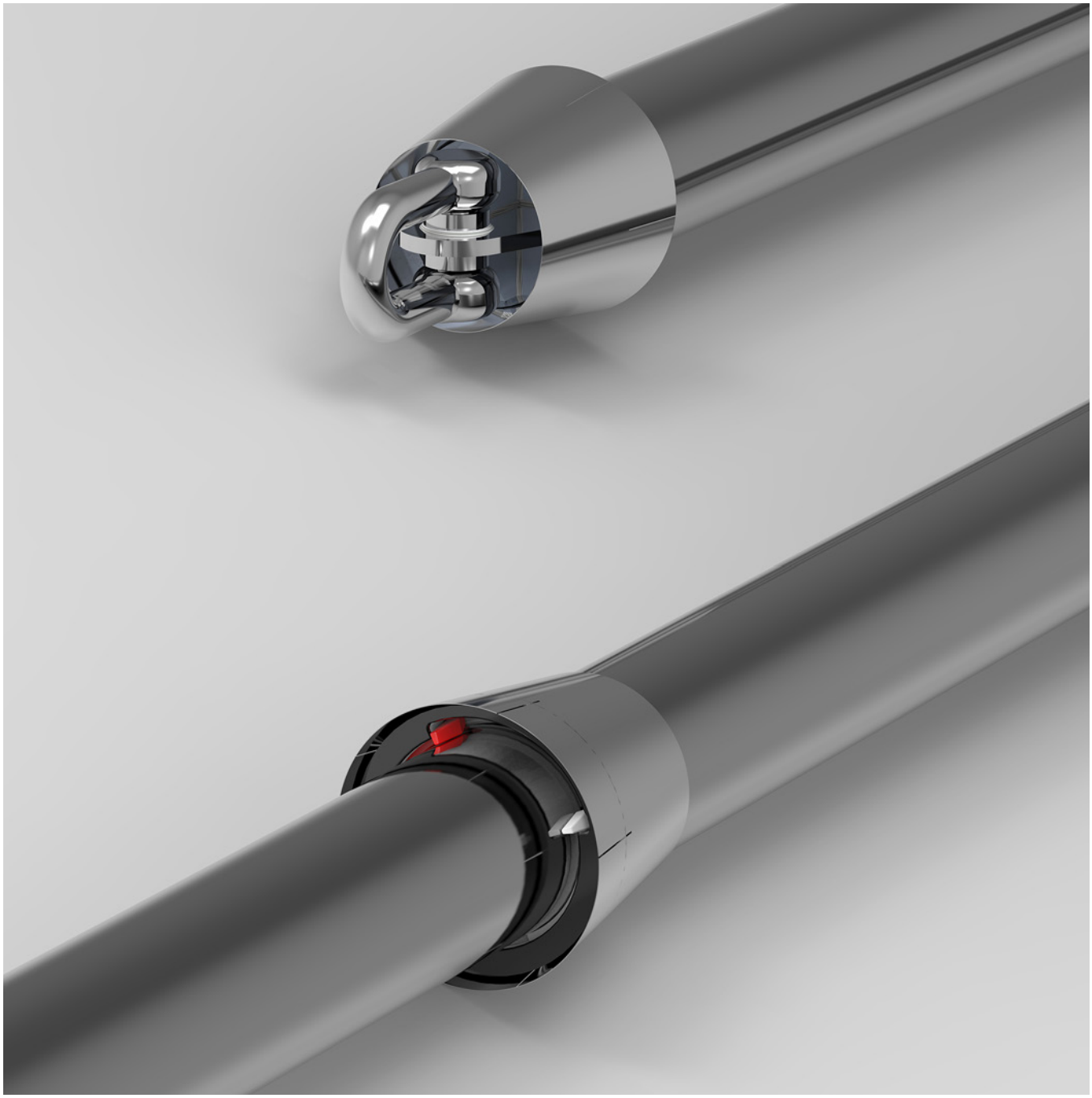
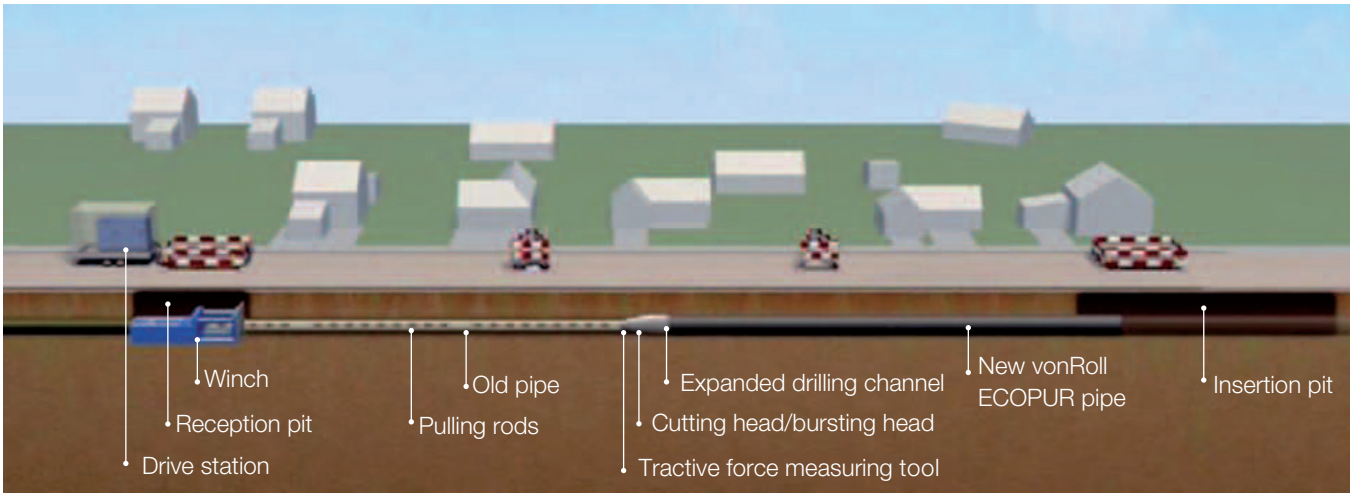
LAYING PIPEWORK WITH TRENCHLESS TECHNOLOGIES

with vonRoll ECOPUR – ductile-iron pipes with reinforced coating according to EN 545



Pipe bursting with vonRoll pipes – quick and reliable



Example of system construction using static pipe bursting

The pipe bursting process

Trenchless pipe replacement using the pipe bursting process is a good alternative to the open-trench pipe laying method and has many different benefits. Minimising conventional excavation work means that disruption to traffic, incursions into ground water and the ground, dust and noise pollution, and the storage and transportation of excavated and foreign material can be significantly reduced.

Pipe bursting is a tried-and-tested process for replacing pipes in the same pipeline without a trench. The process involves destroying the old pipe (min. DN depends on the type of machine) in the existing line and pulling through the new pipe, which often has a larger diameter. Pipe bursting can be used to replace gas and water pipes (pressure pipes), as well as waste-water pipes. With this method, up to 150 metres of piping can be laid in a day.

We distinguish between dynamic pipe bursting and static pipe bursting. Ductile cast iron pipes are usually replaced using the static pipe bursting technique.

Installing the winch

Insertion pit

Bursting head and expanded drilling channel

Types of pipeline that can be burst

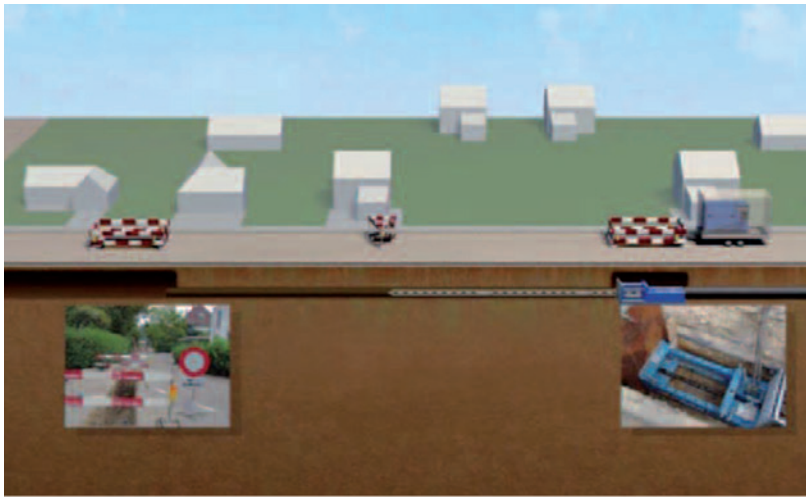
— Steel
— Grey cast iron
— Ductile cast iron
— Concrete (except steel-reinforced concrete)
— Fibre cement
— PE/PVC
— Vitrified clay
— Glass-fibre reinforced plastic

Advantages of trenchless pipeline laying using the pipe bursting process

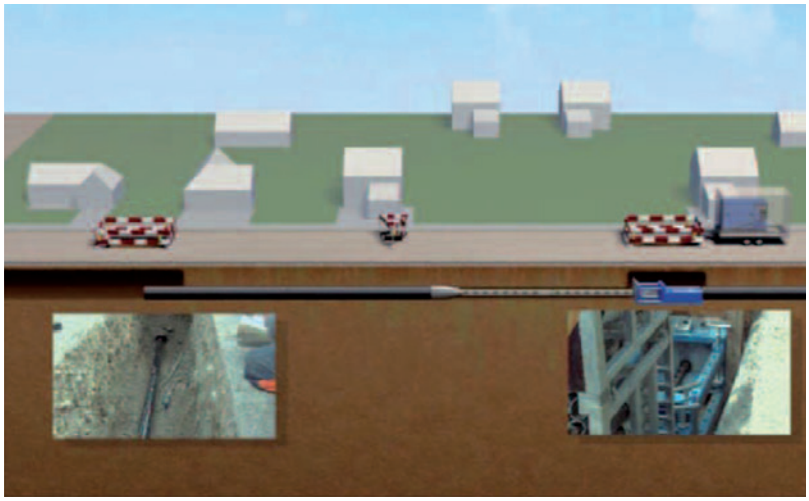
— Reduced transportation requirements and excavation work
— Small reception and insertion pits
— No additional coating materials
— Cost reduction of up to 30% when compared with conventional pipe laying
— Fast installation compared with open-trench pipe laying method
— Protects the environment by reducing CO2 emissions
— Minimal impact on the environment and traffic
— Fast completion times for the upgrade project
— Possibility of increasing the nominal diameter

Information that must be gathered before commencing trenchless pipeline laying using the pipe bursting process

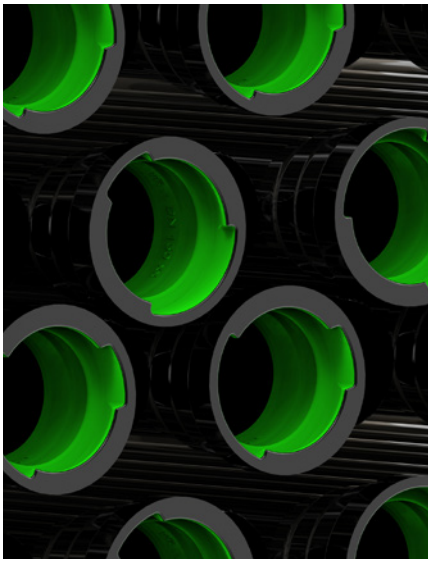
— How far down the existing pipeline is buried
— Location of house service connections and valves
— Horizontal and vertical position of existing utility lines
— Information on any thrust blocks
— Information on any horizontal or vertical bends



Push in rods until they reach the insertion pit



Pull through the new pipe from the insertion pit



vonRoll ECOPUR pipe bursting pipe

Successful in the reception pit

Installed winch

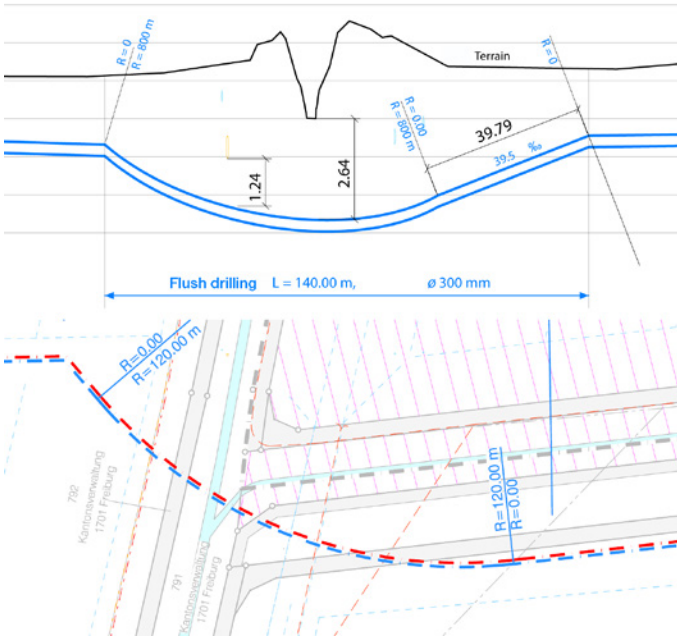
Horizontal directional drilling (HDD) with vonRoll pipes – flexibility when running underneath obstacles

Using HDD for laying pipework with NODIG is particularly suitable for running underneath obstacles (such as roads, buildings, railway lines and bodies of water) and for laying pipes in densely built-up inner city areas.

Information that must be gathered before commencing trenchless pipeline laying using the HDD
Successfully laying pipes using HDD with NODIG requires extensive planning and detailed information about what is in the ground.

Important information to establish:
— Existing infrastructure
— Location of existing utility lines
— Location of foundations
— Whether there is any hazardous waste
— Ground conditions/ground water (any geological expert reports/ ground surveys)
— Sources of electromagnetic disturbance
— Property ownership

Procedure
After the start and end points have been defined for the pipeline that is to be laid, an insertion pit and reception pit are excavated and the directional drilling is carried out in accordance with the following steps. First, a pilot hole is drilled with a directable boring head through to the reception pit. Measuring heads attached to the boring head transmit its exact position and permit highly precise drilling through to the reception pit.
In the reception pit, an expander head (back reamer) is then fitted to the rods. This back reamer rotates as it is pulled back to expand the pilot hole to the defined final boring-channel diameter in one or more expansion steps.
Finally, the preassembled new pipeline comprising vonRoll ECOPUR ductile cast-iron pipes is attached to the expander head and pulled through the ready-made boring channel. As part of every operation, a bentonite fluid is pumped through the rods to the head to flush out the cuttings and stabilise the hole. It also acts as a coolant and lubricant.

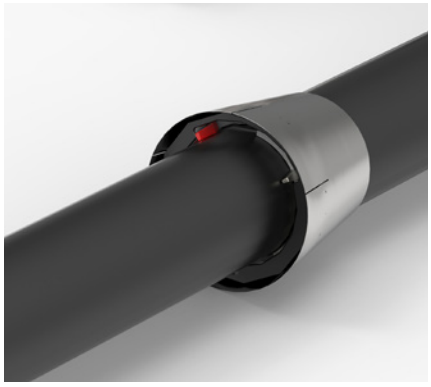


Construction project, detailed diagram of the location / longitudinal section

Pull head in the arrival pit

Preassembled pipeline

vonRoll ECOPUR fully protected pipes for pipe bursting and HDD
vonRoll ECOPUR fully protected ductile cast-iron pipes with reinforced coating in accordance with EN 545 are very well suited to NODIG
using the pipe bursting and HDD processes. The BLS restrained joint reliably absorbs the tensile forces acting on the pipeline when it is being pulled into the boring channel. The socket is protected by a steel sheet cone. The flexible push-in socket joint allows the pipeline to a deflection of minimum 5° in each socket, which permits minimum curve radii of up to 69 m with the 6-metre-long pipes.



Reference objects

PIPE BURSTING PROCESS
Wildparkstrasse, Langnau am Albis (Switzerland)

— New vonRoll ECOPUR pipe DN 125 mm
— Pipe laying, total length 456 m (five stages)

PIPE BURSTING PROCESS
Gütschwald conveyor pipeline, Lucerne (Switzerland)

— New vonRoll ECOPUR pipe DN 300 mm
— Pipe laying under the Gütschwald nature reserve, total length 42 m

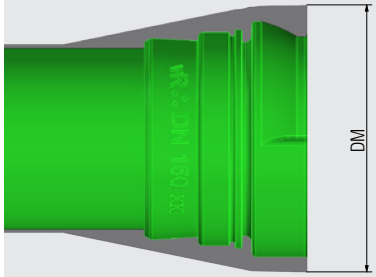
HDD PROCESS
Pipe laying underneath a canal, France

— vonRoll ECOPUR DN 250 mm
— Pipe laying, total length 150 m

HDD PROCESS
Conveyor pipeline, Müntschemier (Switzerland)

— vonRoll ECOPUR DN 300 mm
— Pipe laying, total length 210 m (1 x 150 m and 1 x 60 m)

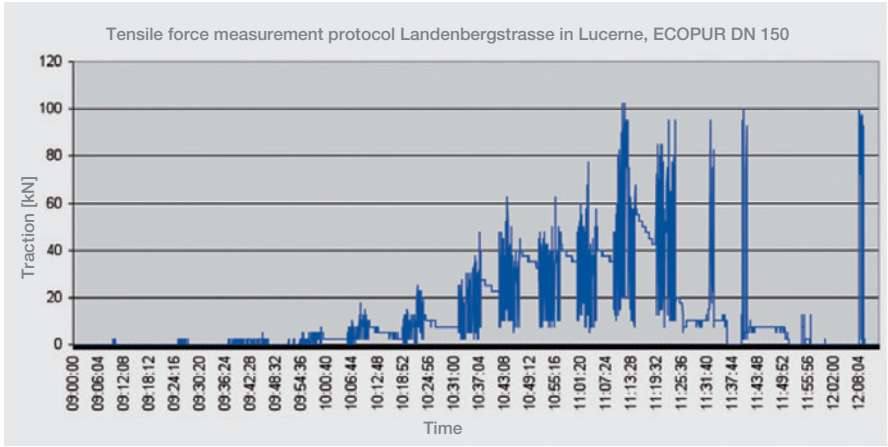
Tensile forces in accordance with DVGW [German Technical and Scientific Association for Gas and Water] spreadsheets GW 321 and GW 323



Ultimate tensile strength F

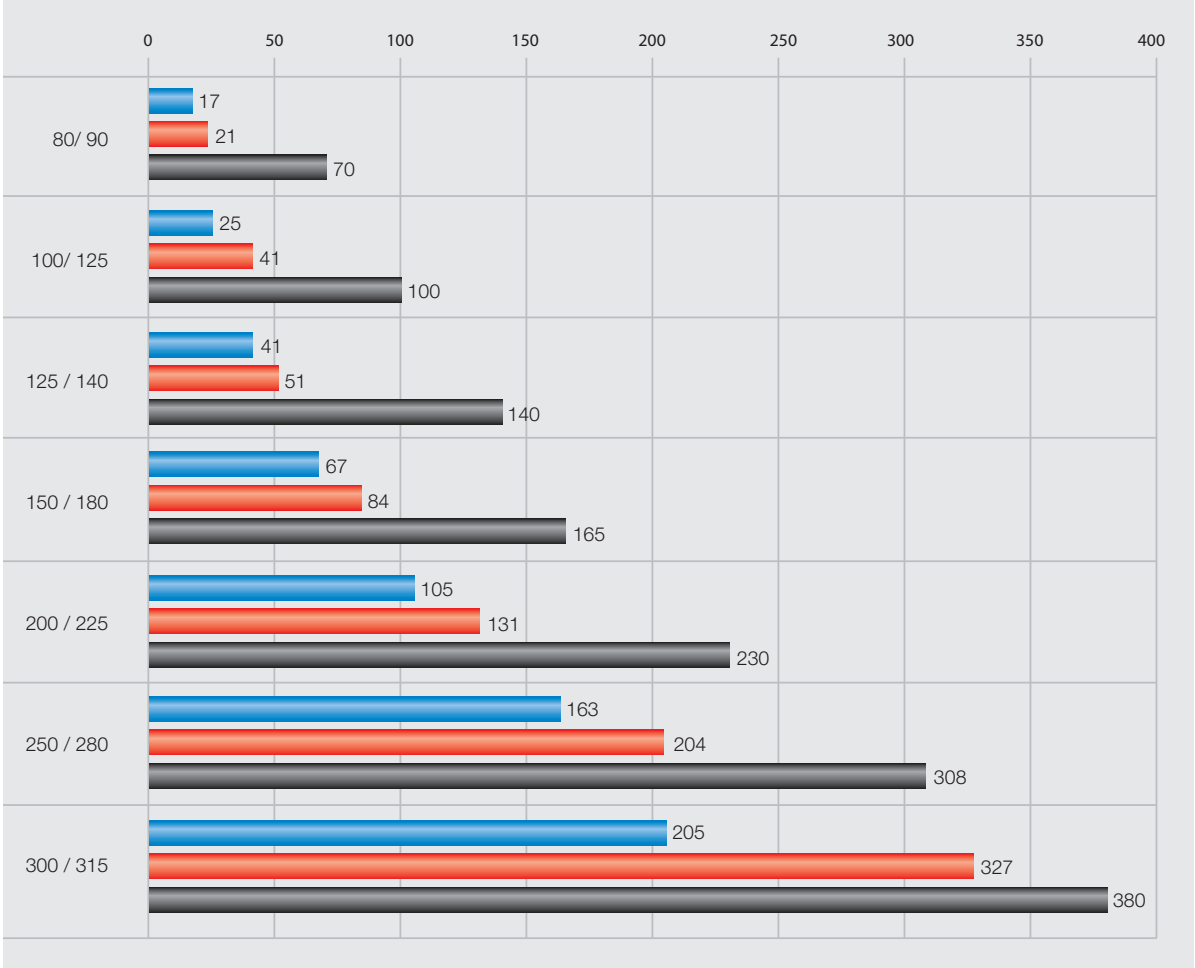
DN	DM mm	Pressure PFA bar	F kN	Minimum radius[1] m
80	158	64	70	69
100	184	64	100	69
125	208	60	140	69
150	241	50	165	69
200	295	40	230	86
250	359	35	308	86
300	412	30	380	86

[1] With an angular deviation of 4° to 5° per push-in connection with a calculated radius. Large DN available on request



Pipe laying using the pipe bursting process

Comparison of the tensile strengths of different materials



PE Xa SDR 11*
PE 100 SDR 11*
Ductile cast iron with restrained joint

* at maximum pipe wall temperatures of 20°C

Do you require further information on trenchless pipeline construction?

Contact us: