

*Effective Date: August 2023**This listing is subject to re-examination in one year.*www.icc-es-pmg.org | (800) 423-6587 | (562) 699-0543*A Subsidiary of the International Code Council®*

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.

Product: Formadrain® Cured-in-Place Pipe Lining System

Listee: Formadrain® Inc.
10121 Parkway
Montreal, QC H1J 1P7 Canada
www.formadrain.com

Compliance with the following codes:

2021, 2018, 2015, 2012 and 2009 *International Plumbing Code®* (IPC)
2021, 2018, 2015, 2012 and 2009 *International Residential Code®* (IRC)
2021, 2018, 2015, 2012 and 2009 *Uniform Plumbing Code®* (UPC)*
2020, 2015, 2010 and 2005 *National Plumbing Code of Canada***
2017 *Uniform Illustrated Plumbing Code – India™* (UIPC-I)*

**Uniform Plumbing Code is a copyrighted publication of the International Association of Plumbing and Mechanical Officials*

*** National Plumbing Code of Canada is a copyrighted publication of National Research Council Canada*

Compliance with the following standards:

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 for Small Diameter Pipelines
ICC-ES LC1011 (October 2010), PMG Listing Criteria for the Rehabilitation of Existing Building Drains and Building Sewers by the Inversion and Curing of Resin-impregnated Tube

Identification:

FORMAPOX 101 or FORMAPOX 301 Resin (A) and Hardener (B): Each container bears a label with the product name, the manufacturer's name (Formadrain®, Inc.), and the ICC-ES PMG listing mark. The ICC-ES PMG listing number (PMG-1203) is optional.

A label must be attached, located at a maximum of 20 feet (6096 mm) apart along the outside length of the lined pipe or tube (if not buried underground) 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.

Installation:

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

The Formadrain® Cured-in-Place Pipe (CIPP) System must be applied by installers trained and certified by Formadrain®, Inc.

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-velocity jetter or with mechanically powered cleaning equipment.

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%, 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 FORMAPOX 101 or FORMAPOX 301 Resin and Formadrain® Hardener required must be calculated in accordance with the manufacturer's formula based on pipe diameter, length and liner thickness.

The FORMAPOX Resin and Formadrain® Hardener must be mixed in accordance with manufacturer's recommendations.

The Formadrain® technology consists of impregnating (wetting) a bidirectional woven fiberglass tissue with FORMAPOX 101 or FORMAPOX 301 epoxy resin. The impregnated "fabric" is rolled on a pneumatic tube (mandrel) corresponding in length with the repair. The assembly will then be slipped inside the conduit (concrete, clay, brick, PVC, etc.) to be repaired using access, at manhole or cleanout.

Circulation of hot water or steam: A bladder, referred to as a mandrel, is installed the length of the liner. The mandrel is inflated with steam at 5 to 23 psi (40 @ 161 kPa) to create heat at 228°F to 265°F (109°C to 130°C) so the fiberglass is compressed against the pipe walls. The impregnation and the curing are completed within 45 minutes to an hour and half with the heat provided by steam cure. Once the liner is cured we air-cool the mandrel to ensure unmolding from the composite membrane. The mandrel is then retrieved to be reused.

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.

Models:

Formadrain® Cured-in-place pipe (CIPP) Liner: The system consists of components tested and listed to NSF 14 and ASTM F1216. The system consists of the Formadrain® Fiberglass Liner, FORMAPOX 101 Epoxy Part A and Part B.

Formadrain® Industrial Liner: The system consists of components tested and listed to ASTM F1216. The system consists of the Formadrain® Fiberglass Liner, FORMAPOX 301 Epoxy Part A and Part B.

When tested to ASTM D790 procedure A, The flexural strength of the liner is 36, 259 psi (250 MPa) or greater and the flexural modulus is 1,450,377 psi (10, 000 MPa) or greater.

Conditions of Listing:

1. Installation must be performed by installers trained and certified by Formadrain® Inc.
2. The Formadrain® CIPP System may be used to line pipe with minimum diameter of 2 inches (51 mm) to maximum diameter of 48 inches (1200 mm).
3. The minimum thickness of the liner must be 0.0825 inch (2.1 mm).

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. Samples of the Formadrain® CIPP System taken in accordance with ASTM F1216 Sections 8.1.1, 8.1.2 and 8.1.3 must be tested in accordance with ASTM D790 for short-term flexural strength and flexural modulus.
6. Final video inspection in accordance with ASTM F 1216 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 insertion and is free of dry spots, lifts, and delaminations.
7. Leakage verification testing must be performed and witnessed by a representative of an accredited laboratory. A test assembly must be set up utilizing a 4-inch-diameter (102 mm) pipe that is a minimum of 50 feet (15.24 m) in length with fittings used to simulate an actual installation. The test assembly must be lined and cured in accordance with the manufacturer's installation instructions. The completed test assembly must be tested for leakage in accordance with ASTM 1216 Section 8.2. Maximum leakage with the maximum pressure of 4.3 pounds per square inch (psi) (29.7 kPa) at the lowest point should be 50 gallons per inch of pipe diameter per mile per day with all air bled from the system.
8. Formadrain® CIPP System materials are manufactured by Formadrain® Inc. in Montreal, QC, Canada under a quality control program with annual inspection by ICC-ES.