



# MEGHA FIBRE GLASS INDUSTRIES LIMITED



**Glass Reinforced Plastic (GRP) Pipes**



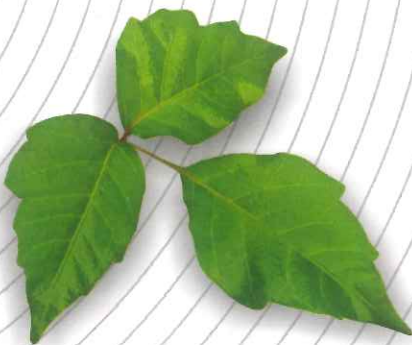
### QUALITY POLICY

To strive to become a leader in the manufacturing of Glass Reinforced Plastic (GRP) Pipes and Fittings, to the satisfaction of customers, through implementation of Quality Management System by the Organization.

### EHS POLICY

We, at MFGIL, are committed to continually improve EHS performance in the manufacture of GRP, GRE pipes and pipe fittings by,

- ❖ Our commitment to prevent pollution, injury and ill health
- ❖ Comply with all EHS legal requirement and other requirements viz. customer, society and others
- ❖ Commitment to reduce waste, conserve natural resources, strive for cleaner technologies and improve work place environment for improved EHS performance
- ❖ Communicate to all employees, contractors and visitors, about their EHS obligations.





## **MISSION**

To continuously strive to develop superior infrastructure meeting the highest standards of engineering excellence, efficiency, quality, and economy without compromising on our corporate social and environmental responsibilities.

## **VISION**

We aim to provide a superior quality of life to the common man by continuous improvement of core infrastructure.



## **THE MEIL GROUP**

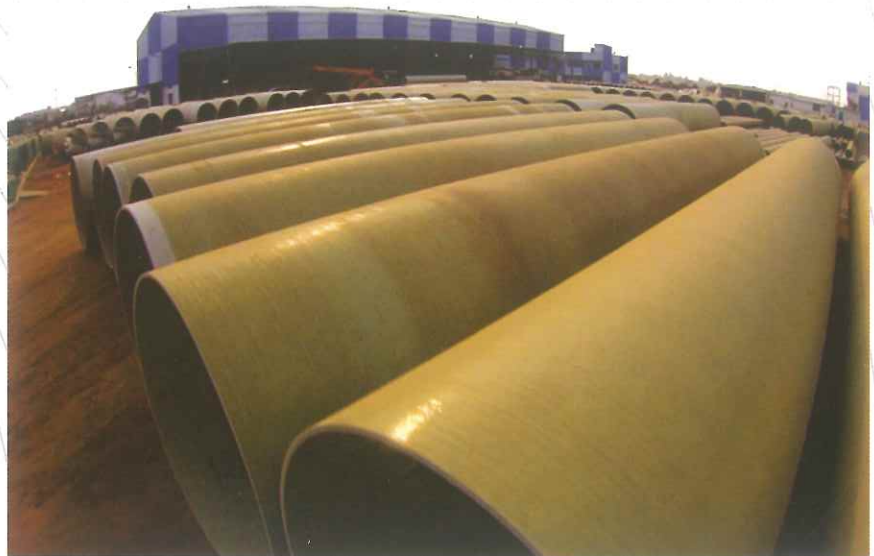
Megha Engineering and Infrastructures Limited (MEIL) is the parent company of MFGIL. It is an engineering & infrastructure company with strong and proven design, development and delivery credentials across more than ten verticals. Our comprehensive backward integration plan makes us a one-stop solution provider for various industries. This enables us to deliver the requirements within time and budget, and to customize solutions for the customer.



## **ABOUT MFGIL**

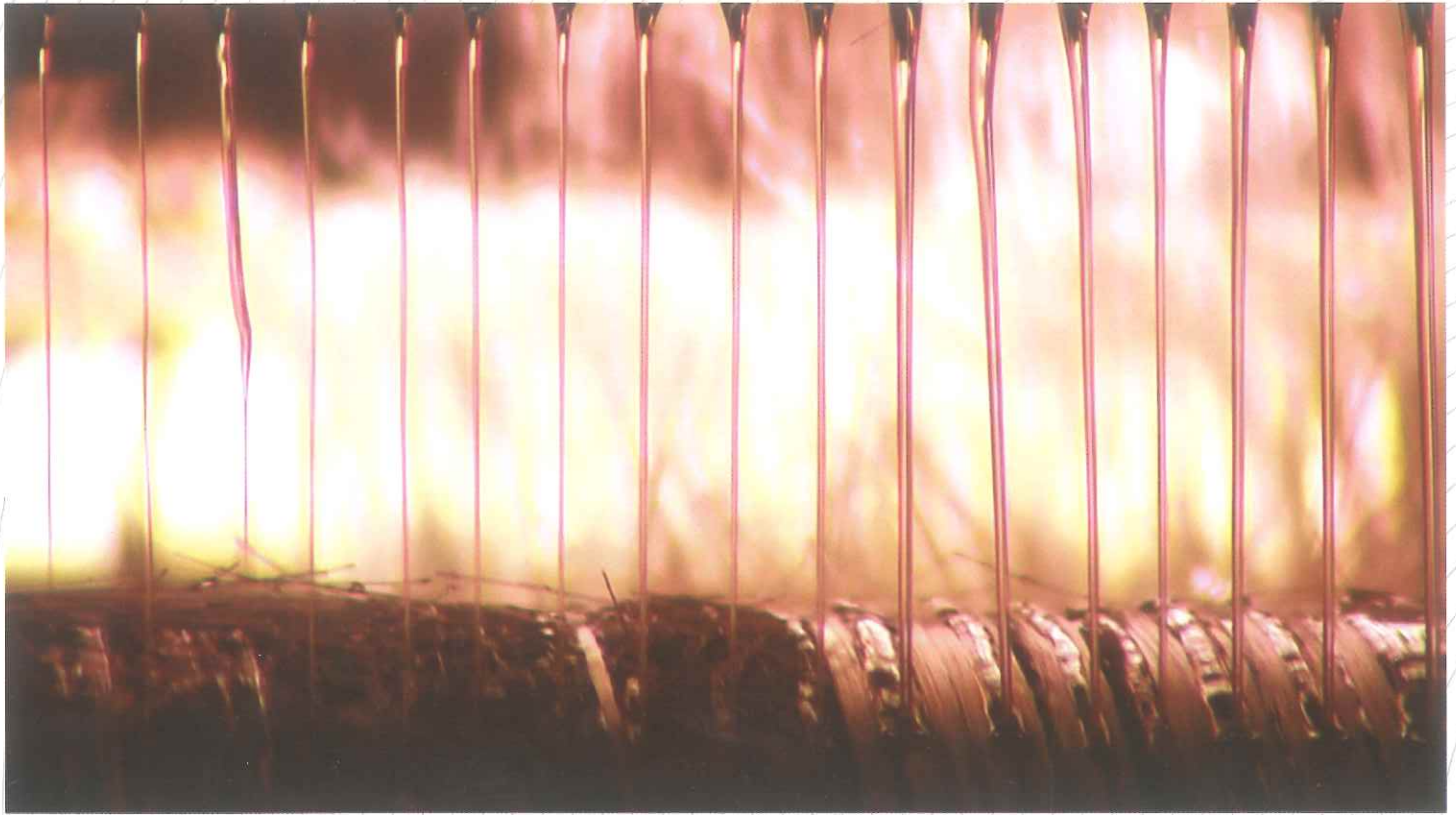
Megha Fibre Glass Industries Ltd. has grown to become a recognized manufacturer of Glass Fibre Reinforced Polyester (GRP) pipes on continuous mandrel process, which represents the state-of-the-art in GRP pipe production technology. The unit also manufactures Glass Reinforced Epoxy (GRE) pipes.

In the role of an EPC contractor, we are involved in the laying, jointing, testing and commissioning processes.



## **GRP PIPES**

MFGIL-GRP is the first Plant in South India to manufacture Glass Reinforced Polyester (GRP) pipes, with a considerably large diameter (upto 2600 mm), on CFW Machine. This process allows the use of continuous glass fibre reinforcements in the circumferential direction. The production activities are carried out under controlled procedure with continuously advancing Mandrel process.



### **GENERAL CHARACTERISTICS OF GRP PIPES**

- ❖ Excellent corrosion resistance
- ❖ Excellent strength to weight ratio
- ❖ Very light weight
- ❖ Electrical properties - GRP pipes are non conductive, but conductivity can be introduced during manufacturing, if required, for special applications.
- ❖ Dimensional stability - While maintaining dimensional limits, the pipe laminate exhibits excellent mechanical & chemical properties.
- ❖ Low maintenance cost - almost nil.

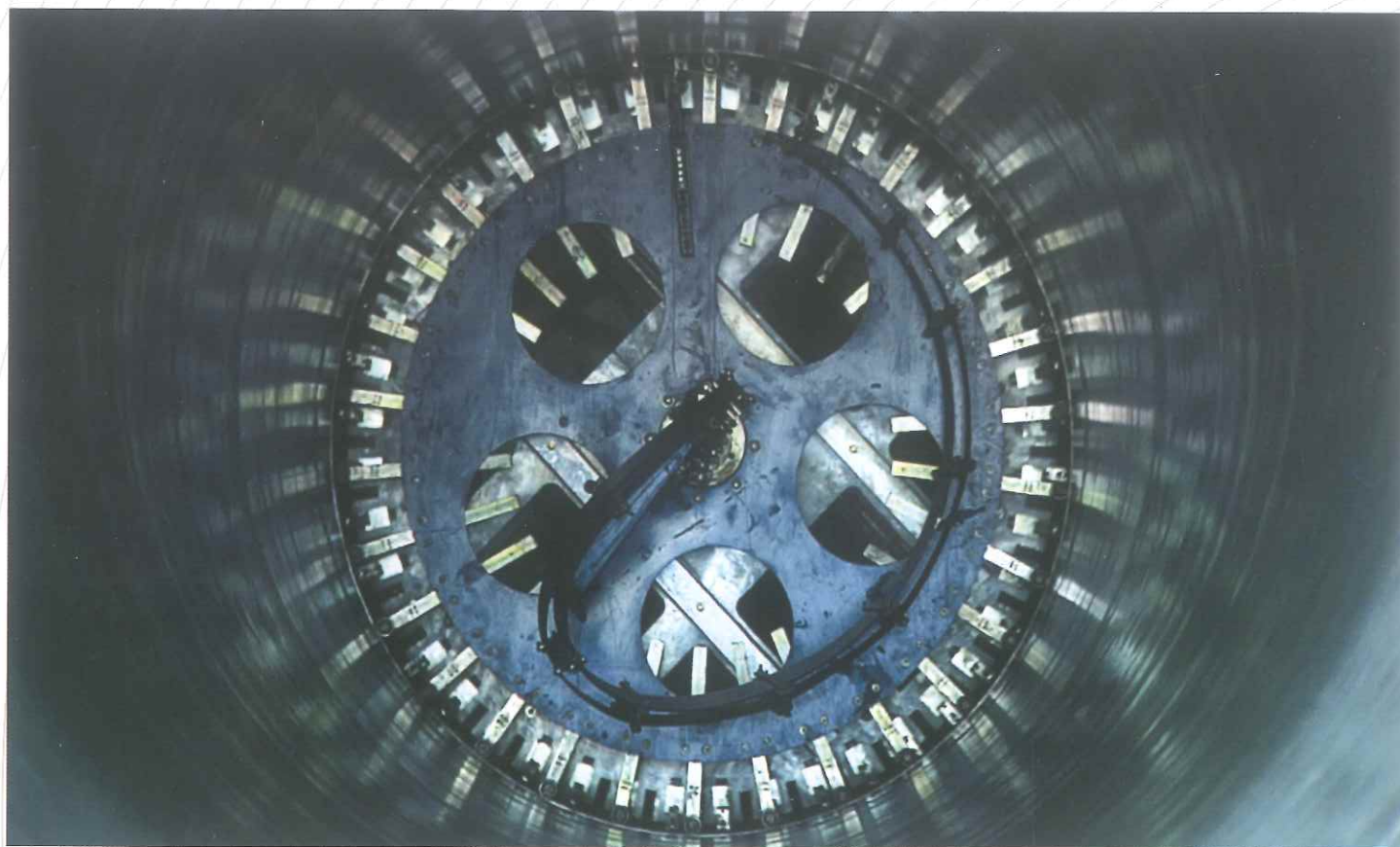


## APPLICATIONS OF GRP PIPES

Growing awareness of the operational cost savings and superior corrosion resistance offered by fibreglass-reinforced pipe by operations has resulted in widespread use for the following applications:

- ❖ Water transmission and distribution (potable and raw water, Irrigation)
- ❖ Sanitary sewerage collection systems and outfalls (direct bury and sliplining)
- ❖ Storm sewers
- ❖ Hydroelectric penstock lines
- ❖ Seawater intake and outfalls
- ❖ Circulating cooling water, make-up and blow down lines for power plants
- ❖ Industrial applications
- ❖ Industrial effluents
- ❖ Industrial process pipelines
- ❖ Industrial ducting
- ❖ Well-casing
- ❖ Fire protection
- ❖ Industrial wastes & effluents
- ❖ Food industries





## **OUR CAPACITY**

MFGIL can manufacture GRP pipes ranges from a nominal diameter of 300 mm to 2600 mm & fittings with different stiffness and pressure classes by complying to national and international standards.

MFGIL has in-house Pipe Design, R & D Department and a complete test facility. The unit has a fully integrated facility of manufacturing and testing of GRP pipes, as per standards. MFGIL has a production capacity of about 300 km per year.



## TECHNICAL SPECIFICATIONS (Pipes)

DN	OD (mm)	ID (mm) *		Wall Thickness (mm) *		Pipe Weight (Kg/m) *	
		min	max	min	max	min	max
300	310	298.7	301.6	4.19	5.66	7.15	10.13
350	361	348.2	351.4	4.79	6.40	9.83	13.50
400	412	397.7	401.2	5.40	7.16	12.84	17.41
450	463	447.2	450.9	6.03	7.91	16.29	21.82
500	514	496.7	500.7	6.66	8.65	20.19	26.63
600	616	595.7	600.4	7.79	10.16	28.66	37.90
700	718	694.7	700.2	8.91	11.67	38.60	51.13
800	820	793.6	799.9	10.04	13.19	50.02	66.37
900	924	894.6	901.6	11.19	14.69	63.19	83.71
1000	1026	993.7	1001.4	12.31	16.16	77.51	102.59
1100	1128	1092.7	1101.3	13.33	17.67	92.70	123.71
1200	1229	1190.8	1200.1	14.44	19.12	109.77	146.27
1300	1332	1290.5	1300.7	15.67	20.74	129.56	172.31
1400	1434	1389.5	1400.4	16.79	22.24	149.83	199.31
1500	1536	1488.7	1500.2	17.92	23.66	171.51	227.44
1600	1638	1587.7	1599.9	19.04	25.16	194.79	258.39
1700	1740	1686.7	1699.7	20.16	26.67	219.48	291.22
1800	1842	1785.8	1799.4	21.18	28.08	245.63	325.05
1900	1944	1884.6	1899.9	22.06	29.69	268.98	363.10
2000	2046	1983.8	1999.0	23.52	31.10	302.36	400.65
2100	2148	2082.8	2098.7	24.64	32.61	332.93	441.40
2200	2250	2181.8	2198.9	25.56	34.12	362.05	484.14
2300	2351	2279.7	2297.7	26.67	35.63	395.07	528.57
2400	2453	2378.7	2397.4	27.79	37.14	429.91	575.25
2500	2556	2478.9	2498.2	28.92	38.55	466.61	622.54
2600	2658	2577.0	2597.9	30.05	40.05	504.41	673.10

\* Depending on stiffness and pressure class

**Note :** All values listed above are for information only. Exact values are given for specific pipes request on order.



## TECHNICAL SPECIFICATIONS

### Strength (SN)

Stiffness Class – SN*	
1.	1250
2.	2500
3.	5000
4.	10000

\* Nominal Stiffness in N/m<sup>2</sup>

### Temperature (°C)

Maximum working temperature for GRP pipes depends on the resin usage. Maximum working temperature for polyester resin is 60°C-70°C.

### Flow Speed

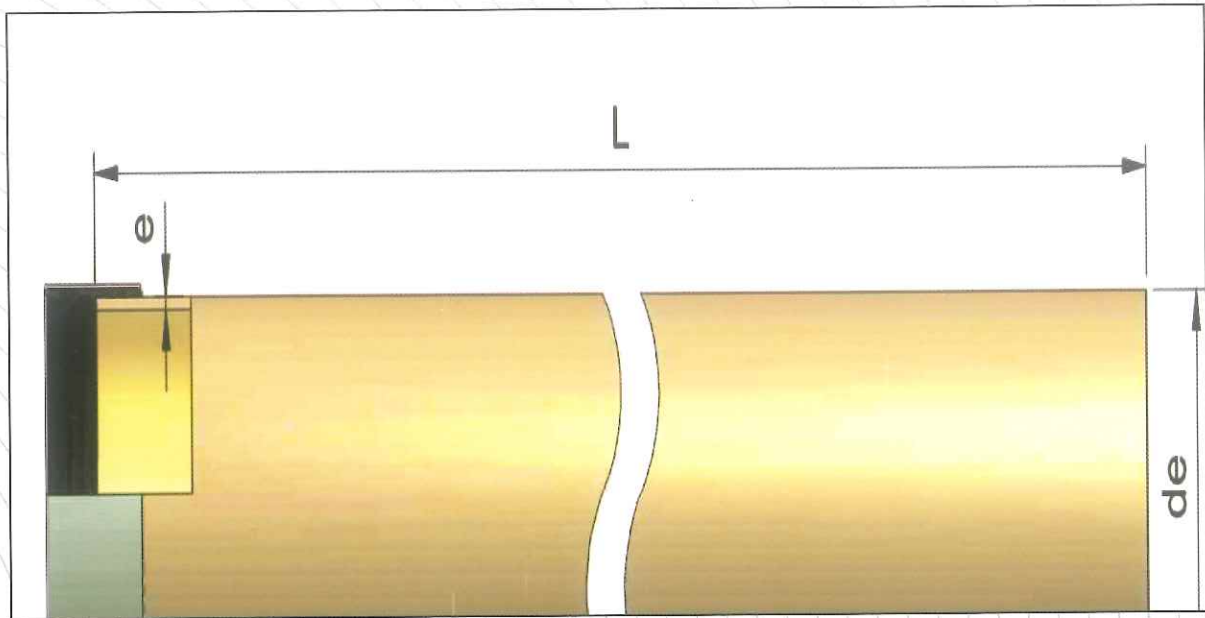
Maximum recommended fluid velocity is 3.7m/sec.

### Friction Factor

Hazen-Williams roughness coefficient C value is 150-165.

### Temperature coefficient (m/m per 1°C)

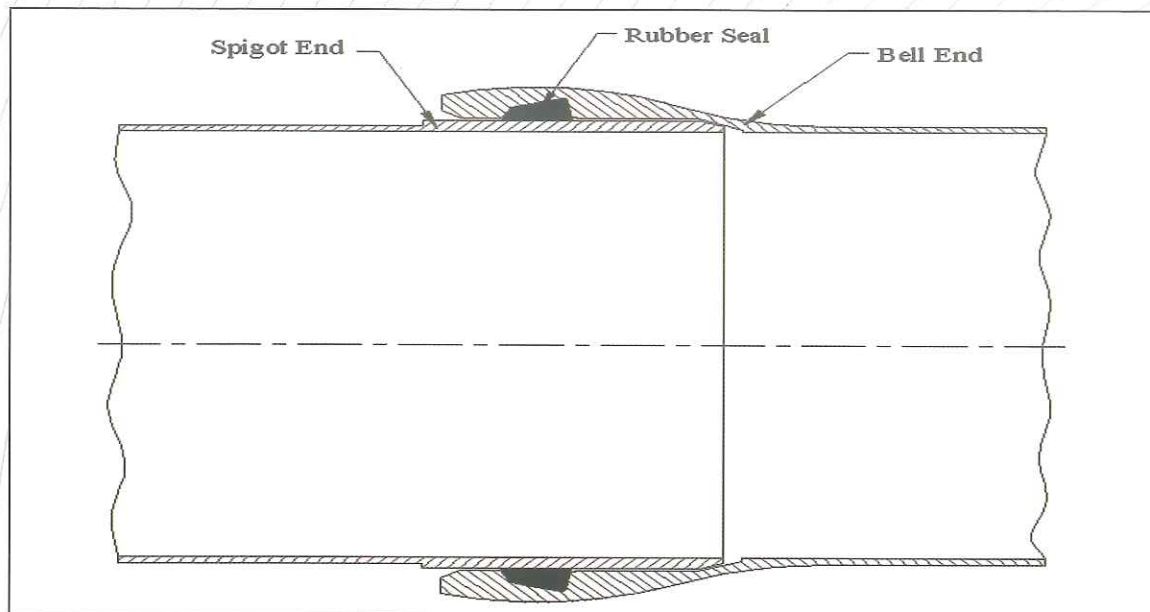
Thermal expansion coefficient depends on the pipe structure and varies from 2.4-3.0X10<sup>-5</sup> m/m<sup>0</sup> C.



### MFGIL PIPE JOINTING METHODS (GRP PIPES)

#### Double bell coupling joint

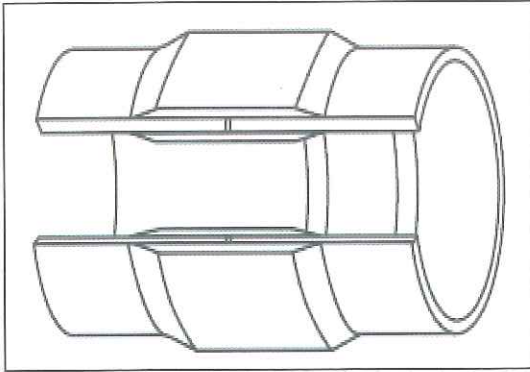
It is the fastest and easiest method of pipe joining. It requires stopper and rubber gasket for joining two pipes. Coupler is employed to connect two GRP pipes, which are mainly used for underground application. MFGIL double bell coupler has grooves inside the coupler to retain elastomeric seals that shall be the sole element of the joint to provide the water-tightness. This flexible joint allows for axial movement of the pipe in the coupler. Both ends of GRP pipe have a spigot, which matches with the coupler.



## MFGIL PIPE JOINTING METHODS (GRP PIPES)

### Bell & spigot with rubber sealing ring

It has a groove, either on the spigot or in the bell to retain an elastomeric gasket that is the sole element of the joint to provide water-tightness. The socket end of this joint is an integral filament wound part of the pipe. The spigot end is a machine part on which the O-ring seal is positioned. This flexible joint allows for axial movement of the spigot in the socket and some angular deflection. These joints are generally available for pipes up to 300mm diameter.



## **MFGIL PIPE JOINTING METHODS (GRP PIPES)**

### **Butt & Wrap joint (Lay-up Joint)**

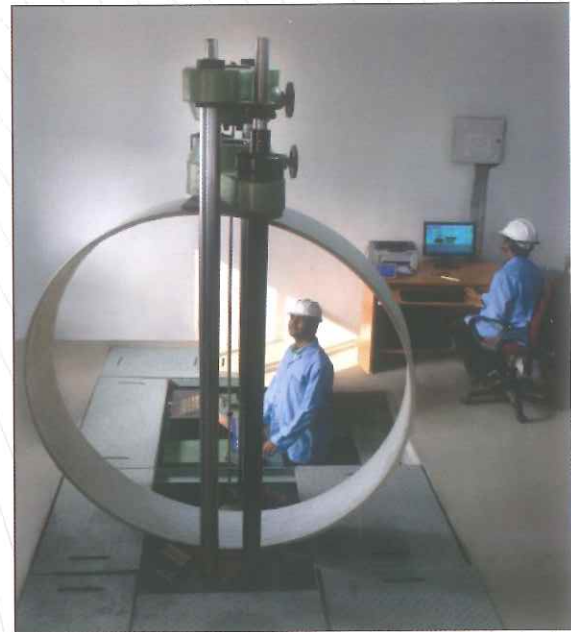
Butt joint is a hand laminated joint and is done by overlay of fibre glass i.e. WR and CSM impregnated with polyester resin. It is a permanent joint. The Butt & Wrap joint consists of plain-ended pipes and fittings, prepared, aligned and laminated with reinforcing fibers and adhesives. The pipe ends are abutted end to end, aligned on the same centerline, and the joint is over wrapped with layers of resin impregnated glass fiber materials. Before work on laminated joint is started, all necessary equipment for completing the procedure must be available. A jig or other holding device should be used to ensure that the pipes are maintained with joint faces held tightly together without offset. The restraints should be left in place until the joints have fully cured.



## GRP FITTINGS

Fibre glass fittings and specials are available over a wide range of diameters, pressures and configurations. These can be prepared by compression mold, filament winding, cutting and mitering and contact molding.

Fittings include bends, tees (concentric/air valve/scour valve), flanges, reducers, manholes etc. High flexibility of the materials used allows the manufacturer in the fabrication of custom-designed specials as per their requirements. Chopped strand mats and woven roving are the main reinforcing materials used in the fabrication of the fittings.



## **IN-HOUSE PRODUCTION TESTING AND DESIGN FACILITY**

The testing facility at our unit caters to stringent quality checks at every stage of the manufacturing process. The quality team facilitates:

- ❖ Raw material inspection
- ❖ Dimensional and workmanship
- ❖ Hydro test
- ❖ Stiffness test
- ❖ Beam strength
- ❖ Longitudinal tensile strength
- ❖ Hoop tensile test
- ❖ Type test
  - a) Long-term hydrostatic test (HDB)
  - b) Potability of water (for potable water supply pipe)
  - c) Strain corrosion test (sewerage, industrial waste & water other than potable pipe).



## OUR SERVICES

### Design

Megha GRP employs engineers who are fully competent in the design and structural analysis of composite equipment, and use computer-aided design and finite element analyses to ensure that the equipment to be produced meets the project requirements.

### Drafting

Before any fabrication begins, detailed drawings are submitted for approval and must be approved by the customer to avoid any misunderstandings.

### Field Installation

For large field tanks, duct systems and piping installations, Megha GRP sends crews around the world to provide field installation services.





## **AFTER SALES SERVICES**

MFGIL-GRP Field Service Dept. plays a vital role in GRP product's installation. Installation sites are visited occasionally by our well-experienced field services staff. Special visits are also made, as per customer's request, to ensure that the product is installed as recommended by the manufacturer.

MFGIL's after-sales service is not just limited to product installation. We also provide training to customer's crew, site pipe hydro-testing assistance, and facilitate round-the-clock emergency service as and when required by the customers.



## QUALITY CERTIFICATIONS

SYSTEMS CERTIFICATIONS	
ISO 9001 - 2008	Quality Management System
ISO 14001 - 2004	Environment Management System
OHSAS 18001 – 2007	Occupational Health and Safety Assessment System

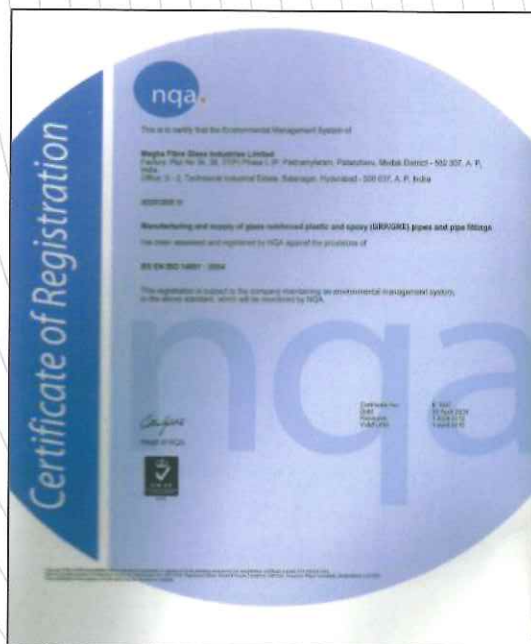
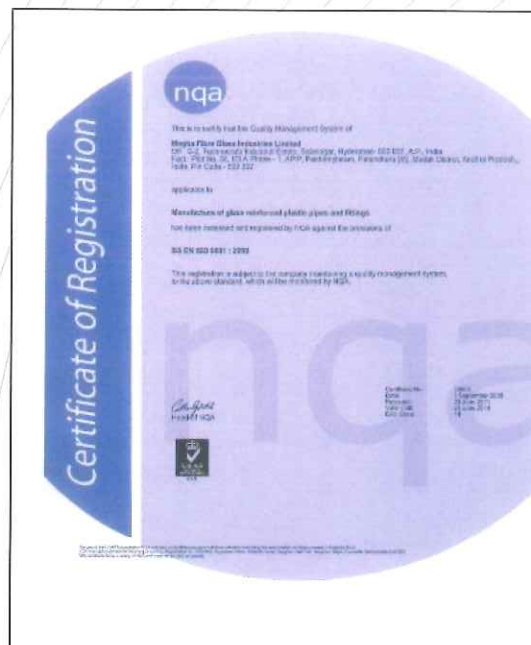
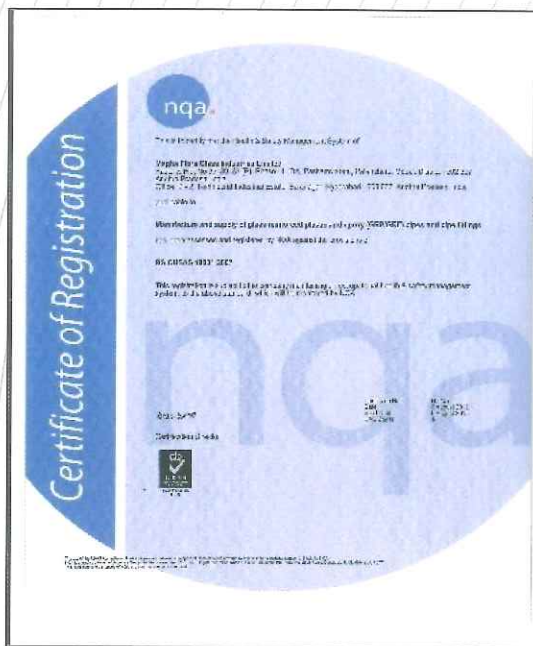
PRODUCT CERTIFICATIONS	
BIS 12709:1994	Glass Reinforced Plastic (GRP) Pipes, Joints and Fittings for Potable Water Supply
BIS 14402:1996	Glass Reinforced Plastic Pipes, Joints and Fittings for Sewerage, Industrial Water (other than potable water)



## REFERENCE STANDARDS

REFERENCE NATIONAL / INTERNATIONAL STANDARDS	
<b>AWWA</b>	
AWWA – M45 AWWA manual for fiberglass pipe design	
AWWA – C950 AWWA manual for fiberglass pressure pipes	
<b>ASTM</b>	
ASTM D - 3754	Fiberglass Pressure Sewer
ASTM D - 3517	Fiberglass Pressure Pipes
ASTM D - 3262	Fiberglass Gravity Sewer Pipes
<b>British Standards</b>	
BS- 5480	Pipes & Fittings for Water & Sewer Pipes
<b>ISO</b>	
ISO- 10639	Plastic Pipes for Pressure & Non - pressure Water Supply ( GRP)
ISO- 10467	Plastic Pipes for Pressure & Non - pressure Drainage and Sewerage Supply ( GRP)

## QUALITY CERTIFICATIONS



BIS Certification for  
GRP Pipes and Fittings:  
IS 14402:1996  
CM/L - 4418257



BIS Certification for  
GRP Pipes and Fittings:  
IS 12709: 1994  
CM/L - 6897107



## ADVANTAGES OF GRP PIPES OVER OTHER PIPES

COMPARISON OF GRP PIPES WITH DI, MS EPOXY COATED, PVC & HDPE PIPES						
S. No.	Description	GRP Pipes	DI	MS Epoxy Coated	PVC	HDPE
1.	Corrosion resistance	Good	Very poor corrosion resistance. Hence inside cement lining is required. For outside corrosion protection wrapping, coating, Cathodic protection is required.	To avoid inside corrosion, additional epoxy coating is required. For outside corrosion protection wrapping, coating, Cathodic protection is required.	Poor against alkali medium	Good
2.	Maintenance	Less maintenance is required	External coating may peel off in due course of time due to rough handling and environment. Periodic maintenance is required.	External coating may peel off in due course of time due to rough handling and environment. Periodic maintenance is required.	Repair is not possible	Repair is not possible
3.	Life	50 years	15-20 years (due to corrosion)	10-15 years (due to corrosion)	5-8 years depending on the service condition	5-6 years depending on the service condition
4.	Underground application	Best design optimization possible between meeting internal pressure class and stiffness requirement with fiber orientation and sand aggregate addition	The life of the underground DI pipe is reduced due to external corrosion	The life of the underground DI pipe is reduced due to external corrosion	Not suitable for underground application	Uneconomical design calling for very high thickness.

## ADVANTAGES OF GRP PIPES OVER OTHER PIPES

### COMPARISON OF GRP PIPES WITH DI, MS EPOXY COATED, PVC & HDPE PIPES

S. No.	Description	GRP Pipes	DI	MS Epoxy Coated	PVC	HDPE
5.	Inside smoothness	Hazen-William coefficient ("C" value) = 150; hence less pumping cost	"C" value = 120; hence pumping cost is higher	"C" value = 120; hence pumping cost is higher	"C" value = 150	"C" value = 150
6.	Design	Optimized design depending upon operating condition	Standard size	Up to 400 NB – Standard size above 400 NB design includes corrosion allowance	Standard size	Standard size
7.	Specific gravity	1.8 - 1.9	7.05	7.85	1.4 - 1.45	0.95
8.	Weight	Light in weight	4 times higher than GRP	4 times higher than GRP	Weight is higher than GRP due to wall thickness	Weight is higher than GRP due to wall thickness
9.	Handling	Handling is very easy since very light in weight	Difficult, due to heavy weight	Difficult, due to heavy weight	Handling is very easy	Handling is very easy
10.	Wall thickness	Lesser wall thickness due to proper fiber orientation	For a particular pressure rating, wall thickness is higher than GRP	For a particular pressure rating, wall thickness is higher than GRP	For a particular pressure rating, wall thickness is higher than GRP	For a particular pressure rating, wall thickness is higher than GRP
11.	Tensile strength	Hoop tensile strength = 375 Mpa	Min 420 Mpa	Min 400 Mpa	50 Mpa	35 Mpa
12.	Modulus of elasticity	Hoop tensile modulus = 35 Gpa	150 – 170 Gpa	210 – 240 Gpa	3 Gpa	5 Gpa
13.	Cost	–	15% higher than GRP	Plain steel pipes on par with GRP, Epoxy coating extra	Higher for 300 NB and above sizes	Higher for 150 NB and above sizes

## **BUSINESS AND TRADE ENQUIRIES**

Please contact us at the following address for enquiry, feedback or suggestions.

Address :  
Megha Fibre Glass Industries Ltd.  
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web : [www.mfgil.in](http://www.mfgil.in)

