



A PURIS COMPANY



STATEMENT OF QUALIFICATIONS



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VALUE

Our trenchless rehabilitation offerings **minimize disruption** to the public by reducing noise, traffic disturbances and road repair - and can be done within a **far shorter time frame, at less cost** than dig and replace.

- ✓ Lower cost
- ✓ Lowest risk
- ✓ Less disruption - no closures
- ✓ Service life of 50 or more years
- ✓ Proven technologies
- ✓ Faster installation
- ✓ Minimal to no digging

SOLUTIONS

Lateral Renewal
 Mainline CIPP
 UV-Lining
 Waterline & Pressure Pipe Renewal
 Geopolymer Lining
 Manhole Renewal

MARKETS

Wastewater
 Stormwater
 Potable Water

COMPANY OVERVIEW

Since our inception in 1987, LiquiForce Services, a PURIS Company, has been maintaining and repairing pipelines for municipal, industrial and governmental clients. In 1993, LiquiForce began utilizing CIPP to repair structural defects in sewer pipelines. For over 34 years, LiquiForce has been providing trenchless rehabilitation services across Canada.

LiquiForce is one of Canada's most experienced trenchless sewer rehabilitation firms employing over 65 full and part-time employees. The size of our fleet allows us to effectively complete large projects in a short period of time and provide our customers with the highest quality available in the industry. Our firm has been in operation since 1987 and our services have grown to include many specialized procedures. With offices across Canada, we have the resources to properly serve your underground infrastructure rehabilitation needs.

SINGLE SOURCE ACCOUNTABILITY

Industry Dedication & Single Source Accountability

PURIS champions Single Source Accountability providing our customers with all services and associated materials, equipment, and labor to execute single or multiple projects of varying scope and size. Our vertical integration and ability to tightly control production and inventory of the liners are significant:

- Increased schedule and cost efficiencies
- Better quality assuredness and control
- Greater synergy between design, manufacturing and installation
- Streamlined resolutions process
- Quicker responsiveness

Lateral Lining

Product Highlights

- Laterals 4" to 6" (100-150mm) in diameter
- Mainlines 8" to 36" in diameter
- No bypass or cleanout required
- All work completed through existing manholes
- Custom CIPP lining tubes
- Liner is ambient-cured

Installation

Preparation is a critical part of our lateral lining installations. Our PFM (Prep-From-the-Main) tools are inserted into the lateral from within the mainline sewer to remove the roots, calcite, blockages, obstructions and other debris. The PFM uses a combination of reamers, flushers, nozzles, and CCTV cameras to clean the laterals through remote means.

The PFM tools also consist of a remote measuring process for determining the diameter of a lateral at every point along its length. This allows our teams to build a customized CIPP liner for a specific residence or business address. The PFM does not require a bypass of the mainline sewer, cleanout access or residential access to facilitate the process. All work is completed through existing manholes in the municipal right-of-way.

Inliner's Measure from the Main (MFM) process utilizes a linear variable displacement transducer (LVDT) to transmit data back to the control system. Running hundreds of diameter checks per linear foot, the LVDT system averages the sizing and determines the appropriate lateral tube sizing for manufacturing.

The liner is ambient-cured and does not require other energy sources such as hot water or steam to achieve full cure.

Lateral reinstatement is not needed with the junction liner installation process. Once the liner is installed, the installation bladder is removed and the line is placed back into service.

Benefits for Our Customers

Our lateral lining renewal eliminates root growth in pipelines, improving the hydraulic characteristics while mitigating infiltration and inflow issues. Our process allows for installation without cleanout or bypass, and the liners are ambiently cured with no need for artificial heat or light.



Mainline CIPP

Product Highlights

- Limited or no excavation required
- Up to 120" in diameter
- Improves hydraulic capacity of existing pipelines
- Design life that exceeds 50 years
- Economic alternative to open cut replacement

Inliner® Cured-in-Place Pipe

Our most widely used solution is our proprietary Inliner Cured-in-Place Pipe. CIPP is a proven, cost-effective no dig solution for problems normally associated with leaking or deteriorated pipelines.

Installation

An Inliner crew will oversee the cleaning and televising of the existing pipeline to determine exact pipe diameters and pipe condition. The crew will then order a lining tube that is custom manufactured for the project and delivered to the jobsite, ready for installation. These tubes are designed as a fully structural pipe or can serve as an interior infiltration barrier only.

Immediately following a second thorough pipe cleaning, the crew will install the resin-saturated liner via manholes or other designated access points using one of two proven methods: direct inversion (ASTM F1216) or pulled in place (ASTM F1743).

Once the liner is in place, the workers apply hot water, steam, or UV light to cure the segment. The length of time required for this process is dependent upon diameter and length, but is typically achieved in a matter of hours. Crews then cut the ends, reinstate the customer lateral services from inside the pipe, and active use of the renewed pipeline can begin.

The Importance of a Proper Cure

In addition to continual monitoring of temperature readings at boiler trucks, our team has implemented new fiber optic monitoring technology. Where earlier efforts provided readings at intervals of 200 to 300 feet using thermocouple measuring devices at manhole access locations, our thermal imaging system now enables the monitoring of the curing process along the entirety of the pipe run at 6-inch intervals. These readings can be monitored remotely by the project manager at an off-site office location, further ensuring a successful installation.

Benefits for Our Customers

With our no-dig CIPP technology, a crew with a modest amount of equipment can install a durable new pipe directly inside the existing worn or damaged pipe without breaking ground. In all but the most extreme cases of deterioration or collapse, Inliner CIPP can fully restore pipelines up to 120 inches in diameter with an additional service life of 50 years or more.



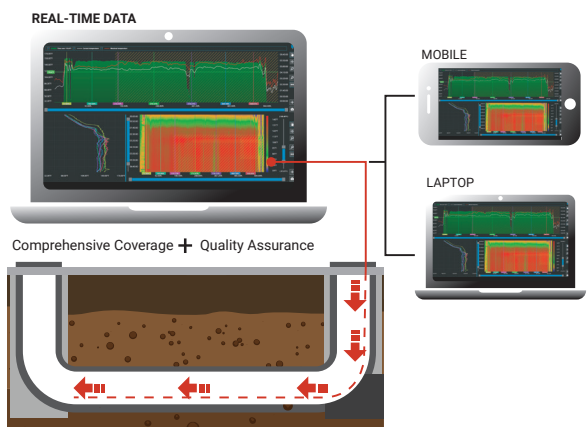
ASTM F1216

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin Impregnated Tube



ASTM F1743

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe



UV-Cured CIPP Lining

Product Highlights

- Fiberglass-reinforced tubes with styrene barrier
- Reduced wall thickness design; added strength
- Suitable for gravity, pressure, and water
- Small carbon footprint
- Six-month shelf life of resin-saturated tubes
- Pipes ranging 6" to 64"

While traditional felt-based liners continue to offer reliable solutions in today's marketplace, fiberglass UV-cured liners can be a valued alternative.

Installation

After thoroughly cleaning the host pipe, installation crews pull the UV liner into place. A protective sliding film or glide foil can be used in significantly deteriorated lines to aid in the pull-in process and to further protect the liner. Both ends of the liner are then sealed with protective end caps and air pressure is introduced, allowing the liner to expand into place. Workers then run a UV light train through the line at a controlled, pre-configured speed of up to 6 feet per minute to cure the liner.

Cameras on the train allow for viewing of the alignment and fit—both before and during the cure process. This computer-monitored process collects and stores data relevant to temperature, pressure and rate of conveyance to ensure proper curing of the installed liner. When complete, the laterals can be reinstated using a remote-controlled cutting unit or via man entry in larger diameter pipelines.

Benefits for Our Customers

UV-cured CIPP provides all the benefits of our thermal-cured product with some additional perks. Our proven UV-cure lining technology has a design service life of 75 or more years, is eco-friendly, several times stronger, and provides increased hydraulic capacity over traditional CIPP. A pre-cure inspection ensures the installation is flawless, and there is virtually no on-site styrene odor.



ASTM F2019

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic Cured-in-Place (GRP-CIPP) Using the UV-Light Curing Method





Water and Pressure Pipe

Product Highlights

- Epoxy is applied using mobile saturation technology
- Certified for drinking water
- Capable of internal connection reinstatements
- Flexible for moderate alignment deflection
- Extensive pressure range
- Resin saturation in a controlled manufacturing facility

Water & Pressure Pipe Applications

We offer several options for renewing pressurized potable water and wastewater systems. Inliner utilizes both a pressure rated, pulled-in-place glass reinforced plastic (GRP) tube cured by UV-light and a glass reinforced felt tube composite installed by the inversion method and cured with heat (steam or water).

Heat-Cured CIPP

Similar to CIPP applications for storm and sanitary sewers using the inversion over-the-hole method, our teams saturate the reinforced tube on-site per ASTM F2994 with epoxy or resin for immediate inversion into the pipe. Liner curing is completed using hot water or steam.

UV-Cured CIPP

This technology utilizes a GRP tube that is saturated with resin at the manufacturing facility prior to delivery, and is pulled into place and cured by exposure to UV light. The instrumentation of the UV light train allows for an internal pre-cure QA inspection of the liner prior to activating the UV lamps.



Benefits for Our Customers

We recommend a variety of glass-reinforced pressure pipe lining solutions for both potable water and wastewater uses.



ASTM F2994

Standard Practice for Utilization of Mobile, Automated Cured-In-Place Pipe (CIPP) Impregnation Systems



ASTM F2016

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of Resin Impregnated Tube



ASTM F2019

Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic Cured-in-Place (GRP-CIPP) Using the UV-Light Curing Method

Geopolymer Applications

Product Highlights

- Monolithic mineral polymer with ceramic properties
- Single-pass applications
- Adheres to any structure surface
- Eco-friendly; composed of over 50 percent recycled materials
- Ideal for large-diameter pipes

Installation







Using a spin caster or low-pressure hand-sprayer, our crews apply a consistent and evenly coated layer of geopolymer material from the top to bottom of the structure. Following the coating, crews use trowels to smooth out the finish. Once applied to the damaged or deteriorated surface, the geopolymer material quickly forms into a crystalline structure for higher resistance to acids, lower porosity and greater surface durability.

Inliner site crews can complete preparation and installation for each segment in the same day, eliminating lead time for ordering materials. Typically, the application of the geopolymer coatings require one pass, in the range of thickness of .5" to 1.5", with a maximum thickness of approximately 3". The quick cure rate shortens bypass time and allows flows to be re-established much quicker than Portland cement-based mortars.

Benefits for Our Customers

Geopolymer applications are ideal for large-diameter pipelines and are an eco-friendly solution, composed of more than 50 percent recycled materials. Site prep and installation can be completed in a single day per segment, with no material lead time.

GEOPOLYMER

 Exceptional Strength	 Cost Effective
 Can be Applied in One Pass	 Strong Bonding & Durability
 Eliminates Excavation & Utility Locates	 Chemically Resistant



Manhole Renewal

Manhole Renewal Applications

We perform manhole renewal installations using both Cured-in-Place Manhole (CIPMH) and a variety of cementitious, epoxy-based applications.

Our NASSCO-certified superintendents provide extensive manhole inspections, which is the first step in determining the best application(s) for improving sewer system performance. These comprehensive inspections provide a concise evaluation of the state of the structure, spanning from the cover/frame to the bench and base.

Benefits for Our Customers

Whether cementitious, epoxy, or CIPMH application, we will recommend the right trenchless manhole rehabilitation solution, including specifying mixture additives to address specific structural or chemical concerns. Manhole renewals are completed quickly, with a single crew performing three to seven installations per day.

CIPMH Product Highlights

- Engineered for a service life of 50 years
- Restores structural integrity, eliminating infiltration and inflow
- Cured-in-place seal creates a watertight, corrosion-resistant structural lining, resisting freeze and thaw conditions
- Each crew can complete 3-7 installations per day

CIPMH Installation

Our CIPMH liners are customized to fit manholes and related structures constructed of brick and mortar, pre-cast concrete or block. Inliner crews can complete preparation and installation in the same day, eliminating lead time for ordering materials. The liner will cure under ambient temperature and pressure in one to two hours.

Epoxy Product Highlights

We also provide epoxy-based solutions. Epoxy products offer great advantages in adhesion, chemical resistance and structural renewal strength.

Epoxy Installation

Prior to applying the epoxy product, the Inliner team performs a visual assessment of the manhole structure, then cleans the surface using a water blasting. Cracks and damage are repaired, and if the damage is severe, a concrete underlay is applied. The epoxy is applied with a hand-spray gun with a technical hatching, or "boxing," to ensure even coverage and thickness. Final thickness can range from 80-125 mils or more per application.



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Liner Manufacturing

Liner Products® is a Inliner-owned liner manufacturing operation that provides reliable and high-performance CIPP products to installers throughout the U.S. These products include tubes for inversion and pull-in-place methods for mainline CIPP, calibration hoses, lateral liners, and pre-liners where required.

Our meticulous standards and our Paoli, IN manufacturing facility's ISO 9001 certification assures installers and owners alike, that they will receive a final product that consistently performs beyond expectations. Liner Products can manufacture liners in diameters of 3" to 120" and can produce them in varying thickness levels based upon design conditions.

Rigorous specifications established in-house and throughout our supply chain ensure quality for all components that go into our material (including raw felt and a variety of tube coatings). Working closely with other industry professionals, Liner Products can provide solutions for the most difficult installations along with more traditional projects. Tubes can be heat-bonded or steam-stitched, fiber-reinforced or straight polyester and even transition from one diameter to another in the same run.

This vertical integration and quality assurance within our CIPP offerings allows us to work closely with our customers to ensure consistent products and exceptional service while meeting recognized industry standards including ASTM D5813, ASTM F1216, and ASTM F1743.



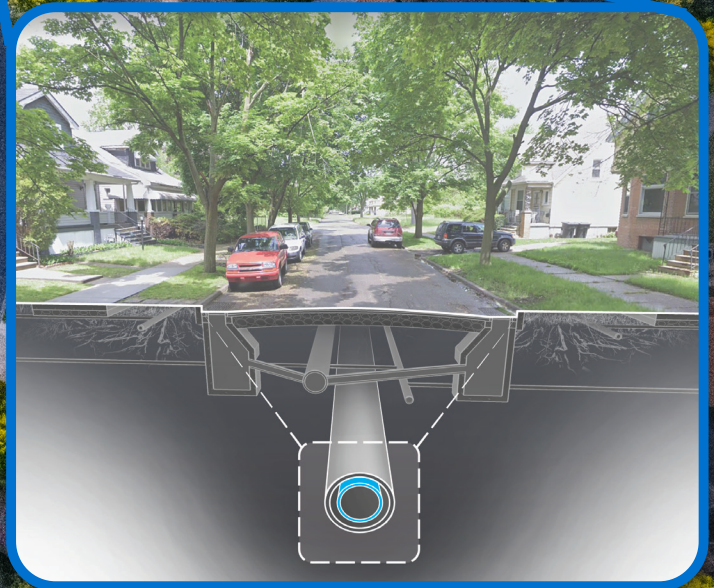


PURIS

PURIS provides end-to-end water infrastructure renewal solutions, specializing in environmentally sustainable trenchless pipeline rehabilitation. PURIS is U.S.-based and vertically integrated. We perform turn-key installation services providing owners with a single source solution for all of their water infrastructure renewal needs. Our technologies operate within the existing infrastructure to minimize environmental impact and reduce community disruption.

We are committed to investing in new product development and partnering with leading-edge technology companies to offer our customers the best solutions for their projects, budgets, and environmental conditions. Our solutions, proven service model, and 1,000-member strong workforce are focused on solving our communities water infrastructure challenges with minimal environmental impact.

Our goal is to have as positive of an impact above ground as we do below it.



FAMILY OF COMPANIES





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● Calgary, AB

● Hamilton, ON

● Detroit, MI

● Kingsville, ON

● Romulus, MI

● Bedford Park, IL

● Beltsville, MD

● Columbus, OH

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● Jacksonville, FL

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● Pasadena, TX

● Sanford, FL

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