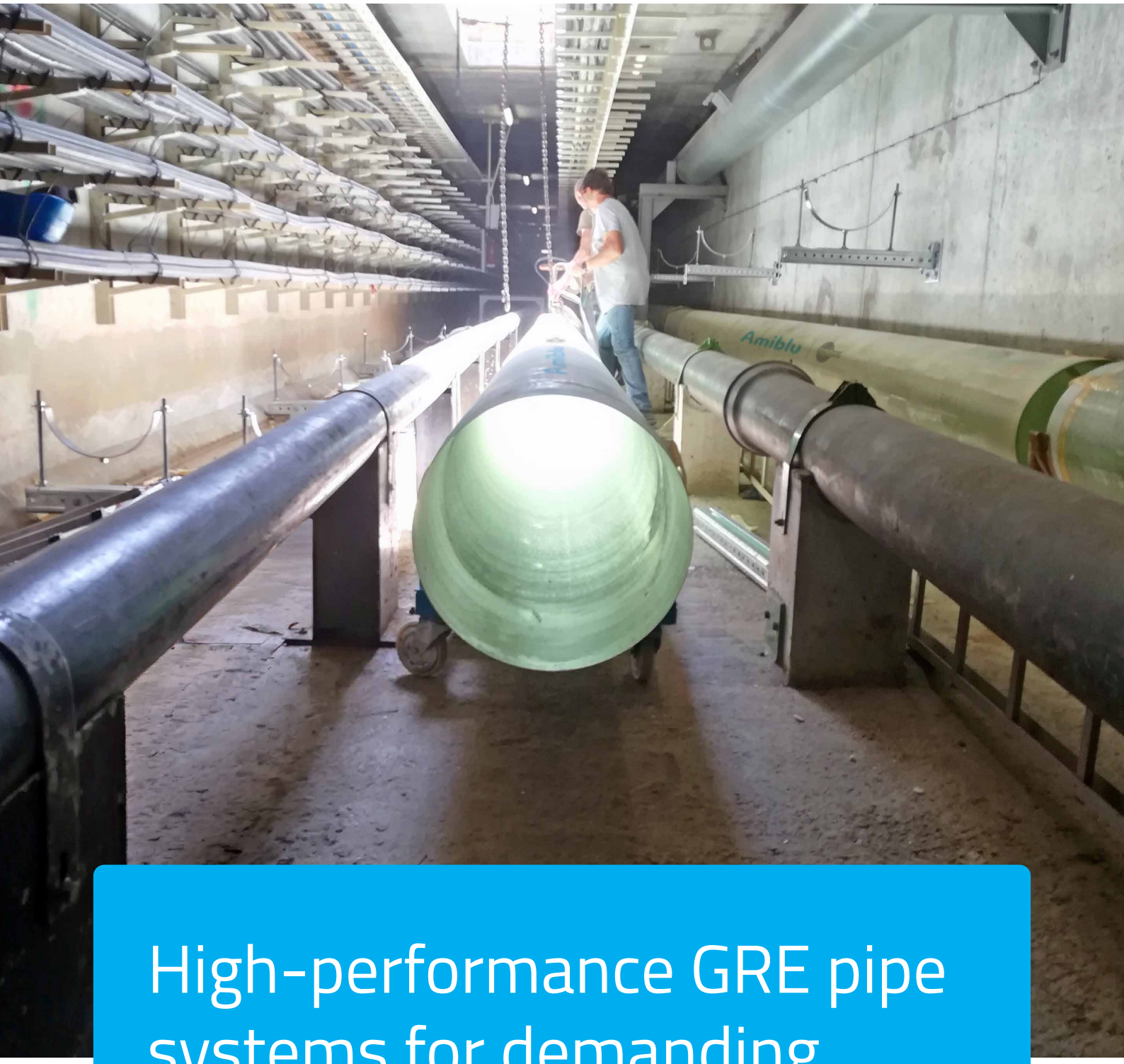


High-performance GRE pipe systems for demanding environments

Infrastructure under pressure

The pace of the 21st century is reshaping infrastructure at every level. Rapid urbanisation, the expansion of district energy networks, and the shift toward more sustainable industrial processes are placing new and complex demands on pipeline systems.

At the same time, climate change and growing water scarcity are accelerating desalination projects, requiring solutions that can perform reliably under harsh, highly corrosive conditions.

Across district cooling and oil and gas networks, pipelines must withstand elevated temperatures, continuous operation, complex pressure dynamics, and aggressive media, while also reducing environmental impact and lifecycle costs. Meanwhile, the rapid growth of data centres is driving demand for reliable, energy-efficient cooling systems, where consistent hydraulic performance and long service life are critical.

Traditional materials are increasingly unable to meet these challenges. Corrosion, thermal degradation, intensive maintenance, and limited service life create operational risks and inefficiencies – particularly in long-term, high-demand applications.

GRE solutions for demanding applications

Amiblu delivers complete GRE system solutions, going beyond standard pipe supply. GRE (Glass-Reinforced Epoxy) combines high-strength glass fibres with a thermosetting epoxy resin matrix, resulting in a material that offers exceptional mechanical performance, corrosion resistance, and thermal stability. Each system is engineered to meet the specific requirements of high-demand environments as in district heating networks, oil and gas refineries, and data centres.

Glass-Reinforced Epoxy (GRE) is a composite material consisting of

- **ECR-glass fibres** – providing structural strength and pressure resistance
- **Epoxy resin matrix** – ensuring chemical resistance, high temperature performance and durability

This combination creates a lightweight, high-strength, and corrosion-resistant piping system capable of operating in aggressive conditions.

GRE pipes offer full resistance to internal and external corrosion, making them particularly suitable for humid or aggressive environments such as the transport of chemical media in processing plants and high temperature applications for district heating. Their filament-wound epoxy structure ensures high resistance to pressure, thermal loads, and operational stresses, while maintaining excellent long-term mechanical properties. Compared to standard GRP systems, Amiblu GRE pipes provide superior axial and circumferential strength as well as long term performance in pressure applications.

Hydraulic performance remains consistently high thanks to the smooth epoxy liner, reducing friction losses over the entire service life. At the same time, GRE retains its mechanical integrity at elevated temperatures up to 120°C, unlike thermoplastics that lose a significant portion of their performance above 60–80°C.

These properties result in stable, leak-tight operation with minimal heat-related aging. Amiblu high-performance GRE pipe systems enable infrastructure that is built to last – supporting reliable, efficient, and sustainable operation in the most demanding environments.

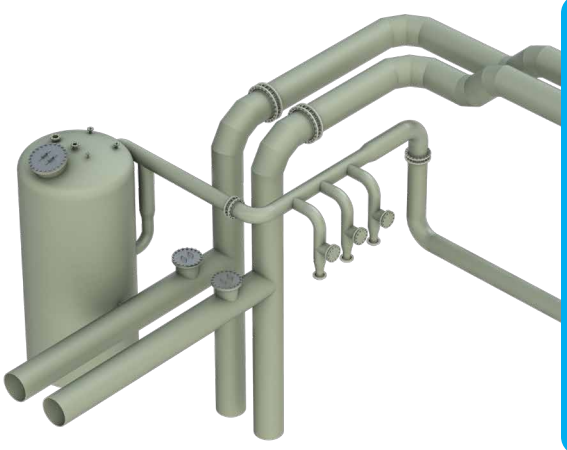
Comprehensive GRE portfolio

Amiblu is the only manufacturer in Europe offering a complete GRE portfolio. We provide fully customised solutions tailored to specific load cases and project requirements, even for large diameters.

Amiblu high-performance GRE pipe systems are available as customised solutions for both buried and above-ground installations. The pipes are manufactured using our Flowtite filament winding technology, ensuring optimised fibre orientation for strength and a multi-layer construction: an inner liner for chemical resistance, a structural layer for pressure performance, and an outer layer for environmental protection.

Our GRE pipe systems are ideal for:

- Oil & gas networks (flowlines, injection lines, firewater systems)
- District cooling & heating systems
- Seawater applications (desalination, ballast systems)
- Industrial & chemical processing
- Water & wastewater infrastructure



Product overview

- **Diameters:** from DN 25 to DN 3200
- **Pressure classes:** up to 50 bar
- **Stiffness:** up to SN 100,000 N/m²
- **Pipe range:** uniaxial and biaxial piping, trenchless pipe solutions for industrial applications, tailored solutions
- **Jointing systems:** adhesive joint, lock joint, butt-wrap joint, lamination, flange
- **Fittings:** elbows, tees, reducers, flanges, caps, spools

Key Benefits

Superior material performance

- Suitable for elevated temperatures up to 120 °C
- Optimal handling of pressure and operational stresses through enhanced material performance

Outstanding corrosion resistance

- Resistant to acids, alkalis, seawater, and aggressive chemicals
- No rust or electrochemical corrosion
- Eliminates need for coatings or cathodic protection

Excellent hydraulic performance

- Smooth internal surface reduces friction losses
- Higher flow capacity and lower pumping energy

Long service life with minimal maintenance

- Lifespan of several decades even in harsh environments
- Minimal maintenance requirements

Material comparison: GRE vs alternative pipe materials

The following table provides a direct comparison of Amiblu GRE pipe systems with the most common alternative materials with regard to key performance, durability, installation, and cost criteria.

CRITERION	CARBON STEEL (LINED)	THERMOPLASTIC (HDPE)	CONCRETE	AMIBLU GRE
MECHANICAL & THERMAL PERFORMANCE				
Max. service temperature	up to 400 °C (unlined)	60–80 °C	up to 60 °C (limited)	**up to 120 °C**
Pressure resistance	★★★★★	★★★☆☆	★★☆☆☆	★★★★★
Axial & hoop strength	★★★★★	★★☆☆☆	★★★★☆	★★★★★
Strength-to-weight ratio	★★☆☆☆	★★★☆☆	★☆☆☆☆	★★★★★
DURABILITY & CORROSION RESISTANCE				
Internal corrosion resistance	Requires lining	Excellent	Limited (pH < 9)	**Excellent** (acids, alkalis, seawater)
External corrosion resistance	Requires cathodic protection	Excellent	Moderate (carbonation)	**Excellent** (no additional protection needed)
Estimated service life	20–30 years (with maintenance)	50+ years	30–50 years	**50+ years**
HYDRAULIC PERFORMANCE				
Internal roughness (Manning n)	0.012–0.015 (increases over time)	0.009–0.011	0.013–0.014	**0.008–0.009** stable over full life
Flow section loss over time	High (corrosion & scaling)	None	Moderate	**None**
INSTALLATION & MAINTENANCE				
Weight (DN 400, 12 m section)	~1,200 kg	~180 kg	~3,500 kg	**~110 kg**
Heavy lifting equipment needed	High	Low	Very high	**Low**
Periodic maintenance	High (inspection, coatings, anodes)	Minimal	High (cracks, joints)	**Minimal**
COST & SUSTAINABILITY				
Initial cost (relative)	Moderate–high	Moderate	Moderate	**Higher upfront investment**
30-year TCO (relative)	Very high	Moderate	High	**Lowest**
Recyclability (end of life)	Recyclable (steel)	Recyclable	Reusable (as aggregate)	**Limited** (composite material)

Score scale: ★★★★★ = best | ★ = poor | TCO = total cost of ownership over 30 years including installation, maintenance and operation.