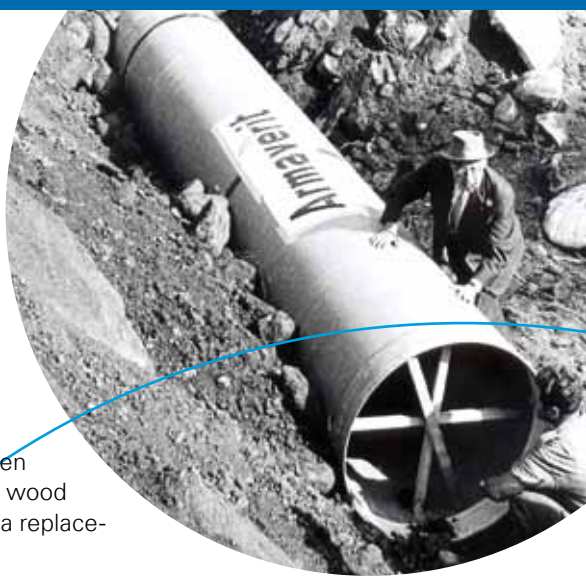
PipeLine

Special Edition
Quality for Generations

HOBAS®

Contents

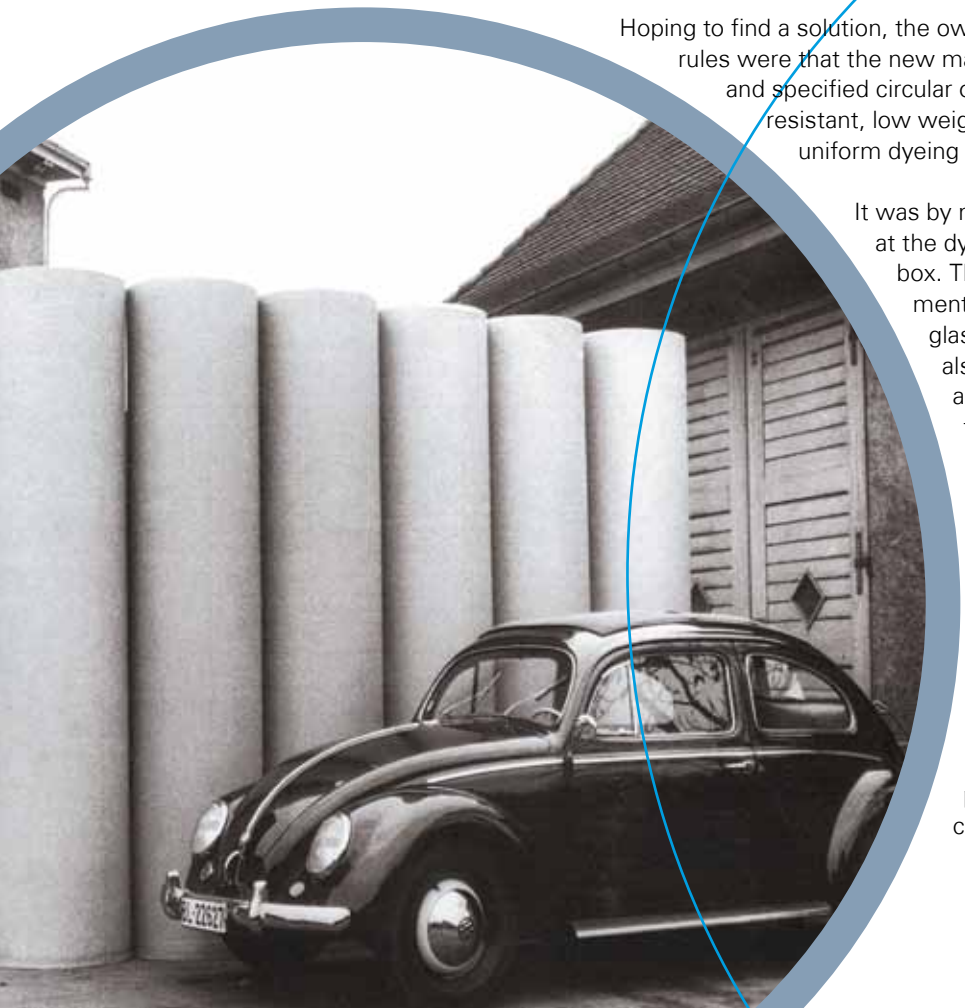


From Dye Works to Switzerland's First Hydropower Pipeline in 1961

HOBAS®: a Success Story

Innovations that occur by chance are often the most successful. Such was definitely the case in Switzerland in the 1950s.

At that time, the Basle dye works were looking for an alternative to the wooden cylinders used for winding round the fabric during the dyeing process. As the wood splintered and became discolored, it damaged the expensive textiles making a replacement urgently needed.



Hoping to find a solution, the owners staged an in-house ideas competition. The rules were that the new material had to allow cylinders of a certain length and specified circular outside diameter to be made, it had to be corrosion resistant, low weight and have a smooth surface in order to ensure uniform dyeing results and also had to be cost effective.

It was by no means an easy undertaking, but the employees at the dye works proved that they could think outside the box. The mechanical engineers in the plastics department built a centrifuge and produced a roller made of glass fiber and polyester resin. Although these materials had previously only been used in the automotive, aircraft and shipbuilding industries, their resistance to corrosion and chemicals also made them ideal for other applications. The innovative centrifugal casting process enabled them to meet the specifications for the outside diameter, as the inside diameter of the casting mold was determined in advance - the new roller for dyeing textiles was found.

Just for dyeing fabrics?

The Swiss, renowned worldwide for their vision and inventiveness, soon discovered that not only the outer surface of the rollers had special properties but also the inner layer displayed unique characteristics.

Year of Construction
1961
Total Length of Pipeline
> 3 km
Diameter
DN 1000
Pipe Specifics
Pressure pipeline, wall thickness 7 mm
Installation Method
Open cut

Application
HydropowerLine®
Client
Gommerkraftwerke AG
Advantages
Low weight, easy installation, relatively thin wall, long service life, outstanding hydraulic properties

One thing led to another and the first centrifugally cast pipe made of glassfiber-reinforced plastic (GRP) was produced in 1957. The Swiss initially manufactured rollers for their own use at the dye works and patented the production process shortly after.

It was not long before the first external application in the form of pipes followed in 1961. In the Binn Valley in the Swiss canton of Valais, Gommerkraftwerke AG was seeking a suitable material for a pressure pipeline to their hydropower plant. When they heard about the excellent features and low weight of the centrifugally cast GRP pipes bearing the company name at that time, ARMAVERIT, it was soon clear what material they wanted for the three-kilometer-long, very steep sloping DN 1000 pipeline. The pipes were green inside and joined with bell sleeves.

Today plant director Bernhard Truffer is still highly satisfied with the HOBAS Products, "especially when you take into consideration the very low wall thickness of 7 mm for a diameter of 1000 mm. What's more, the pipes neither had ideal bedding nor were they installed or grounded properly", adds Truffer extremely pleased with the experience that the company has had with the pipes over the past 50 years. And HOBAS can justifiably be proud of producing quality for generations.
HOBAS. Make things happen.

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Above and Below Ground - Anything Possible with HOBAS® Pipes Even in 1981

In Use at a Paper Pulp Factory for Thirty Years, CZ

At the beginning of the 1980s, HOBAS Pipes were installed in the Czech Republic for conveying industrial wastewater and have enjoyed a great track record ever since.

Biocel Paskov a.s., the paper pulp factory, is located in Paskov in the northeast of the Czech Republic and now belongs to the HEINZEL Group. Pulp has been produced in the small town for over a hundred years.

From 1981 through 1984, pipes were installed in several stages for disposing of the effluent and conveying it to the wastewater treatment plant. A total of 14 km of HOBAS Pipes were used here and installed by open trench construction as well as above ground. Particularly interesting is the part of the line laid above ground. Its route includes a pipeline bridge over the River Ostravice and takes the industrial wastewater to the company's treatment plant and a reservoir.

Biocel Paskov's operators are still delighted with the outstanding quality of the HOBAS Products and in a testimonial underscored the highly competent technical advice they received from the HOBAS Experts. The pipeline speaks for itself - it has now been in operation without any technical problems for three decades.

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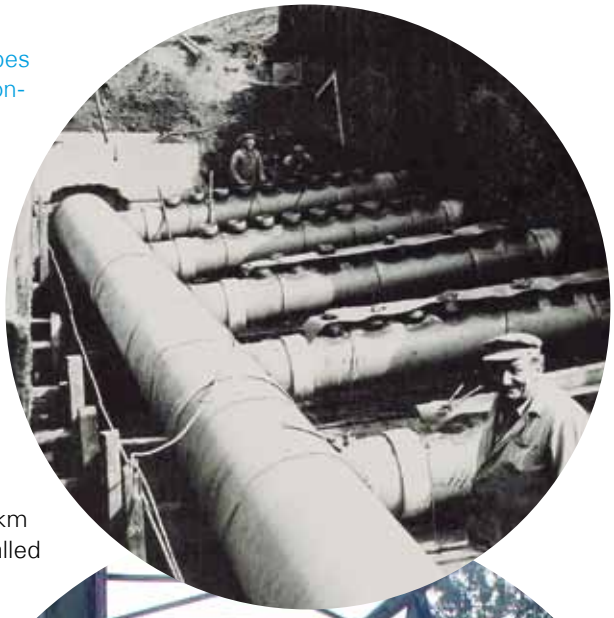

Left:
HOBAS Pipes during installation at the beginning of the 1980s

Below:
Today, the 30-year-old pipeline still conveys the wastewater safely over the River Ostravice

Year of Construction
1981 - 1984
Total Length of Pipeline
14 km
Installation Method
Open cut, aboveground installation also on a pipeline bridge
Application
SewerLine® (Industrial wastewater)
Client
Biocel Paskov a.s. (now part of the HEINZEL Group)
Advantages
Simple construction, long service life, installation possible above and below ground, excellent technical advice, outstanding quality

Anti-Aging HOBAS® Pipes Produced in 1987

Pipeline Withstands Highly Abrasive Glacial Sediment, AT

The Wald hydropower plant enjoys a picturesque setting at the edge of the Hohe Tauern National Park and takes advantage of the considerable difference in elevation between the villages of Krimml and Wald. Built by Salzburg AG in the 1980s, it has been in operation since fall 1988 to meet the rising energy demand in the surrounding area.

Top priority when planning this project were environmental protection and nature conservation. As the national park is such a sensitive area, extreme care was also taken both during construction of the power station and installation of the pipeline to comply with the stringent legislation. The powerhouse is situated in Wald, while the water intake was built around 200 meters higher up in the village of Krimml not far from the famous waterfalls. A daily storage reservoir with a capacity of 65,000 cubic meters and a dam body were integrated in the existing terrain, landscaped and planted. The water intake is an inconspicuous structure and has a very well designed fish ladder that looks virtually like a natural creek. Strict regulations were observed during installation of the HOBAS Pipeline to prevent flora and fauna from being disturbed.

Like most parts of the hydropower pipeline, the penstock between the daily storage reservoir and headrace tunnel was buried. A DN 2200, PN 4-6 pressure pipeline measuring 840 meters in length constituted the first part of the penstock. It is encased in concrete in the area of the storage dam and the Krimmler Ache river crossing.

After 18 years in operation, the sand flushing pipeline in the hydropower plant consisting of DN 2200, PN 1 HOBAS Pipes underwent inspection by the owner and HOBAS Experts in March 2006. The engineers were delighted to find that even after having been in service for nearly two decades, the pipeline showed hardly any signs of wear. Despite the highly abrasive medium – water with sand and glacial sediment – the inner pure resin layer that is also responsible for the unique hydraulic properties of HOBAS Pipes was neither pitted nor worn away and also in the invert area of the pipes the liner was completely intact.

Just how aggressive glacial sediment is on most materials can be seen from the fact that the power plant's turbine had to be replaced several times over the same period – the HOBAS Pipeline however shone like new against the light. Even the original installation numbering on the pipes was largely still visible and only slight signs of mechanical abrasion could be detected on the markings.

The management at Salzburg AG has every reason to be more than happy with this project and many following generations can rely on the quality of HOBAS Pipes.

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Year of Construction
1987 - 1988
Total Length of Pipeline
1,143 m
Diameter
DN 1200 - DN 2200
Pressure Class
PN 1 - PN 8.5
Stiffness Class
SN 2500 - SN 10000
Installation Method
Open cut installation, encased in concrete in the dam and stream area, freely installed in the tunnel

Application
HydropowerLine®
Client
Salzburg AG
Contractor
ARGE Polensky & Zöller
Advantages
Abrasion and corrosion resistance, long service life, quick and easy installation, low weight, excellent hydraulic properties

Green Electricity as Early as the 1980s
Clean Power with **HOBAS®** Pipes, AT

The hydropower plant pipelines in Rauris and Mariensee in Austria have also earned top marks. Following several decades in operation, their test results are even better than predicted, making Mother Nature happy to embrace HOBAS Pipes.

No less than 175,200 hours or 7,300 days or 20 years: that is how long a DN 500, PN 36, SN 10000 HOBAS Pressure Pipeline produced in Austria in **1983** was in use at a hydropower plant **in Rauris, Austria**, before HOBAS Experts subjected a pipe sample to tests at the laboratory. They then compared the actual results with the assumed long-term regression curve: both stiffness and failure pressure were substantially higher than that required by the standard, testifying to the excellent properties of HOBAS Pipes.

"I would use HOBAS Pipes again," says hydropower plant operator Stefan Schenker reassuringly and totally satisfied with the DN 800, PN 1, SN 5000 HOBAS HydropowerLine® Pipes that were laid in **Mariensee in Lower Austria in 1982**. In particular the products' low weight was a great advantage during aboveground installation in the steep, very rough terrain. After six weeks, the 570 meter section was completed. Some 30 years later, the moss-covered pipes have become a harmonious part of the landscape – Mother Nature loves HOBAS too...

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Top:
HOBAS Austria over three decades ago

Left:
Moss-covered pipes – nature embraces HOBAS

Crystal Clear From the Faucet Since 1992
HOBAS® Ensures Reliable Potable Water Supply, PL

In Poland, a pipeline has been supplying potable water safely and reliably to people in Wrocław for around 20 years.

A new potable water line consisting of DN 300 HOBAS WaterLine® Pipes was laid in Wrocław in Poland in 1992. The PN 16 class pressure pipes have a stiffness of SN 10000 and have been conveying potable water safely and reliably to the population since then. After about twenty years, the original pipeline was altered and HOBAS received pipe segments for long-term testing. Even the HOBAS Experts were impressed to find that the potable water pipes did much better than expected in all the tests. The mechanical properties in particular by far exceeded the levels required by the standard, as you can see from the graph on the right.

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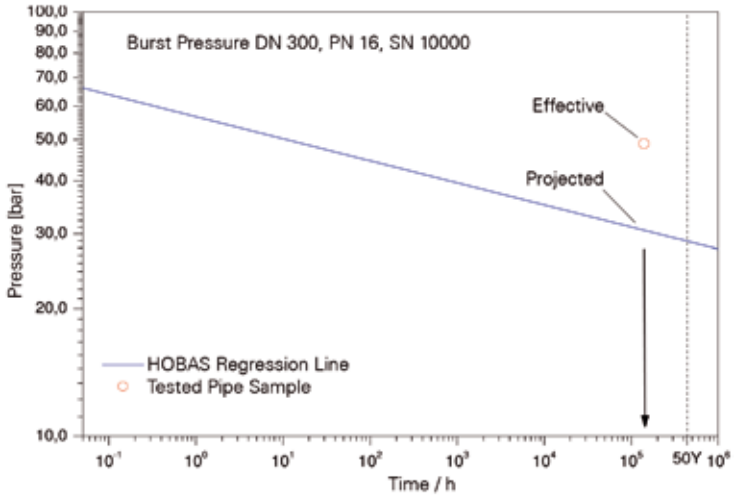

Thorough Testing Since 1987

Texas Has Been Able to Rely on **HOBAS®** Pipes for over 20 Years, US

When our quality management teams get to test pipes that have been in service for several decades, their eyes light up. And they have every right to be proud that the test results are always much better than predicted or required by the applicable standards.

HOBAS has had a plant in the United States since 1987. One of the first projects was a pipeline near Odessa in western Texas. It required DN 450, PN 10, SN 5000 HOBAS GRP Pipes to take brackish water to the nearby oil fields for use in processing. The six-meter-long pipes totaled 44 km in length and were joined with HOBAS FWC Couplings. After installation, the pipeline was successfully tested at 12 bar and went into operation in 1987. It then remained in place with the pressure maintained at 5 to 7 bar.

Years and years went by uneventfully until the pipeline owner contacted the HOBAS Experts in June 2009. The group operating Centurion Pipeline L.P., a subsidiary of Occidental Petroleum Corporation, approached HOBAS, as an adjacent third-party pipeline had burst, damaging parts of the HOBAS Pipeline and they urgently needed replacement pipes. Responding quickly, the HOBAS Plant manufactured and supplied 24 meters of DN 450 HOBAS Pipes within a short space of time.

The pipes damaged by the burst adjacent pipeline were taken to the HOBAS Laboratory where they underwent close scrutiny. „We took a look at the records we keep for all products we make and found that the pipes used were among the first to be centrifugally cast in the United States in November 1987", explains Pepe Rodriguez, quality control supervisor at HOBAS Pipe USA. Being able to test pipe segments after use is a very rare occurrence because they usually remain in service over their entire useful lives.

Year of Construction
1987
Total Length of Pipeline
44 km
Diameter
DN 450
Pressure Class
PN 10 - 12
Stiffness Class
SN 5000
Installation Method
Open cut
Application
Brackish water supply
Client
West Texas Water Supply System
Contractor
Key Enterprises
Advantages
Quick installation, long service life, corrosion resistance

Top:
Pepe Rodriguez with the old and new HOBAS Pipes

After 21-and-a-half years, the pipes used for the brine pipeline were tested to check their mechanical properties. A range of procedures to ASTM standards revealed that the products performed better in all tests than the original project specifications had required.

„When they were planning the pipeline, they selected HOBAS Products made of glassfiber-reinforced plastic because they are extremely corrosion resistant," says Rick Turkopp of HOBAS Pipe USA looking back. „The brackish water is normally at a temperature of 32 to 35 degrees Celsius and contains hydrogen sulfide. This corrosive mixture limits the service life of other materials to a maximum of 15 years." The tests on the HOBAS Pipeline however confirmed that the products designed for 50 years and more actually last that long.

It therefore comes as no surprise that the pipeline operators are exceedingly pleased with the HOBAS Products. In use since installation, there have never been any problems. Since 1987, HOBAS Pipes have been ensuring that the brackish water is reliably conveyed and will continue to do so for many years to come.

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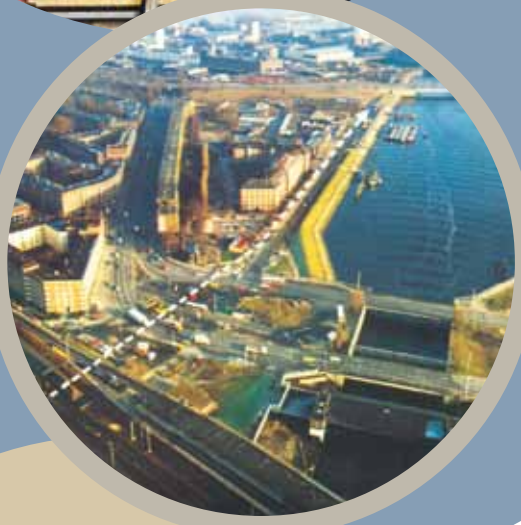
Below:
The old pipes undergo strict testing and deliver impressive results

Premiere in Hamburg in 1982

The First Large-Scale and Technically Demanding GRP Jacking Project in the World, DE



HOBAS made its debut with Centrifugally Cast GRP Jacking Pipes in 1982. Before then, the pipes had only been used on some test construction sites in northern Germany for pushes of up to 50 meters. The world's first large and technically highly demanding jacking project with GRP products was undertaken at Hamburg's customs port.

A sewer was to be installed under a very busy part of the port in the north of Germany. The specifications were challenging: a fire service exit, port railway and federal railway lines were not to be disrupted under any circumstances and settling had to be prevented over the entire length of the pipeline. Given the fact that trenchless construction saves space and is highly accurate, jacking was truly predestined for this application. The HOBAS Products' corrosion resistance also to aggressive wastewater, their smooth outer surface and easy handling persuaded the clients and they ordered jacking pipes with an outside diameter of 752 mm and wall thickness of 50 mm. The pipes were installed six meters under the groundwater table in two drives over a length of 165 meters without any intermediate jacking stations.

Although their outer surface is very smooth, the HOBAS Pipes were lubricated with bentonite every 30 meters to reduce friction and speed up the jacking work. It is hardly surprising therefore that the greatest jacking force used was only 1700 kN, which is far less than the limit for the pipes. What is also remarkable is the great precision with which the HOBAS Pipes were jacked through the silt and clay soil under the groundwater table at that time: the pipeline only deviated 15 mm from the planned route over a length of more than 100 meters, thus remaining well below the specified tolerance.

The facts sounded spectacular then but are now exceeded many times over. In 2009, HOBAS supplied De 3000 jacking pipes that were installed without using the intermediate jacking stations in sections of almost a kilometer...

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Year of Construction
1982
Total Length of Pipeline
165 m
Diameter
De 752
Wall Thickness
50 mm
Installation Method
Jacking
Application
SewerLine®
Advantages
Corrosion resistance, smooth outer surface, easy handling

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HOBAS Group Worldwide
HOBAS manufactures and markets HOBAS CC-GRP Pipe Systems. The HOBAS Network includes HOBAS Production Facilities and Sales Organizations in Europe and throughout the world.

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