

about: frp

Glass-fibre Reinforced Polyester (GRP) and Glass-fibre Reinforced Epoxy (GRE) are composite materials characterised by the high strength of the glass fibre and the corrosion resistance of the resin. These combined benefits produce an advantageous list of benefits when compared to traditional materials:

Corrosion resistance

- Long service life
- No linings, coatings or other protection needed
- Low maintenance costs

Lightweight

- 1/4 weight of steel or ductile iron
- Lower transport and handling costs

Smooth bore

- Low friction loss reduces pumping energy and lowers operating costs
- Minimal scale build up

Low thermal conductivity

- Reduces the need for lagging

UV Resistant

- Can be used in exposed locations without UV degradation



General properties of frp

GRP and GRE piping is the material of choice where high levels of corrosion and/or high strength is required. The following table compares some of the key properties with steel:

Typical Properties	FRP	Steel	St/Steel
Property			
Glass fibre content by weight, %	30 - 80	-	-
Flexural strength, MPa	689 - 1862	1931	206 - 241
Flexural modulus, GPa	34 - 48	2068	1931
Tensile strength at yield, MPa	561 - 1724	199 - 227	206 - 241
Compressive strength, MPa	310 - 482	193	206
Ultimate tensile elongation, %	1.6 - 2.8	38 - 39	50 - 60
Heat distortion at 1.82 MPa, °C	177 - 204	-	-
Continuous heat resistance, °C	260	-	-

Typical Properties	Filament wound GRP or GRE
Property	
Coefficient of thermal expansion, in./in./°C	15.3 - 22.86
Thermal conductivity Watt/centimetre - °C	0.00187 - 0.00288
Specific gravity	1.8 - 1.9

Product Range

Pipes

The selection of the pipe is dependent on the application and project specification. Pipes in diameters up to 300mm are manufactured by filament winding (cross winding). Larger diameter pipes are manufactured by hoop winding.

Pipes are available in diameters from DN25 up to DN1000, with working pressures from PN4 to PN25,

Fittings

A range of fittings is available in diameters to match the pipes. Fittings are hand laminated, except for collars and flanges, which are rotation cast.

Joining

System diameters up to 300mm may be jointed using adhesive bonded joints. This method is quick and reliable, using socket ended pipes. All pipes may also be joined using laminated butt joints, providing excellent axial strength.

Available Resins

Pipes and fittings are available manufactured from the following Vinylester and Polyester resins:

Standard Epoxy Vinyl Ester	Urethane Modified Vinyl Ester	Novolac Epoxy Vinyl Ester	High Crosslinked Epoxy Vinyl Ester
Flexible Epoxy Vinyl Ester	Rubber Modified Vinyl Ester	Fire Retardant Epoxy Vinyl Ester	Bisphenol Fumarate Polyester

Applications for frp piping

Chemical and process engineering

GRP/GRE products offer good chemical resistance at elevated temperatures and pressures and vacuum conditions to most acids, chemicals and other corrosive elements. The additional excellent mechanical resistance at pressure and the excellent product properties makes frp the most suitable material for transporting/storing fluids and water at high temperatures.

Petrochemicals

GRP and GRE pipes and accessories are commonly used in the oil industry, not only for the transport of oil in the oil fields but also for sewerage and brines derived from this activity. These materials are also used for transporting hydrocarbons and in fire extinguishing systems and includes, as well as pipelines, also tanks and process vessels for petroleum products.

Pulp and paper

Our GRP systems are especially recommended for the processing and the transport/storage of wood pulp, whitening agents, colouring and residues. In the printing works, they are used commonly for the transport of liquid residues with acidic and solvent contents.

Firfighting systems

All GRP/GRE products offered guarantee high security in case of fire and have often been used in industrial systems with higher fire risk, especially for buried lines in chemical and power plants.

Water and sewerage

From raw water intakes to treatment plants and main distribution networks, there are proven solutions to meet all market needs. The products have been tested and approved by major potable and sewerage authorities worldwide for the use in water applications.

Power generation

The low maintenance requirement, due to its corrosion resistance, has made GRP pipes a highly appreciated material in vital power plant water lines. Used in the major cooling systems, GRP large diameter pipes are a well approved solution for sea water applications, as well as for internal cooling pipelines.

Desalination

GRP sea water intakes and outfalls to all piping systems.

Food and drink

GRP systems may be used for the secure transport and storage of food related liquids. The sugar, wine, olive, brewing and canning industries benefit from the low thermal conductivity and the good resistance of GRP against aggressive acids, chemicals and cleaning liquids.

Shipbuilding and offshore

The excellent corrosion resistance, its lightness and fire resistance, makes GRP/GRE products the first choice for cooling circuits, storage, transport and general construction.

