

GRP Products and Services

For Industrial Applications



AMIATIT PIPE SYSTEMS

Amiantit – Group of Companies

The Saudi Arabian Amiantit Company (Amiantit) was established in 1968 in Dammam / Saudi Arabia and has grown and developed into a major diversified industrial group with operations spanning the globe. The Group's core business activities comprise:

- manufacture and sale of pipe systems
- ownership and sale of pipe technologies
- the provision of water management consultancy and engineering services
- manufacture and supply of polymer products

Today, Amiantit markets a wider range of pipe products than any other pipe manufacturer and provides a total solution to customers' fluid transfer needs that is designed to optimise the applied technology and costs. The Group serves industrial, municipal, civil engineering, energy, and agricultural markets worldwide, supporting global infrastructure development.

The Group comprises more than 30 manufacturing plants, 6 technology companies, several materials suppliers, and many supply and engineering subsidiaries in 17 countries. In addition, an extensive sales and service network caters for the needs of customers in 70 countries around the world.

Amitech Industrial

Amitech Industrial as a part of the Amiantit Group is located in different countries worldwide. It supplies a complete range of services for engineering and jobsite works. The division also designs and manufactures Glass Reinforced Plastic (GRP/GRE) and related thermoplastic/fluoro-plastic products for the mining, petroleum and chemical industries and gives individual support for special applications, installation and maintenance for many industrial applications.

Amitech Industrial in Spain is specialised in the engineering, design, delivery and installation of industrial pipe systems and applications.

Amitech Industrial South Africa designs, manufactures and installs worldwide plants and equipment which include piping, ducting and fittings, process vessels, gas scrubbing plant and vessels, solvent extraction plant, water treatment, storage tanks and other process vessels. Products and material also incorporates the supply and installation of supporting steel structures, stainless steel products, lead linings and products.

Our product brands:

- GRP (Glass-fibre Reinforced Polyester) pipe systems are called Flowtite and Vectus
- GRE (Glass-fibre Reinforced Epoxy) Pipe systems are named Amipox
- Thermoplastic pipe systems made of HDPE are sold as Amipol
- Thermoplastic pipe systems made of uPVC/mPVC are called Amiplas
- GRP tanks, vessels, ducting, pipe & fittings are branded as Speedmark



Industries and Applications

Thanks to their high performance, Amitech Industrial systems and services are of special interest for the chemical, petrochemical, metallurgical and mining industries:

Chemical and Metallurgical Industry

GRP/GRE and allied thermoplastic 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 make Amitech Industrial products the most suitable material for transporting/storing fluids, dumpings and water at high temperatures.

The success of GRP/GRE equipment in a chemical and metallurgical environment also relates largely to the initial design. Amitech Industrial boasts to having amongst the best design capabilities incorporating GRP/GRE and Thermoplastic process vessels and structures.



Petrochemical Industry

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.



Paper Mill Industry

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



Food and Agricultural Industry

Amitech Industrial GRP products have food certificates 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.



Water and Sewerage Systems

From raw water intakes to treatment plants and main distribution networks, Amitech Industrial has 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.

Shipbuilding Industry and Off Shore Rigs

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

Firefighting Systems

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





Power Stations

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 Plants

From sea water intakes and outfalls to all plant piping systems, Amitech Industrial provides all the products and services required in desalination plants worldwide.

Water Treatment Marine Systems

Commonly used in sea outfalls and intakes, large GRP structures are designed to provide long life and easy installation below sea. Water intakes as well as diffusers have been supplied up to 3.5 m diameter, combining workshop and jobsite manufacturing.

Large diameter wyes are also designed according to project specifications and provide great advantages during the installation as well as the operation of the pipelines.



Materials and Product Properties

Amitech Industrial's preferred material of choice is Glass-fibre Reinforced Polyester (GRP) or Glass-fibre Reinforced Epoxy (GRE). Depending on project requirements, the design work is also carried out for thermoplastic, fluoroplastic piping, vessels & equipment.

GRP/GRE is a composite material which is characterized by the high strength of the glass fibre and the corrosion resistance of the resin. The combination of mechanical and chemical properties of the glass fibres, together with the different resins used, combine in the final GRP/GRE product to a tailor-made solution for many applications. The important selection of the resin in combination with the glass fibres determines the level of corrosion resistance and influences the product properties with regard to temperature and pressure. The tables below show some of the key aspects of GRP/GRE compared to other materials such as steel.

	Filament Wound Epoxy	Rod Stock Polyester	Moulding Compound Phenolic	Spray-Up Polyester	Cold Press Moulding Polyester	Perform/MAT (Compression Moulded)	Low Carbon Steel (cold rolled)	Stainless steel
Glass fibre content by Weight, %	30 – 80	40 – 80	5 – 25	30 – 50	20 – 30	25 – 50	–	–
Flexural Strength MPa	689 – 1862	689 – 1241	124 – 165	110 – 193	151 – 255	68 – 275	193	206 – 241
Flexural Modulus GPa	34 – 48	27 – 41	20	68 – 82	89 – 131	89 – 124	2068	1931
Tensile Strength at yield MPa	551 – 1724	413 – 1241	48 – 117	62 – 124	82 – 137	172 – 206	199 – 227	206 – 241
Compressive Strength MPa	310 – 482	206 – 482	96 – 241	103 – 172	–	103 – 206	193	206
Ultimate Tensile Elongation, %	1.6 – 2.8	1.6 – 2.5	0.25 – 6	1.0 – 1.2	1 – 2	1 – 2	38 – 39	50 – 60
Heat Distortion at 1.82 MPa, °C	177-204	163-190	204 – 260	177 – 204	177 – 204	177 – 204	–	–
Continuous Heat Resistance, °C	260	66 – 260	163 – 177	66 – 177	66 – 204	66 – 204	–	–

Product properties of different materials -1-

	Filament-wound, Epoxy or Polyester Resins	Centrifugally Cast Epoxy or Polyester Resin	Contact Moulded Polyester Resin
Modulus of Elasticity in Axial Tension at 25° C, MPa	6895 – 18620	8963 – 10340	5516 – 12410
Ultimate Axial Tensile Strength at 25° C, MPa	55.1 – 68.9	1724	62 – 124
Ultimate Axial Tensile Strength at 25° C, MPa	165.5 – 344.7	241	62 – 68.9
Modulus of Elasticity in Axial Tension at 25° C, MPa	13790	8963 – 10340	6895 – 8274
Coefficient of Thermal Expansion, in./in./°C	15.3 – 22.86	23.4	27
Heat Deflection Temperature at 1.82 MPa	93 – 149	93 – 149	93 – 121
Thermal Conductivity Watt/centimeter - °C	0.00187 – 0.00288	0.00129	0.00216
Specific Gravity	1.8 – 1.9	1.58	1.3 – 1.7

Product properties of different materials -2-

Certificates and Approvals

Tensile Strength, MPa	689.50
Young Modulus, KPa	20.68
Elastic Recovery, %	10.00
Specific Strength, kN	76.00
Coefficient of Expansion, °C ⁻¹	72 – 108
Thermal Conductivity, cal/sec/cm ² /°C	8 x 10 ⁻⁵
Specific Heat, cal/g/°C	0.16 – 0.2

Mechanical properties of fibre glass

Features and Benefits

Amitech Industrial products provide long term economic solutions to customers around the world. The long list of features and benefits add up to provide an optimum system of installation and life cycle costs.

Corrosion-resistance

- Long, effective service life materials
- No need for linings, coatings, cathodic protection, wraps or other forms of additional corrosion protection.
- Low maintenance costs

Light weight

(1/4 weight of ductile iron or steel; 1/10 weight of concrete)

- Low transport costs
- Eliminates need for expensive handling equipment

Long standard lengths for pipes

(6, 12 and 18 metres)

- Fewer joints reduce installation time
- More pipe per transport vehicle means lower delivery cost

Extremely smooth inner bore

- Low friction loss in pipelines means less pumping energy needed and lower operating costs
- Minimum slime build-up can help lower cleaning costs.

Low thermal conductivity

UV resistance

Amitech Industrial considers quality an essential factor for the success of the company. In addition, respect for the environment is an essential factor of our company policy. The satisfaction of customer's requirements and quality standards has top priority, and all products supplied are manufactured according to the standards and certifications required by the customer. Amitech Industrial complies with different certifications or norms depending on our customer's requirements.

Depending on product and location, our products or facilities are approved

- by UNE EN ISO 9001:2000
- by UNE EN ISO 14001:96
- as AENOR product
- by ACS (Atestation de Conformité Sanitaire) for Potable water use
- by CSTB (Centre Scientifique et Technique du batiment)
- by NSF (Standard No. 61) – United States
- by DVGW – Germany

In addition, independent associations have certified the compliance of our products. Among others these are:

- American Society for testing and Materials, ASTM
- American Society for Mechanical Engineers, ASME
- American Water Works Association, AWWA
- Factory Mutual Research, FM
- American National Standards Institute, ANSI
- International Organisation for Standardisation, ISO



Product Range

Pipes

The types of pipes and fittings supplied are dependant on the required piping system for each application and project specifications. GRP/GRE pipes and fittings are manufactured by Continuous Filament Winding or Double Helix Filament Winding. To cater for several industrial applications, the GRP/GRE pipe systems are produced with Polyester, Vinylester or Epoxy resins and can be supplied in a wide range of diameters and pressures.

Individual requirements according to customer's requests are available.

Diameter	25 to 4000 mm
Nominal Pressure	1 to 100 bar
Stiffness	1250, 2500, 5000, 10000 Pa
Corrosion resistance	According to resins used
Temperature	Up to 120° C

Pipe Range of diameters and pressures



Fittings

Amitech Industrial has specialized in the design and manufacturing of fittings in GRP for all its range of pipes and applications. For metered fittings, a complete product range up to 4000 mm diameter and in all required pressure classes is available. Moulded fittings, also available in Polyester, Vinylester and Epoxy resins, are offered in diameters from 25 to 600 mm. Among others this includes the following main fittings:

- Elbows 11°-22°-30°-45°-60°-90°
- Equal and reduced tees.
- Concentric and eccentric reducers.
- Fixed and loose flanges.
- Caps
- Wyes

A speciality of GRP is the high flexibility with regard to shape and design. This allows the supply of tailor-made, special fittings, designed and manufactured according to the needs of your project.

Joining Techniques

All Amitech Industrial piping solutions have proven joining systems that ensure the correct functionality of the system through its whole estimated lifespan. Amitech Industrial supplies connections to other materials, connections to pumps, valves, vents and other instruments. The most common joining methods are:

- **Joint with elastomeric sealing rings** either as standard GRP coupling or bell-spigot end pipes for the double helix pipes. Adding a locking device can resist axial forces.
- **Butt and strap joints** are permanent joints consisting of a laminate of glass mat and tissue with resin, especially used for strong axial forces.
- **Flanged joints** allow the regular dismantling of the installation and are also used as connectors between different materials. Available as GRP/GRE fixed or loose flanges.
- **Adhesive bonded joints** are commonly used in epoxy piping (GRE) and allow fast and reliable connections by gluing the shaped bell ends of the pipe.



Tanks, Scrubbers, Vessels and Chimney Stacks

Amitech Industrial also designs, manufactures and installs customized GRP and related thermoplastic & fluoroplastic piping, ducting, process vessels, storage tanks, exhaust stacks and ancillaries.

This individually designed product range includes, for example:

- World's first patented scrubbing system including scrubber & quench vessels with internal diameters of 4.3 metres and overall height of up to 22 metres carrying internal weight in excess of 100 metric tonnes
- Scrubber vessels with internal diameters of 7.3 metres and overall height of up to 30 metres carrying internal weight in excess of 350 metric tonnes
- Pulsation columns for SX extraction with an internal diameter of up to 4.5 metres and overall length of 23 metres carrying an internal weight in excess of 250 metric tonnes
- Double walled underground storage tanks for petroleum storage with an internal diameter of 3.2 metres and overall length of 13.5 metres with a single storage capacity of 104 m³
- Chimney stacks with an internal diameter of 2.2 m and overall height of up to 77m
- Complete piping and ducting systems for electro-winning base metal plants
- Numerous process vessels including wet electrostatic mist precipitators, gas cooling towers, storage tanks, gas scrubbing vessels, including ducting, varying from 0.8 metres up to 2.4 metres in diameter

Services

Amitech Industrial offers outstanding experience and support in the design and development of solutions with composite material. Our experts support consultants and engineers in establishing the best GRP/GRE solution for their individual project. The common definition of the most important project parameters and a close product development guarantee the ideal performance of the installation on site.

Amitech Industrial offers the following services:

Technical assistance to designers and engineers for

- Project study and selection of the most suitable materials according to the conditions of corrosion, temperature and pressure.
- Detailed project engineering
- Configuration of the installation and calculation of supports and anchorages.
- Hydraulic calculations.
- Stress and finite analysis for underground and aboveground installations.
- Drawing of plants, isometrics and production sheets.

Prefabrication

- Spool drawings for jobsite fast assembly
- Workshop pre-mounting of spools.
- Special fittings manufacturing at jobsite

Installation

- Jobsite supervision
- Hydraulic tests.
- Jobsite teams for product installation.

Evaluation and Systems Maintenance

- Inspection and diagnosis of installed systems.
- Maintenance plans for established networks and plants.
- Repairing works and substitution of installations.



References

Due to its worldwide product availability, the Amitech Industrial has established projects all over the world. The list below only represents a small extract of the references available.

For further information please visit our reference page at www.amiantit.com!

Project	Country	Dimensions	Diameters	Length (m)
CTCC Barranco de Tirajana / ENDESA	Spain	2000	2000	600
CTCC Cas Tresorer / ENDESA	Spain	1300	1300	300
CTCC As Pontes/ ENDESA	Spain	2800 / 2000	2800 / 2000	400
CTCC Catagena Escombreras/ AES	Spain	3500 / 3200	3500 / 3200	200
Biodiesel Moyresa / PREMONOR	Spain	600	600	100
Las Salinas / UNELCO-ENDESA	Spain	600 / 400 / 150 / 50	600 / 400 / 150 / 50	320
Firefighting Ferrol / DRAGADOS	Spain	350 / 200 / 150	350 / 200 / 150	5494

Project	Country	Description
TMMIC/LURGI	Taiwan	Manufacture and installation of sulphuric acid mist precipitators and corresponding GRP ducting
AMPLATS/ LGP	South Africa	Design, manufacture and installation of 7.3 m dia x 30 m high gas scrubbing towers, storage vessels and ducting and piping for platinum plant
CHEVRON/ TEXACO	Angola	Supply and installation of material and piping for pumping seawater for cooling purposes on oil refinery
IMPALA PLATINUM	South Africa	Design, manufacture and installation of 2.2 m x 77 m high GRP chimney stack, ducting, piping and process vessels
SKORPION ZINC MINE	Namibia	Process piping (25mm to 2200 mm dia), Tanks, Ducting and Launderers for electrowinning cellhouse and Solvent extraction plant
MOPANI COPPER	Zambia	Design, manufacture and installation of sulphuric acid mist precipitators. Cooling towers, Gas scrubbers and piping and ducting



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Distributed by:



**Amitech
Industrial S.A. (Pty) Ltd.**

– Headquarter –
P.O. Box 3261
Kenmare 1745
South Africa
Tel: +27 11 955 12 16
Fax: +27 11 955 12 32
info@amitechindustrial.co.za
www.amitechindustrial.co.za

**Amitech
Industrial Sasolburg (Pty) Ltd.**

P.O. Box 360
Sasolburg, 1947
South Africa
Tel: +27 16 920 23 28
Fax: +27 16 920 24 73
speedsasol@iafrica.com
www.amitechindustrial.co.za

**Amitech
Industrial Namibia (Pty) Ltd.**

P.O. Box 3261
Kenmare 1745
South Africa
Tel: +26 48 12 70 00 50
Fax: +27 11 955 12 32
info@amitechindustrial.co.za
www.amitechindustrial.co.za

**Amitech
Industrial North Coast (Pty) Ltd.**

P.O. Box 10364
Empangeni 3880
South Africa
Tel: +27 35 787 01 55
Fax: +27 35 787 01 41
nci@futurenet.com
www.amitechindustrial.co.za

**Amitech
Thushanang (Pty) Ltd.**

P.O. Box 50094
Zinniaville - Rustenburg 0302
South Africa
Tel: +27 14 538 04 14
Fax: +27 14 538 02 25
thushanang@iafrica.com
www.amitechindustrial.co.za

**Amitech
Industrial Spain S.A.**

Polígono Industrial Sur
C/ Farigola, 38
08755 Castellbisbaal (Barcelona)
España
Tel: +34 937 72 27 52
Fax: +34 937 72 28 40
info@amitech.es
www.amitech.es

www.amiantit.com