FARATEC GRP pipe
Production Lines

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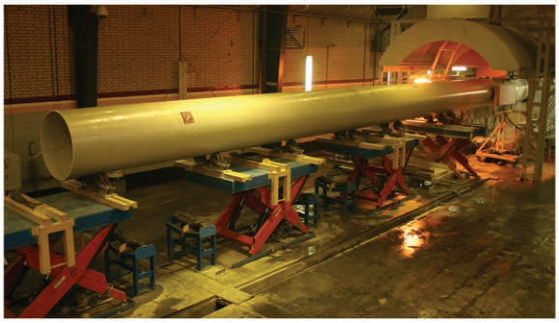
The continuous filament winding process by FARATEC technology allows producing GRP (Glass Reinforced Plastic) pipes in a continuous way and is carried out fully in compliance with international standards.
Glass filament reinforcements are wound continuously around a spiral steel band and metal beams called a mandrel, raw materials (resin, glass, silica sand, chopped fiber) are machine-fed on it, to form the structural wall of the product.
Produced pipe is cut to proper size by automatic saw units. All settings and feeds are automatically executed and monitored by PLC and computer.



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Qualification tests :

FARATEC provides knowhow and technology to its customers through its highly educated team of researchers and engineers, with more than 30 years of experience in the composite industry. FARATEC is one of the most
advanced international research centers concentrates on composite pipes.

Also FARATEC is collecting long-time experience and references in the construction of plants (and production lines) for the manufacturing of GRP pipes suitable for different fields of application. The range of services supplied by FARATEC covers all phases of an industrial execution, from the system analysis, through the engineering and up to the construction and start-up on site. The granting of theoretical and practical training of the customer's personnel and after-sale skilled assistance, in addition to the above services, makes FARATEC one of the most complete and competitive companies operating in the field of GRP production Plants.

Development of high-technology filament winding systems plays a fundamental role in production of high quality GRP piping systems. This new generation of production technology has caused reduction in production cost while maintaining high level of quality. FARATEC's fully automated, numerically controlled continues and discontinues winding equipment are in full operation in South Korea, Turkey, Romania and Iran. FARATEC's customers benefit from a full package of technology support, such as complete documentation, plant lay-up, test equipment, training, mechanical installation of each production unit, plant startup, and full range of operation marketing and staff

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Continuous Filament Winding (CFW): The glass fiber laminate is applied onto a re-forming moving mandrel. As the mandrel moves, fine graded filler, glass fiber, resin and surface materials are metered on in precise amounts under the direction of a Programmable Logic Controller (PLC) and personal computer (PC). The PLC-PC modules provide integrated process control based on pre-programmed recipes. Only basic pipe data such as diameter, pressure and stiffness class needs to be entered and the computer calculates all the machine settings. Material consumption, as well as pipe thickness is continuously monitored and logged.

Curing of the laminate is accomplished with a combination of induction heating through the steel band and infra-red (IR) elements directly heating the laminate.

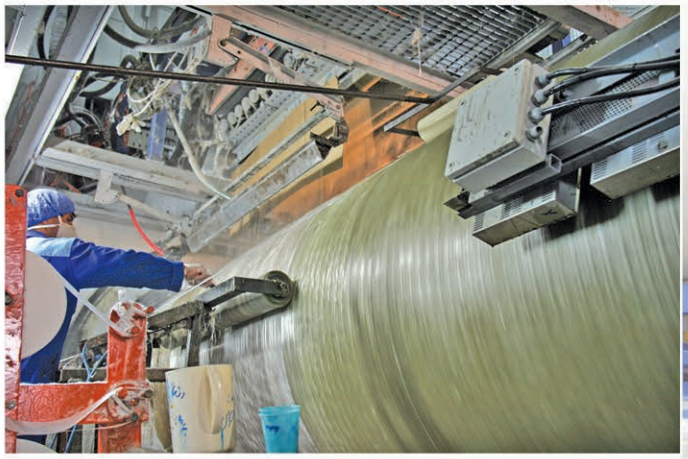
With the dual resin delivery system, the FARATEC equipment has the capability of applying a special inner liner resin for corrosive applications while utilizing a less costly resin for the structural and outer portion of the laminate.

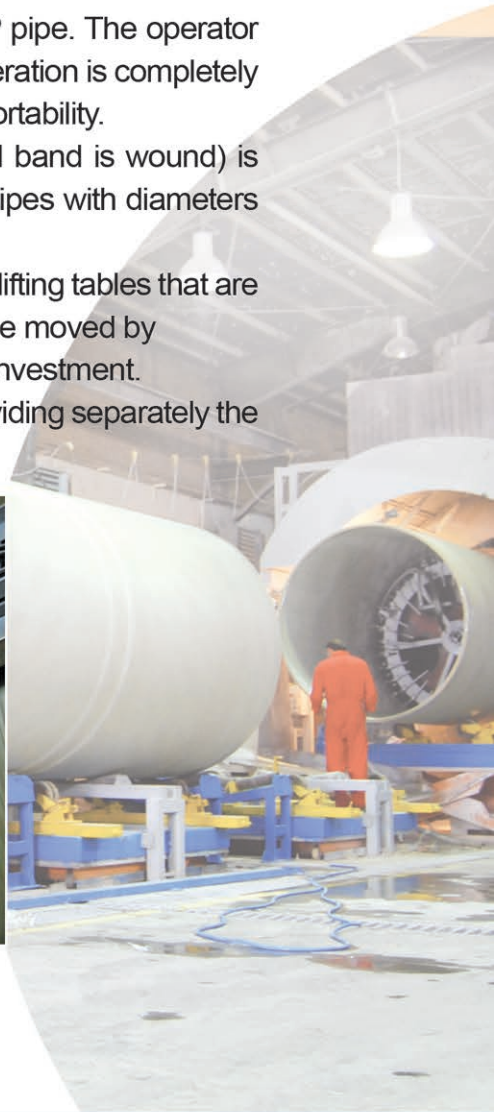
The saw unit is synchronized with the continuous longitudinal movement of the laminate, which ensures a clean perpendicular cut of the GRP pipe. The operator presents the length of pipe in the control system so the saw operation is completely automatic. The length of such pipes is only restricted by transportability.

The diameter of the mandrel (around which the endless steel band is wound) is changeable, thus enabling it to be used for the production of pipes with diameters 300-4000 mm.

After passing the cutting station, the cured pipe is supported on lifting tables that are specially designed for receiving the pipes. The pipe may then be moved by conveyor, forklift, cart or crane, depending of plant design and investment.

The process is suitable as well as for tanks manufacturing, providing separately the end caps.





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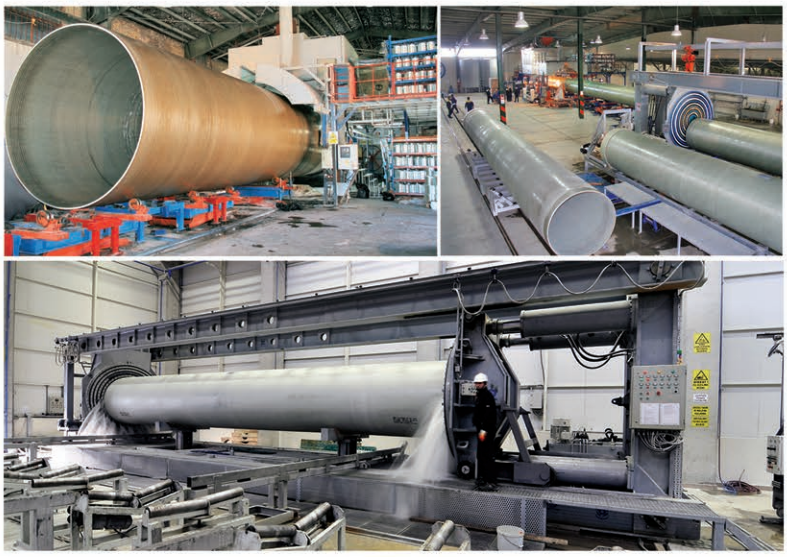
Discontinuous Filament Winding (DFW): The inside diameter of the finished pipe is defined by the mandrel outside diameter and the designed wall thickness is achieved by repeated winding passes. In such a way the outside diameter of pipe (OD) is determined by the pipe wall thickness.

MAIN PRODUCTION LINES

1) FD300 - Discontinuous line for manufacturing of GRP pipe ND100- 300mm
2) CFW1500 - Continuous line for manufacturing of GRP pipes / tanks ND300-1500 mm
3) CFW2400 - Continuous line for manufacturing of GRP pipes / tanks ND300-2400mm
4) CFW3000 - Continuous line for manufacturing of GRP pipes / tanks ND300-3000mm
5) CFW4000 - Continuous line for manufacturing of GRP pipes / tanks ND300-4000mm



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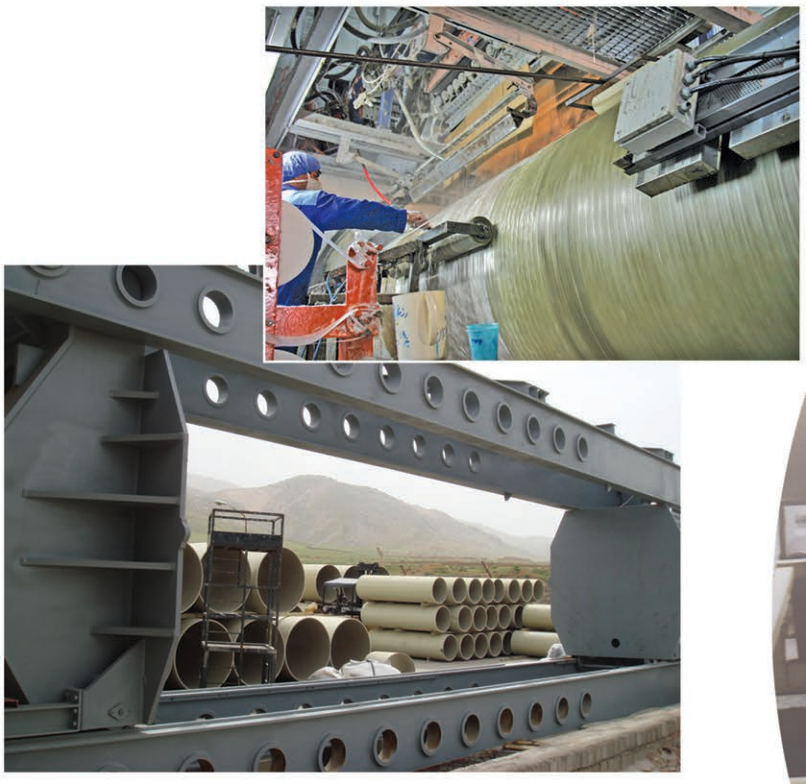
In addition to pipe production machines, FARATEC also produces and supplies the following auxiliary machines and equipments if needed:

- Laboratory equipment and measurement devices
- Ancillary machineries and transportation vehicles
- Coupling milling machine
- Coupling mounting machine
- Chamfering and calibration machine
- Pipe hydrotest machine
- Coupling hydrotester
- Resin bulk tanks
- Sand bulk tanks
- Styrene bulk tank
- Fitting manufacturing equipment



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Most important items needed for establishing GRP pipe factory:

- Total land, approximately 30,000 m (up to 60,000 m^2 depending on future development in case of adding more production lines)
- Building for 2 winders including storage , Resin tanks, sand silo, Laboratory, Fitting, Coupling Production 3,500 m (up to 7,000 m^2 depending on future development)
- Finish goods storage 25,000 ~ 40,000 m^2 with concrete or asphalt ground
  Office building 200 ~ 500 m^2

- Electrical power, approximately 500 kw for two winders
- Water 20 ~40 m^3/day
- Operation personnel should be at least 15 people at each shift per winder
- Administrative personnel
- Technology service , license agreement , royalties , R&D support

The given data are for information purposes only and may be subject to change without prior notice.