About Us

Tiroler Rohre GmbH

www.trm.at

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Impressive properties of ductile iron

Professional consulting and planning expertise

The Company

Tiroler Rohre GmbH

Tiroler Rohre GmbH has more than 75 years of experience in the development, production and marketing of high-quality ductile iron systems for transporting water and deep foundations for structures.

At our production site in Hall in Tyrol, in the heart of Europe, 250 employees use their expertise and professionalism every day to produce high-quality products. In order to keep this extensive knowledge within the company, we train our employees ourselves, and we have won national awards for our training schemes. The sustainable properties of this material, combined with innovative product technologies and professional expertise in our customers' areas of application, make us the right partner for the water industry and deep-foundation engineering.

Our products are in use around the world – what better reference for our company could there be? Sustainability is very important to us. In the interests of conserving resources, a large proportion of the by-products generated during production, such as waste heat or excess electricity from our photovoltaic system, are fed into the public grid. The raw materials used during production are 100% recycled.

Sustainability

Environmental protection

Sustainability is a key value at Tiroler Rohre GmbH. Environmental protection and careful use of resources are close to the company's heart, and this is reflected in the following areas:

Waste heat

Melting iron produces high temperatures. The heat generated during this process, the so-called waste heat, is reused by feeding it into the regional district-heating network. It supplies 650 households in the surrounding area, saving 3,100 tons of CO_2 a year – the equivalent of the pollution emitted by 7,200 empty trailer trucks traveling between Hall and Vienna.

Exhaust air treatment

Our exhaust air purification systems are regularly updated with the latest technology to ensure that no pollutants enter the atmosphere.

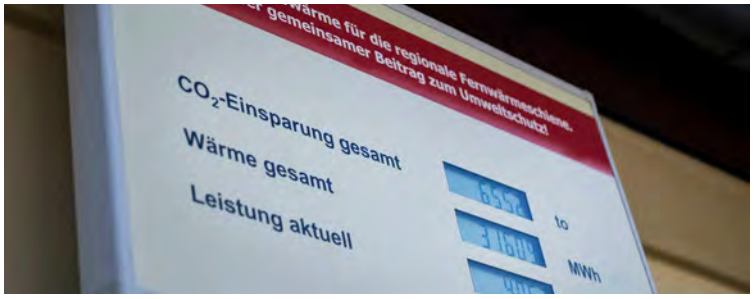
Wastewater treatment

The wastewater from the production process is filtered and cleaned so that it does not pollute the environment.

Exhaust air and waste water treatment

100% recycled scrap iron as a raw material

Delivery of raw materials by rail directly to the works premises



Waste heat fed into the regional district heating network

Transport

The majority of the raw materials required in order to make our products are delivered by rail. We ensure that resources are used as ecologically as possible during delivery.

Noise control

The plant site is surrounded by a high noise barrier to minimize the background noise from our production out of consideration for our immediate neighbors and to keep the impact on the entire environment as low as possible.

Production

Sustainability is close to our hearts. For this reason, we use nothing but 100% recycled material in the production of our pipe and pile systems. And that's not all: In certain conditions, our products can have a service life of more than 100 years, and at the end of their service life, they can be re-melted and made into new cast products.

Photovoltaic system

With an area of 9000 m², Tiroler Rohre GmbH has the largest photovoltaic plant in Austria, generating 851 kWp. The power fed into the grid supplies almost 300 households in the region with sustainable energy.

Our Mission Statement

Innovation based on tradition

We are a long-standing, Tyrol-based production company specializing in ductile iron pipe and pile systems for the water industry and for deep-foundation engineering. We operate worldwide with Europe as our core market. Since 1947, our activities have been geared to quality, safety, mutual trust and respect. We see ourselves as a reliable and expert partner in a vast range of applications in our industry – a view that is shared by our partners.

Our core areas of expertise

Tiroler Rohre GmbH develops, produces and markets high-quality, ductile iron pipe and pile systems for transporting water and for deep-foundation engineering. We are making a major and lasting contribution to the construction and operation of high quality, water supply and wastewater-disposal infrastructures. Tiroler Rohre GmbH pile systems provide our partners with bespoke and economically efficient solutions for deep foundations for structures.

Our products and services

Our products are efficient, durable and robust. They are known especially for their ecological and economic benefits. The properties of ductile cast iron and our expertise in the areas in which our products are used mean that we are in a position to master even the most extreme challenges. We are highly competent, willing to go the extra mile and reliable – in other words, a powerful system partner who is in for the long run.

Our corporate culture

Our employees are our most valuable asset. What makes our employees so special is their loyalty, awareness of responsibility, creativity and power of innovation. With their know-how and their dedication, they are the key to our success and they identify with the company. We give them responsibility and enable them to improve their skills and qualifications. Our corporate culture is based on open communication, trust and honesty. Decision-making paths are short, which ensures a flexible and swift response.

Our environment and social responsibility

Produced in an ecological cycle, our products go a long way towards protecting the environment. Water is the world's most important nutritional resource. The use of our products enables us to make a sustainable contribution to the responsible use of this valuable resource. At our location, we are considered to be an attractive employer and an important player in the local economic region.

Our future

We are an enterprise geared to success, and we generate our profits in accordance with this principle. Profits are the basis for investment. By investing in the development of our products and services, we protect jobs and safeguard the future of our company.

Tiroler Rohre GmbH

An eventful history over more than seven decades

For more than 75 years, this traditional Tyrolean company has developed, produced and marketed high-quality ductile iron pipe and pile systems. The drive for innovation is deeply rooted in the company and is supported by the entire workforce.

The factory was founded in 1947 by Guido Holzmeister, the son of architect Clemens Holzmeister, who also designed the historic buildings on the 82,000 square-meter company site. The company was founded during Austria's post-war reconstruction period, because Guido recognized the opportunity presented by the lack of pipes and fittings for water supply and facilities to manufacture them. He, together with his renowned father, laid the foundation for the reconstruction of the Austrian public water supply as well as for a globally successful company.

As early as 1953, the largest annealing furnace in Europe was put into operation in Hall and a license for the production of spheroidal graphite iron was acquired from Mond Nickel Co. Just a year later, the first pipes with a nominal diameter of DN 500 were produced, and the first lance injector, an invention of the then director Dr. Schreiber, was patented – proof positive of the importance placed on innovation by Tiroler Rohre GmbH right from the very start. By the end of the 1950s, a stationary rail system for the production of drain-pipe sections and a roller conveyor system for the production of pressure fittings had been put into operation. Both production lines represented the European state of the art at the time.

As the 1950s moved into the 1960s, production was successively expanded by commissioning a centrifugal casting machine for nominal diameters of DN 300 to 500 and, in due course, for nominal diameters of DN 150 to 250. By 1969, the 500,000th meter of spheroidal graphite iron pipe had been produced and delivered to the City of Vienna. The following year series production switched from gray iron to spheroidal graphite iron, and in 1975 the VRS® restrained locking system, still in production today, was developed.

At the beginning of the 1980s, a 120g/m² zinc spray coating and a bituminous pipe top coating were introduced in order to better meet the needs of the market. The cement mortar lining was introduced for the water pipes and ductile iron sewage pipes were produced for the first time. In addition, from 1986, the pipes were developed for use as transport pipes for snow-making systems and the cast-iron pile system was introduced. Tiroler Rohre GmbH didn't stop there: The introduction of powder coating for fittings, Factory Mutual (FM) certification for fire-extinguishing pipes, extension of zinc spraying to 200g/m² and polyurethane pipe coating followed. At the turn of the millennium, a new annealing furnace was put into operation and the improved VRS®-TIROLFLEX® restrained locking system was introduced.

In 2007, we opened a new coating plant, which uses whirl sintering to ensure the powder coatings are applied even more accurately to our products. Tiroler Rohre GmbH also became a member of the Quality-Assurance Association for Heavy-Duty Corrosion

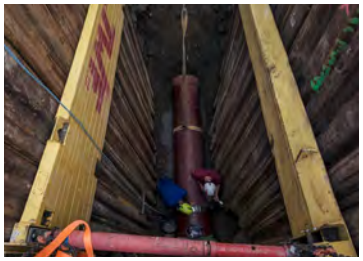
Protection of Valves and Fittings with Powder Coating (GSK e.V.) and successfully obtained German building approval for ductile piles. A new pipe centrifuge system was installed, in line with the company's commitment to running state-of-the-art production facilities.

After a turbulent period in which the company changed hands several times, Tiroler Rohre GmbH has been firmly in the hands of Max Kloger and his wife Karin since 2013. Decades of continuous development of the material, manufacturing processes and products have made the company and its employees' expertise highly sought-after around the world. That same year, a conical pile shoe was introduced for the ductile pile system. The company's research and development laboratories were enhanced with the addition of a test stand in 2015, and production is currently being expanded by installing equipment for lining the pipes with cement mortar. The "TechCenter" at the plant opened in 2018 to provide training for customers in how to use our products.

Since June 1, 2022, TRM Swiss AG has been an independent company in the Swiss market.

Supply of drinking water

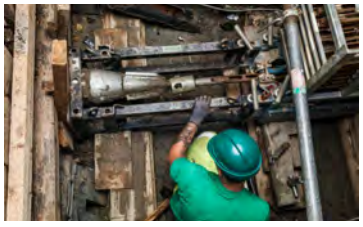
Turbine pipes



Disposal of wastewater

Snowmaking and high-pressure pipes

Bridge pipes



Trenchless laying methods

Pipe Systems

Leading technologies

VRS®-T: The restrained locking system

+ Extreme stability for high internal pressures and external loads
+ Operating pressures of up to 100 bar
+ Can be bent to 5°: saves on fittings
+ No concrete thrust blocks required for restrained locking systems
+ Quick and easy to install in all weather conditions
+ Extensive range of fittings – custom-made designs are not required
+ Simple plug-in sockets make for highly productive installation
+ No welding and no weld-seam testing
+ Root-resistant connections
+ Non-flammable material
+ All parts in stock for quick deliveries to the construction site
+ Sand bedding often not required
+ High sustainability due to very low CO2 footprint of the pipe system, confirmed by our EPD (Environmental Product Declaration)

Narrow structures with special requirements for foundations and wind loads

Slope reinforcement

Retrofit foundations with reduced working headroom space

Buoyancy protection

Bridge construction

Pile Systems

Leading technologies

Tiroler Rohre GmbH pile systems – a complete solution

+ Cost-effective construction-site equipment
+ Use of lightweight, mobile and standard equipment
+ Reduced maintenance costs through reduced wear
+ Fast and restrained Plug&Drive joints®
+ Driving without special tools or welding
+ Driving resistance provides insight into geo-technical load-bearing capacity
+ Flexible adjustment of pile lengths to the building ground on site and to changing building-ground conditions
+ Low-vibration driving
+ With a center distance to existing buildings of just 50 cm, piles can be driven even in restricted spaces
+ High cost efficiency, short construction time, low investment costs
+ No additional costs for debris disposal or pile-head reworking
+ No waste: any excess length is cut off at the desired height and used as the first element in the next pile
+ TRM´s large stock ensures short notice deliveries to the construction site
+ High corrosion resistance and less corrosion than steel
+ Coupling sleeves enable use in reduced working headroom space
+ A pile-driving system from a single cast, from the foundation to the integration into the load-bearing ground Everything in stock and from one source.
+ The pile system has a very low CO_2 footprint, confirmed by our EPD (Environmental Product Declaration)

Filling the centrifugal casting machine

Materials

Ductile iron

GJS...G=cast, J=iron, S=spherical

Historical development

Cast iron, an alloy of iron, carbon and silicon, and ways of processing it, have been familiar to mankind since early times. The first gray cast-iron pipes were produced more than 500 years ago and were used mainly for transporting drinking water and water for utilitarian purposes.

In the early 20th century, metallurgists discovered that graphite which separated out in spheroidal form allowed stronger pipes to be manufactured.

The spheroidal form of graphite was first observed when elements such as cerium, lithium and barium were added to molten iron, but in the middle of the last century, industrial processes were developed for treating the molten iron with magnesium, because magnesium did the same thing but was very much easier and cheaper to obtain than these elements.

The crucial distinction

In contrast to gray cast iron (GJL), which contains undissolved graphite in the form of lamellae, in ductile (i.e. deformable) iron, the graphite is in the form of spheres – spheroidal graphite. Graphite in this form improves the ductility of cast iron and increases its strength.

Whereas in cast iron with lamellar graphite the stress lines become highly concentrated at the tips of the graphite lamellae, in ductile iron they flow round the graphite which has separated out in spheroidal form almost undisrupted. This is why ductile iron is able to deform under load and has a high elasticity range.

Material properties

According to ÖNORM EN 545, ÖNORM EN 598 and ETA-07/0169, the following material properties apply to ductile cast iron:

Material properties for ductile iron pipes

Properties	Numerical value	Dimension
minimum tensile strength	≥ 420	N/mm²
0.2% proof stress	≥ 300	N/mm²
minimum elongation after fracture	≥ 10	%
Modulus of elasticity	170,000	N/mm²
Mean coefficient of thermal expansion	10*10–6	m/m*K
Thermal conductivity	0.42	W/cm*K
maximum Brinell hardness	230	HB

Material properties for ductile iron piles

Properties	Numerical value	Dimension
minimum tensile strength	≥ 450	N/mm²
0.2% proof stress	≥ 320	N/mm²
minimum elongation after fracture	≥ 10	%
Compressive strength	700	N/mm²
Modulus of elasticity	164,000–176,000	N/mm²

100% recycled scrap iron as a raw material

Coke

Hard stone as a slag former

Silicon carbide to increase the silicon content in the iron

Lime

Production

Production steps in detail

In order to obtain cast iron, the various metallic input materials and aggregates (coke, lime, hard stone, silicon carbide) are professionally mixed in a process that delivers both the highest quality and ultimate cost-efficiency.

Aggregates

Each of these aggregates has its own role to play:

+ Hard stone (diabase), as a slag former
+ Coke, to increase the carbon content and as an energy source
+ Lime, for better slag composition and desulfurization
+ Silicon carbide, to increase the silicon content in iron

Tiroler Rohre GmbH sets great store by using nothing but high-quality raw materials.

The remarkable sustainability, cost-efficiency and environmental friendliness of cast-iron pipes is achieved through the use of 100% recycled materials in production, an extremely long technical service life and the subsequent recovery of raw materials.

Cupola furnace with channel furnace in the foreground

Georg Fischer converter

Centrifugal casting machine

Cupola and holding furnace

This mixture is then melted in the cupola furnace to form the base iron and is then further processed at approx. 1,520 °C.

Magnesium treatment with the Georg Fischer converter

In order to obtain the characteristic properties of ductile cast iron with spheroidal graphite, the iron is alloyed with magnesium in the Georg Fischer converter and then tested for its chemical composition. This treatment chemically binds and separates sulfur and oxygen, and the carbon/graphite is deposited in globular (spherical) form instead of in lamellar form in the metal structure.

Centrifugal processes

Three centrifugal casting machines, which alternately produce cast-iron pipes and cast-iron piles in three-shift operation, allow Tiroler Rohre GmbH to process 40,000 tons of cast iron every year. The pipes and piles are cast using the De-Lavaud process. In order to obtain the internal socket contour, different sand cores are inserted into the centrifugal casting mold depending on the diameter and type of joint.

Continuous quality controls during production

Annealing furnace to improve material properties

Annealing furnace

Due to the rapid solidification in the manufacturing process, brittle iron-carbon compounds (carbides) are formed in the material in addition to the graphite spheres. In order to dissolve these carbides, the pipes/piles are heat-treated in an annealing furnace. The annealing material is heated to 920–950 °C and then cooled to 200–250 °C via a defined temperature curve. This gives the microstructure its largely ferritic structure, which is crucial for obtaining the required material properties.

When the annealed pipes are tested, it must be ensured that the characteristics of the material comply with EN 545 (for drinking-water pipes), EN 598 (for wastewater pipes) and ETA-07/0169 (for piles).

Thermal zinc spraying

Pile systems production line

After thermal treatment, the piles are sent without zinc coating to the pile processing and final inspection stage. Here, the wall thickness is automatically measured and the piles are inspected in as much detail as possible. Once the inspection is complete, all piles are signed with a meter mark, designation and production date and are then bundled together.

Pipe systems production line Thermal zinc spraying

Since 2019, after thermal treatment, a zinc coating has been applied to all pipes by an innovative coating robot, which raises the process stability and thus the quality of the products to a new level. In this metallic zinc-spraying process, a zinc wire is melted by means of an electric arc. The zinc coating is part of the DUPLEX system (zinc coating with top coat) and serves as active corrosion protection.

⚠ The spray-galvanizing process is followed by the testing and cleaning section. Here, the pipes are examined in meticulous detail and individually tested for tightness by means of a pressure test.

Pipe machining

Pipes with a VRS®-T joint also have a welded bead at the spigot. The pipes are fitted with a cement mortar lining according to ÖNORM B2562, depending on their later application. The lining, a mixture of sand, cement and water, is applied and controlled in state-of-the-art rotary centrifugal machines. The lining is subject to rigorous quality controls – checking the source materials, the fresh mortar and the stipulated thickness, depending on the nominal diameter. The cement mortar linings are then cured in a curing chamber at a defined humidity and temperature.

Pipe machining

Label at the end of the production line

PUR top coat

PUR-Longlife coating

The galvanized pipes are coated with solvent-free polyurethane in an airless process. This coating serves as passive corrosion protection and has a different color for marking the different product groups.

PUR-TOP coating

This coating increases the thickness of the polyurethane layer, following which the pipes are wrapped with a PE impact protection tape at the factory.

ZMU-Austria coating

The cement mortar is extruded onto the pipe with a mesh bandage and is smoothed at the same time. We developed the cement ourselves in collaboration with one of our partners, and it offers very high sulfate resistance, enormous strength and high impact protection. The entire pipe is coated with zinc. The spigot and socket areas are free from cement mortar and are provided with our proven PUR coating.

ZMU-Austria (cement-mortar coating)

Label

Before leaving the production line, all pipes are labeled with the production date, manufacturer's marking, nominal diameter, pressure rating, type of joint and the required standards, and they are then bundled together. Drinking-water pipes are capped (closed) because they will be used in the food industry.

Stock control at Tiroler Rohre GmbH

We carry out quality-control checks throughout the process to ensure that our products meet the desired standard.

Coating robots in use at the location Hall location in Tyrol

Extensive range of fittings

Fittings

Production

Epoxy resin top coat according to EN 14901. "Gütegemeinschaft Schwerer Korrosionsschutz" (GSK – Quality-Assurance Association for Heavy-Duty Corrosion Protection).

Our fittings are manufactured by selected casting suppliers using sand casting. After thorough inspection, the raw parts are sandblasted. In order to obtain the best possible application of the tested powder, the fittings must be heated and then coated with epoxy according to EN 14901 using whirl sintering and then cooled down again.

The coating applied to the fittings meets the strict requirements of the Quality-Assurance Association for Heavy-Duty Corrosion Protection (GSK) and has a minimum thickness of 250 µm. This means that our fittings certified according to EN 545 can be installed in soils of any corrosivity.

Load demonstration with wheel loader

Type testing in the laboratory on the works premises.

Continuous research and development of the material

Quality

Constantly reviewed and continuously developed

Tiroler Rohre GmbH has made it its mission to put the quality of its products and customer satisfaction first.

For 30 years now, we have had a certified management system according to EN ISO 9001 in place. Our products and production processes are continuously monitored and tested by our staff and, several times a year, by accredited testing and inspection bodies.

In 2015, a state-of-the-art type testing facility was installed which allows pipes and piles to be tested according to the applicable standards, including pressure tests at up to 300 bar.

Environmental Product Declaration (EPD)

Environmental and energy management issues have become increasingly important in recent years, which is why we work according to the EN ISO 14001 environmental standard. In addition, Tiroler Rohre GmbH is the first ductile iron and pile manufacturer to issue an EPD (Environmental Product Declaration). Energy consumption and key figures are continuously monitored and controlled using a state-of-the-art system.

Certificates

In addition to ÖVGW, GRIS and DVGW approvals, our products also have numerous other approvals including FM Approval (fire-extinguishing systems) and GSK Approval (Quality-Assurance Association for Heavy-Duty Corrosion Protection). This ensures that our products are made, and our services delivered, to a consistently high quality.

⚠ The certificates are available on request from Tiroler Rohre GmbH.

Texts for use in invitations to tender

Texts for use in invitations to tender for pipes and fittings are available to download at www.trm.at in a variety of formats (Word, PDF and GAEB).

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