time of this writing. Values for non-typical polyesters, vinyl esters, and epoxies should be substituted when applicable. Unless otherwise specified, these values shall be supported using lab test samples.

• **INSTALLATION PREPARATIONS:**

The following installation procedures shall be adhered to unless otherwise approved by the Owner's representative.

Access – The owner shall ensure that a clean out or access point exists at or beyond the termination point of the length of service lateral to be rehabilitated, to allow for the passage of the required cleaning and video equipment. The point of access shall be constructed of materials which provide a four inch (4") minimum diameter circular opening. **NOTE: For BLD "Top Hat" installations no cleanout will be installed. Contractor is to line the lateral from the main up to 60" in length.**

Safety – The installer shall carry out his operations in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements involving entering confined spaces.

Cleaning of Sewer Line – It shall be the responsibility of the Installer to verify, prior to installation, that all internal debris has been removed from the sewer line. Internal debris consists of broken pipe sections, roots, loose gravel, etc.

Inspection of Pipelines – Inspection of pipelines shall be performed by experienced personnel trained in locating breaks and obstacles by closed circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of the lateral liner 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.

Bypassing Sewage – The Installer, when required, shall provide for the flow of sewage around the section or sections of mainline pipe where the service lateral designated for lining is located. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow.

It is required that the service lateral be inactive during the time of installation. This is normally accomplished by turning off the

homeowner's services or requesting that the homeowner relinquish using his services during the period of installation.

Line Obstructions – If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, as in solids, dropped joints or collapsed pipe then the Installer shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

If the mainline pipe diameter is less than 8", then the laterals will be replaced externally utilizing excavation methods. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

The mainline pipe opening shall be prepared to accept the lateral CIPP and the mainline reconstructed pipe shall be maximized to obtain the best possible connection.

- **INSTALLATION OF LATERAL LINING**

The Installer shall designate a location where the liner will be vacuum impregnated prior to installation. The Installer shall allow the Owner to inspect the materials and "wet-out" procedure. A catalyst system compatible with the resin and liner shall be used.

The wet-out liner shall be loaded inside a pressure apparatus above ground. The pressure apparatus, with an end attached to a robotic device, shall be winched through the mainline pipe to the service connection. The robotic device, together with a television camera, will be used to position the pressure apparatus' inversion elbow at the service connection opening. Air pressure, supplied to the pressure apparatus through an inversion hose, shall be used to invert the wet-out liner through the lateral pipe. The inversion head will be adjusted to be of sufficient pressure to cause the impregnated liner to invert completely in the lateral pipe and hold the tube tight to the pipe wall. Care shall be taken during the curing process so as not to overstress the Insitutube.

Curing – In most circumstances, an accelerated ambient-temperature curing resin system will be utilized, however if a heat cure is required, the Installer shall supply a suitable heat source and water recirculation equipment. The equipment shall be capable of delivering hot water or other approved heating medium 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.

If a heat cure is required, the heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Water

temperature in the line during the cure period shall be recommended by the resin manufacturer. NOTE: **No UV cure systems will be allowed.**

Initial cure shall be deemed to be completed when inspection of the exposed portions of the CIPP appears to be hard and sound and the temperature gauge indicates that 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 installation process.

Cool-down – The Installer shall cool the hardened CIPP to a temperature below 100°F before relieving the pressure in the pressure apparatus. Cool-down may be accomplished by the introduction of cool air into the pressure apparatus to replace water being forced out of the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

Finish – The finished CIPP shall be continuous over the entire length of an inversion run and be free of dry spots, lifts, and delamination. The lateral CIPP shall not inhibit the closed circuit television post video inspection of the mainline or service lateral pipes.

During the warranty period, any defects which will affect the integrity or strength of the cured-in-place liner shall be repaired at the Installer's expense in a manner mutually agreed upon by the Owner and the Installer.

After the work is completed, the Installer will provide the Owner with a videotape showing the completed work including the restored conditions.

- **CLEAN-UP:**

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

- **PAYMENT:**

Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed. Progress payments will be made monthly based on the work performed during that period.

- **WARRANTY:**

Contractor warrants to Owner that all products and work provided by Contractor to Owner under this Agreement will be free from material defects in workmanship and materials for a period of one year from the earlier of the date on which Contractor's work is accepted by Owner or the date on which the Contractor completes performance and leaves the worksite. In the event that a

material defect in workmanship or materials supplied by Contractor is found during the one year period following acceptance of the work, then such defect shall be repaired, replaced or adjusted by Contractor at no additional cost to Owner. Owner's exclusive remedy in the event of any warranty claim hereunder is limited to correction of such defect, adjustment, repair or replacement as the Contractor shall at its sole option elect. The foregoing warranty is the exclusive warranty provided by contractor and is given in lieu of all other warranties, whether express, implied or statutory, including but not limited to, any implied warranties of merchantability or fitness or suitability for a particular purpose or use; and all other warranties are hereby expressly disclaimed.

In no event shall Contractor's liability for warranties hereunder exceed the purchase price paid by the Owner for Contractor's work and materials.

The warranty set out above shall be void and of no effect in the event that (I) Contractor is not notified of claim of defect within the one year period provided above; (ii) Contractor is not provided timely and unrestricted access to the site at which the claimed defect is located in order to investigate and/or repair, adjust or replace the work or materials claimed to be defective or Contractor is not provided suitable working conditions to perform such investigation, repair, adjustment or replacement; (iii) any materials or work is exposed to chemicals or substances other than those listed in the Specifications to this Agreement as accepted by Contractor; (iv) site conditions or pipeline, conduit or access way conditions are other than those disclosed to and accepted by Contractor; (v) Owner's site, pipeline, conduit or access ways are cleaned or modified in a manner not disclosed in writing to and accepted in writing by Contractor in advance of commencement of Contractor's work or tampered with prior to, during or after completion of Contractor's work; or (vi) the work, the site at which the work is performed or the materials provided by Contractor are otherwise abused or misused.



BLD TOP HAT & BLD TOP HAT PLUS

Product

- BLD TOP HAT & BLD TOP HAT PLUS service lateral rehabilitation is performed using a proven, non-disruptive process. Working remotely from inside a main line sewer, we rehabilitate service laterals and seal connections. This allows the process to take place without requiring access to the lateral pipe from the property side.
- Using a polyester felt tube with a flexible flange that will have a tight – fitting connection at the main.
- Requires minimal access from the homeowner or business' side of the property. Typically this is achieved through an existing or new cleanout.
- Typically for lengths up to 30 feet (main to cleanout) the installation is achieved from the mainline to the cleanout in one installation process.
- For lengths over 30 feet an overlap consisting of one installation from the main followed by an installation from the cleanout.
- Installs rapidly and results in a joint less, tight-fitting and structurally sound service connection. We have successfully installed over 12,000 CIPP Laterals.
- Both 4-inch and 6-inch service lateral rehabilitation.
- Service laterals in up to 24-inch mainlines, customizable applications in larger pipes.

BLD TOP HAT

- Nondisruptive method of restoring structural integrity at the junction or within a lateral line.
- Using a polyester felt tube with a flexible flange that will have a tight-fitting connection at the main.
- A one piece joint less tube that will seal at the main and line up to 5 feet of the lateral
- Rehabilitation is completed while working remotely from inside a main sewer line .
- No cleanout is necessary for this process

BLD TOP HAT PLUS

- Nondisruptive method of restoring structural integrity at the junction or within a lateral line.
- Typically this is achieved through an existing or new cleanout.
- Using a polyester felt tube with a flexible flange that will have a tight-fitting connection at the main.
- A one piece joint less tube that will seal at the main and line up to 30 feet of the lateral
- A lateral that is longer than 30 feet will require an overlap installation from the cleanout
- Rehabilitation is completed while working remotely from inside a main sewer line or from a clean out.

Service Lateral Rehabilitation



Preparation

- The service lateral is inspected using a robotic camera system that is propelled into the service lateral from the main line pipe or pushed in from a cleanout.
- This inspection provides valuable information about the condition and profile of the lateral pipe and connection.
- It is necessary to thoroughly clean the pipe prior to the rehabilitation process.
- We typically use high-pressure water to free the service lateral of roots, mineral deposits, grease, sand and sludge.
- After cleaning, and before installation, another inspection ensures that the lateral pipe is properly prepared.



We provide a structurally sound, tight seal.

Installation

- An installation device is placed into the main line sewer and positioned at the damaged service connection.
- The assembly unit is used to secure a flexible, resin soaked flange at the service lateral opening.
- An inflation bladder is then used to hold the flange end of the BLD Top Hat in place while it is inverted into the service lateral using an inversion hose and air pressure.
- A curing process is then initiated, during which the liner is held in place by the inversion hose.
- Once the BLD TOP HAT or BLD TOP HAT PLUS has cured, the assembly unit is removed, leaving the service lateral and its connection rehabilitated and ready for use.