



**PRIMUS**  **LINE**

SAFE. RELIABLE. SUSTAINABLE.

REHABILITATION

# PRIMUS LINE® REHABILITATION<sup>1</sup>

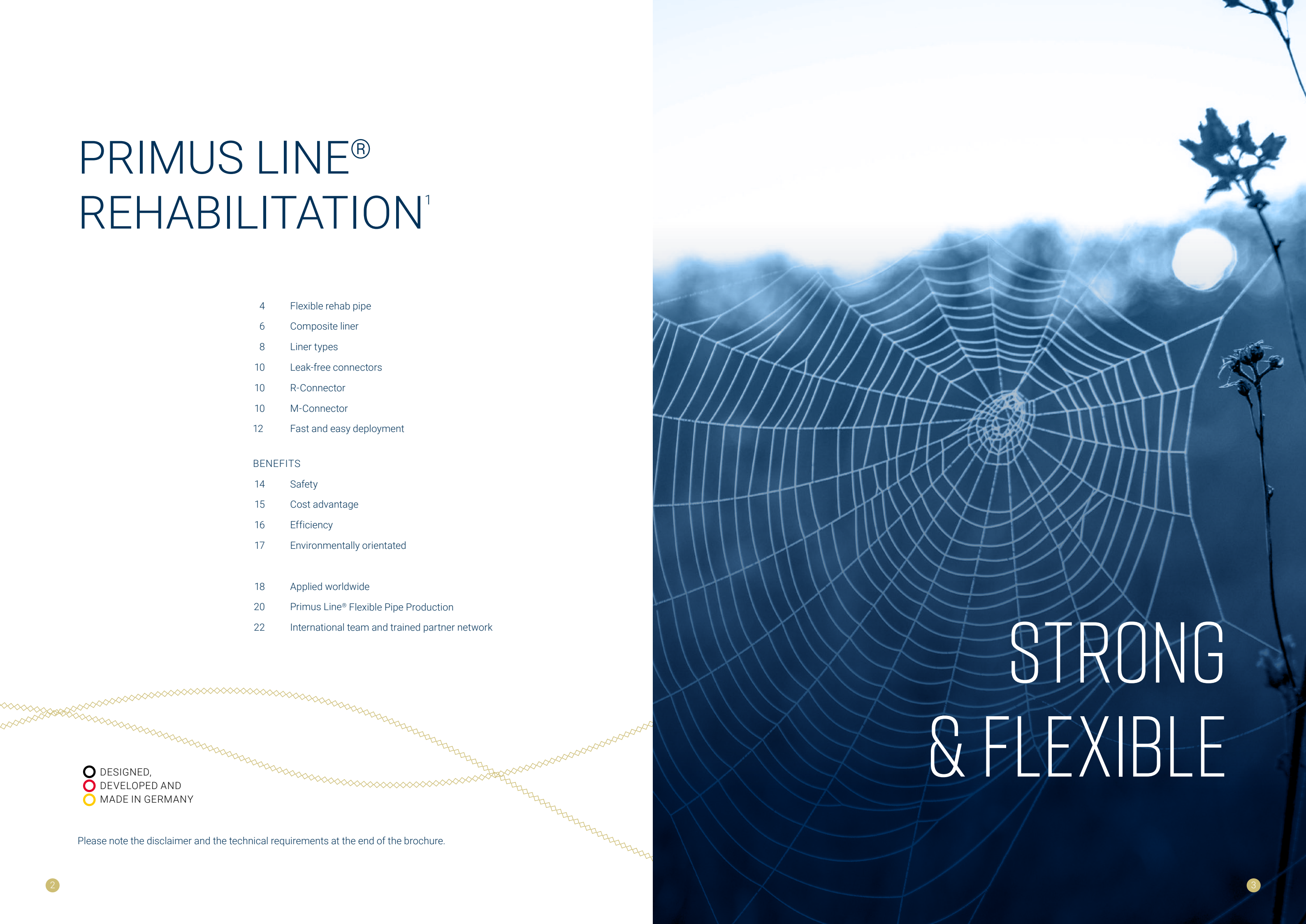
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## BENEFITS

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- 22 International team and trained partner network

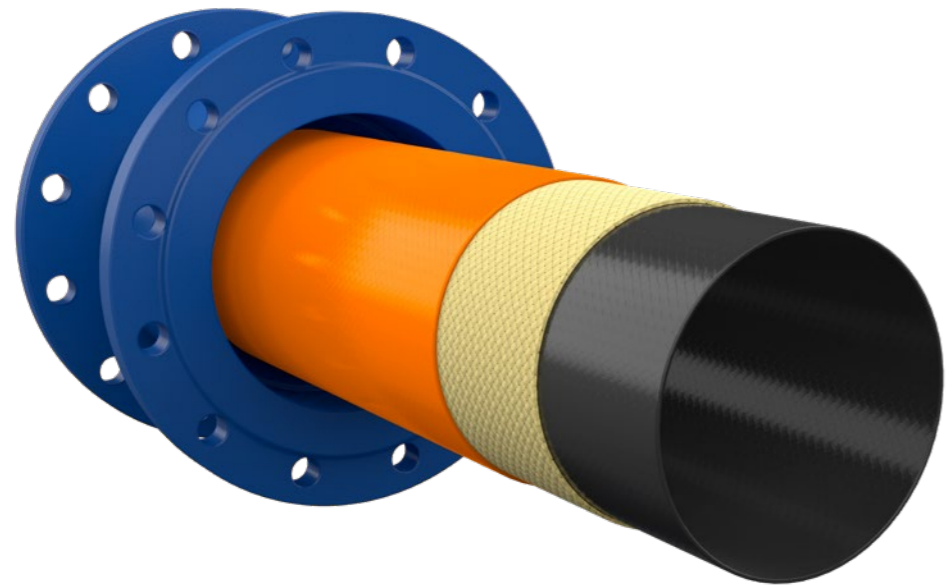
○ DESIGNED,  
○ DEVELOPED AND  
○ MADE IN GERMANY

Please note the disclaimer and the technical requirements at the end of the brochure.



STRONG  
& FLEXIBLE

# FLEXIBLE REHAB PIPE = LINER + CONNECTOR



## PIPELINE REHABILITATION MADE EASY

Primus Line® Rehab is an innovative technology for the trenchless rehabilitation of pressure pipelines for different media such as water, gas and oil.<sup>2</sup> The process is based on a flexible high-pressure liner and a connection technology developed specifically for this system.

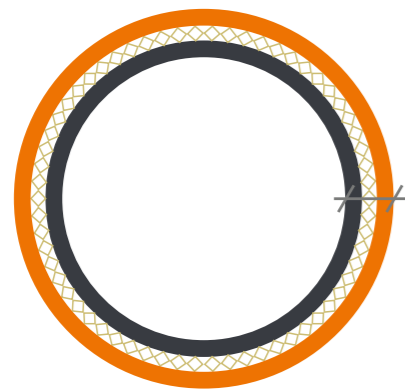
The Primus Line Flexible Rehab Pipe is suitable for the transportation of various liquids and even has drinking water approval in many countries.<sup>3</sup>

The ideal flow characteristics due to a smooth inner

coating and the optimised systems for high-, medium- and low-pressure requirements make Primus Line® Rehab an economical solution (depending on the individual case) for the rehabilitation of aging pipelines. In this way, network operators benefit from reliable operation and a sustainable investment in their assets.



# COMPOSITE LINER



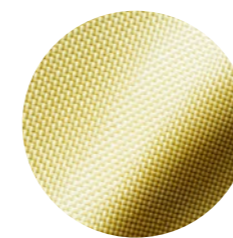
Wall thickness = 6 mm / 0.24 inches



Wall thickness = 8 mm / 0.31 inches



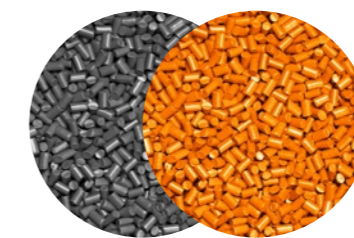
## WE EXCLUSIVELY UTILISE TOP-QUALITY RAW MATERIALS



Kevlar®

Kevlar® is a high-strength, lightweight para-aramid synthetic fiber known in the industry for its exceptional tensile strength and durability.

The chemical structure of Kevlar® is comprised of several repeating inter-chain bonds. These chains are cross-linked with hydrogen bonds, providing a tensile strength up to 10 times greater than steel on the same weight basis. For us, it is the perfect reinforcement material for flexible pipes due to its ability to withstand mechanical stress and resist abrasion.



PE

Polyethylene, chosen for its properties, serves as the optimal material for the inner and outer layers of our flexible pipes.

Its flexibility enables easy installation. In addition, the high abrasion resistance of polyethylene contributes significantly to the durability of the pipework. This material ensures long-lasting protection and a secure seal, making it a reliable and robust solution.



TPU

Thermoplastic polyurethane (TPU) is the right polymer for our flexible pipe inner and outer layers. It offers a high level of flexibility, impact strength and chemical resistance, ensuring first-class protection even under extreme conditions.

In addition, TPU has UV and temperature resistance, which is crucial for long-lasting durability and protection of pipework in various applications. The robustness of TPU offers a reliable and durable solution for different industrial and infrastructure requirements.

## TECHNICAL DETAILS<sup>4</sup>

- Available in nominal diameters from DN 150 to DN 500 / from 6 inches to 20 inches
- Maximum operating pressure depending on diameter: 82 bar to 12 bar / 1189 psi to 174 psi
- Design values for temperatures greater than 30 °C / 86 °F and, under certain conditions, up to 60 °C / 140 °F
- Design values for installation around bends
- Friction coefficient:  $k = 0.028 \text{ mm}$

### Inner layer

Polyethylene (PE) or thermoplastic polyurethane (TPU), depending on the transported medium

- Hygienic
- High abrasion resistance
- High chemical resistance

### Reinforcement

One- or two-layered Kevlar® fabric, depending on the required pressure rating

- Accommodates operating pressure by itself
- Up to 10 times stronger than steel of equal weight

### Outer layer

Polyethylene (PE) or thermoplastic polyurethane (TPU)

- High abrasion resistance, protecting the fabric during installation and operation

# LINER TYPES

Name	Inner layer media-specific based on:	Reinforcement	Outer layer	Wall thickness	Suited for the following media / fields of application. Other media only after detailed review and approval.		
<b>W</b>	PE					<ul style="list-style-type: none"> <li>→ Potable water</li> <li>→ Firefighting water</li> <li>→ Industrial water</li> <li>→ Sea water</li> <li>→ Process water</li> </ul>	<ul style="list-style-type: none"> <li>→ Residential wastewater</li> <li>→ Industrial wastewater</li> <li>→ Treated wastewater</li> <li>→ Brine</li> </ul>
<b>O</b>	TPU					<ul style="list-style-type: none"> <li>→ Crude oil</li> <li>→ Refined petroleum products</li> <li>→ Process water mains</li> <li>→ Diesel</li> </ul>	<ul style="list-style-type: none"> <li>→ Jet A1</li> <li>→ Kerosene</li> </ul>
<b>G</b>	TPU					<ul style="list-style-type: none"> <li>→ Natural gas</li> <li>→ Coke gas</li> <li>→ Methane</li> <li>→ hydrogen (H2ready certified)</li> </ul>	<ul style="list-style-type: none"> <li>→ Propane</li> <li>→ Butane</li> <li>→ Oxygen</li> </ul>
<b>F</b>	TPU				 	<ul style="list-style-type: none"> <li>→ Process water</li> <li>→ Flowback water</li> <li>→ Residential wastewater</li> <li>→ Industrial wastewater</li> <li>→ Firefighting water</li> <li>→ Brine</li> </ul>	<ul style="list-style-type: none"> <li>→ Formation water</li> <li>→ Injection water</li> <li>→ Brackish water</li> <li>→ Sea water</li> <li>→ Supply water</li> <li>→ Treated wastewater</li> </ul>

# LEAK-FREE CONNECTORS<sup>5</sup>

## R-CONNECTOR

- The principle for a pull-proof connection between a liner and an R-Connector is always the same: The bushing has a malleable steel jacket inside. Under high pressure, a two-component resin is pumped through a valve that pushes the steel jacket and the liner into the core profile. This forms a permanently stable unit after the resin has cured.
- Available in nominal diameters from DN 150 to DN 500 / 6 inches to 20 inches – equipped with flanges according to DIN, ANSI and AS4087. Individual solutions for projects are possible as well.
- For wall mounting in chambers, the connector is also available with a mounting plate. It is also offered with a welded connection. That makes it the most flexible type among the Primus Line® connectors.



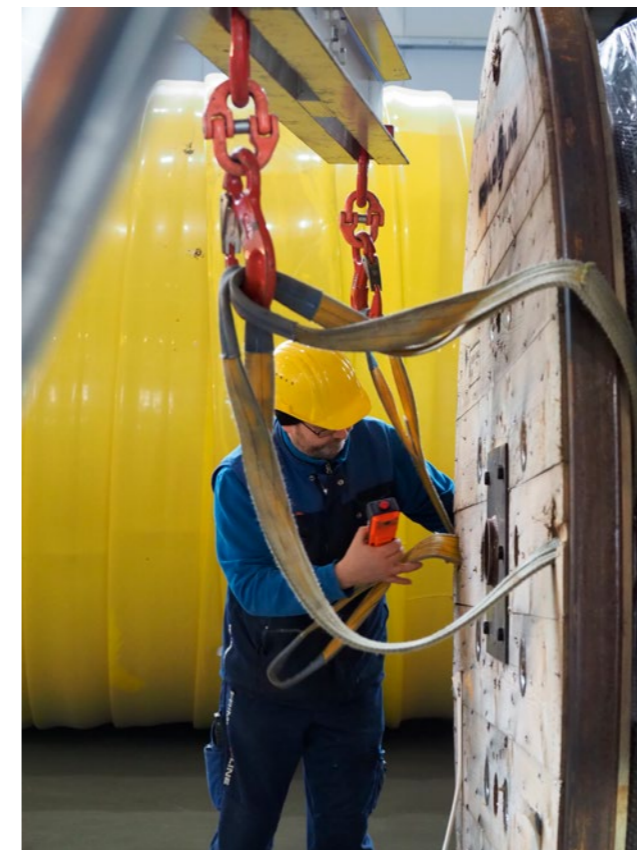
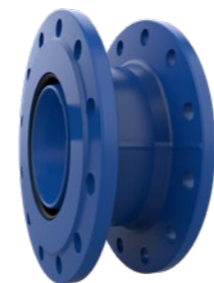
Connection with flange



Welded connection

## M-CONNECTOR

- A pull-proof<sup>6</sup> hold between our flexible pipe and the Primus Line M-Connector is established purely by mechanical forces.
- This is achieved by pressing the core into the bushing with hydraulic equipment that is suitable for on-site use. Not only does this speed up the assembly.
- Available in nominal diameters from DN 150 to DN 350 / from 6 inches to 14 inches with flanges according to DIN, ANSI and AS4087. Project-individual solutions are available on request.



## TRANSPORT

The flexible pipe is coiled in U-shape onto specialised transport reels and delivered to the customer. Depending on its diameter, a single reel can accommodate up to 4,000 metres / 13,120 feet of pipeline, efficiently fitting onto a single truck. This approach minimizes both logistics costs and the environmental impact associated with transport.<sup>7</sup>

# FAST AND EASY DEPLOYMENT

## MOST SUITED ENVIRONMENTS

Pipelines often run through environments that are hard to access. Obstacles to an easy and fast rehabilitation of aging pipes can be of geographical, economical, architectural or environmental nature.

## SUITABILITY OF PRIMUS LINE®

Primus Line® is suitable for a quick (depending on the individual case) and reliable rehabilitation of pressure pipes between DN 150 and DN 500 / 6 inches to 20 inches. Thereby, several bends can be traversed while achieving installation lengths of up to 2,500 m / 8,200 feet.



# BENEFITS

SAFETY

COST ADVANTAGE

EFFICIENCY

ENVIRONMENTALLY ORIENTATED



## SAFETY

- The core of the Primus Line Rehab pipe is made of seamlessly woven Kevlar® fabric. This synthetic fiber is up to ten times stronger than steel and has twice the strength of glass fiber or nylon. Due to its core, the pipe has a very high factor of safety (FoS). The burst pressure of the flexible pipe is at least 2.5 times the allowable working pressure, depending on the transported medium.
- No work with hazardous materials for curing on site.
- The entire production process is accompanied by in-depth monitoring. Sensors and cameras constantly capture process parameters and are the basis for comprehensive mechanisms for the control of wall thickness and consistency. In addition, every pipe produced is pressure tested in-house before delivery to site.



## COST ADVANTAGE<sup>8</sup>

- Installation speeds of up to 10 meters per minute
- Up to 2,500 meters / 8200 feet per pull
- Quick re-commissioning for short downtimes
- Low pre-investment for installers
- 50+ years of service life



## EFFICIENCY<sup>9</sup>

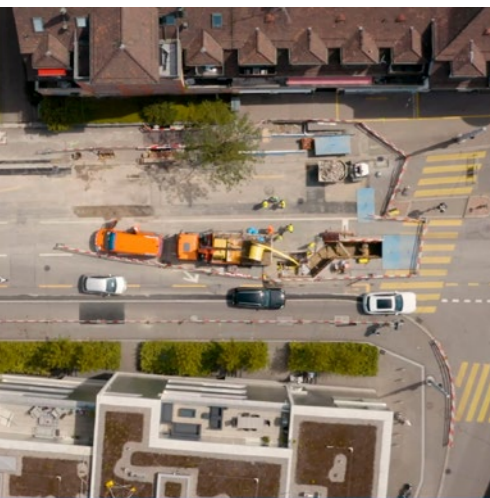
- Installation through multiple bends up to 90°
- Withstands thermal expansion of the host pipe and ground movement
- Burst pressure rates up to 206 bar / 2987 psi
- Operating pressure up to 82 bar / 1189 psi
- Independent of host pipe
- No curing, steaming or adhesion process
- Independent of weather conditions during installation



## ENVIRONMENTALLY ORIENTATED<sup>10</sup>

- Reduced use of machinery:  
The installation can be performed only with a winch. This can result in a significant reduction of the on-site carbon footprint
- Small pits and reduction of road work
- Decreased impact on traffic
- Less disturbance of daily life
- Reduction of the on-site carbon footprint by up to 90% compared to dig and lay

# APPLIED WORLDWIDE<sup>11</sup>



## ZURICH

Transported medium: gas  
Project length: 414 m / 1,350 feet  
Old pipe: steel pipe DN 300 / 12 inches from the year 1970

- Installation time of just under 1.5 hours
- Road traffic was able to continue

*"The street has many residents and a lot of traffic - Primus Line® was the best way to organize the construction site."*

Primus Line® Rehab user



## ESTONIA

Transported medium: wastewater  
Project length: 554 m / 1,810 feet  
Old pipe: reinforced concrete DN 500 and carbon steel DN 600 / 24 inches and DN 700 / 28 inches

- Various bends: one 45° bend in the first section, three 22.5° bends and one 30° bend in the second section
- Many diameter changes:  
Section 1:  
DN 600 - DN 500 - DN 700  
24 inches - 20 inches - 28 inches  
Section 2:  
DN 600 - DN 500 - DN 600 - DN 500 - DN 600  
24 inches - 20 inches - 24 inches - 20 inches - 24 inches



## GERMANY

Transported medium: drinking water  
Project length: 580 m / 1,900 feet  
Old pipe: Grey cast iron DN 500 / 20 inches from the year 1878

- Rehabilitation with traffic on a main road with tramway operation
- Line route with tram tracks, inaccessible park on a slope and an 80 m / 260 feet long railway subway.

*"A space-saving and fast method for the renovation of complicated pipe runs in large dimensions. A problem solver."*

Primus Line® Rehab user



## FRANCE

Transported medium: brine  
Project length: 455 m / 1,490 feet  
Old pipe: steel, unlined DN 450 / 18 inches

- maximum operating pressure is 28 bar / 406 psi and traverses underneath a channel with four 45° bends with  $r = 33xD$

*"I think we have to move with the times and not close our minds to all the technologies, all the new plastics that exist."*

Primus Line® Rehab user



## USA

Transported medium: wastewater  
Project length: 670 m / 2,200 feet  
Old pipe: steel DN 400 / 16 inches

- The seven original steel pipes under the Passaic River were laid more than 100 years ago. Due to fluctuating tides and currents, the water pipes never settled into the riverbed.

*"Despite the challenges and the extreme emergency situation, the water main was cleaned, CCTV-inspected, lined, pressure-tested and put back into operation in less than four weeks."*

Primus Line® Rehab user



Visit our website for additional references:  
<https://www.primusline.com/en-us/rehabilitation/references>



# INTERNATIONAL TEAM AND TRAINED PARTNER NETWORK

Primus Line® is applied in over 55 countries worldwide. In order to better cover the global market and support our partners, three international offices have been established.

At Primus Line's headquarters in Germany and on site, our partners receive a tailored training course. The participants are introduced to the technical details of the system components and trained for the requirements of their construction site.

We also work with local international distributors to be close to the customer.

- Raedlinger Primus Line, Inc. (2013) in Charlotte, North Carolina, operating in the United States only
- Raedlinger Primus Line Pty Ltd. (2016) in Sydney, New South Wales, operating in Australia only
- Raedlinger Primus Line CA Inc. (2018) in Toronto, Ontario, operating in Canada only



## RELY ON EXPERIENCE!

The family-managed company manufactures the Primus Line® system, which has been developed in-house, for the trenchless rehabilitation of pressure pipes and overland piping.

In doing so, it relies on the know-how of its employees, which has grown over decades, going back to the beginning of development in 1996 and incorporating many influences from research on the way to market maturity in 2001. This knowledge has also led to the innovative vertical production line for the flexible pipe and the logistics warehouse that is ideally suited to its handling.



## LOGISTICS CENTER

The smooth transport of Primus Line® on reels and in freight containers is prepared by the shipping specialists in the logistics center in Germany. We stock a range of standard sizes of our flexible pipes, which can be prepared for their journey around the world in a short time using the most suitable handling equipment.

Shipments are sent to international partners or regional offices.



07 2025 US CA



Operating in the United States of America only  
Raedlinger Primus Line, Inc.  
112 South Tryon Street, Suite 1130  
Charlotte, NC 28284-2109  
Phone: +1 704 5694460

Operating in Canada only  
Raedlinger Primus Line CA Inc.  
480 University Avenue, Suite 1500  
Toronto ON, M5G 1V2  
Phone: +1 980 3659058

[www.primusline.com](http://www.primusline.com)  
[info@primusline.com](mailto:info@primusline.com)



Disclaimer and technical requirements:

The installation of the Primus Line® system has to be performed by an accredited and trained installer. The execution of the work on site is done in accordance with the manufacturer's installation manual. The design guidelines – including but not limited to the maximum allowable operating and testing pressure for the installed system – are documented in the manufacturer's Submittal Support Document. Product specific information available on product datasheet. The installation company is requested to provide the manufacturer's operating instructions to the network operator. It is the responsibility of the installing company to work with the most current guidelines of the manufacturer which will be made available by the manufacturer upon request or via cloud access. In case of any doubts on the technical properties of the product or the suitability for a certain application, please contact the Primus Line technical experts in your region.

1, 5, 6: Please consider that the following information serves purely informative purposes about the product and does not provide any warranties or guarantees with regard to the product presented. Rather, the following information as well as the conditions for the suitability and usage of the product must be specifically assessed and verified for each individual case. We will be happy to provide you with customized advice for your project. Please note, however, that the ultimate responsibility for operation and compliance with regulatory and, in particular, environmental regulations is with the user of the product.

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