



HOBAS Pipe USA

Non-Circular Profiles



Production of **HOBAS** NC

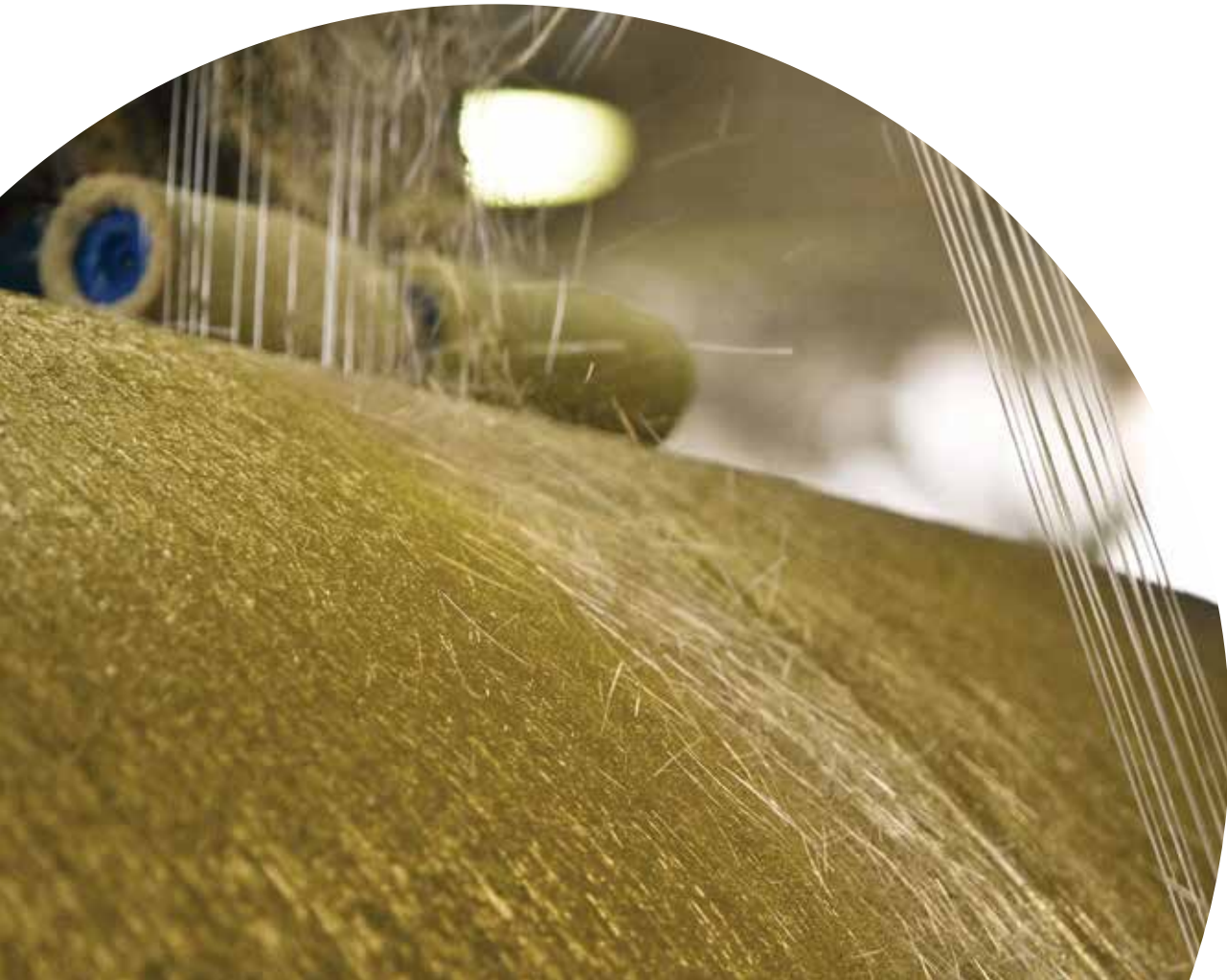
Years of Experience

Many US cities started building modern sewer systems in the late the 19th century. Still in service today, the large sewers with specially shaped cross sections are the result of great feats of engineering and the foresight shown by the city fathers at that time. After such long periods in use, however, rehabilitation often becomes inevitable despite regular maintenance. HOBAS NC profiles, with their non-circular cross sections, are ideal for rehabilitating these old sewers or building new ones. HOBAS can also provide manhole renovation solutions and reline older pipes..

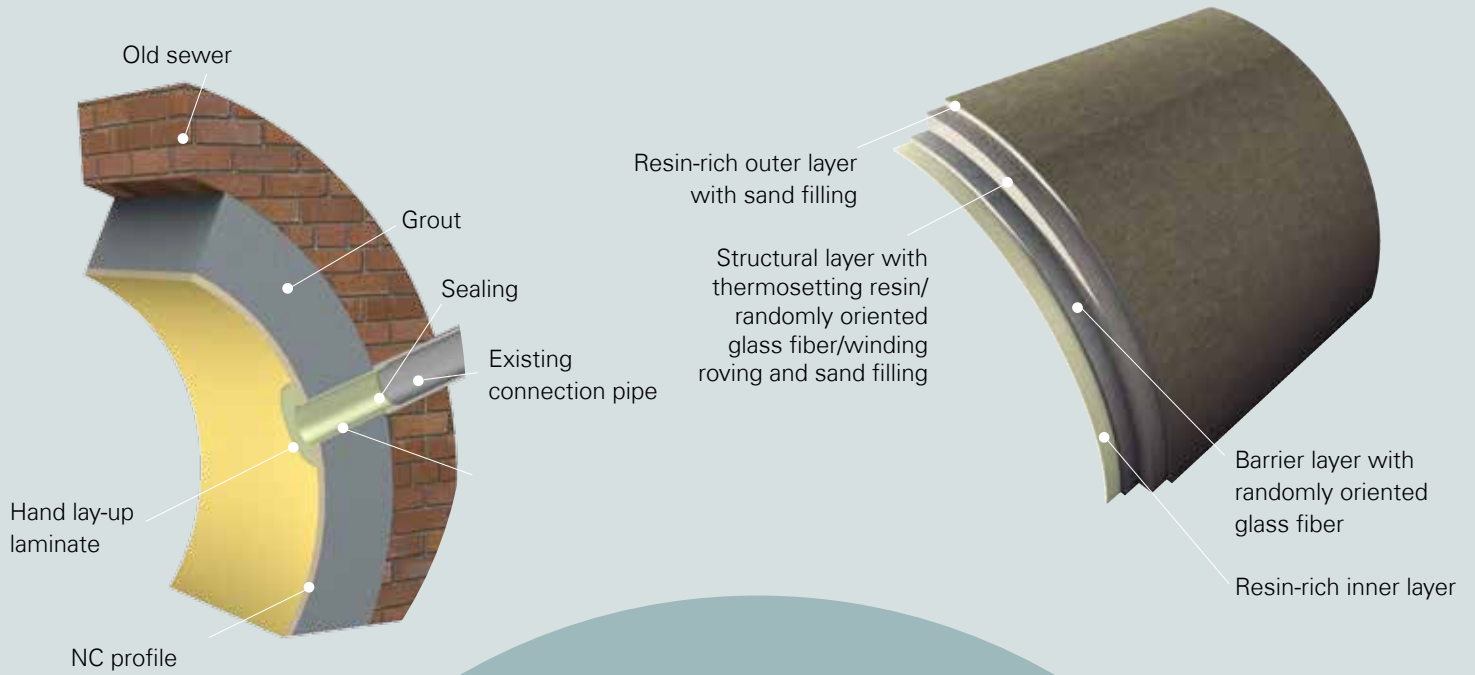
Manufacture

HOBAS NC pipes feature a particularly resin-rich inner layer. Pipes are designed for specific loads and project requirements, while also taking structural dimensions, customer specifications and regulations regarding chemical resistance into account.

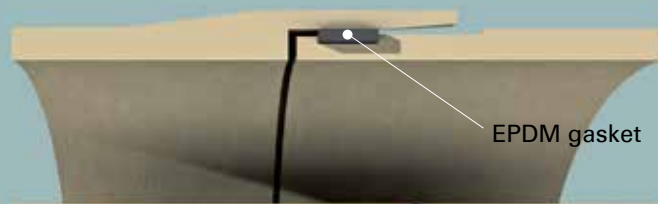
During installation, the pipes are pushed or pulled into the existing pipeline and the remaining annular space between the host and liner pipes is filled with grout. This fixes the inserted pipe in position, creating a pipeline of the very same integrity as a new one.



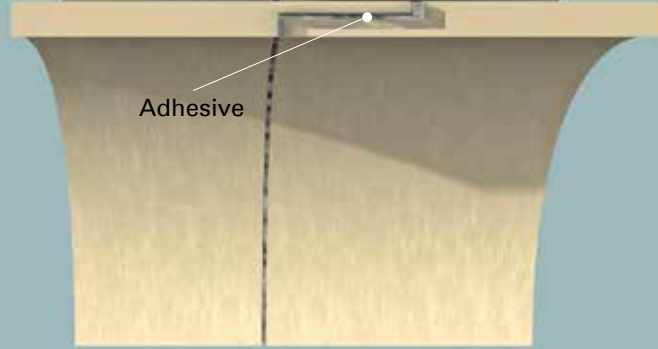
Joints and Couplings



Type I kit:
Standard joint with EPDM gasket



Type II kit:
Adhesive joint for special applications





Kite-shaped cross section



Egg-shaped cross section



Elongated egg-shaped cross section



Jaw-shaped cross section



Jaw-shaped cross section with dry weather channel

HOBAS NC Profiles

The range of available HOBAS NC cross sections is just as varied as the history of wastewater disposal itself.

In addition to classic cross sections, such as circular, egg, jaw, or kite-shaped pipes, we manufacture additional combinations of shapes to customer request. Having perfected the necessary manufacturing technologies, HOBAS is regarded as a specialist for solving complex rehabilitation problems.

Our product range also features shafts and manholes. HOBAS can supply customers with a complete system including pipes with special cross sections, lateral connections and manholes.



HOBAS NC Applications

HOBAS NC profiles help you overcome a wide range of challenges in rehabilitation. The material properties and cross-sectional shape are determined for each specific application. Particularly when other materials have reached the end of their life cycles or failed prematurely, our pipe sections are a long-lasting option.

NC products are ideal for conveying

- Municipal sewage
- Industrial wastewater
- Raw water
- Chemically aggressive wastewater

The special material properties, shapes and jointing options result in the following advantages:

- Good hydraulic performance under various loads
- Flexibility in difficult installation situations
- Self-cleaning properties when flow is low
- Low maintenance costs
- Connection options to various materials
- High static load capacity
- Short installation times
- Long service life



Optimal Service and Top Quality Standards

Reliable Service

HOBAS attaches great importance to service. Our experts will support you to ensure that your project runs smoothly – from initial planning right through to completion. HOBAS is committed to providing customers with a broad range of products and professional support.

This includes:

- Technical advice for planning, installation, and rehabilitation
- Feasibility studies
- Static calculations
- Design and drawings for manholes and special constructions
- Training and support for contractors
- Installation services
- Technical documentation and information
- On-site support during construction work by HOBAS technicians

Top Quality

HOBAS plants are certified by independent institutes to various international standards, making sure that each finished product meets the most stringent customer specifications.

Our comprehensive quality control program not only meets international standards but also takes special customer specifications into consideration. Auditors from recognized certification bodies keep a permanent check on us, carrying out tests and inspections. Our internal HOBAS Quality Control Program also includes the following quality assurance measures:

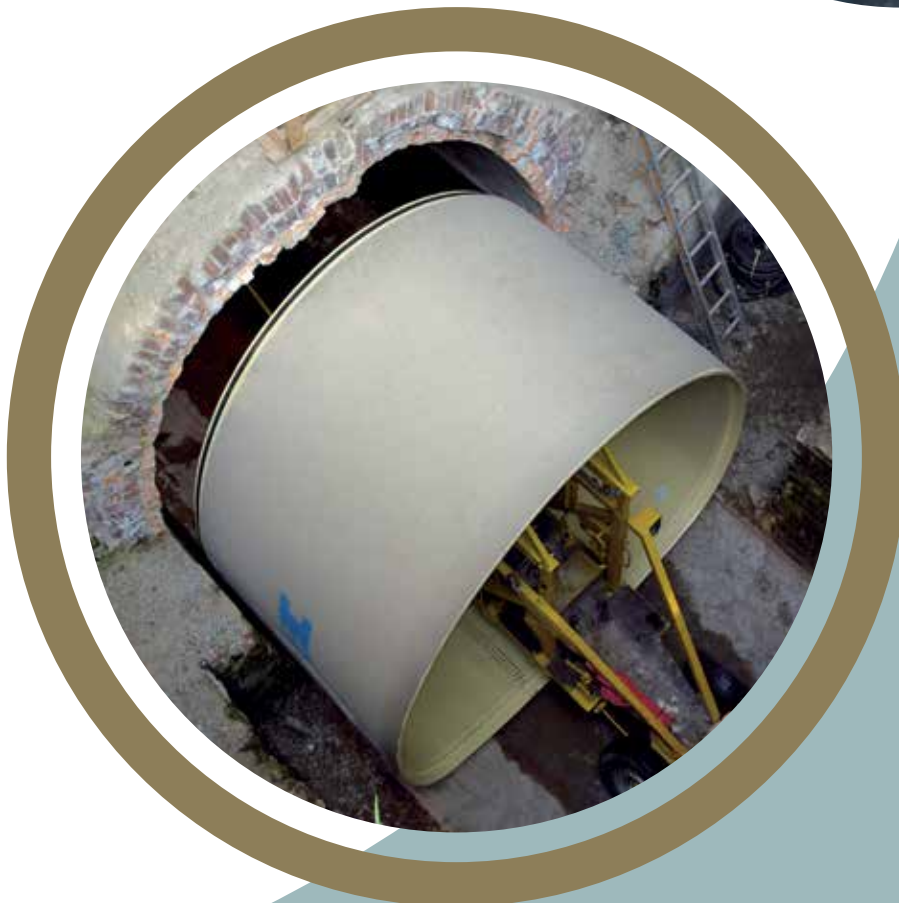
- Testing raw materials
- Technical release for production
- Strength tests on finished products
- Visual and dimensional inspection of finished products
- Calibration of instruments
- Ensuring the identification and traceability of the products



HOBAS NC: Impressive Benefits

HOBAS NC Products Feature:

- Full static load capacity
- Variable pipe lengths (to customer specifications)
- Customized cross-section shape
- Option of various jointing systems
- High hydraulic capacity
- High corrosion resistance
- Tested abrasion resistance
- Easy handling
- Installation without significant traffic disruptions
- Installation irrespective of weather conditions
- Compatible with all HOBAS product lines
- Little incrustation and sludge deposits
- Minimized trench width that is easier for working in confined spaces (e.g. city centers)
- Environmental benefits
- Prevention of drops in groundwater level
- Very long service life



Unnoticed Under Historic Dresden

HOBAS NC Profiles Rehabilitate Sewer, DE

At the beginning of the 20th century Dresden's sewer system was already 267 miles long. An essential part of the sewer system with connection to the wastewater treatment plant Kaditz is the "Altstädter" collector, which underpasses a big part of Dresden's historic center.

One of the interceptors was made of tamped concrete. Inspections revealed damage, meaning that the load capacity could no longer be guaranteed: the sewers urgently needed to be repaired. Over half a mile in length, the section to be rehabilitated ran through the old town and along the banks of the Elbe. As an attractive destination, Dresden draws some seven million visitors every year. In view of this situation, the only option was trenchless rehabilitation by relining. Compared with open-cut installation, construction time would be reduced and disruptions to traffic and tourism kept to a minimum.

Dresden's utility company weighed the various alternatives but decided in favor of HOBAS NC profiles made of GRP. The first step was to assess the condition of the existing pipes by inspecting the old sewer, calibrating it by laser scan and manually with a template to determine the exact outside dimensions for the individual NC profiles. Our aim was to make best possible use of the old sewer while ensuring easy installation at the same time. What we came up with was an installation plan with regular, short and special pipe sections with bevel joints. In areas with particularly pronounced angular deflection the prefabricated curved parts were joined using GRP hand lay-up. The prefabricated HOBAS profiles could be produced with any wall thicknesses required, thus compensating for any structural imperfections in the old sewer.

Opting for two construction stages, we installed a total of 1,706 ft. of HOBAS NC with an inner cross-section of 84 X 83 in. and 1,050 ft. with 88 x 86 in. Thanks to the smooth inner surface of the HOBAS pipe with a k value of ≤ 0.01 mm, the hydraulic requirements were still met despite the reduction in diameter. After completion, the interceptor was totally rehabilitated and will reliably operate for at least 50 years even in the event of flooding.

Year of Construction

2009

Total Length of Pipeline

2887 ft.

Diameter

84/83 in.

88/86 in.

Installation Method

Relining with short profiles

Client

Stadtentwässerung

Dresden GmbH

Advantages

Pipe cross-sections

designed to fit the old sewer, no disruption of tourism/traffic, reliable deliveries



No Dig Award for Relining with **HOBAS** NC

HOBAS NC Replaces Sewer System in Tilburg, NL

The sewer in Sint Josephstraat was built in 1928 and has the shape of an upside-down egg 74 in. wide and 84 in. high. In the late 1990s, work on the road above put a considerable strain on the concrete sewer base with brick arch. Inspections with radar systems revealed that cavities had formed around the base because cracks in the sewer had caused sand to be washed out. Injecting resin into the cracks did not prove successful, so rehabilitation was inevitable.

Analyses showed that the sewer's masonry was actually intact, but the concrete sewer base had suffered greatly in recent years. Attempts at repairing the base failed because the structural damage could not be rectified. In order to guarantee structural safety, the only answer was to rehabilitate the old sewer or install a new one. A total replacement would have involved extensive construction work in open trenches and would have been very expensive, so relining was the only feasible option. What was important to the local authorities was to reduce the diameter as little as possible (maximally 4 in.). Angular deformation on the horizontal plane along the route of the pipeline where rehabilitation was required also had to be taken into account.

The Tilburg city council opted for HOBAS NC to reline the pipeline. Reasons were the high standards of HOBAS pipes; the company's experience regarding installation; the tested, consistent material quality; high stiffness; and adaptability, enabling only a slight reduction in diameter. In addition, the sewer can remain in service during installation even if there is heavy rainfall. The tender also specified various fittings, which HOBAS customized for the project.

After calculating the wall thickness of the pipe segments to be 1 in., the client designed a special transport cart for installing the pipeline. During the construction work the wastewater was diverted. In the event of heavy rainfall, the existing sewer could be evacuated within 15 minutes and then be used. The pipes were fixed in place to prevent them from floating and the annulus between the new and existing pipeline was filled with grouting.

A panel of experts selected the project for the NSTT (Netherlands Society for Trenchless Technology) No Dig Award in 2009 and the client was more than satisfied – the decision to use HOBAS NC again for the next rehabilitation section is perfect proof.

Year of Construction
2008

Construction Time
5 months

Total Length of Pipeline
2,822 ft.

Diameter
84/74 in.

Installation Method
Relining

Client
Community Tilburg

Contractor
Heijmans Infra techniek BV

Advantages
Custom pipes, leak tightness of the system, high quality, only slight diameter reduction





The Best Solution for Basel-Stadt

HOBAS NC System for Relief Sewer, CH

After 70 years of service, the approximately half-mile-long egg-profile concrete relief sewer in the Swiss canton Basel-Stadt Switzerland could no longer be maintained. Due to the remaining load-bearing capacity of the old structure and the varying geologic conditions, three renovation options were considered: re-profiling mortar, GRP lining and an inside shell of self-compacting concrete (SCC). After weighing all aspects, the evaluation spoke clearly in favor of relining with HOBAS NC.

As the only solution that could reliably reinforce the old and porous sewer structure in the future, the GRP lining with HOBAS NC was the best option in terms of structural safety. The significantly lower roughness coefficient of the inner pipe layer and relatively thin wall thickness of one inch of the HOBAS NC profiles provided the highest stability and sturdiness, as well as the greatest discharge capacity compared to the alternatives. The prefabricated 51 x 73 in. NC profiles were designed to match the original channel's form and comprise a dry weather channel as well as a lateral walkway with a safety tread for inspections.

Three access shafts were prepared to slipline the HOBAS NC pipes which were delivered in 1.6-, 3- and 7-ft.-lengths to optimally adapt to the pipeline route. The easy handling of the profiles was particularly important regarding the restricted accessibility to the channel and depth of the route. Just-in-time deliveries and a fast installation reduced impacts on the environment, traffic impairments and disturbance of the inhabitants. Despite the necessary drainage of the old structure during construction and preparation of shafts, the estimated installation period for sliplining HOBAS NC was the shortest of all compared solutions.

Thanks to the products' longevity of a minimum of 50 years and minimal cleaning efforts due to the smooth finish of the internal pipe walls, HOBAS also clearly scored in respect to low maintenance costs. And unlike other proposed materials, costs will not increase with the line's age.

Year of Construction

2011 - 2012

Total Length of Pipeline

3,280 ft.

Product Range

1.6-, 3- and 7-ft.-long sections with dry weather channel and walkway

Diameter

51 x 73 in., wall thickness 1 in.

Installation Method

Relining

Client

Tiefbauamt Stadtentwässerung Basel-Stadt
Contractor

Insituform Rohrsanierungstechniken GmbH

Advantages

Highest structural safety, long product life, low maintenance costs, fast installation for less impacts



HOBAS NC Conquers North America

Replacement of Stormwater Pipeline in Québec, Canada

When the old stormwater sewer crossing a highway and a highly frequented shopping avenue in the city of Québec partly collapsed and had to be replaced, the city government was presented with quite a challenge: a way had to be found to renovate the pipeline while keeping traffic interruptions to an absolute minimum. The single best way to cope with this issue was trenchless installation. Moreover, the new pipeline needed to be durable and low-maintenance in order to prevent further work in this sensitive area.

The name of the solution that made the grade was HOBAS – the only pipe supplier in Québec able to provide a custom-tailored product with the required properties and an arch cross-section available in various lengths. HOBAS was awarded the contract and 720 ft. NC profiles with a cross-section of 61 x 31 in. were sent from Germany to Eastern Canada. With minimal excavations and no traffic disruptions, the old corrugated steel sewer was successfully replaced with GRP within five weeks.

The client is very satisfied with his choice and especially the project's good environmental balance, which also received an official hearing: The Québec association for road building and heavy construction (ACRGTO) awarded the rehabilitation job Best Environmental Project of 2013. The way is now paved for further HOBAS projects on North American soil.



Year of Construction

2013

Diameter

61/31 in.

Stiffness Class

SN 72

Application

**Rehabilitation of
storm water sewer**

Client

City of Québec

Designer

SNC Lavalin

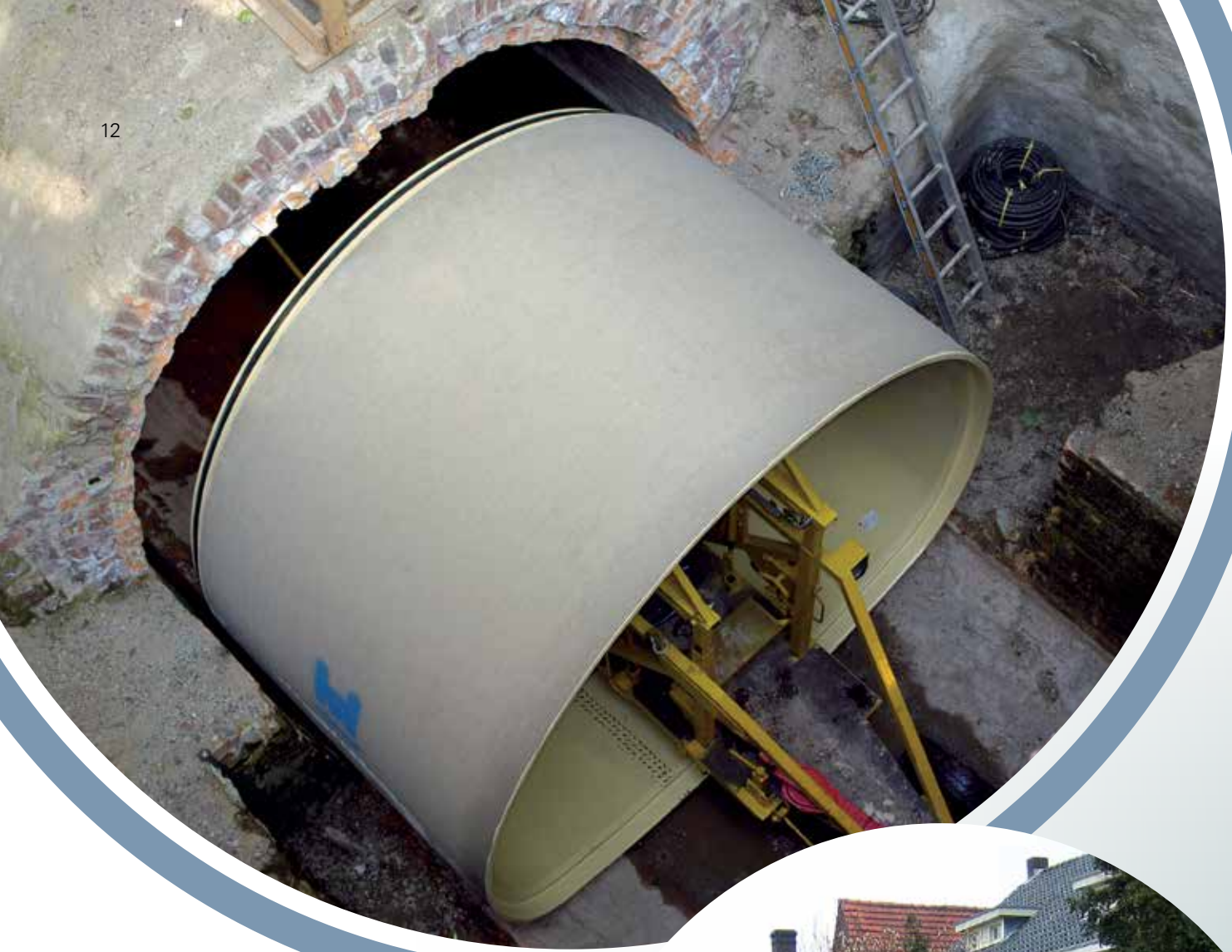
Contractors

**Excavation Lafontaine,
2C2T**

Advantages

**Corrosion resistance, high
static load capacity, long life-
time of more than 50 years**





HOBAS NC is a licensed technology of
Amiblu manufactured by HOBAS Pipe USA