

GRAVITATIONAL DRILLING SYSTEM



The first ideas for trenchless devices and solutions appeared back in the '90s as a result of the constant pressure to limit the scope of excavation works and search for alternative solutions. Year by year trenchless technologies were becoming more and more important, as investors, municipal companies, construction companies and contractors realized the high costs required to reverse the side effects of digging the trenches. In 1990 we decided to take up the challenge and created our own trenchless drilling company **MIDO**.

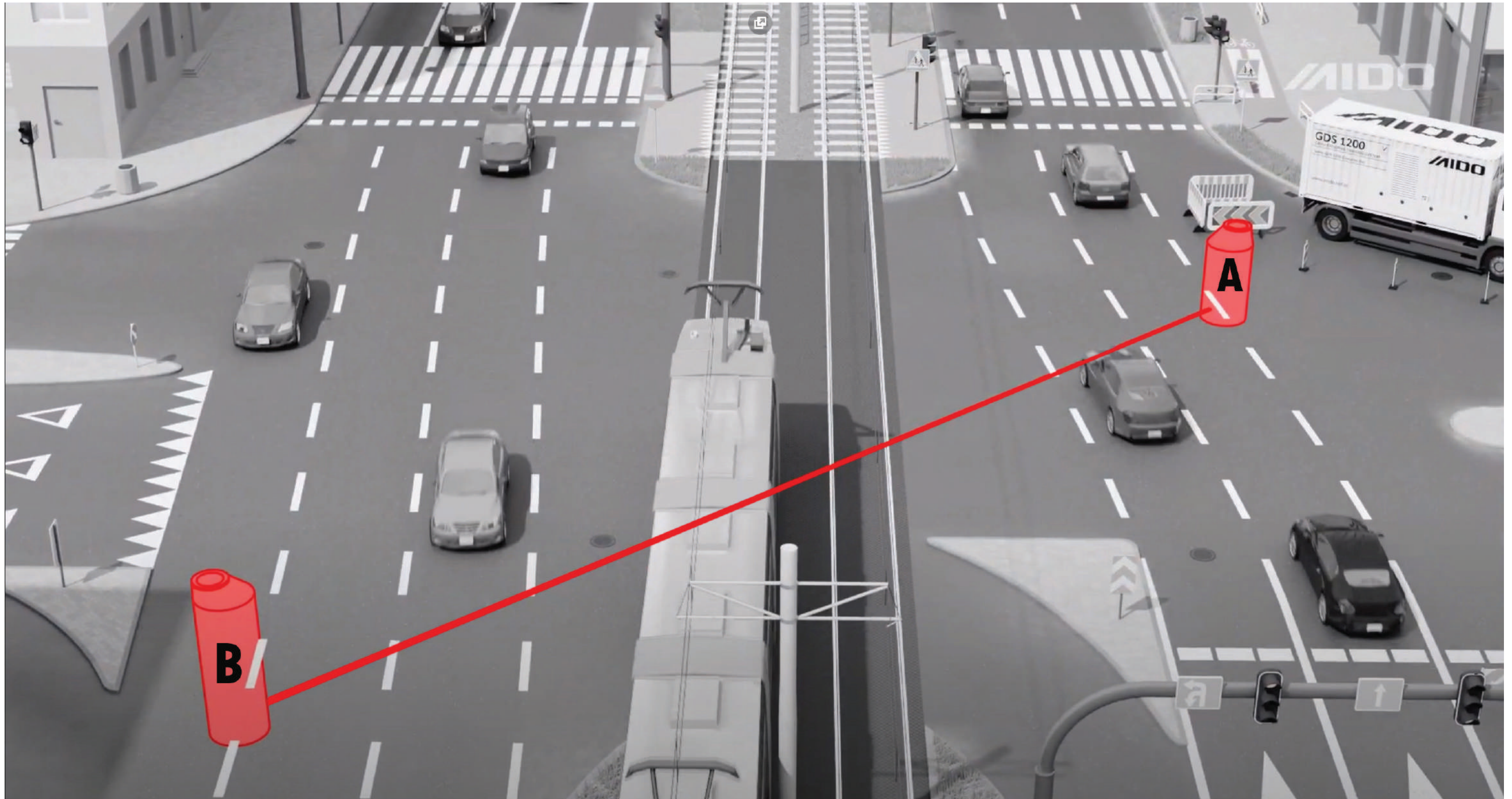
Since then we have performed countless installations using various trenchless technologies. While exploring the field of pneumatic impact drilling we also noticed the need to expand our technology range with controlled horizontal and vertical drilling machines. The development of our own machinery, in most cases designed and made in-house, enabled us to become a company offering a wide range of trenchless technology services.

While performing these services we saw the need to construct a machine characterized by small dimensions, which would allow drilling from sewage wells. Soon the idea turned into reality and we created our gravity drilling rig that we still affectionately call "Picolo".

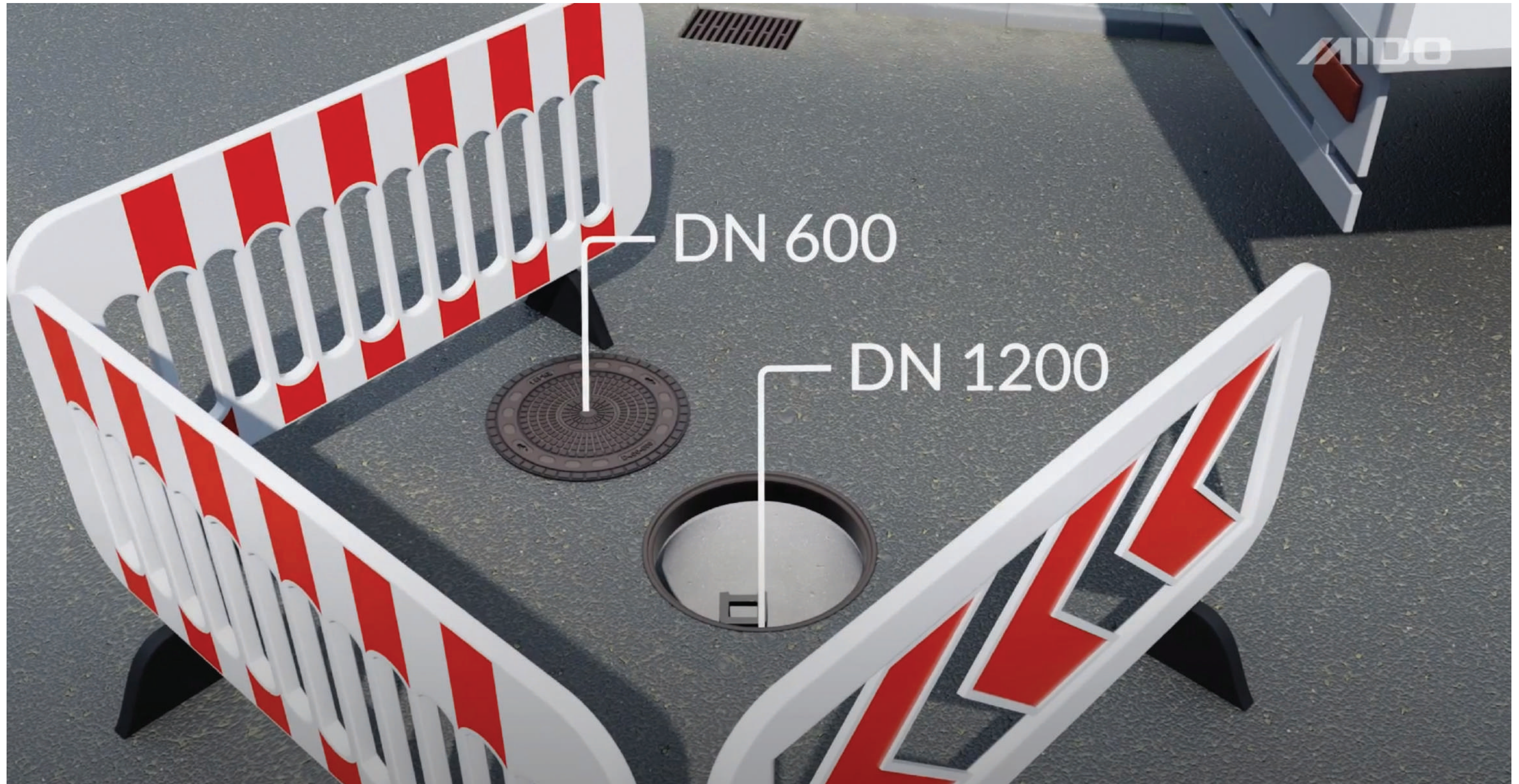
The first drilling rig was completed in 1998. Over the next twenty years all subsequent generations were used in the drilling jobs. They were field-tested while carrying out real tasks on countless construction sites throughout Poland. Kilometers of boreholes performed with these machines allowed us to introduce a number of improvements and design enhancements related to the type of the drive, drive position, type of feeding process, method of installation in the well...

LAYING A NEW INSTALLATION

The construction of a new installation is carried out from the starting well (A) to the final well (B) using the trenchless method without any additional excavations. Our technology allows us to build an installation regardless of the ground conditions and the type of development around the construction site.



1. Our gravitational drilling rig design allows assembly through a manhole (well cover) DN 600.
The work can be carried out from a well of DN 1200 size and larger.



2. Our solution allows quick preparation of the machine for work. The installation of a drilling rig is carried out by introducing the device by means of a crane and then fixing it on special mounting rims.



3. After being set to the starting position, the drilling rig is easily attached to the previously screwed stabilizing rings.

Work is possible in wells with depth up to 15 m.

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The device can work directly under the manhole cover or with space-limiting elements such as a reducing ring, orifice etc. without disassembling them.

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It is possible to start the installation from a well with a low mechanical strength.

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It is possible to install the machine in wells with a non-standard shape (e.g. rectangular) using additional adapters.

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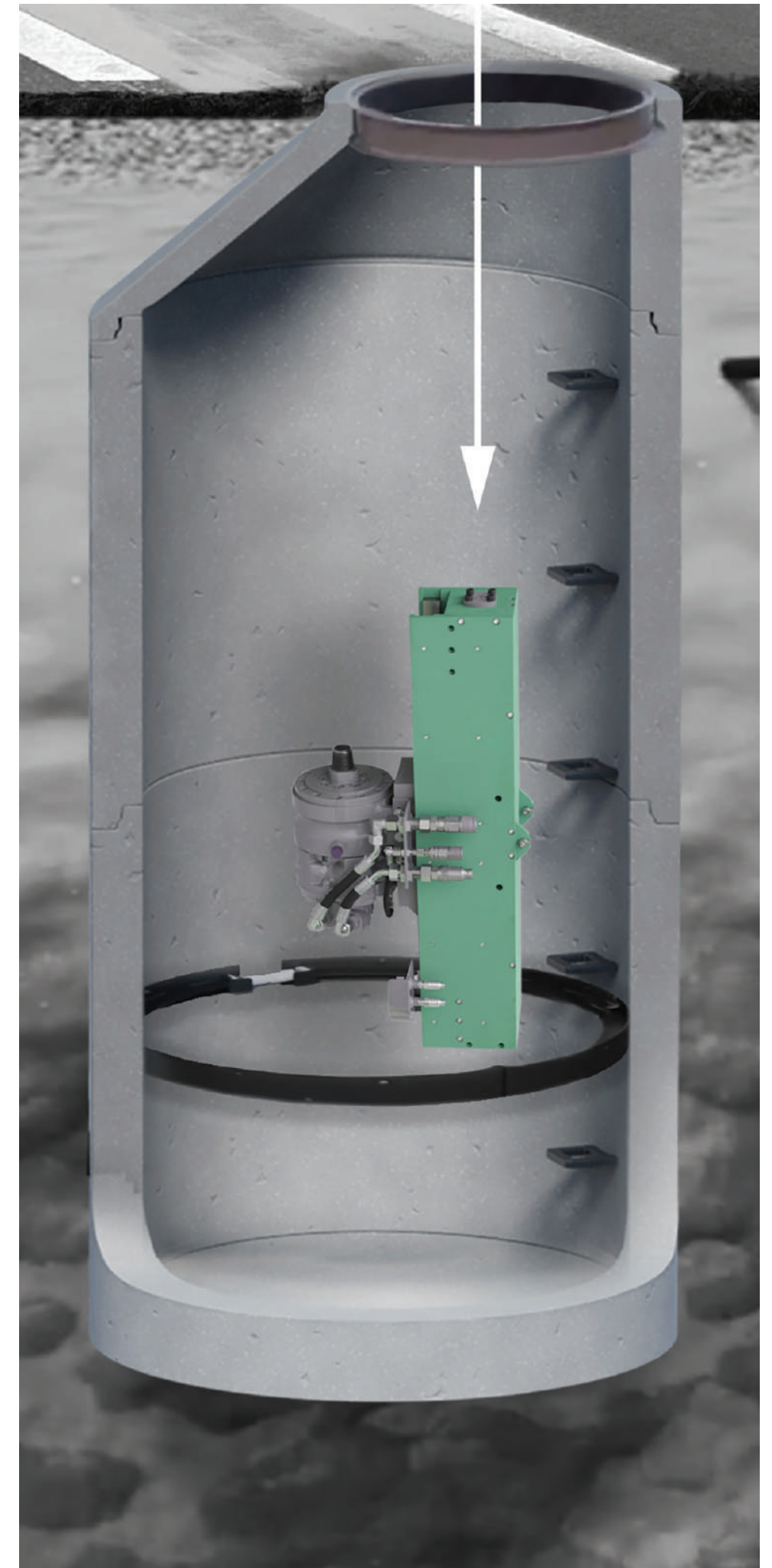
There is no need to build starting chambers and drain them, which speeds up work.

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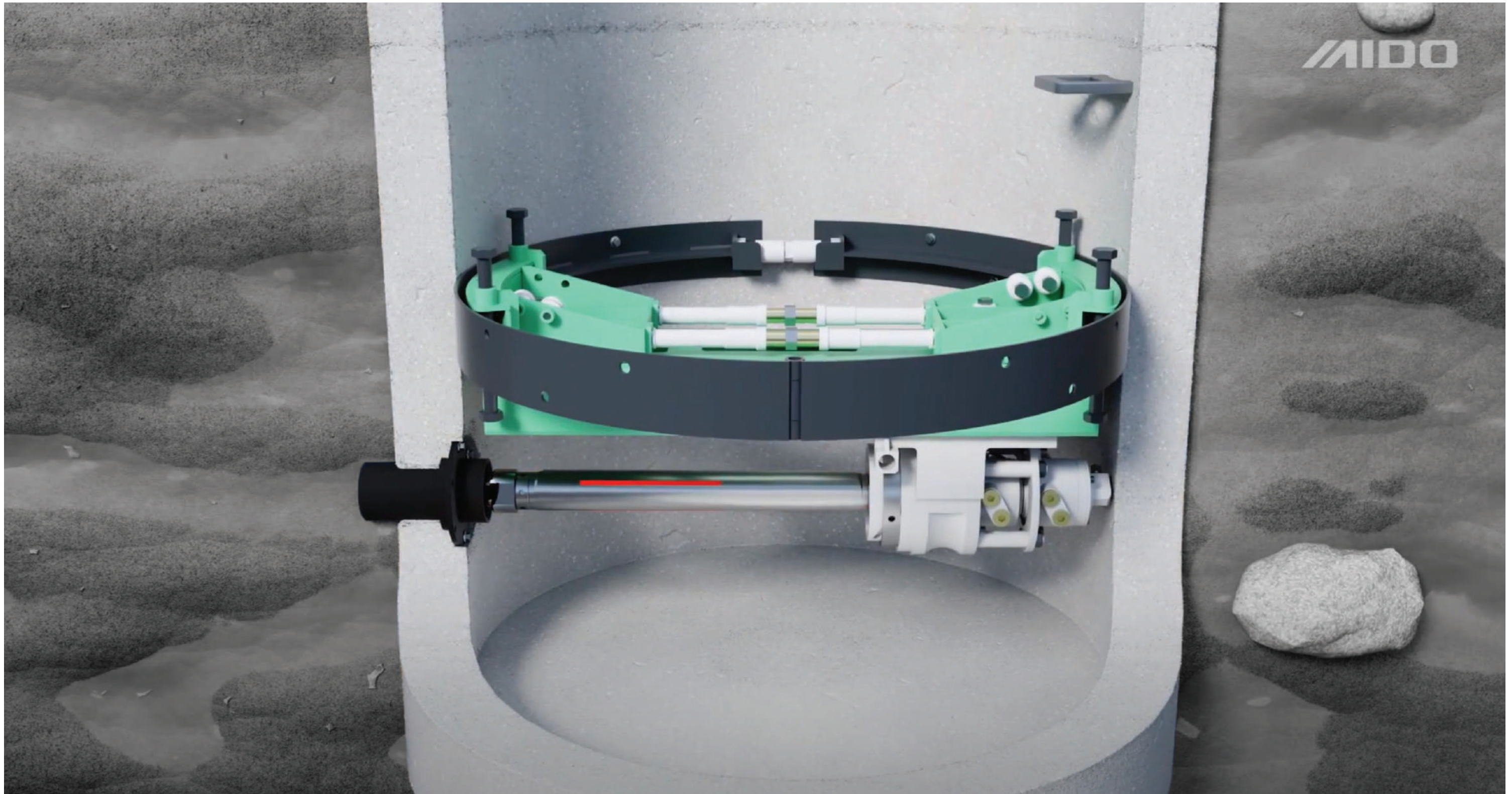
The risk of drilling failures and damaging the equipment is low.

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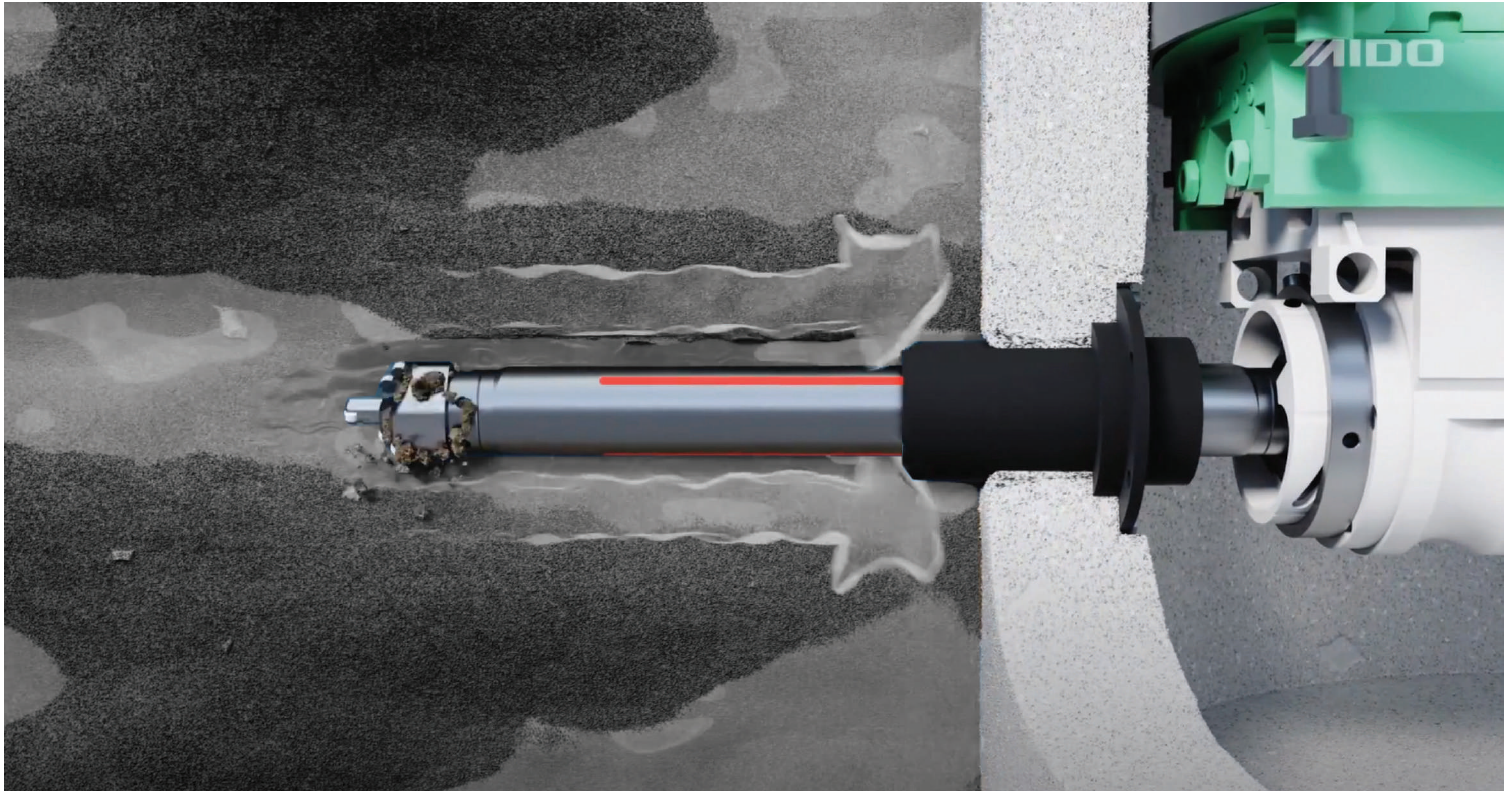
Many years of experience allows us to precisely estimate the time and cost of the installation.



4. The drilling can be carried out directly at the bottom of the well (in new wells) or at the level of the channel. There is no need to dismantle the bench or to deepen the well.



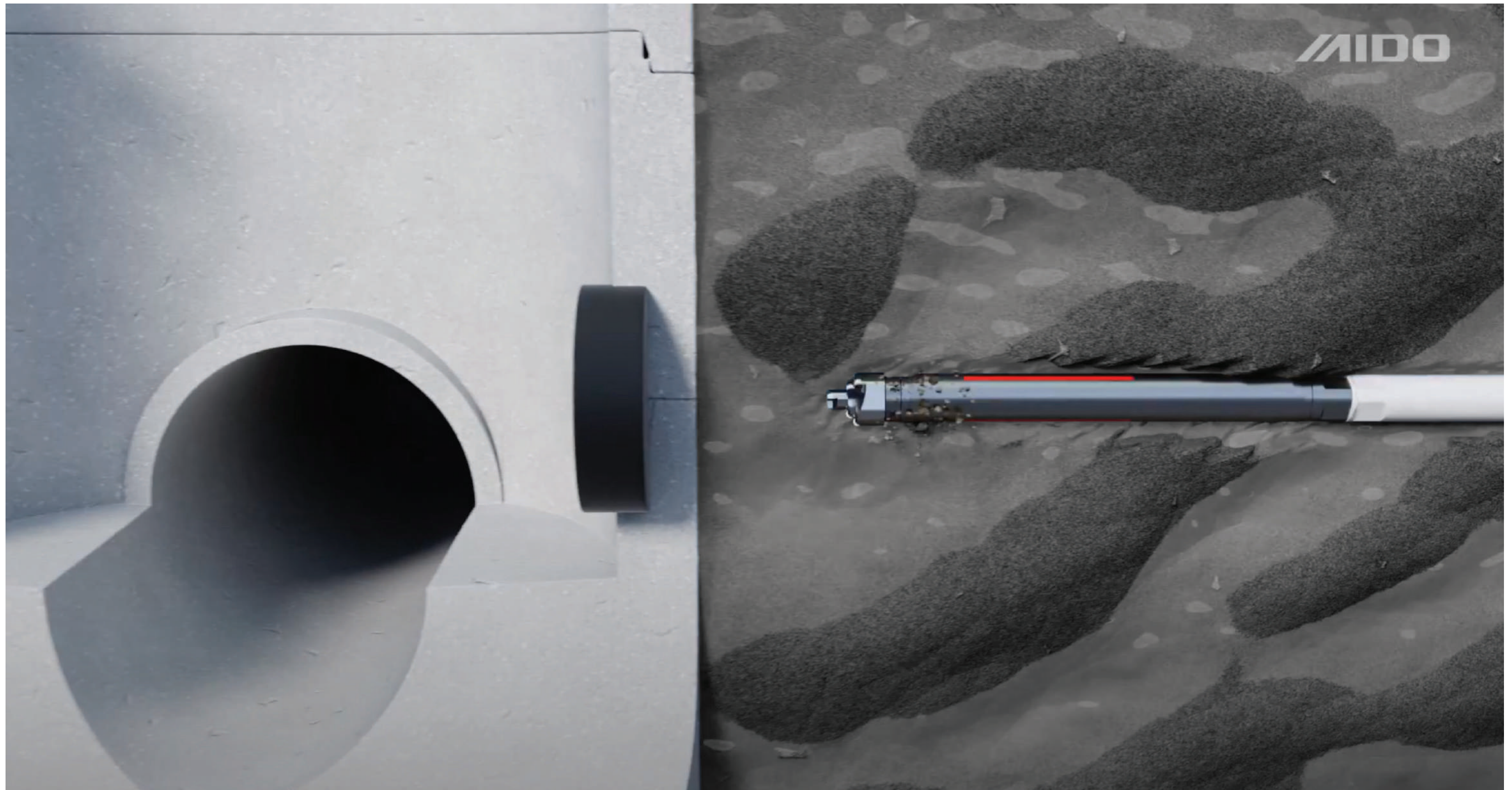
5. The water-sealing system allows us to drill in spite of a significant level of groundwater. There is no need for drainage which reduces the impact on the surrounding natural environment. Our solution does not destroy soil microorganisms and does not change the soil structure.



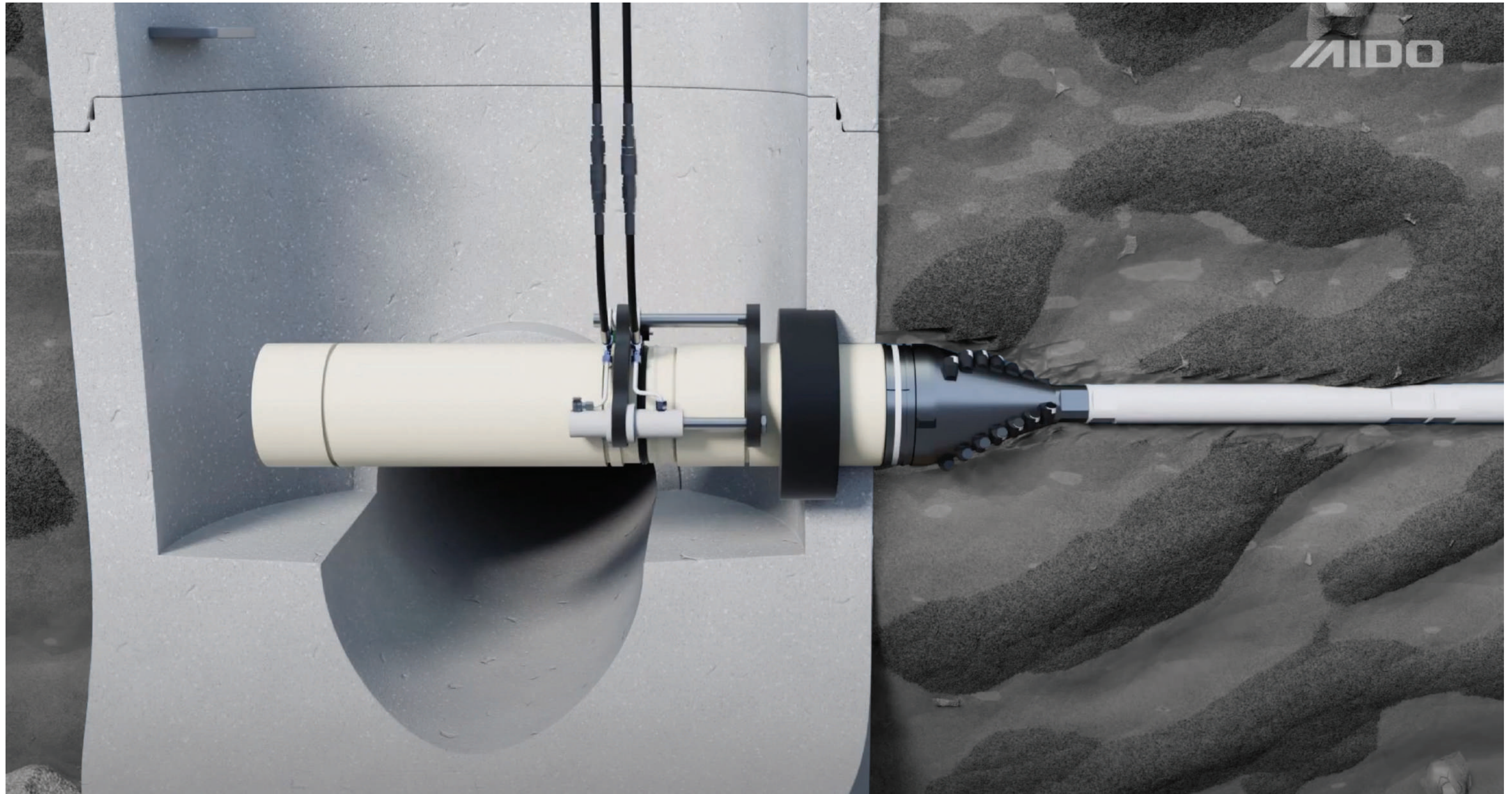
6. The radiolocating system controls the direction and slope of the installation within a very narrow tolerance range (up to 0.2%).



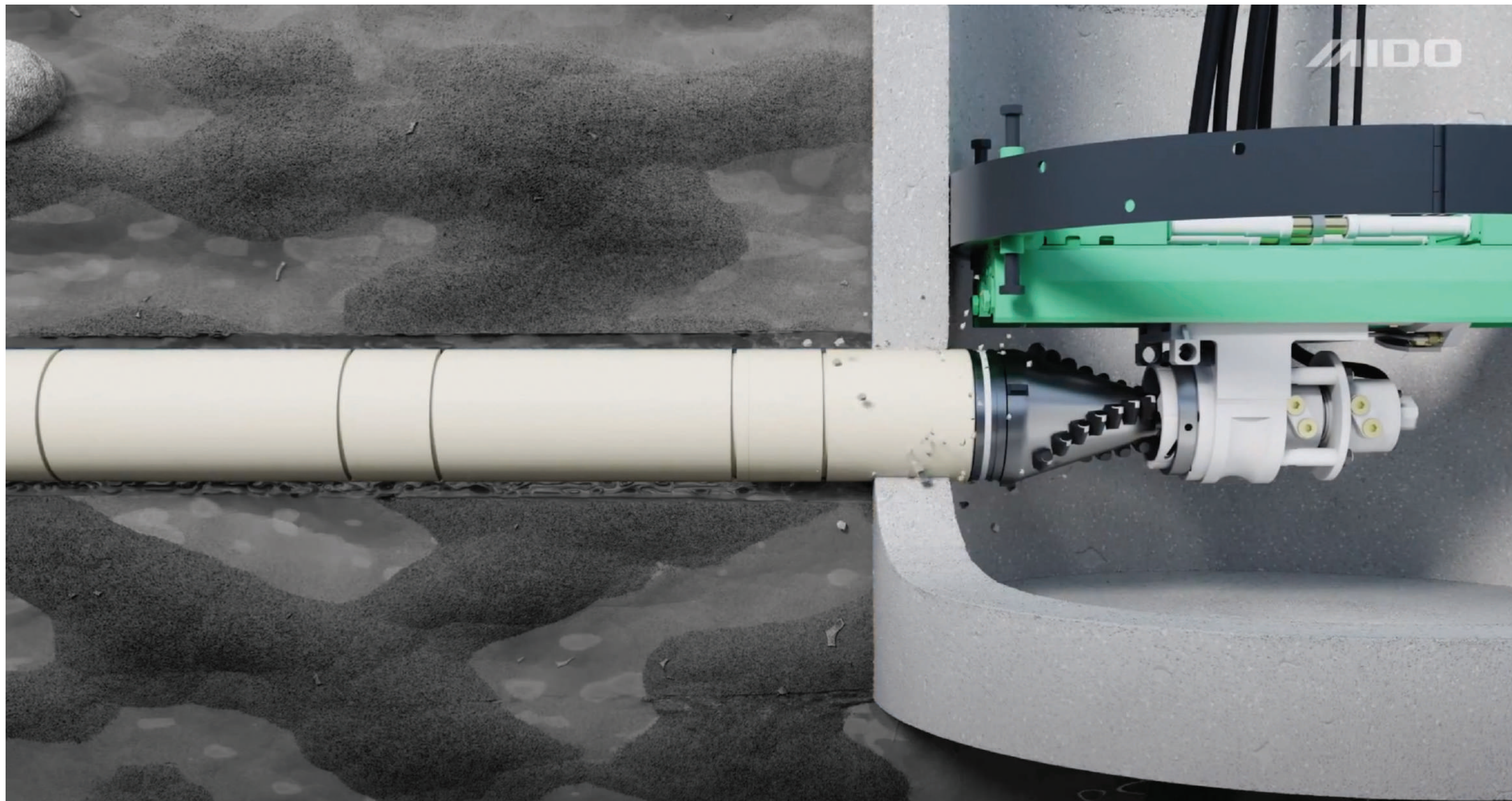
7. It is not necessary to block the flow of wastewater. The device can work in soils with drilling classes: II, III, IV, V (sands, gravels, clays and soft rocks, medium: marly limestone, boulder clay, marl, sand slate, debris), concrete obstacles.



8. The process does not affect the soil compaction, but on the contrary it even thickens the zone around the pipe and around the well (the spoil is in most part squeezed out and a small amount is removed from the borehole).



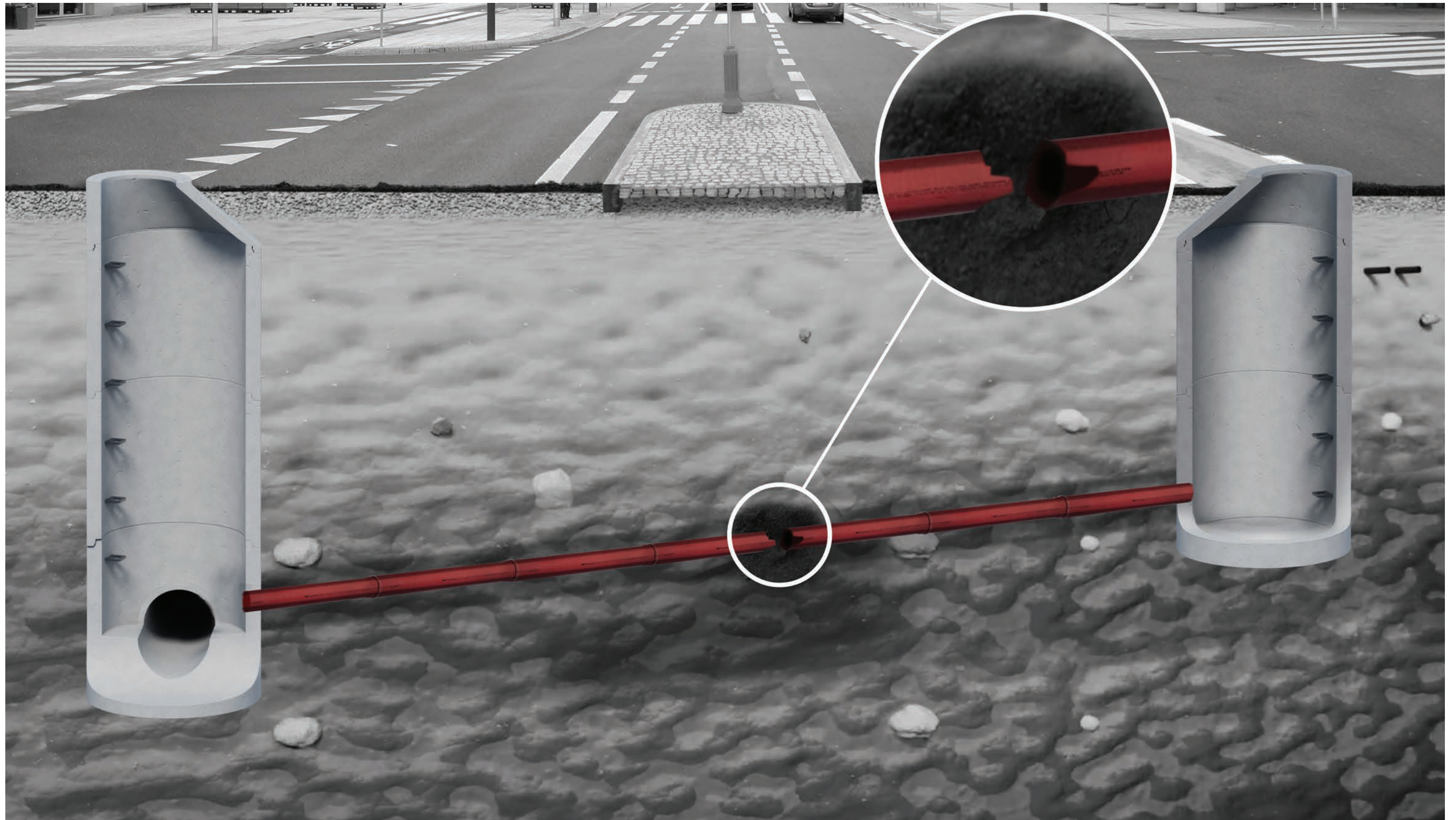
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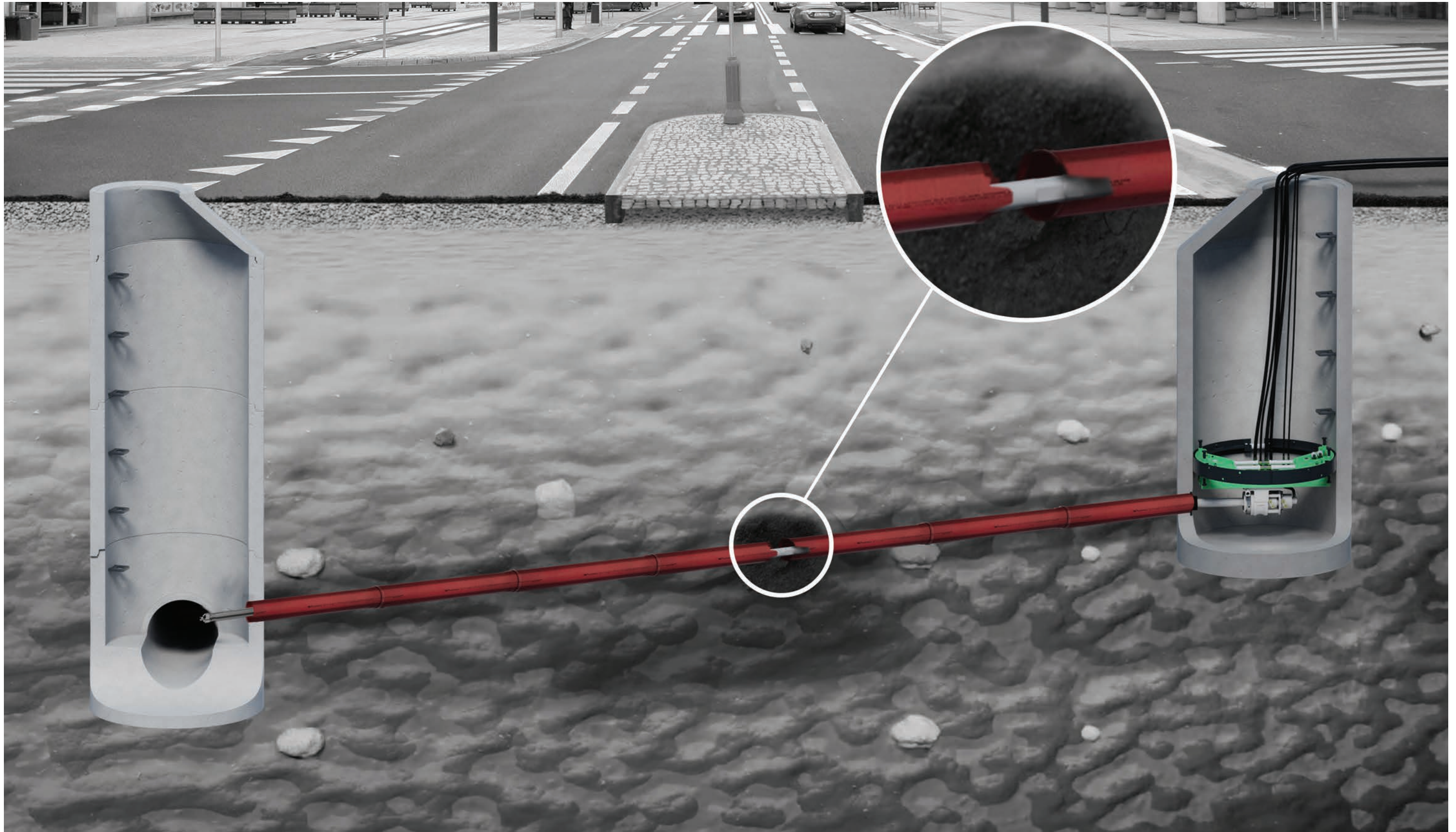
RENOVATION OF DAMAGED SEWAGE INSTALLATIONS

Our services include renovating and unblocking existing, damaged sewage pipes without the need to destroy the road surface, in a way similar to the method of hydraulic pipe bursting. This solution is used wherever urgent intervention is needed, especially when the failure occurs in a densely built-up urban area, where interference with existing infrastructure would generate high social costs.

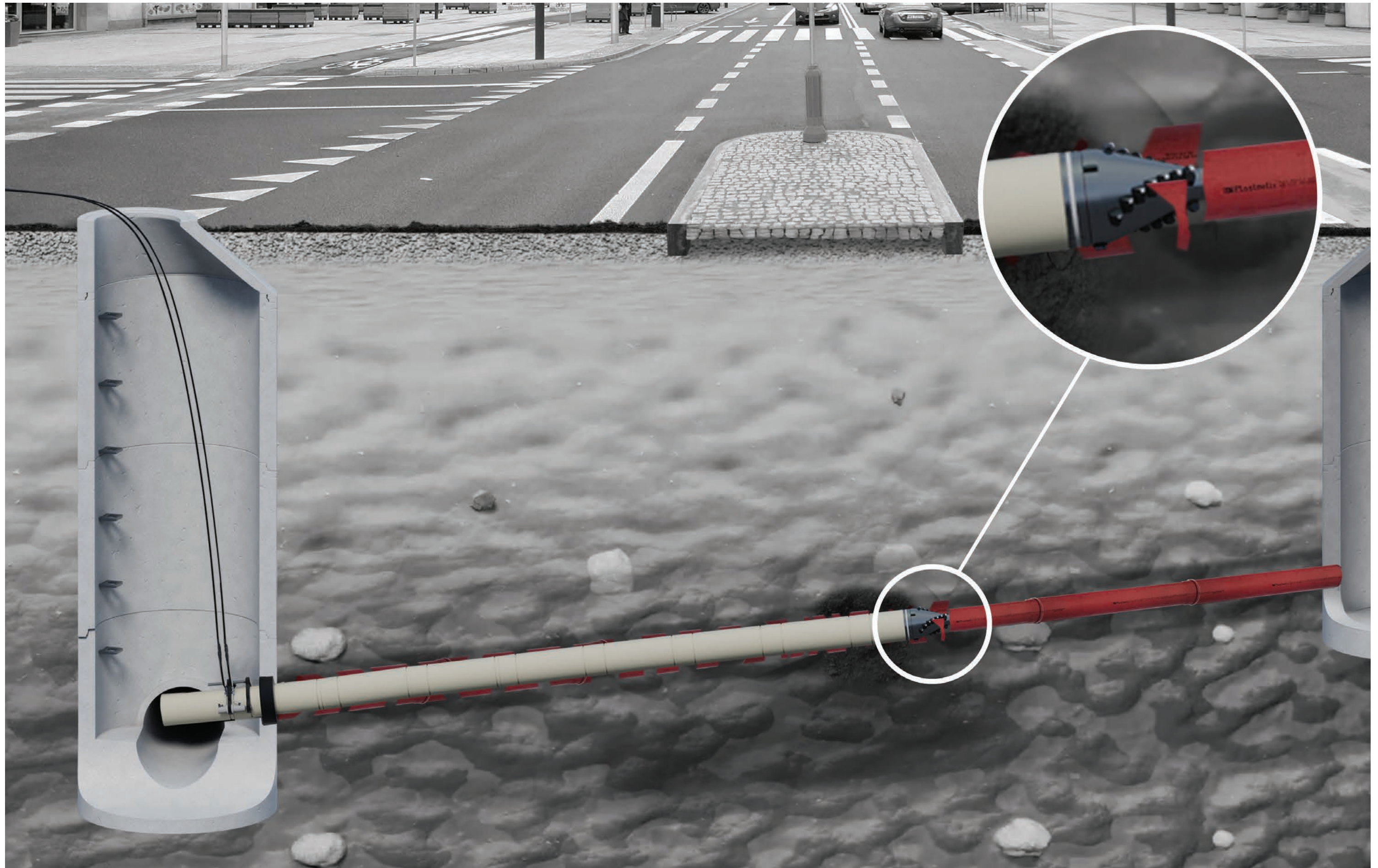
1. We can renovate old installations even if the sewer is completely collapsed or blocked.



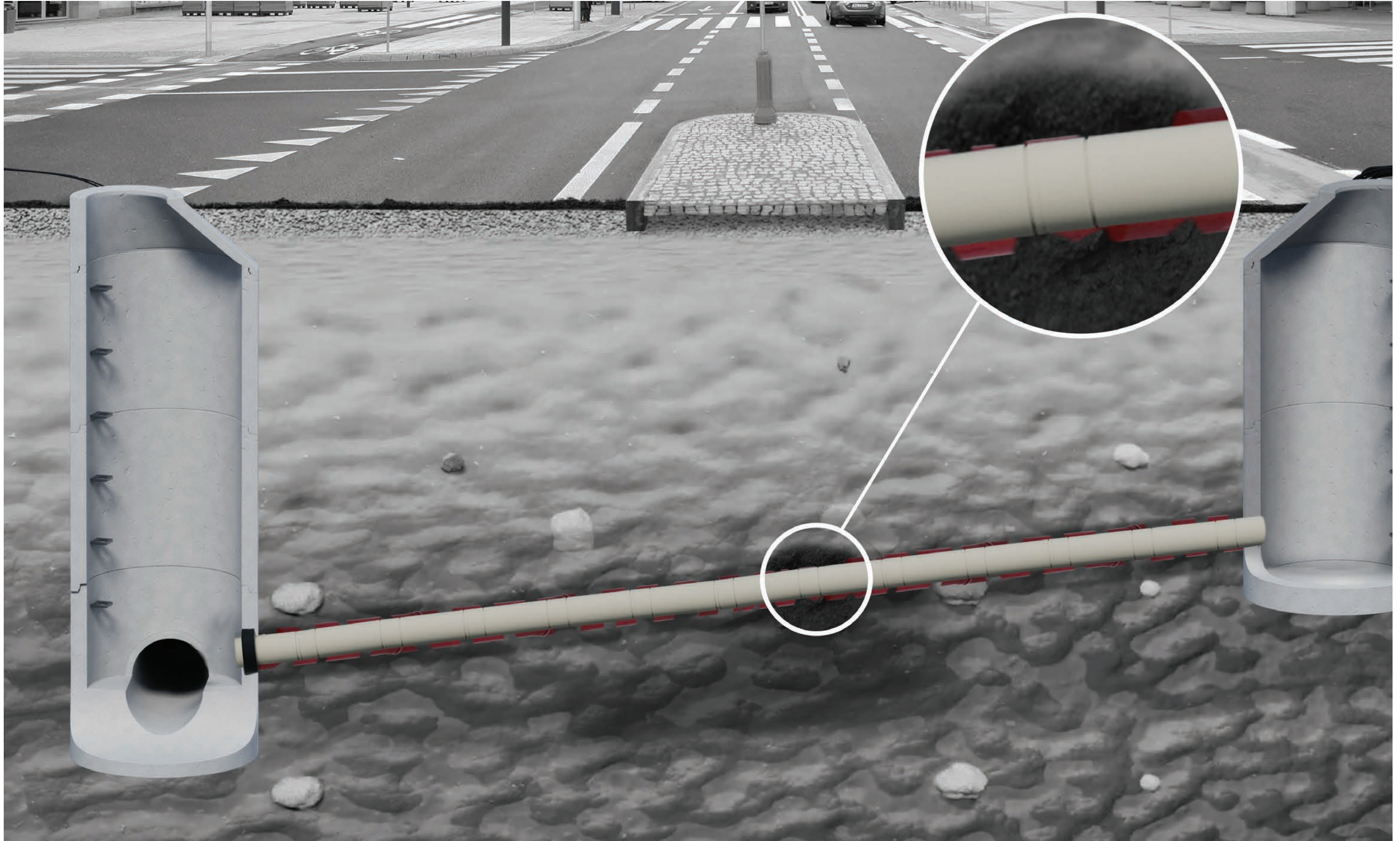
2. Our radiolocating system makes it possible to control the route and avoid obstacles during pilot boring.



3. The method used for reaming the sewer allows us to change its diameter similarly to the hydraulic pipe bursting method.



4. There is no need to block the flow of sewage in adjacent sewers during renovation.



CONTAINER WITH OUR GRAVITATIONAL DRILLING SYSTEM

Our innovative equipment allows a high level of precision while performing gravity sewer installations. The technology of gravity sewer drilling does not require pit excavation and allows drilling in all ground conditions even in the presence of groundwater.

bentonite flush unit

hydraulic unit

hydraulic hoses set

drilling rod set

drilling rig's stand

SMALL DIMENSIONS

*Installation of the machine
through a DN 600 manhole*

TOTALLY TRENCHLESS

*Horizontal drilling begins
and ends in the well*

PRECISION

*Installation with an
accuracy of 0.2%,
using a remote control
and radiolocating system*

NO DRAINAGE IS REQUIRED

*Installation in places
where groundwater
occurs*

DRILLING AT EVERY DEPTH

*Building the sewer at the very
bottom and under
the well cover*

NO NEED TO BLOCK THE SEWER

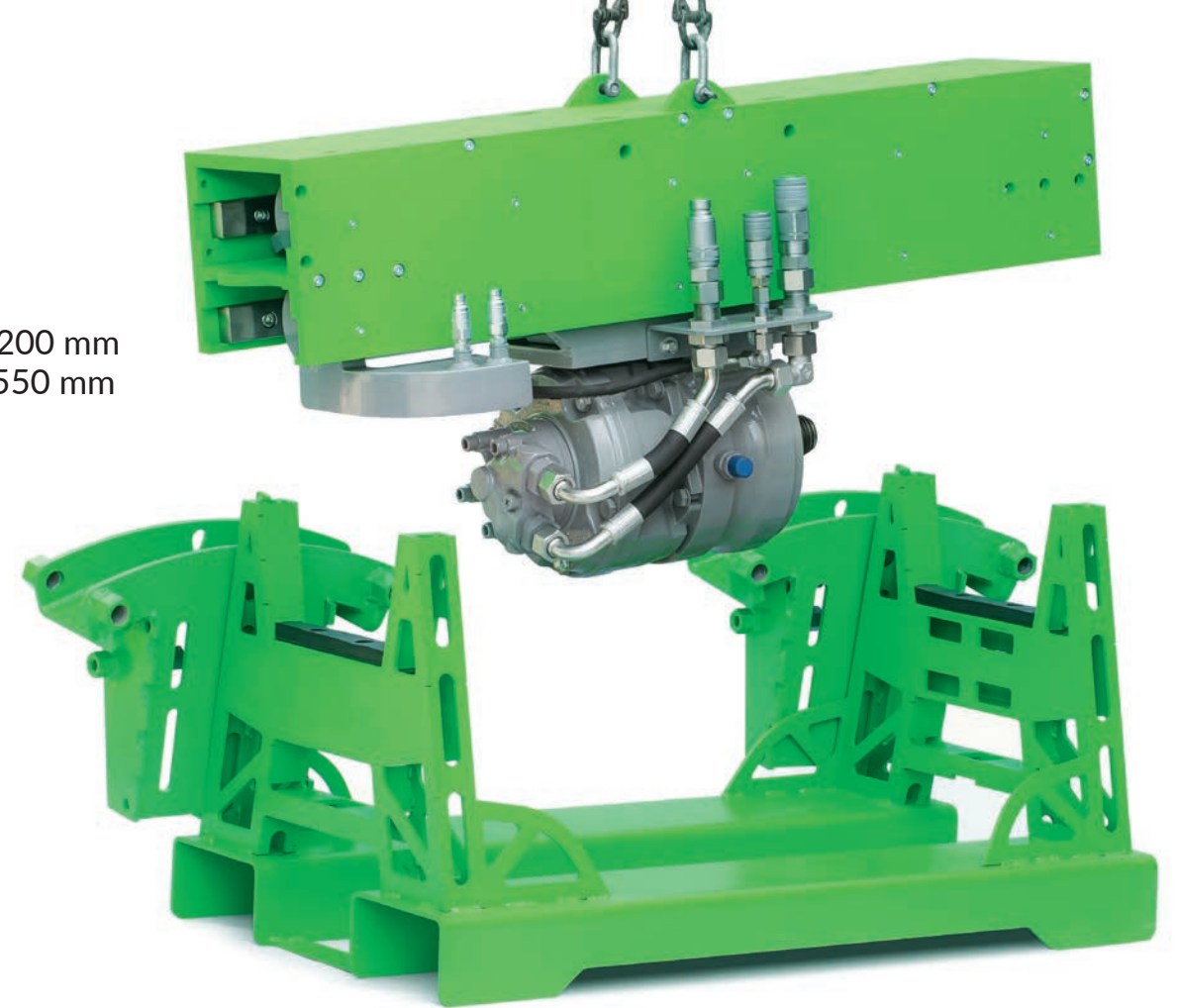
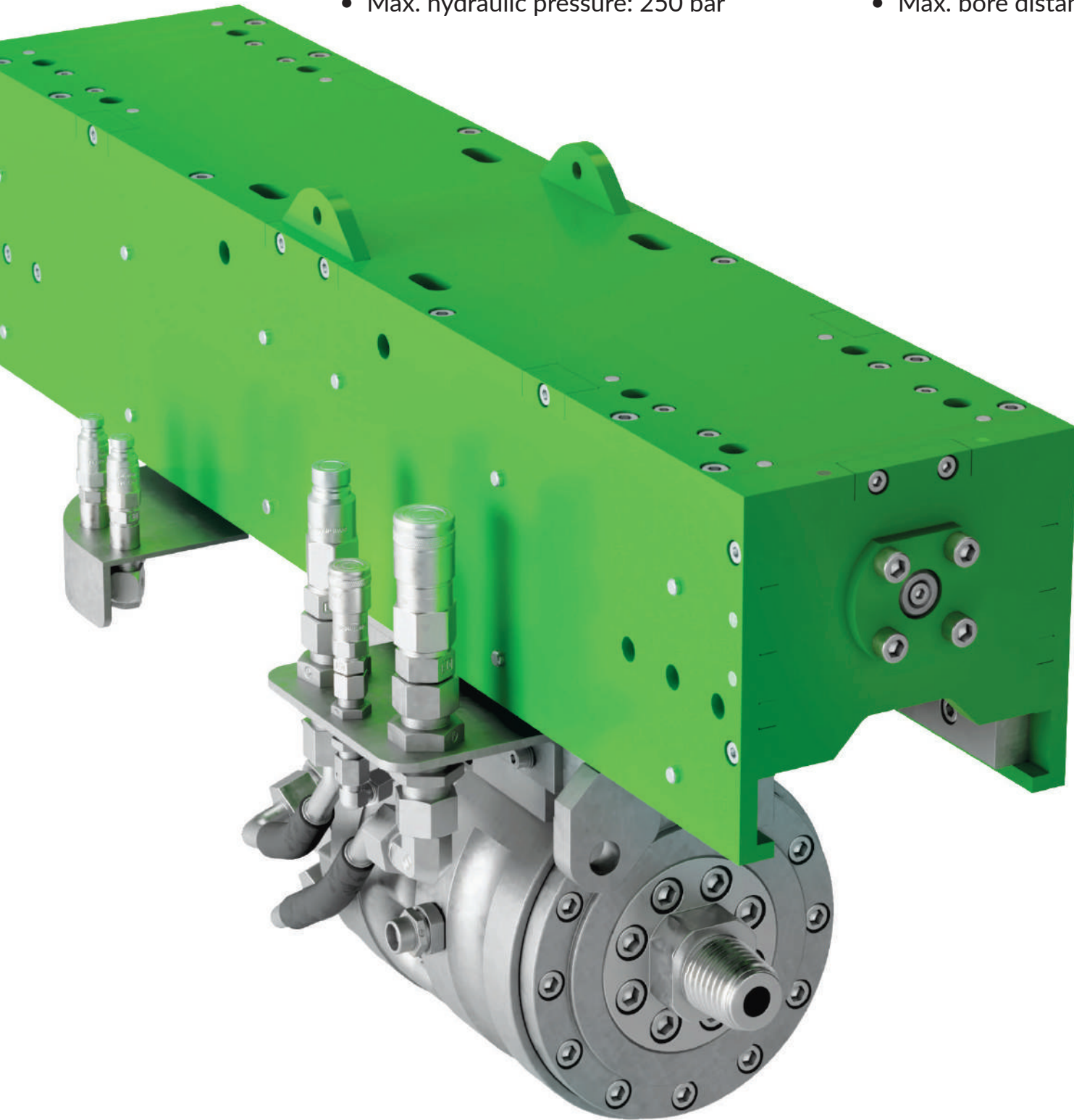
WORKING IN WELLS WITH LOW MECHANICAL STRENGTH



SINGLE DRIVE DRILLING RIG SPECIFICATIONS

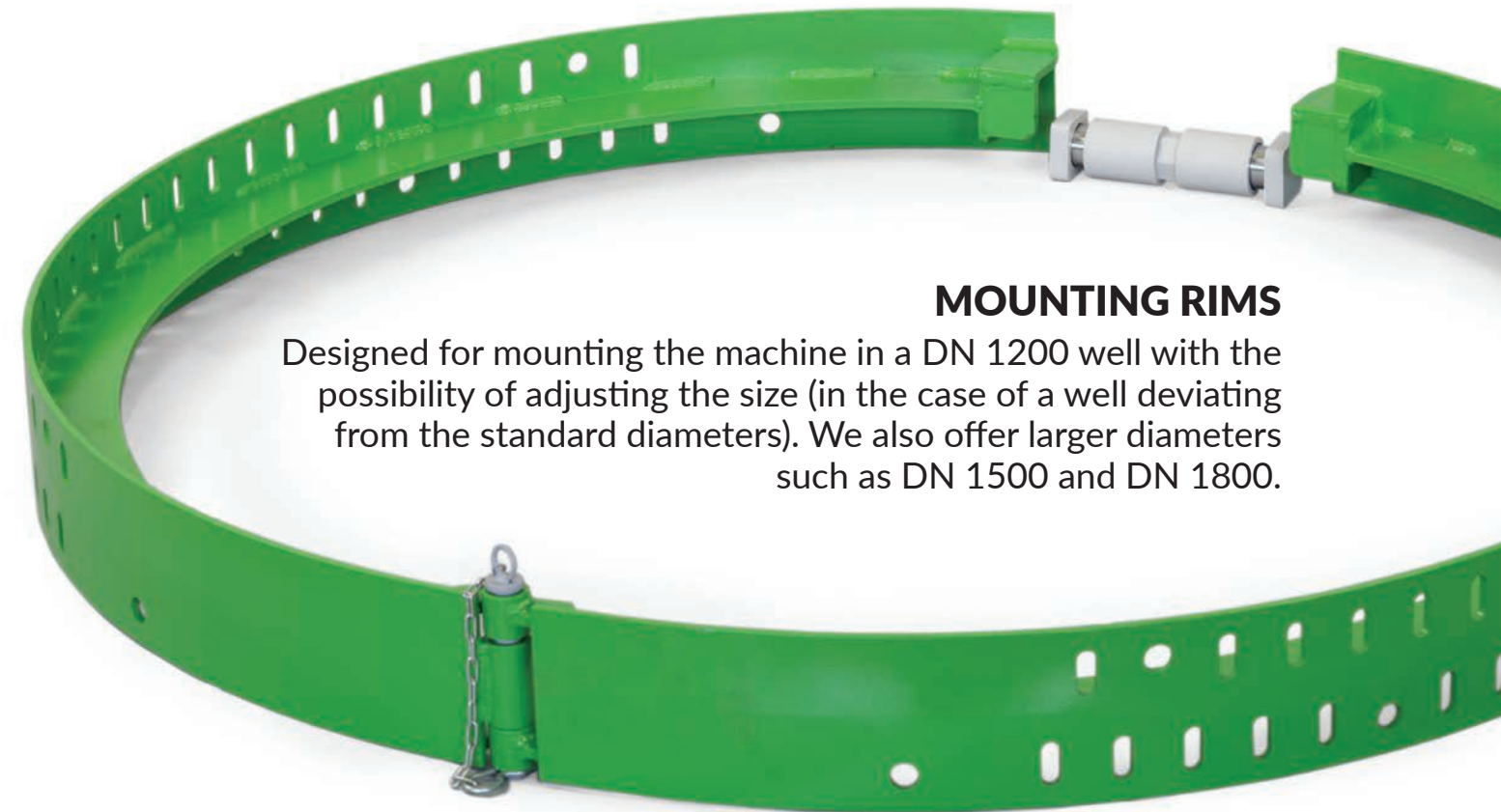
- Max. thrust force: 90 kN
- Max. pullback force: 90 kN
- Stroke length: 670 mm
- Feed speed: 50 mm/s
- Max. torque: 1100 Nm
- Max. rotation speed: 350 rpm
- Max. hydraulic pressure: 250 bar

- Dimensions: 1070 x 330 x 555 mm
- Drilling rig weight: 330 kg
- Starting sewage well diameter: Ø 1200 mm
- Pipe/drilling rod length: 700 mm / 550 mm
- Drilling rod diameter: Ø 76 mm
- Max. pipe diameter: Ø 315 mm
- Max. bore distance: 50 m



DRILLING RIG TRANSPORT STAND

Enables safe transport of the gravitational drilling rig and fastens its elements.



MOUNTING RIMS

Designed for mounting the machine in a DN 1200 well with the possibility of adjusting the size (in the case of a well deviating from the standard diameters). We also offer larger diameters such as DN 1500 and DN 1800.

HYDRAULIC UNIT

Radio controlled, diesel powered with one pump, one regulator and proportionally controlled distributors powering all functions of the drilling rig and the bentonite flush unit.



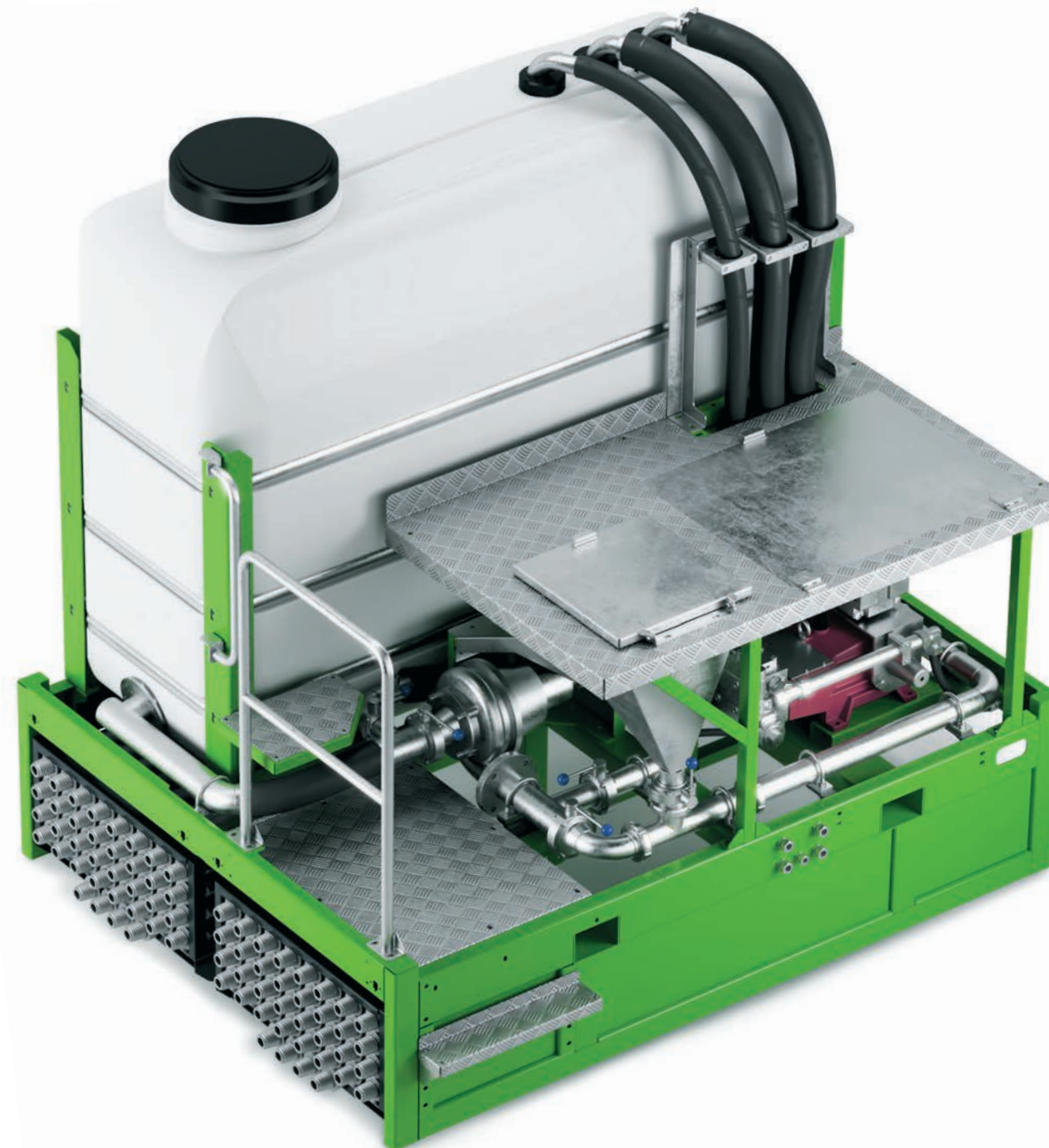
- Deutz diesel engine, liquid cooled, 55.6 kW
- Hydraulic supply parameters: max. pressure of 250 bar, max. flow of 120 l/min
- 250 l oil tank (oil included), 250 l diesel fuel tank, remote control system
- Emergency stop switch operated via a remote control even from the sewage well



REMOTE CONTROL TRANSMITTER

The drilling set is equipped with a waterproof radio remote control unit allowing the control over the entire drilling process.

- Ergonomic design makes it possible to work in difficult conditions.
- The device controls 14 functions.
- The remote control transmitter is paired with the hydraulic power pack.



BENTONITE FLUSH UNIT

Powered by the hydraulic power unit, it features a mixing tank and an integrated unit for flushing the system and a tank for the drilling fluid.

- Tank volume 2000 l
- Jet mixing system
- Drilling fluid max. flow: 160 l/min
- Drilling fluid max. pressure: 80 bar
- Remote controlled



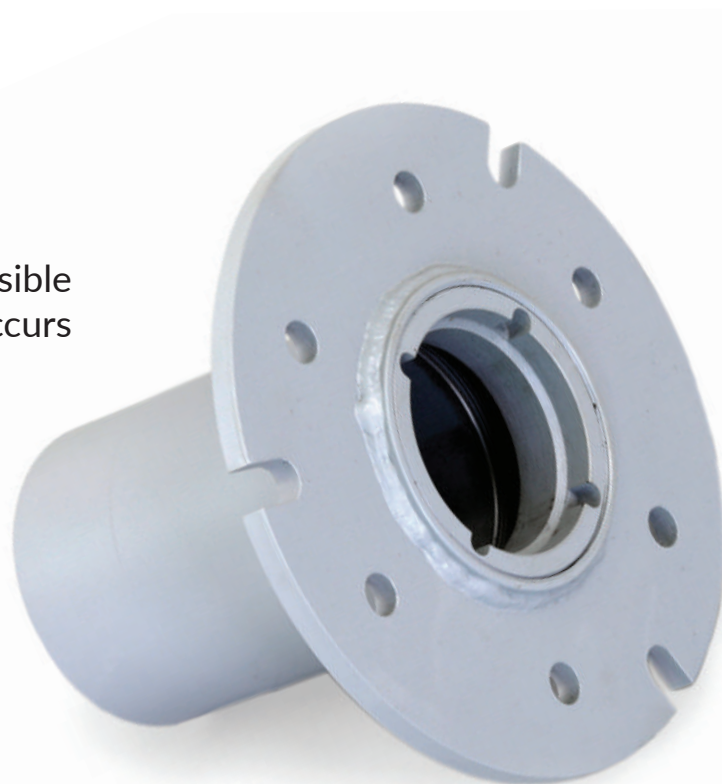
DRILLING RODS (36 pcs.)

- Rod length: 550 mm
- Rod diameter: Ø 73 mm
- Custom rack for 36 rods



SET OF REAMERS

- The set includes reamers for the diameter range of dedicated modular pipes: Ø 180, 225, 280, 315 mm
- Reamers are equipped with a swivel



WATER-SEALING SYSTEM

The water-sealing system makes it possible to drill in places where groundwater occurs and additionally stabilizes the rods.

MAG 8

REMOTE CONTROL AND RADIOLOCATING SYSTEM

Advanced device characterized by manufacturing precision and an interference-resistant 3D Faraday antenna. Ability to work in 10 frequencies and to switch between high and low power. Easy to use interface. Allows a larger distance from the transmitter and descending deeper than ever before. Easy switching between operating modes. Gold-plated electronic modules and a powerful DSP processor ensure reliable operation. 2-in-1 locating system, acting as two independently tracking locators to ensure better accuracy and reliability.

- Frequency range: 10 frequencies, 4 kHz – 31 kHz
- Water Resistance: IP 65
- Temperature range: from -20 °C to 60 °C
- Telemetry: 4 radio channels with range up to 90 m
- Lithium battery pack: 12.5 V
- Battery life: max. 50 h
- Dimensions: 680 x 130 x 300 mm
- Weight: 3 kg



HYDRAULIC JOINING TOOL FOR MODULAR PIPES

A set of dedicated devices makes it easy to join modular pipes. The set includes a hydraulic power pack, a joining tool and a wired control unit. Compressive force of about 45 kN guarantees permanent connection.

- The set of joining tools for modular pipes, matching the range of available pipe diameters
- 12 m long hydraulic hoses
- Wired remote control (12 m)



MODULAR PIPES

Modular pipes are made of polypropylene. They are manufactured by means of extrusion. The locks are made mechanically. NBR rubber sealing rings ensure the tightness of connections. Modular pipes are installed by means of a hydraulic joining tool designed for the specific pipe diameter. The total length of modular pipes (including the connecting ends) is 700 mm. Longer modular pipes

(up to 1000 mm) can be made on customer request. Modular pipes are intended for the construction of non-pressure installations outside of and under building structures. They are used for the construction and renovation of non-pressure pipelines using the traditional method (in an open trench) or the trenchless method of gravitational drilling.

The modular pipes meet the required standards and their quality is confirmed by applicable certificates.

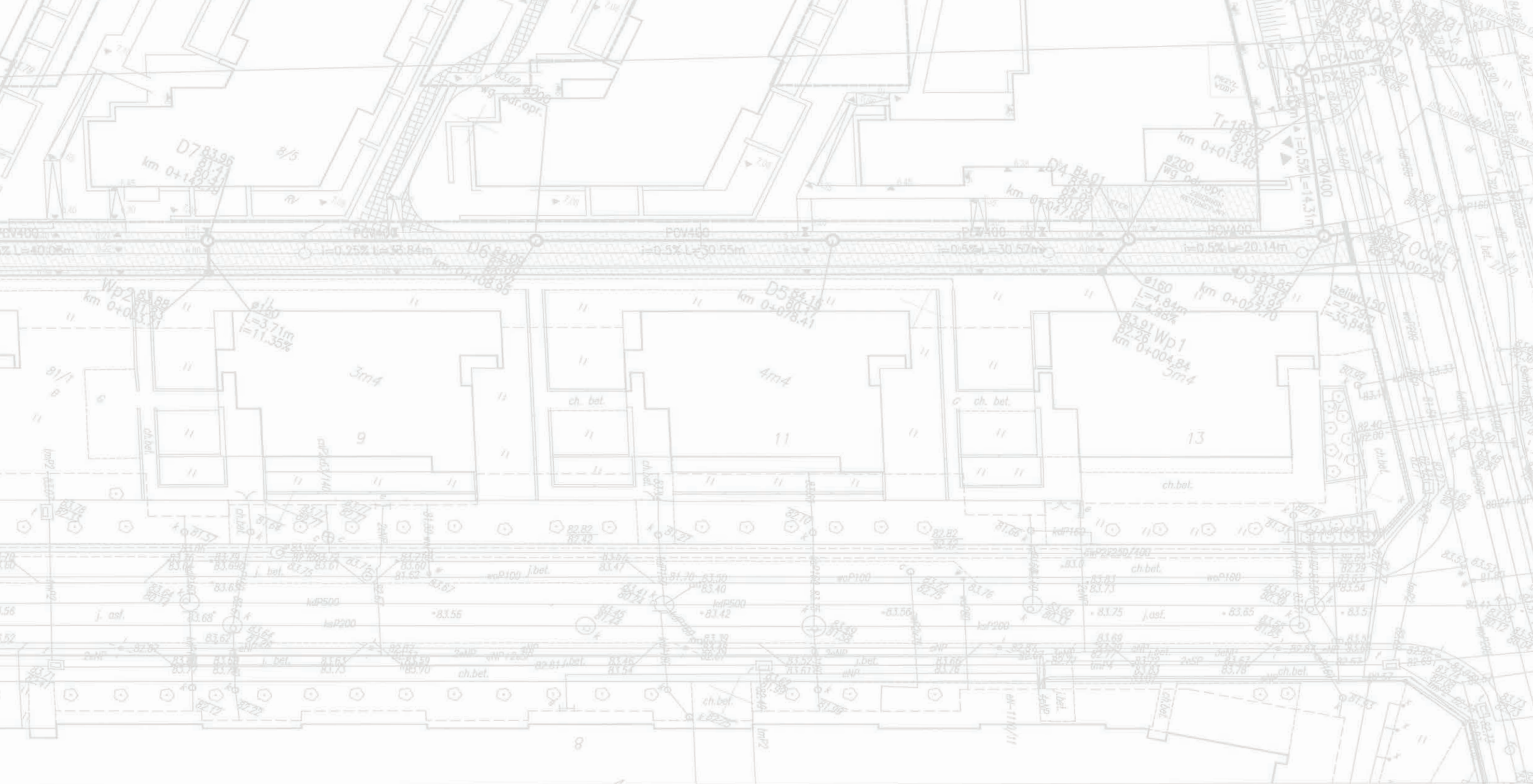
In Poland the product has the National Technical Assessment issued by the Building Research Institute in Warsaw.

Range of diameters of manufactured modular pipes:

- 110 x 10.0 mm
- 180 x 10.2 mm
- 225 x 13.8 mm
- 250 x 14.2 mm
- 280 x 15.9 mm
- 315 x 17.9 mm
- 400 x 22.7 mm
- 500 x 28.3 mm



MAIN CHARACTERISTICS	PERFORMANCE PROPERTIES	ASSESSMENT CRITERIA
measurement tolerances		PN-EN ISO 3126:2006
resistance to external impacts	TIR ≤ 10	PN-EN ISO 3127:2017 examination parameters: PN-EN 1852-1:2018
diametral stiffness (kN/m²)	SN 8 ≥ 8 kN/m² SN 10 ≥ 10 kN/m² SN 12 ≥ 12 kN/m² SN 16 ≥ 16 kN/m² SN 20 ≥ 20 kN/m² SN 32 ≥ 32 kN/m²	PN-EN ISO 9969:2016
longitudinal contraction (%)	≤ 2 no damage such as blistering, delamination or cracks	PN-EN ISO 2505:2006 examination parameters: PN-EN 1852-1:2018
mass flow rate index MFR (230°/2.16kg), g/10 min	maximum MFR change as a result of processing raw material +/- 20%	PN-EN ISO 1133-1:2011
tightness of connections with elastomeric sealing ring	≤ 2 no leakage air pressure ≤ 0.27 bar	PN-EN ISO 13259:2018 examination parameters: PN-EN 1852-1:2018



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