WAVISTRONG™

From Design to Installation

FUTURE PIPE INDUSTRIES

www.futurepipe.com

FROM DESIGN TO INSTALLATION

Modern industrial processes demand reliability. Interruptions caused by failures or maintenance can lead to downtime and further costs. A reliable piping infrastructure is essential; liquids and gasses must be delivered without interruption, regardless of their environments which may be saltwater, contaminated soil or other corrosive conditions. Conventional piping materials, such as steel and concrete, do not perform well under these conditions and can require ongoing maintenance or present environmental hazards if leaks occur.

GRE Pipe Systems: Durable and Reliable Solutions

Future Pipe Industries composite piping systems are proven in their reliability and durability. Our piping solutions have been in used successfully under the most demanding and corrosive conditions. Major clients in industries such as petrochemical, refineries, shipbuilders, offshore, oil and gas, and power plants rely on Future Pipe Industries piping solutions to reduce the total cost of ownership and provide ongoing reliability.

Future Pipe Industries is one of the world's largest manufacturers of composite piping systems, including epoxy, polyester and vinylester resin composites. We provide total piping solutions from design to installation, from our network of plants and sales offices based across the world, including manufacturing facilities in Europe, the Middle East, America, North Africa and Asia.

We work with a range of composites including Glass Reinforced Polyester (GRP), Glass Reinforced Vinylester (GRV) and Glass Reinforced Epoxy (GRE) depending on the needs of your project. All Future Pipe Industries products are manufactured in accordance with international standards using the latest technology. Our complete range of all composite pipe products sees diameters ranging from 25mm (1") up to 4,000mm (160"), with an ability to withstand pressures of up to 200 bar (3000 psi) depending on the diameter.

PIPING SOLUTIONS: FROM CONCEPT TO INSTALLATION

Future Pipe Industries delivers innovative, fully customized and integrated solutions. We design, manufacture, test, install and manage bespoke composite pipe systems and solutions that are tailored specifically to different sectors, applications and projects.

We think in terms of solutions, not products. We work with you to identify and understand your specific project requirements. Understanding the medium, temperature, pressure requirements, along with many other parameters allows us to specify the requirements, select the most suitable product and start the pipe system design stage. We then determine and design the right piping system, including pipes, fittings and spool configurations (prefabricated pipe sections) using our calculation and design programs. Now we are ready to manufacture the selected pipes and fittings, and prefabricate the spools.

Using the most up to date software packages and technology, Future Pipe Industries can carry out additional engineering work as required, such as isometric drawings, stress calculations, optimization of required support and bearing points, or dynamic calculations such as water hammer simulations.

Installation

With adequate training, Future Pipe Industries' GRE pipe systems are easy to install. Therefore, the skills of our certified contractors who have followed our specific training program are required. Future Pipe Industries can also supply supervisors to provide advice and carry out inspections. Alternatively, we can manage the entire installation.

Spool Building

Instead of separate components, Future Pipe Industries can construct GRE pipe systems by prefabricating pipe sections. These are tailor made and include bends, branches, reducers, flanges and so on. These 'pipe spools' have the distinct advantages:

- reduction in the number of field joints;
- shorter in-built lengths;
- pre-tested;
- spool building under controlled conditions;
- fast and faultless assembly;
- weather conditions have no effect on production and installation; and
- freedom of design, not dependent on standard products.

Spool building can take place at a Future Pipe Industries plant, at one of our worldwide certified contractors' locations, or by Future Pipe Industries at the client's premises or on the construction site.

FEATURES OF GRE PIPE SYSTEMS

Industrial pipe systems are required to meet continuous high demands. Temperature, pressure, chemical resistance, installation and maintenance are all aspects that play a role in the choice of material. Safety and environmental aspects are also important. In many cases, Future Pipe Industries' GRE pipe systems prove to be the perfect solution.

- Wavistrong is our standard GRE product range, and comes with many options, such as electrical conductivity, extra fire-resistant layer, extra NSF and WRAS potable water certification.
- Fibermar is our marine GRE piping range and can be fitted with an extra fire-resistant layer.

Both Wavistrong and Fibermar systems are fiberglass reinforced epoxy pipe systems and offer a wide range of features.

- Optimum protection of the environment.
- Available in standard diameters of 25 mm (1") up to and including 1600 mm (63").
- Standard lengths of 3, 6, 10 or 12 meters (10, 20, 33 or 39 ft) depending on diameter and production location
- Standard pressure classes up to and including 50 bar (700 psi).
- Special products can be designed for pressures up to 200 bar (3000 psi).
- Choice of various jointing methods, including lamination joints, adhesive bonded joints, mechanical couplers and flanges.
- Absolutely corrosion free.
- High chemical resistance.
- A long lifetime of over 20 years, free of maintenance, equals to low life cycle cost.
- Resistant to temperatures of up to 121°C (250°F), depending on the medium and exposure duration.
- Swift and low-cost assembly, thanks to its light weight and simple joining techniques.
- Lighter support structures needed for aboveground systems.
- Excellent mechanical properties.

Quality Assurance and Certification

Future Pipe Industries puts quality assurance first in the production of all its pipe systems, including GRE. The systems have been designed and produced in accordance with the ISO 9001 quality assurance system since 1989, and all our manufacturing locations are ISO 14001 certified.

Future Pipe Industries' Wavistrong and Fibermar products have undergone extensive testing and have obtained certifications and (type) approvals by leading institutes. These include, but are not limited to: WRAS, NSF, KIWA, Belgaqua, INSP, FM, ABS, DNVGL, LR, BV, KR, TSSA, RINA, DWI, USCG, NK and BVEG. Also, they comply with relevant major standards from ISO, BS-EN, API, SHELL DEP and ASME.

FUTURE PIPE INDUSTRIES' PIPE SYSTEMS IN PRACTICE

Future Pipe Industries list of references includes hundreds of major projects around the world. A brief description of the most common underground and aboveground applications is provided below.

Firefighting Pipes

Wavistrong firefighting pipes withstand the corrosive effects of polluted or brackish water, pumped through the pipes under high pressure. The behavior of Wavistrong firefighting pipes made of glass fiber reinforced epoxy is excellent during a fire: fire tests conducted around the world have shown that the firefighting system continues to operate properly at the seat of a fire, due to the insulating effect of the glass fibers. Optionally, Wavistrong can be fitted with a proven fire-resistant layer for protection of the firefighting pipes during extreme fires such as jet fires.

Potable Water

Wavistrong has proven track record for use as pipe in potable water applications and has been approved as such by institutes across the world.

Process Pipe Systems

Whether for process water, potable water or cooling water, every chemical plant, power station, offshore production platform and indeed many other industries depend on reliable pipe systems for uninterrupted operation.

High-Pressure Pipelines

Wavistrong's high strength makes it possible to design pipelines for high pressures. Standard Wavistrong pipe systems can be used at operating pressures of up to 50 bar (1000 psi). However, for special applications, piping systems have been designed and successfully tested up to 200 bar (3000 psi).

Industrial Sewers

Resistance to chemicals in sewer systems is extremely important in the (petro)chemical industry, because effluents often contain aggressive substances. In some countries there is even a legal requirement to regularly pressurize these sewer systems, to prove there is no leakage. The Wavistrong system can be easily pressurized and handle these requirements.

Saltwater pipelines and desalination

The combination of corrosive seawater, high pressure and high temperature over long period of time, make Wavistrong or Fiberstrong the ideal system for desalination plants, both for multi-stage evaporators and reverse osmosis installations.

Degassing Pipe Systems

Wavistrong is the ideal solution for degassing systems due to its high resistance to corrosion and chemical attack, low expansion forces and being light weight. Apart from installation being much easier than with steel, supporting structures can be made lighter and fewer expansion loops are required. As a result, costs are much lower.

Offshore Pipe Systems

Wavistrong is often used on offshore platforms for seawater cooling lines, discharge pipes, produced water, injection water, drilling effluents, fire-fighting systems, ballast lines and potable water. Wavistrong offers many advantages, low life-cycle costs, corrosion resistance, light weight and the pipe systems can be installed quickly, and without requiring welding.

Electrically Conductive Pipe Systems

The Wavistrong electrically conductive system was developed especially for applications on offshore platforms and ships, where static electricity has to be conducted away safely. Wavistrong electrically conductive pipes have conductive carbon fibers in the pipe wall, which lead the electrical current away and prevent hazardous situations form occurring through unwanted electrical discharges.

Shipbuilding

Wavistrong and Fibermar are developed in compliance with IMO regulations for applications in and on ships as, for example, ballast lines, potable water lines or scrubber systems. They offer important advantages over conventional materials. Fibermar and Wavistrong will not corrode, require no maintenance, are lightweight, have excellent fire-resistant properties and, if required, can be electrically conductive or fitted with an extra fire-resistant layer.

Core Barrels

Perfect soil samples and undisturbed sample transport to the laboratory are the main requirements that geologists have when conducting soil surveys in search of oil and gas. Future Pipe Industries has developed glass fiber reinforced epoxy core barrels especially for this purpose. The pipes are lightweight and extremely smooth inside. This ensures low frictional resistance and the maximum sampling yield. The high temperature resistance makes deep drilling possible. Indelible number and color codes in the outer wall exclude the possibility of sample errors during analysis.

Please see our other documentation for specific, technical information on the various systems. You will find a summary of our capabilities on our website www.futurepipe.com