



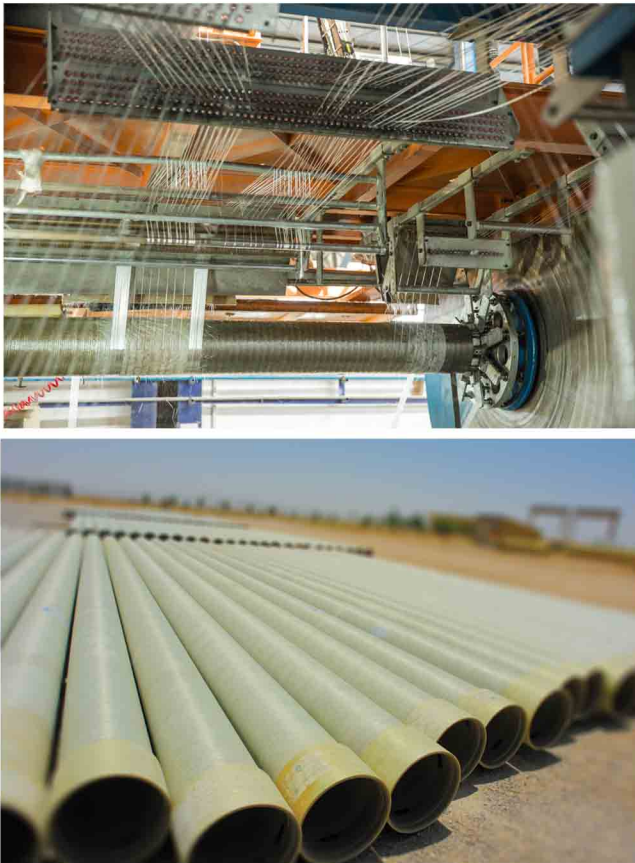
Pars Industrial Pioneer Engineering Co

Preface

Introduction

Pars Industrial Pioneer Engineering Co. (P.I.P.E) with the brand of BELFA was established in 2000 with the purpose of Glass fiber Reinforced Plastic (GRP) pipe manufacture and sales in domestic and foreign markets. Relying on trained and experienced experts, P.I.P.E is incorporated with other industrialized countries to improve and develop technical knowledge in GRP industry through performing national and international projects. P.I.P.E products are designed with Technobell (the most advanced technologist in the world) fundamental and acknowledged industry standards such as AWWA, ASTM, ISO, EN, and BS. This company is also the pioneer in producing full glass pipes in Iran.

The creative technology used by P.I.P.E is an ideal solution for the Green Economy realization and environmental protection and this company could fulfill all its commitments in achieving quality assurance standards throughout the entire process



Wide Range of Products

► GRP pipes

Thanks to the advantage offered by Continuous Filament Winding Technology P.I.P.E is capable of manufacturing according to the technical specifications of each project with the desired length, pressure and stiffness parameters.



<i>m 12</i>	Length(Standard)
<i>mm 2600 – 300</i>	Diameter (DN)
<i>bar 32 – 1</i>	Pressure (PN)
<i>N/m2 12500 – 1250</i>	Stiffness (SN)
<i>m/s 4 – 3</i>	Fluid Velocity
<i>C°60 – 50</i>	Temperature

Also, P.I.P.E has the monopoly on manufacturing full-glass pipes in Iran for the first time .

► Pipe Wall Description

GRP pipe wall consists of three layers perfectly adherent with one another, each having different characteristics and properties in relation to their function.

Topcoat or External Layer ▼

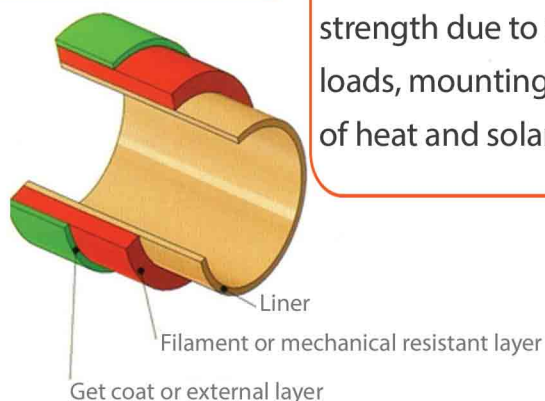
This has the minimum 3. to 2. thickness of about mm and consists of resin and C-Glass. This layer is also anti UV which guarantees a complete impregnation of the peripheral fibers .

Middle Layer (Mechanical resistant) ▼

This layer is composed of thermosetting resin, chopped glass and silica sand which lead to the mechanical resistance of the pipes. Its function is to render the pipe wall resistant to the stresses due to the design conditions, the internal and/or external pressure, flexural strength due to the external loads, mounting and the effects of heat and solar radiations .

Liner ▼

Liner presents the internal surface as particularly smooth with the minimum roughness coefficient. The specific kind of fiberglass used in liner provides maximum resistance to chemical attacks
The standard thickness of liner is about 8 to 1.2mm which should be in accordance with pipe's size. Producing customized pipes with thicker liner is one advantage of the pipe systems offered by P.I.P.E .



► Fittings and Joints

One of the advantages of P.I.P.E GRP system is fitting production. Fittings can be supplied either as standard pieces or custom designed in accordance with project specifications .

Joints used to connect pipe ends and fittings cover components for in-line, offset and multi-port . GRP couplings produced with the technique used in GRP pipes and prepared at the cutting and grooving machines and then are subjected to leakage tests under pressure. Sealing in couplings are ensured with gaskets. This property of the gaskets prevents the reflection of stresses directly on the pipes. P.I.P.E GRP couplings offer the opportunity to make quick and safe connections in every ground and weather conditions.



- Coupling
- Elbow with any bending angle
- Fixed and non-fixed flange
- Tee
- Reducer (Concentric and Eccentric)
- Custom designed joints



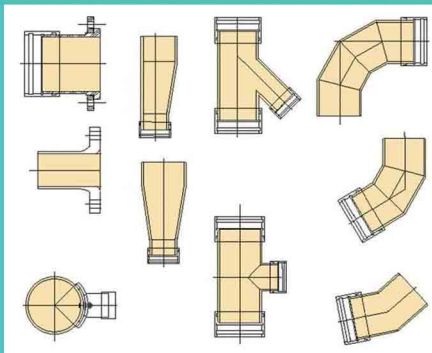
The Key Properties that Comprise the Advantage of GRP Pipes Can Be Summarized as Follows

► Erosion Resistance

The composite structure of GRP pipes offers perfect erosion resistance. This property eliminates pipe's need for supplemental coating, material and maintenance costs. Furthermore GRP pipes preserve their initial performance even after a 50 year service life

► Buckling property

Like plastic pipes, GRP pipes have the ability to buckle both in longitudinal and transverse directions



► Corrosion Resistance

This property eliminated the pipe's need for isolation, electrical, chemical and cathodic protection. Another important advantage offered by P.I.P.E manufacturing technique is the ability to use project specific resin in the pipe against highly corrosive environments or non-standard chemical effects

► Superior Hydraulic Properties

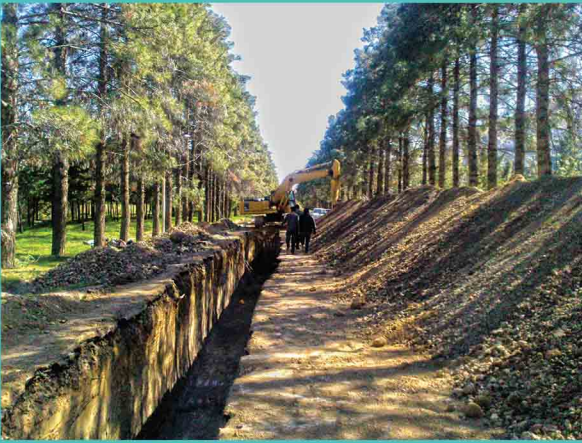
P.I.P.E presents GRP pipes with a particularly smooth surface and the minimum roughness coefficient. The hydraulic properties of GRP pipes provide stability throughout the operating lifespan. In comparison to other pipes with the same nominal diameter, the inner diameter of GRP pipes are usually more. This property is the result of utilized materials and pipe's wall thickness

► Light Weight

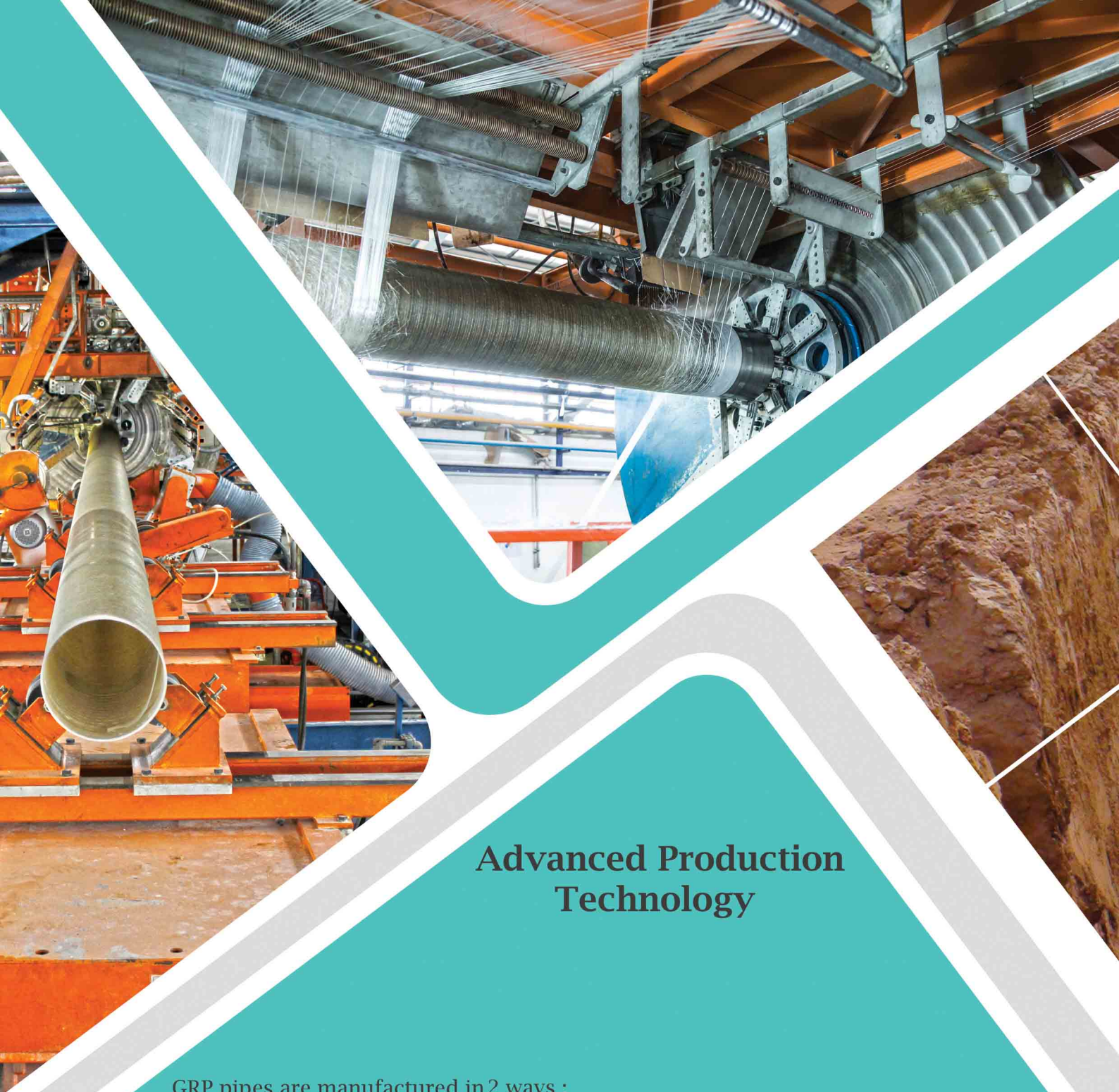
GRP pipes weigh 1/4 of steel and 1/10 of concrete pipes. This light weight structure not only eliminates the need for expensive transport equipment, but also reduces operating costs



Application Fields of GRP Pipes



- Application Fields of GRP Pipes
- Sanitary sewers
- Stormwater sewers
- Chemical process lines
- Seawater intake and outfalls
- Irrigation
- Penstock lines of dams
- Cooling water lines
- Industrial applications
(industrial and chemical waste)
- District cooling projects
- Pipe jacking
- Desulfurization
- Renovation of old lines, and relining
of existing pipes



Advanced Production Technology

GRP pipes are manufactured in 2 ways :

- ▶ A. Centrifugal Casting
- ▶ B. Filament Winding Method (Continuous and Discontinuous)

This process allows the use of fiberglass in a circumferential direction. Resin is either impregnated with fiberglass or added by a feeder. A sand fortifier is used after resin if necessary

Continuous Filament Winding

This process involves the winding of principal raw materials around a continuously rotating structure called mandrel. As the mandrel rotates, raw materials forming the composite structure (fiberglass, silica sand and polyester) are applied automatically by computer controlled systems and this leads to the strength of pipe in all directions. The main advantage of this method is lean manufacturing at high speeds. The pipe is also cut automatically in the desired length .

Services

P.I.P.E is ready to present all the below services to the customers :

- ▶ Site inspection and supervision on installation
- ▶ Consulting in revamping of old pipelines
- ▶ Manufacturing custom pipes and fitting components on request
- ▶ Testing and inspecting GRP pipes quality in the most updated quality control laboratories



from Production to Consumption



Quality Control and Assurance

P.I.P.E GRP products are designed and tested in compliance with Technobell's fundamental and acknowledged industry standards such as AWWA, ASTM, ISO, EN and BS as well as to meet the requirements of the national ISIRI standard. These standards define the initial design specifications and set out the product qualification and performance criteria. The tests involve the entire process from on-site raw material control up to the final product shipment, and are performed in such form to assess the product's short and long term performance.

P.I.P.E's quality approach is not restricted to the manufacturing process and products only. The management concept applied throughout the entire process in an approach that gives

Having established its management systems on these principals, P.I.P.E has obtained certificates upon inspections hourly performance tests 1000 conducted by quality control institutions. Products manufactured by P.I.P.E pass the carried out by the Flowtite International Technology Center

From Raw Material Admission to product Delivery

- ▶ Quality control of raw material during the admission process and periodic control of warehouse raw materials

Resin Quality Control

- | | |
|--|------------|
| • Gel time of resin | ASTM D2471 |
| • Resin, catalyst and accelerator maximum reaction temperature | ASTM D2471 |
| • Resin Viscosity | ASTM D2393 |
| • Resin acidity | ASTM D1639 |
| • Barcol hardness mechanical test of cured resin | ASTM D2583 |
| • Water absorption | ASTM D570 |

Fiberglass Quality Control

- | | |
|--|----------|
| • Moisture content | ISO 3344 |
| • Ignition test to determine the distribution of glass fiber | ISO 1887 |
| • Weight control mechanical test | ISO 3374 |

Silica sand quality control

- | | |
|------------------------------|----------|
| • Particle size distribution | ASTM C33 |
| • Moisture content | ASTM C33 |





► Quality Control during Manufacturing Process

- Pipe Dimensional Control
- Pipe Thickness Control
- Raw Material Control

BS 5480/ASTM D3567/AWWA C950 /National Standard

BS5480/ASTM D3567/AWWA C950 / National Standard

According to P.I.P.E Technology

► Final Product (Pipe) Quality Control

- Visual Inspection
- Pipe Dimensional Control
(Pipe inside and outside diameter pipe length
pipe wall thickness and surface inspection)
- Hydrostatic Pressure Test
- Ring Stiffness

ASTM D2563 / National Standard

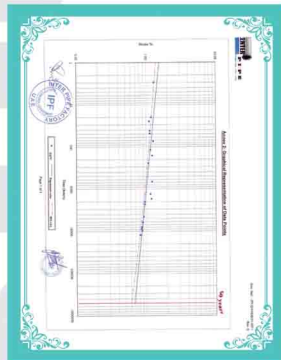
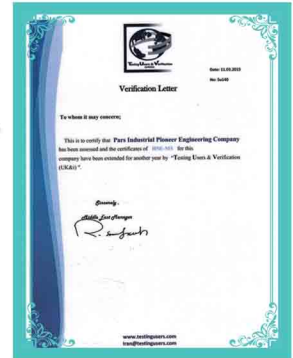
BS548/ASTM D3567/AWWA C950 /National Standard

ASTM D2992

ASTM D2412



Certificates





Pars Industrial Pioneer Engineering Co

www.iranpipeco.com
info@iranpipeco.com

4th Floor- Safir Apadana Building- 25Street- Rajai Blvd- Shiraz- Iran.

Tell: + 987136324970-3