GLASS REINFORCED PIPES & FITTINGS
For Municipal & Industrial Applications

EXTRA CO COMPOSITES INDIA PRIVATE LIMITED

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IN COLLABORATION WITH
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Introduction

Extra Co, India an ISO 9001:2008 certified company in collaboration with Extra Co, Sharjah, UAE, a powerful Brand throughout the Middle East Countries. It has a reputation for Technically Superior Quality Products and it provides value for Money. Hence Extra Co, India will have access to superior technology compared to the competitors and also the stringent manufacturing/quality practices will be employed enabling the company to provide quality products on time bound schedules with better pricing to the satisfaction of esteemed customers.

Extra Co Composites India Pvt. Ltd has set up a State of the Art Factory for the Manufacture of GRP/GRE/GRV (Glass Reinforced Plastics) Pipes, Tanks, Fittings and other specialty products at Tada Village, Tada Mandal, Nellore District, A.P, India.

The Design, Engineering and Manufacturing facilities are spread over a 60,000 Sq Feet dedicated facility with all world class machinery backed by a team of experienced professionals in the field of Composites.

Extra Co, has obtained the following accreditations:

- ANSl/AWWA C950-01 from TUV India Pvt. Ltd.
- IS 12709 : 1994 from Bureau of Indian Standards (BIS)
- IS 14402 : 1996 from Bureau of Indian Standards (BIS)*
- ISO 9001 : 2008 from Bureau Veritas Certification India

Salient Features of Extra Co. Glass Reinforced Pipes

Glass Reinforced Plastics “GRP” or Reinforced Thermosetting Resin “RTR” pipes exhibit excellent adhesion, fatigue-resistance, impact strength, chemical-resistance and low shrinkage, leading to lesser stresses in the finished pipe, superior mechanical and chemical properties, long-term performance and excellent fatigue-resistance under cyclic loading.

Different types of resins are used, leading to the following categories:

- **GRP** Using Isophthalic Resin in structural wall and isophthalic in liner (where applicable). For both underground and aboveground applications, restrained and non-restrained systems, in media temperature up to 60°C.

- **GRV** Using Vinylester Resin throughout. For Industrial application where specific chemical resistance is required. Used mainly in aboveground applications in media temperature up to 85°C.

- **GRE** Using Epoxy Resin throughout. For industrial application in media temperature up to 120ºC. Additional external protection can be applied to allow for additional fire-retardance.

Applications

- **Water Transmission**
- **Sanitary Sewers**
- **Storm Water Systems**
- **Sewer Force Mains**
- **Effluent Water**
- **Manhole Liners**
- **Structural Manholes**
- **Pumping Stations**
- **NDM**
- **Thrust Boring**
- **Valve Chambers**
- **Fire Mains**
- **Water Desalination Plants**
- **Power plants**
- **Chemical and Petrochemical Industry**
- **Food Industries (Refineries and Breweries)**


EXTRACO’s quality policy

To build Quality into the processes with Continual Improvement, to customer standards, for achieving defect free products on time, every time aiming at Total Customer Satisfaction, by involvement of personnel and upgradation of technology.

* Certification under process

Applicable Standards

<table>
<thead>
<tr>
<th>Standards</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D 3517</td>
<td>BS 5480</td>
</tr>
<tr>
<td>ASTM D 3754</td>
<td>IS 14402 : 1996</td>
</tr>
<tr>
<td>ASTM D 3262</td>
<td>IS 12709 : 1994</td>
</tr>
<tr>
<td>AWWA C-950</td>
<td></td>
</tr>
</tbody>
</table>

Manufacturing

EXTRALITE GRP/GRV/GRE pipes are manufactured on CNC filament winding machine monitored by a fully computerized system. The inner liner thickness of pipes is innn, reinforced with ‘C’ glass veil and can be of higher thickness as required. The structural wall consists of glass rovings impregnated with Resin wound at precisely set helical winding patterns under uniform tension for the various designs. The outer finish consists of Resin topcoat.

GRP/GRV/GRE fittings required for various applications are provided by Extra Co. Using same material as pipe, formed to suit pipe size and end design, in required elbows, tees, unequal tees, concentric and eccentric reducers, flanges, blanks/flanges, saddle/flanges, couplings, saddles, wyes, crosses, end caps, etc. Special fittings can be made available upon request.
Jointing System of Pipes and Fittings

**Restrainted (Tensile Resistant)**
- Flanged Joint
- Butt and wrap joint
- Rubber seal locked joint
- Adhesive joint

**Non-Restrained (Tensile Resistant)**
- Bell and spigot
- Double bell coupling

**Flanged Joint**
To enable connections with steel and to allow for assembling and disassembling of process lines, Extralite pipes and fittings can be supplied with flanges, drilled in accordance with ANSI, BS DIN or other specifications. Special requirements can be met upon request.

**Lamination Joint**
In general these joints will only be used for diameters over 400mm. The preparation of this rigid joint requires good craftsmanship.

**Rubber Seal Lock Joint**
This type of joint consists of an integral filament wound socket end and a machined spigot end. The O-ring seal is positioned on the spigot end. The locking device is inserted through an opening in the socket end. If fits in a circumferential groove on the inner side of the socket end and rests against a shoulder on the spigot end. Extralite rubber seal lock joint allows for some axial movement as well as a certain angular deflection.

**Adhesive Joint**
Pipes are produced with integral socket and spigot ends. Ends are slightly tapered. The inside of the socket matches with the outside of the machined spigot. The two-component of adhesive, namely, epoxy resin and hardener are supplied in appropriately sized cans in correct mixing ratio.

**Bell And Spigot Joint**
The socket end of this joint is an integral filament wound part of the pipe. The spigot end is a machined part on which O-ring seal positioned. The flexible joint allows for axial movement of the spigot in the socket and some permissible angular deflection.

**Double Bell Coupling**
Short pipes are joined using double bell coupling. The sealing of the joint is achieved by the compression of two elastomeric rubber gaskets when the joint is assembled.

**Product Information & Application**

1. **Series : EX 100 - Oil Field Industry**
   - Pressure upto 32 bars
   - Diameter 50-300mm
   - Aboveground & underground application
   - GRP pipes

2. **Series : EX 200- Chemical & Petro-Chemical Industry**
   - Pressure upto 16 bars
   - Diameter 50-1200mm
   - Aboveground application
   - GRP pipes

3. **Series : EX 300- Water Supply**
   - Pressure upto 16 bars
   - Diameter 50-2000mm
   - Mostly underground application
   - GRP pipes

4. **Series : EX 400- Fire Protection System**
   - Pressure upto 32 bars
   - Diameter 50-300mm upto 32 bars
   - Diameter 400-600mm upto 25bars
   - GRP pipes

5. **Series : EX 500- Sewerage/Drainge**
   - Gravity and pressure 12 bars
   - Diameter 50-2000mm
   - 1/8-0.2mm thick Viny/vector Resin liner
   - Structural wall Isophthalic
   - GRP pipes

6. **Series : EX 600- Power Stations & Desalination Plants**

<table>
<thead>
<tr>
<th>Pipe Stiffness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1500 N/m²²</td>
</tr>
<tr>
<td>2500 N/m²²</td>
</tr>
<tr>
<td>5000 N/m²²</td>
</tr>
<tr>
<td>10000 N/m²²</td>
</tr>
</tbody>
</table>

**NB :** Other stiffness designs can be made available upon request.

**Available Standard Extralite Systems**

<table>
<thead>
<tr>
<th>Pressure Class (Bar)</th>
<th>50-300</th>
<th>350-600</th>
<th>700-1200 up to 2000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravity</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>6</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>12</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>16</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>25</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>32</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

**NB :** Other pressure systems can be made available upon request. Diameters greater than 2000mm are also available.
**Quality Control & Inspection**

EXTRALITE GRP/GRV/GRE pipes and fittings are subject to quality control testing/inspection and thorough checks. All incoming raw materials and finished products are

Following are in-house tests carried out on EXTRALITE GRP/GRV/GRE pipes and fittings.

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Type of Test</th>
<th>Standard for Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Wall thickness</td>
<td>ASTM D 3517 / 3567 ; BS 5480 / 4549</td>
</tr>
<tr>
<td>2.</td>
<td>Visual inspection</td>
<td>ASTM D 3517 / 2563 ; BS 5480 / 4549</td>
</tr>
<tr>
<td>3.</td>
<td>Dimensional checks</td>
<td>ASTM D 3517 / 2563 ; BS 5480 / 4549</td>
</tr>
<tr>
<td>4.</td>
<td>Hydrostatic pressure test</td>
<td>ASTM D 3517 ; BS 5480</td>
</tr>
<tr>
<td>5.</td>
<td>Barred hardness</td>
<td>ASTM D 2583 ; BS 2782</td>
</tr>
<tr>
<td>6.</td>
<td>Constituent by weight % (LOI)</td>
<td>ASTM D 2584 ; BS 2782</td>
</tr>
<tr>
<td>7.</td>
<td>Stillness test</td>
<td>ASTM D 2412 ; BS 5480</td>
</tr>
<tr>
<td>8.</td>
<td>Split disk test (circular end strength)</td>
<td>ASTM D 2290 ; BS 5480</td>
</tr>
<tr>
<td>9.</td>
<td>Tensile strength (axial tensile strength)</td>
<td>ASTM D 3338 ; BS 5480 / 2782</td>
</tr>
<tr>
<td>10.</td>
<td>Flexural strength</td>
<td>ASTM D 390 ; BS 5480 / 2782</td>
</tr>
<tr>
<td>11.</td>
<td>Compressive strength</td>
<td>ASTM D 695 ; BS 5480 / 2782</td>
</tr>
<tr>
<td>12.</td>
<td>Shear strength</td>
<td>ASTM D 2334</td>
</tr>
<tr>
<td>13.</td>
<td>Beam strength test</td>
<td>ASTM D 3517 ; BS 5480</td>
</tr>
<tr>
<td>14.</td>
<td>Hydrostatic design basis for pipes and fittings (static)</td>
<td>ASTM D 2992 ; BS 5480</td>
</tr>
<tr>
<td>15.</td>
<td>Strain corrosion test</td>
<td>ASTM D 3681 ; BS 5480</td>
</tr>
<tr>
<td>16.</td>
<td>Short-time hydraulic failure pressure of pipes</td>
<td>ASTM D 1599 ; BS 5480</td>
</tr>
<tr>
<td>17.</td>
<td>Water absorption</td>
<td>ASTM D 500 ; BS 3532 / BS 2782</td>
</tr>
<tr>
<td>18.</td>
<td>Long-term Ring Bending Strain Test</td>
<td>ASTM D 5365</td>
</tr>
<tr>
<td>19.</td>
<td>Joint Tightness</td>
<td>ASTM D 4161</td>
</tr>
<tr>
<td>20.</td>
<td>Elastomeric Gasket</td>
<td>ASTM DF 477</td>
</tr>
</tbody>
</table>

**Mechanical & Physical Properties**

Typical Mechanical and Physical of Extralite GRP/GRV/GRE Pipes and Fittings:

<table>
<thead>
<tr>
<th>Type of Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity</td>
<td>1580 - 1500 Kg/m³</td>
</tr>
<tr>
<td>Hoop tensile strength</td>
<td>220 - 490 N/mm²</td>
</tr>
<tr>
<td>Axial tensile strength</td>
<td>40 - 50 N/mm²</td>
</tr>
<tr>
<td>Coefficient of thermal expansion</td>
<td>18 to 30 x 10⁻⁶ (mm/mm²/C)</td>
</tr>
<tr>
<td>Flexural modulus</td>
<td>13800 - 20000 N/mm²</td>
</tr>
<tr>
<td>Compressive strength</td>
<td>208 - 364 N/mm²</td>
</tr>
<tr>
<td>Stiffness</td>
<td>1500 - 15000 N/m²</td>
</tr>
<tr>
<td>Barred hardness</td>
<td>40 - 50</td>
</tr>
<tr>
<td>Hoop modulus of elasticity</td>
<td>20 - 30 kN/mm²</td>
</tr>
<tr>
<td>Axial modulus of elasticity</td>
<td>06-10 kN/mm²</td>
</tr>
<tr>
<td>Thermal conductivity</td>
<td>0.2 - 0.35 W/m² K</td>
</tr>
<tr>
<td>Specific heat</td>
<td>921 J/Kg°C</td>
</tr>
</tbody>
</table>

**Visual Properties**

The exterior surface of Extralite pipes and fittings shall be free of the following irregularities.

- **Fuzz**
  - Glass fibres loosely adhering to the pipe and not wet out with resin.
- **Protruding fibres**
  - Glass fibres sticking out from faces that are wet out with resin.
- **Resin runs**
  - Runs of resin and sand on surface of pipe.
- **Dry area**
  - Area in laminate with glass not wet out with resin.
- **Hand lay up ragged areas**
  - Rough area at the edge of hand lay up.

**Marking Pipes & Fittings**

Pipes and fittings are clearly marked at Extra Co. factory with the following information.

1. Distinctive mark of manufacture
2. Date of manufacture
3. Class or pressure rating
4. Inner diameter
5. Angle of Bend

**Delivery, Storage & Handling**

Should be in accordance with Extra Co. recommendations. Please refer to Extra Co. Storage, Handling and Installation.

**Installation**

Extra Co. installation specifications have been developed to ensure proper performance according to the design requirements.

- **Buried Installation**
  - The customer shall ensure that buried pipes are installed in accordance to Extra Co. Handling and Installation Instructions.

- **Above ground Installation**
  - A complete engineering design is needed to ensure performance. The same is provided by highly qualified consulting houses in the following activities:
    - Flexibility analysis
    - Hydraulic calculations
    - Surge analysis
    - Dynamic analysis, vibration prediction and control of piping
    - Support design
    - Isometric drawings
    - Design of GRP/GRV/GRE Systems