Trenchless Sewer Rehabilitation

USING THE CIPP

Trelleborg DrainLining
Part of the wider Trelleborg Industrial Solutions Business Area of Trelleborg Group, Trelleborg Seals & Profiles is a world leader in new seals and rehabilitation sealing solutions for concrete and plastic pipes, manholes, and connectors used for water supply, sewerage and drainage. Drawing on advanced polymer technology, the high performance of our seals ensures the fulfilment of the highest possible reliability standards.

With a global reach and a track record spanning more than half a century, we deliver continuous innovation to customers across the globe with a logistics and sales network spanning Asia Pacific, Europe, Middle East, Africa, North America and South America. Drawing on our engineering expertise and advanced technological solutions, we will see your project through from the beginning to the end.

Whether you need an entirely new system or if your existing one needs rehabilitation, we offer a range of market-leading seals that promise:

- High quality
- Quick and easy installation
- Improved productivity
- Zero leakage

Trelleborg offers the highest reliability and performance standards, providing watertight solutions that protect not only your pipe cycle, but your reputation too.
The Method at a Glance

The Trelleborg DrainLining method is a trenchless sewer rehabilitation (“no-dig” applications) that features a flexible, corrosion-proof tube (liner) made up of synthetic and/or fiberglass. The liner is impregnated with reactive resin and then introduced – with the help of an inversion unit – into the host pipe through a manhole, access pit or inspection chamber. This process, which uses air or water pressure, inverts the liner so that the resin-impregnated side is forced against the pipe wall. The resin-impregnated liner can then be cured with heat or at ambient temperatures. The cured fiber/resin compound now forms a tight and frictional fit with the host pipe wall. This cured-in-place pipe (CIPP) system is thus integrated with the host pipe and fully meets structural and hydraulic requirements. A final CCTV inspection is then performed to review and document the result of the rehabilitation process. A final leakage test is performed according to the EN 1610 standard or to similar international standards.

Trelleborg DrainLining – a customized solution

Trelleborg provides innovative solutions for almost any lining application, with the Trelleborg DrainLining system being perfectly suited to the rehabilitation of the following:

- Main pipes of sewerage systems
- House sewers
- Lateral connection pipes
- In-house pipes

The perfectly matched components of the system guarantee optimal lining results.

APPLICATIONS

The Trelleborg DrainLining method is suitable for use in circular-, egg-, or special-shaped pipes made out of common pipe materials such as concrete, asbestos cement, plastic (PVC, GRP, PP, HDPE), cast iron, reinforced concrete or vitrified clay.

DAMAGE TYPES

- Leaks (with or without groundwater infiltration or exfiltration) in pipe walls, at pipe joints and lateral connections, etc.
- Offset pipes, ruptures, cracks, and pipe debris
- Closing of lateral connections which are no longer needed
- Mechanical wear
- Corrosion

Components at a glance

- LINERS, PRELINERS and CALIBRATION HOSES
- RESIN SYSTEMS
- INVERSION DRUMS for various applications
- IMPREGNATION UNITS
- RESIN MIXING UNITS
- VACUUM SYSTEMS
- CURING UNITS (hot water, steam)
The Trelleborg DrainLining method uses a flexible tube (liner) made up of corrosion-proof synthetic and/or fiberglass and coated with flexible plastic on the outside. The fiber is then impregnated with reactive resin and the liner is introduced into the host pipe section through a manhole, access pit or inspection chamber with the help of an inversion unit.

During this process, which uses air or water pressure, the liner is inverted so that the resin-impregnated side is forced against the pipe wall. The plastic coating is now on the inside and helps keep the liner pressurized until the resin is cured.

The resin-impregnated liner in the pipe section can be cured with hot water, steam or at ambient temperatures depending on the resin system used. After the fiber/resin compound is fully cured, the liner forms a tight and frictional fit with the host pipe wall. This cured-in-place pipe (CIPP) system is thus integrated with the host pipe and fully meets structural and hydraulic requirements.
Trelleborg provides perfect liner solutions for the rehabilitation and repair of main lines, laterals, lateral connections, horizontal and vertical pipes with bends and in differing diameters:

**Quality At The Highest Level**
Since 2012, Trelleborg has been manufacturing the carrier materials (liners) for trenchless rehabilitation solutions under state-of-the-art production standards. Trelleborg’s products and quality management processes have attained ISO 9001 and ISO 14001 certifications as well as undergone tests by/received certification from international organisations such as ASTM International and IAPMO (The International Association of Plumbing and Mechanical Officials) and the DIBt (the German Centre of Competence for Construction). These independent tests and certifications prove that our quality promises are kept.

**Trelleborg UltraFlex Liner**
The Trelleborg UltraFlex Liner with silicone coating represents a new generation in liner. An allencompassing solution for some of the most common challenges you face when rehabilitating pipes: bends and transitions.
- For 90 degree bends and up to 2 transitions
- Available diameters DN 100 - 250 (4 - 10 inch)
- Appropriate for ambient, hot water and steam cure
For detailed information please refer to the product data sheet.

**Trelleborg MultiFlex Liner**
Perfectly suited for vertical and horizontal pipes in buildings with very small diameters. The Trelleborg MultiFlex Liner can be ambient cured, alleviating the need to carry a steam generator or hot water boiler into areas where space is restricted.
- For multiple bends up to 90° and diameter changes
- Available diameters DN 30 - 100 (1¼ - 4 inch)
- Appropriate for ambient cure (hot cure possible when used with calibration hose)
For detailed information please refer to the product data sheet.

**Trelleborg ProLiner**
The Trelleborg ProLiner is recommended for all standard installations in house connection sewers and building pipes. The special formula of its flexible PP coating makes the liner very flexible and easy to invert even into smaller diameters during cold temperatures.
- Longitudinal reinforcements for precise length
- Can navigate 45 degree bends
- Appropriate for ambient, hot water and steam cure
For detailed information please refer to the product data sheet.

**Trelleborg MainLiner**
The Trelleborg MainLiner is the best choice when you need a customized solution. It is coated with an elastic polypropylene-coating, which varies from flexible to robust, in correlation to the tube diameter. This gives the liner optimal processing properties adapted to the respective area of application.
- For longer, straight CIPP lining
- Available diameters DN 150 - 1600 (6 - 63 inch)
- Appropriate for ambient, hot water and steam cure and many resin types
For detailed information please refer to the product data sheet.

**Trelleborg ResinSystems for liner inversion**
Trelleborg supplies a wide range of hot-cure and ambient-cure epoxy and silicate resins for pipe rehabilitation. All have been tested by independent inspection bodies to meet ASTM, WIS, DIN EN and other international standards. They:
- Feature consistent pot and comfortable cure times
- Are easy to use and environmentally friendly
- Able to cure in the presence of water
- Are approved by the German DIBt (Deutsches Institut für Bautechnik – German Institute for Construction Engineering)
Trelleborg’s epoxy resins are specifically designed to work with Trelleborg DrainLiners to guarantee successful installations. These resins are very easy to use due to their ample pot time and short cure time, are able to withstand high temperatures without distortion, and are resistant to chemicals ranging in pH value from 2 to 13.
Inversion Drums

- Suitable for both horizontal and vertical applications
- Appropriate with water or air inversion methods and heat or ambient curing processes
- Provides constant pressure during the entire installation process, without any pressure loss
- Drum can be turned vertically by 45 degrees (Type M/L/XL)
- Drum types L and XL feature a ergonomic design that is 60% lighter and smaller than previous models
- All drums are equipped with wheels or mounted on trailers for easy transportation
- Large service window for the smooth and quick handling of liner
- All types come with hot water circulation ports

Steam generators for steam curing

- Steam capacity ranging from 3 kg/h (6.6 lbs/h) to 1000 kg/h (2205 lbs/h). Smaller units with steam production of up to 8 kg/h (13.2 lbs/h) can only be used for the rehabilitation of lateral connections in house sewer pipes
- Electric or oil-operated
- Available as mobile units or fitted to trailers, trucks or containers
- Ensures that curing temperatures can be reached quickly and – as a result – rapid and homogenous curing
- Can be delivered in compliance with national standards

Hot water boiler units in various designs

- Output ranging from 90 kWh to 1000 kWh
- Depending on the size, can be delivered as mobile units or fitted to trailers, trucks or containers
- Featuring integrated high-power pumps with optimal input and throughput so that water can be rapidly heated and thus, ensuring rapid and homogenous curing

Vacuum Units, by providing a constant and adjustable vacuum source, are key in the rapid and homogeneous impregnation of the liner felt – a crucial factor in complying with global quality standards set by engineers, specifiers, municipalities, authorities, industrial companies, etc.

- Mobile units can be used on job sites both outdoors and indoor
- Available in two different models: electric and air-operated

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<th>Liner wall thickness mm</th>
<th>Type S DN 150 m/ft</th>
<th>Type M DN 225 m/ft</th>
<th>Type L DN 300 m/ft</th>
<th>Type XL DN 400 m/ft</th>
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<td>20 / 62</td>
<td>24 / 72</td>
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<td>12 / 39</td>
<td>19 / 62</td>
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Impregnation tables

- Stable and professional
- Provides rapid and homogeneous impregnation in compliance with global quality standards set by engineers, specifiers, municipalities, authorities, industrial companies, etc.
- Available as manual or electric mobile impregnation units (that can be mounted onto trailers, trucks or containers) or standalone units.
- Application range of up to DN 800 [31.5”]/width of ~1350 mm [53”], larger sizes available on request
- Continuously variable conveyor belt speed
- Convenient forward-reverse operation via foot pedal
COUNTRIES WITH DISTRIBUTORS

Australia  France  New Zealand
Belgium  Great Britain  Norway
China  Hong Kong  Poland
Croatia  Ireland  Portugal
Czech Republic  Malaysia  Russia
Denmark  Mexico  Spain
Finland  Netherlands  Sweden

COUNTRIES WITH OWN OFFICES

USA  Germany

FURTHER INFORMATION

DIBt Approvals

No. Z-42.3-375
Trelleborg DrainLiner Method (previously known as epros® DrainLiner Method) DN 100 – DN 400 with Trelleborg Epoxy Resin System (EPROPOX) HC60

No. Z-42.3-466
Trelleborg DrainLiner Method (previously known as epros® DrainLiner Method) DN 100 – DN 250 with Trelleborg Epoxy Resin Systems (EPROPOX) FC15 / FC 30

No. Z-42.3-468
Trelleborg DrainLiner Method (previously known as epros® DrainLiner Method) DN 100 – DN 600 with Trelleborg Epoxy Resin Systems (EPROPOX) HC120 with Trelleborg Epoxy Resin Systems (EPROPOX) FC15 / FC 30

No. Z-42.3-488
Trelleborg DrainLiner Method / Trelleborg LCR-B Method (previously known as epros® DrainLiner Method / epros® DrainLCR-B method) [rehabilitation of defective sanitary pipes, rainwater downpipes and house drains inside the building structure] DN 100 – DN 250 with Trelleborg Epoxy Resin Systems (EPROPOX) HC60/HC120

http://www.trelleborg.com/pipe-seals
Video http://www.youtube/c/trelleborgpipeseals
Technical Data Sheets
Method Statement
Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way. The Trelleborg Group has annual sales of about SEK 34 billion (EUR 3.32 billion, USD 3.92 billion) and operations in about 50 countries. The Group comprises three business areas: Trelleborg Industrial Solutions, Trelleborg Sealing Solutions and Trelleborg Wheel Systems, and a reporting segment, Businesses under development. The Trelleborg share has been listed on the Stock Exchange since 1964 and is listed on Nasdaq Stockholm, Large Cap.

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