



CSI: DIVISION: 22 00 00—PLUMBING  
Section: 22 13 16—Sanitary Waste and Vent Piping

**Product certification system:**

The ICC-ES product certification system includes testing samples taken from the market or supplier's stock, or a combination of both, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the supplier's quality system.

**Products:** Perma-Lateral™ Inverted Cured-in-place Pipe Lining System

**Listee:** Perma-Liner Industries, LLC  
13000 Automobile Blvd.  
Suite 300  
Clearwater, FL 33762  
[www.perma-liner.com](http://www.perma-liner.com)

**Compliance with the following codes:**

2024, 2021, 2018, 2015, 2012, 2009 *International Plumbing Code*® (IPC)  
2024, 2021, 2018, 2015, 2012, 2009 *International Residential Code*® (IRC)  
2022 and 2017 Uniform Illustrated Plumbing Code-India™ (UIPC-I) \*

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**Compliance with the following standards:**

ICC-ES LC1011 (October 2010), ICC-ES PMG Listing Criteria for the Rehabilitation of Existing Building Drains and Building Sewers by the Inversion and Curing of Resin-impregnated Tube  
ASTM F1216-2022, Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin-Impregnated Tube  
NSF/ANSI 14-2022, Plastic Piping System Components and Related Materials  
NSF SE 13004-2013, Rehabilitation of Small Diameter Pipelines

**Code Alternate:**

LC1011 was approved by the ICC-ES PMG listing committee based on several factors which include the following: (1) ASTM F1216 is a consensus standard but not referenced in the code; (2) the code prohibits drainage line size reduction in the direction of flow. Perma-Liner's installation does not constitute a reduction to a smaller nominal pipe size, further the resulting surface affords less friction loss which provides equivalent flow capacity despite the small reduction in diameter; (3) the use of this system restores the treated pipe capacity to minimum requirements in the code. Note this analysis only applies to systems evaluated by ICC-ES in accordance with LC1011.

**Identification:**

The Perma-Lateral™ and Flex-Liner™ Cured-in-place Pipe Lining materials are stamped indicating the product name (Perma-Lateral™ or Flex-Liner™), the ASTM designation (ASTM F 1216), the words ICC-

ES PMG listing mark, repeating the mark continuously over the entire length of the material (See Figure 1). A label must be attached, located at a maximum of 20 feet (6096 mm) apart along the length of the lined pipe or tube and at each fixture connection, indicating the listing holder's name, the ICC-ES PMG listing mark and the words "Caution: CIPP Epoxy Lined Pipe." The label must include a warning against using flame or heat when repairing any part of the system.

Perma-Lateral™ Lining Resin (A) and Hardener (B): Each container bears a label with the product name, the manufacturer's name (Perma-Liner Industries, LLC), the ICC-ES PMG listing mark. The ICC-ES PMG listing number (PMG-1068) is optional. (See Figure 2)

#### Installation:

Installation must comply with the manufacturer's published installation instructions and the applicable codes.

The Perma-Lateral™ and Flex-Liner Cured-in-place Pipe (CIPP) Lining Systems must be applied by installers trained and certified by Perma-Liner Industries, LLC.

The Perma-Lateral™ Scrim reinforced liner and Flex liner Cured-in-place Pipe (CIPP) Lining System may be used to repair vertical and horizontal pipelines.

**Inspection and Cleaning:** The pipe must be clean of all debris, roots and other obstructions that would block proper inversion of the CIPP. The cleaning must be done with a high-pressure jet unit or with mechanically powered cleaning equipment such as an electric rod machine with cutting attachments.

Inspection of the pipe must be done using a closed-circuit television (CCTV) camera and performed by experienced personnel trained in locating breaks, obstacles and service connections. The interior of the pipe must be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP liner into the pipe. Conditions such as protruding service taps, collapsed or crushed pipe, reductions in the cross-sectional area of more than 40 percent, or other obstructions must be corrected.

If inspection reveals a condition that cannot be removed by conventional sewer cleaning equipment, then a point repair excavation should be made to uncover and remove or repair the obstruction.

**Preparation, Installation and Curing of the Liner:** The quantity of the specified Perma-Lateral Lining Resin and Hardener required must be calculated in accordance with the manufacturer's formula based on pipe diameter, length and liner thickness.

Perma-Lateral Lining Resin and Hardener must be mixed in accordance with the manufacturer's recommendations.

The installer must remove all air from the liner tube, using equipment approved by the manufacturer, prior to filling the liner with the epoxy mix.

Once the liner tube has been "wetted out" with the epoxy mix, the installer must evenly distribute the mix in the liner tube using roller equipment approved by the manufacturer to ensure thorough saturation. The "wetted out" liner tube must be inverted into the pipe. Inversion is the process of installing the resin-impregnated liner into the pipe to be renovated by turning the liner inside out by the use of water or air pressure. The epoxy must be cured using the following method:

**Circulation of hot water or steam.** A bladder, referred to as a calibration hose, is installed the length of the liner. The bladder is filled with water or steam pressurized to between 5 and 7 PSI. The bladder is connected to a heater and circulation pump which circulates the water in the bladder and raises the water temperature between 125-135°F. This water temperature and pressure are maintained for a minimum of 1 hour. This forces the liner against the inside diameter of the piping during curing. The bladder is then removed.

**Ambient air curing.** Depending on the air and ground temperatures, the appropriate mixture of Part B hardener is mixed with Part A to "wet out" the liner, which is pulled into the pipe. There are different formulations of Part B depending on the temperature (hot weather, warm weather and cold weather mixtures). Once the liner is installed in the pipe, the epoxy can be cured by exposing the liner to ambient air.

Cured piping is then inspected in accordance with the manufacturer’s published installation instructions using equipment approved by the manufacturer. A final CCTV inspection is performed and recorded in accordance with Item 5 of the Conditions of Listing section.

The installation of seamless molded hydrophilic gaskets (SMHG) in cured-in place pipe (CIPP) rehabilitation of main and lateral pipelines shall be in accordance with ASTM F3240.

Models:

**Perma-Lateral™ Cured-in-place Pipe Lining System:** The system consists of components tested and listed to NSF 14 and ASTM F1216. The liner tube is 3 mm thick with a reinforced scrim and is intended to be used for most standard installations.

**Flex-Liner™ Cured-in-place Pipe Lining System:** The system consists of components tested and listed to NSF 14 and ASTM F1216. The liner tube is 2 mm thick and does not have the reinforced scrim, making it more flexible. It is intended to be used where multiple bends are involved in the installation.

Conditions of Listing:

1. Installation must be performed by installers trained and certified by Perma-Liner Industries.
2. The Perma-Liner™ CIPP System may be used to line pipe with a minimum diameter of 2 inches (102 mm) up to a maximum diameter of 12 inches (305 mm).
3. The minimum thickness of the liner must meet the design parameters of each individual application using the ASTM F1216 Appendix X1 Design Method.
4. The pipe must be inspected and cleaned in accordance with the Inspection and Cleaning section of this listing and the manufacturer’s published installation instructions.
5. Final video inspection in accordance with ASTM F1216 must be performed and witnessed by the code official or his designated representative. The final inspection must verify that the liner is continuous over the entire length of the inversion and is free of dry spots, lifts, and delaminations.
6. Perma-Liner™ CIPP System materials are under a quality control program with an annual inspection by ICC-ES.

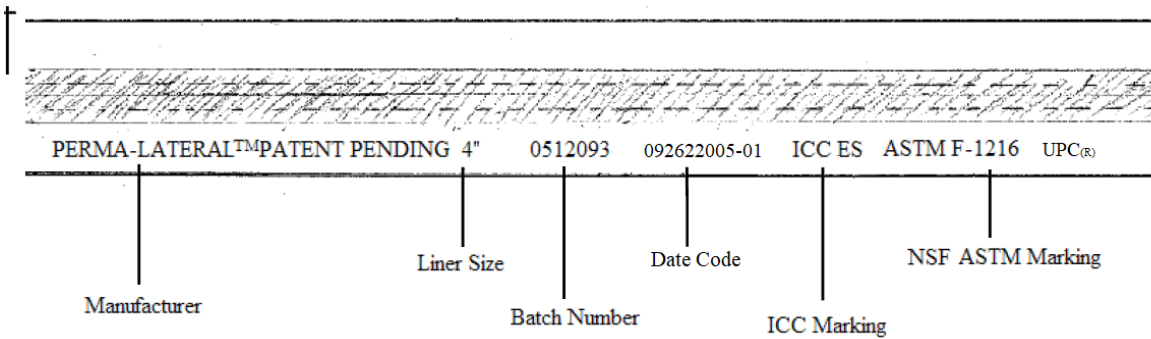


FIGURE 1—LINER MATERIAL LABEL

The figure shows two side-by-side product labels for Perma-Liner Epoxy Resin. Both labels feature the Perma-Liner Industries LLC logo and NSF certification marks.   
**Left Label (Part A):** 'PERMA-LINER EPOXY RESIN PART A EPOXY RESIN'. Product ID: PL23104. It includes a warning symbol (exclamation mark in a triangle) and a text box: 'WARNING: Causes skin irritation. Causes serious eye irritation. May cause an allergic skin reaction. May cause respiratory irritation.'   
**Right Label (Part B):** 'PERMA-LINER EPOXY RESIN PART B 1 CURING AGENT - HOT WEATHER (>70° F)'. Product ID: PL23105. It includes three warning symbols (skull and crossbones, flame, and exclamation mark in a triangle) and a text box: 'DANGER: Causes severe skin burns and eye damage. Causes serious eye damage. May cause an allergic skin reaction. Suspected of damaging fertility. May cause damage to organs (central nervous system (CNS)). May cause damage to organs through prolonged or repeated exposure (bladder, kidneys, liver).'   
 Both labels also contain 'PREVENTION', 'RESPONSE', and 'DISPOSAL' instructions, as well as 'STORAGE' information and emergency contact details for health and safety assistance.

FIGURE 2—RESIN PART A & RESIN PART B