



Primus Line Technology

Field of application

Primus Line is a new technology in the field of the trenchless reconstruction of public pipelines under pressure.

Its application is very advantageous for all pipeline reconstructions under pressure upto an operational pressure of max. 25 bar, in the diameter range of 150-500 mm.

Its most important advantage is the exceptionally long pulling length, which can be also 1000 m, for a diameter of 500 mm it is about 830 meters.

Among other technologies developed for similar solutions, it must be mentioned that the flexible liner of small wallthickness can be installed by using very simple equipments in very short time and with very low costs.

The pipeline to be reconstructed is only the track for the installation of a new pressure pipeline which results in a small reduction of the wallthickness.

Typical fields of application:

- gas pipelines PN 16-25 bar
- water pipelines PN 16 bar or also higher pressures
- fire fighting water, industrial pipelines

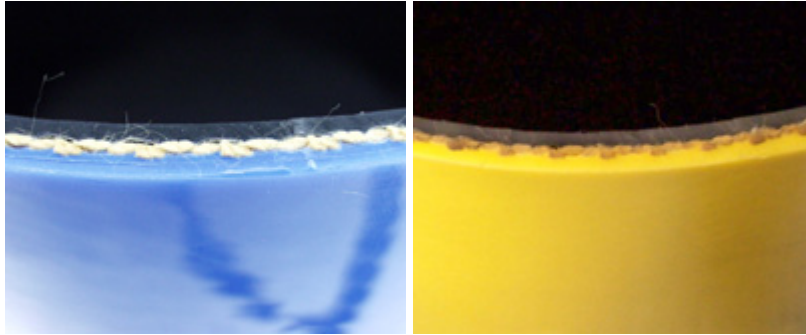
Advantages of application:

- especially long installation lengths
- only very simple, traditional equipments needed for the installation
- the capacity of the pipeline will not be reduced
- the flexible liner can be installed also through bended sections
- the reconstruction of hidden or concealed pipelines can be executed which are unaccessible for other technologies

Technical data of the liner:

Primus Line is a plastic pipeline of high strength, with excellent abrasion resistance and small wallthickness. The load capacity of the liner is guaranteed by the seamless woven Aramid fibres embedded in a special plastic layer. The material Aramid is often called as Kevlar. The liner is designed for 50 years' operation, calculated also with the eventual changes of pressure during operation.

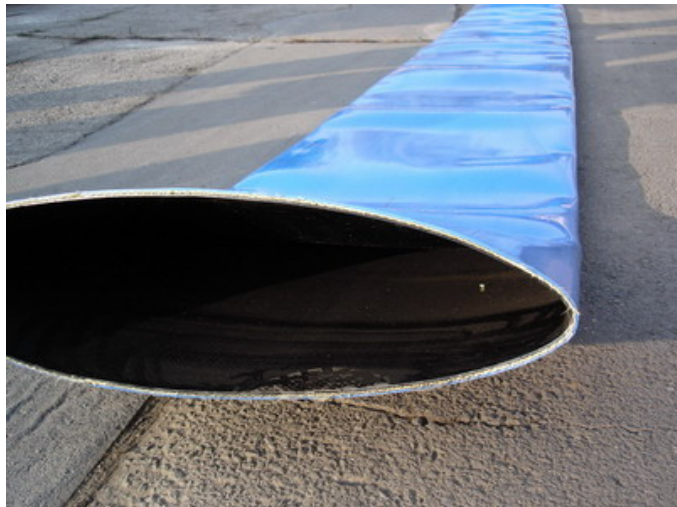
The inner layer of the liner can be defined so that it is resistant to the corrosive influences of the medium transported or that it would be suitable for the transportation of potable water.



Structure of Primus Line

	DN 150	DN 200	DN 250	DN 300	DN 400	DN 500
max. operational pressure	25 bar	25/40 bar	16/32 bar	16/32 bar	12/25 bar	10/16 bar
Short time burst pressure	>140 bar	>100 bar	>72 bar	>72 bar	>100 bar	>100 bar
max. installation length	1000 m	1000 m	1000 m	1000 m	800 m	650 m
Minimal bend	5 D/45°	5 D/45°	5 D/45°	5 D/45°	5 D/45°	5 D/45°

During production a continuous liner (without any elongations) will be produced according to the installation lengths. The liner will be wound as flat onto a drum as a last step of the production. The maximal length that can be wound onto a drum is 2000 meters.



The actual product range:

- diameter between 150-500 mm
- future developments: up to 600 mm
- wall thickness: 6-8 mm
- weight: 2,5-8,0 kg/m (depending on the diameter)



Installation steps:

The pipeline to be reconstructed has to be inspected by an industrial video in order to determine the possible reconstruction technology and to detect obstructions.

If necessary, additional places for open cut must be determined (i.e. bends with small radius, changes of directions) as well overgrown roots, sharp joints on the inner surface of the pipeline must be cut out by a cutting machine.

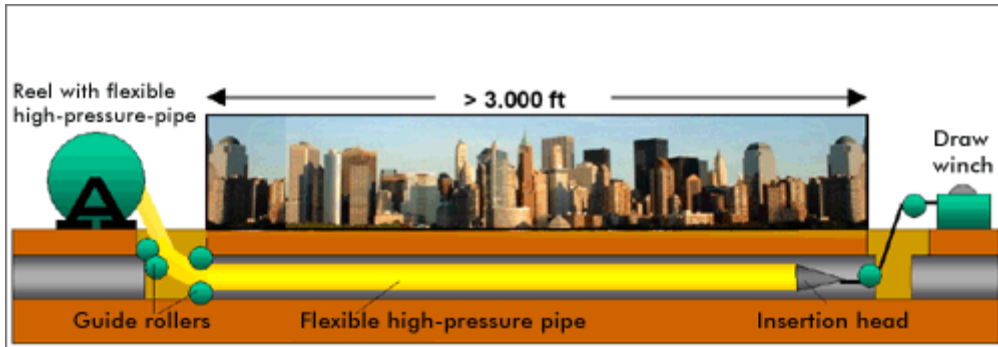
After that the pipeline must be cleaned by means of a pipe pig or by high pressure water or by other means.

The installation of the liner will be made through a start pit and a destination pit. The drum with the Primus Line flexible plastic pipe is positioned at the start pit and the cable winch with a max. pulling capacity of 10 tonnes at the destination pit by which the flat liner will be pulled to its place.



The installation procedure is supported by insertion rolls along the bends and the edges of the host pipe have to be covered in order to avoid any damages to the liner pipe.

The easy installation technique allows installation lengths up to 1000 meters in one single step.



The pulling speed can achieve max. 400 meters per hour.

The Primus Line hoses will be inflated by water or air pressure.

By cutting the ends of the inflated liner, the installation procedure is completed.

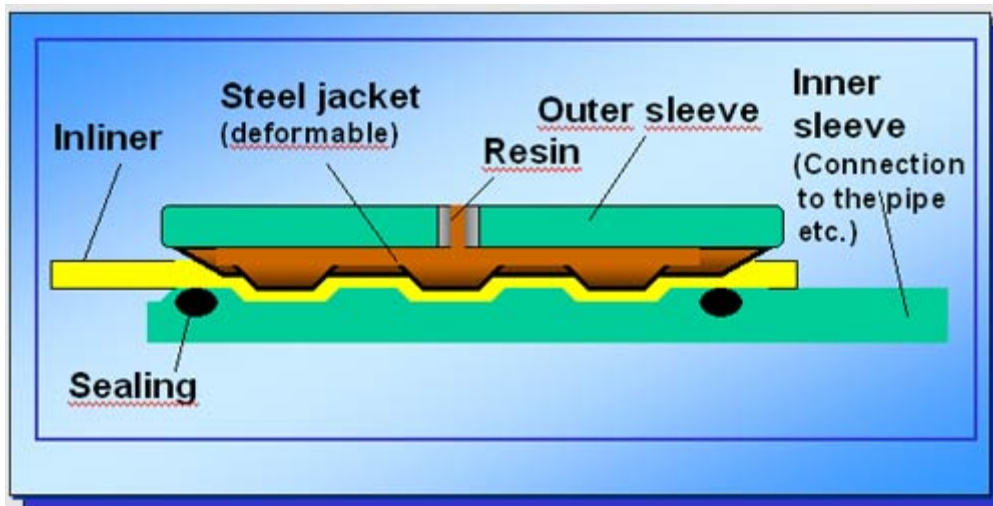


The connection of the pipes will be made by using special couplings. Traditional fittings and PE pipes will be installed between the couplings used at the pipe ends in order to form the suitable junctions. The coupling technology was developed in cooperation with Schuck Armaturen GmbH especially for the Primus Line technology.

The principle of the coupling is based on an inner sleeve and an outer sleeve. The inner sleeve is put into the inliner, the outer sleeve is slid over the inliner.

A deformable steel jacket is welded on the inside of the outer sleeve to form a casing. A resin is pressed into this casing and forces both the steel jacket and the inliner to move into the contours of the inner sleeve. After curing of the resin the coupling serves as a durable and safe joint.

Bonex



Coupling after having been injected by resin

After that the inner sleeve will be connected in the traditional way to the parts of the joint.

Audits and certificates

Patentee and manufacturer of the inliner Primus Line is Rädlinger Primus Line GmbH, Cham, Germany. The company has the certificates ISO 9001:2000, ISO 14001:1996.

Exclusive licencee in Hungary is Bonex Építőipari Kft.

The product and the technology has the DVGW Certificate (Deutsche Vereinigung des Gas- und Wasserfaches). Certificate number: DG-4554BP0476.

Official brand name: Primus Line

According to the tests and inspections (e.g. bending tests, Darmstadt test) the technology has excellent technical parameters, can be applied economically.