FLOWTITE Case Studies
- Water Applications -
The FLOWTITE GRP piping products and accessories sold by the AMIANTIT Group offer many advantages for the use in water applications.

The worldwide product availability of FLOWTITE GRP pipes has established water projects using all over the world. This case study brochure represents only a small extract of the available water references.

Many other countries around the world realized a huge number of installations and an increasing number of projects are recently in work.

Further information about additional references and case studies can be found on our website at www.amiantit.com!

Additional information about product advantages and available product range of our GRP pipes for the use in water projects are available in our Raw Water and Potable Water brochures. Please request them from your local dealer.
# Case Study -1-  

## PROJECT NAME:  
Aguas Argentinas

## Community/Country:  
Buenos Aires, Argentina

## Amiantit location  
Amitech Argentina S.A.

## Description:  
135 kilometres of pipes delivered in more than 50 projects with many different sizes (DN 300 mm to 1500 mm), pressures (1 to 10 bars) and stiffness (2500/5000 N/m²)

<table>
<thead>
<tr>
<th>Application</th>
<th>Water network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transported medium</td>
<td>Potable Water</td>
</tr>
<tr>
<td>Working pressure</td>
<td>1 – 10 bar</td>
</tr>
<tr>
<td>Type of project</td>
<td>✗ new installation</td>
</tr>
<tr>
<td>Demanded standards/specifications/approvals</td>
<td>AWWA – ASTM – IRAM</td>
</tr>
</tbody>
</table>

## Special requirement on pipe-system:  
Delivery promise and best technical – economical equation.

## chosen pipe system:  
FLOWTITE GRP filament wound

## other materials in this project?  
- 

## why our product?  
- ✗ light weight
- ✗ corrosion resistance
- ✗ flow characteristics
- ✗ chem. properties
- ✗ mech. properties
- ✗ price

## Project owner:  
Aguas Argentinas

## Consultant/Engineer:  
Safege, Montgomery & Watson, Hagler Bailly, etc.

## Contractor:  

## Pipe Details - material 1:  
- Total pipeline length: 135,000 m
- Diameter DN min / max (mm): DN 300 / DN 1500
- Pressure PN min / max (bar): PN 1 / PN 10
- Stiffness SN min / max (N/mm²): SN 2500 / SN 5000
- Joint types: FLOWTITE Standard GRP Couplings
- Fittings used: Elbows, Tees & Flanges

## Installation Details:  
- Type: ✗ open trench
- Native soil type: Silts and clays with liquid limit less 50%
- Backfill soil type / compaction: Sand and gravels
- THRUST BLOCKS / joint: Thrust blocks
- Deflection min/max: Less than 3°
- Year start/end: 1995 / 2005

## Summary:  
Aguas Argentinas is the second most important water supplier in Latin America. They provide drinking water and sewage services to over 10 million customers in the city of Buenos Aires and in 14 districts in the greater Buenos Aires.
# Case Study -2-

**PROJECT NAME:** Brujuela Casui Water Project  
**Community/Country:** Santo Domingo, Dominican Republic  
**Amiantit location:** Flowtite Andercol S.A.  
**Description:** A 76 km long pipeline partly provides the capital of Santo Domingo with water.  
- **application:** Water network  
- **transported medium:** Raw water  
- **working pressure:** 10 bar  
- **type of project:** New installation  
- **demanded standards / specifications / approvals:** AWWA  
- **Special requirement on pipe-system:** Ease of installation and field assistance from the pipe supplier’s technical team.

- **chosen pipe system:** Flowtite GRP filament wound  
- **other materials in this project:** -  
- **why our product:** Light weight, corrosion resistance, flow characteristics, chem. properties, mech. properties, other reasons?  

**Project owner:** CAASD Santo Domingo Water and Sewer Company  
**consultant / engineer:** Harza International, USA  
**contractor:** NCC International, Sweden  

### Pipe Details - material 1:  
- **Total pipeline length:** 76,000 m  
- **Pipe lengths supplied:** 12 m  
- **Diameter DN min / max (mm):** DN 400 / DN 1100  
- **Pressure PN min / max (bar):** PN 6 / PN 10  
- **Stiffness SN min / max (N/m²):** SN 2500 / SN 2500  
  - **joint types:** Flowtite Standard GRP Couplings  
  - **fittings used:** Elbows, tees, drains, vents  

### Installation Details:  
- **type:** Open trench  
- **trench dimensions:** 1.75 x DN  
- **laying depth:** 1.2 to 4 m  
- **native soil type:** Varied from medium cohesive sandy silt to hard rock  
- **backfill soil type / compaction:** Silty sandy gravel compacted to a minimum of 90% SPD  
- **thrust blocks / lockjoints:** Thrust blocks  
- **deflection min/max:** Vertical: 3° max.; horizontal: 1 - 3°  
- **quality measures during installation:** Backfill compaction, vertical deflection, trench width, and general field inspection  
- **Project duration:** 2 years  
- **Year start / end:** 2003 / 2005  
- **tunneling equipment (jacking):** Trencher for excavation in rock material  

### Summary:  
The project is located in a Caribbean coastal area and that the water is pumped from deep wells. Flowtite GRP material was an excellent choice for corrosion resistance and low energy consumption due a smooth inner surface.
### Case Study -3-

**PROJECT NAME:** Loja’s Master Plan for Potable Water  
**Community/Country:** Loja Municipality, Ecuador  
**Amiantit location** Flowtite Andercol S.A., Amitech Spain S.A.  
**Description:** Construction of the water mains, reservoirs tanks, and related infrastructure. Project will ensure drinking water supply for the city of Loja until 2020.

- **application:** Water network  
- **transported medium:** Potable water  
- **working pressure:** 6 to 20 bar  
- **type of project:** × new installation  
- **demanded standards / specifications / approvals:** AWWA  
- **Special requirement on pipe-system:** Low weight  
- **project value in US$:** US$ 35,000,000 (total project)

**Project owner:** Loja Municipality  
**consultant / engineer:** ABENGOA, Spain  
**contractor:** ABENGOA, Spain  

**Pipe Details - material 1:**  
- **Total pipeline length:** 52,688 m  
- **Pipe lengths supplied:** 12 m  
- **Diameter DN min / max (mm):** DN 350 / DN 900  
- **Pressure PN min / max (bar):** PN 6 / PN 20  
- **Stiffness SN min / max (N/mm):** SN 5000 / SN 5000  
- **joint types:** FLOWTITE Standard GRP Couplings  
- **fittings used:** over 720 elbows, 160 tees and 30 reducers all in GRP

**Installation Details:**  
- **type:** × open trench  
  × aboveground  
- **trench dimensions:** 1.75 x DN  
- **laying depth:** 1.5 m to pipe crown  
- **native soil type:** native silty sand to sandy silt  
- **backfill soil type / compaction:** selected native material  
- **thrust blocks / lockjoints:** Thrust blocks  
- **deflection min/max:** 2 - 3°, angular  
- **quality measures during installation:** Proctor Compact and Hydrostatic test  
- **Project duration:** 2 years  
- **Year start / end:** 2002 / 2004

**Summary:** Project carried in the Andes and pipeline led through difficult terrain. Spanish financing; thus pipe supply by Amitech Spain. Fittings supply and technical service by Flowtite Andercol S.A – the Amiantit partner in Latin America.

**comments from Owner/Consultant/Contractor:** Supply and technical service done to their expectations.
# Case Study -4-:

**PROJECT NAME:** Water Main Quito New International Airport  
**Community/Country:** Quito, Ecuador  
**Amiantit location:** Flowtite Andercol S.A.  
**Description:** Provides the water needed in the region of the new International Airport nearby the City of Quito. Transport of raw water from the Papallacta Reservoir to the this region and the villages of Tababela and Pifo nearby. Water supply for approx. 1 million people.  

| Application | Water network  
| transported medium | Raw water  
| working pressure | Up to 32 bar  
| type of project | New installation  
| demanded standards / specifications / approvals | AWWA  
| Special requirement on pipe-system | Hydrostatic tests required for the whole length  
| Project value in US$: | US$ 45,000,000 (incl. airport)  

**Project owner:** QUIPORT  
**consultant/engineer:** AECON, Canada, Andrade Gutierrez, Brasil  
**contractor:** AECON, Canada, Andrade Gutierrez, Brasil, COANDES, Ecuador  

**Pipe Details - material 1:**  
- Total pipeline length: 20,000 m  
- Pipe lengths supplied: 11.8 m  
- Diameter DN min / max (mm): DN 350 / DN 500  
- Pressure PN min / max (bar): PN 16 / PN 32  
- Stiffness SN min / max (N/m²): SN 5000 / SN 10000  
- Joint types: Flowtite Standard GRP Couplings  
- Fittings used: Elbows, tees for air vent and drain connections  

**Installation Details:**  
- Type: Open trench  
- Trench dimensions: 1.75 x DN  
- Laying depth: between 1.2 and 3 m  
- Native soil type: Sandy silt with medium to firm consistency  
- Backfill soil type / compaction: Clean sand at the bed location and native soil up to 30 cm. above pipe crown  
- Thrust blocks / lockjoints: Thrust blocks  
- Deflection min/max: up to 2”  
- Quality measures during installation: Hydrostatic test at lengths between 1 and 3 km and as per BSI Standard 8010  
- Project duration: 1.5 years for the GRP pipe and the water infrastructure installation  
- Year start / end: 2006 / 2007  

**Summary:** The long pipe length and easy installation system allowed installation up to 120 meters per day.  
**Comments from Owner/Consultant/Contractor:** Good feedback to Flowtite Andercol S.A. who handled project design, construction and commissioning.
**Case Study -5-**

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Avesta Polarit (Today Outokumpu Stainless OY)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Tornio, Finland</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>APS Norway AS</td>
</tr>
<tr>
<td>Description:</td>
<td>Water supply to the stainless steel plant</td>
</tr>
<tr>
<td>application:</td>
<td>Supply line</td>
</tr>
<tr>
<td>transported medium</td>
<td>Raw water</td>
</tr>
<tr>
<td>working pressure</td>
<td>6 - 8 bar</td>
</tr>
<tr>
<td>type of project:</td>
<td>☒ new installation</td>
</tr>
<tr>
<td>demanded standards / specifications / approvals:</td>
<td>AWWA C950, M45</td>
</tr>
<tr>
<td>Special requirement on pipe-system:</td>
<td></td>
</tr>
<tr>
<td>project value in US$:</td>
<td>US$ 1,900,000</td>
</tr>
</tbody>
</table>

**chosen pipe system:** ☒ FLOWTITE GRP filament wound

**other materials in this project?**

**why our product?**
- light weight
- corrosion resistance
- flow characteristics
- chem. properties
- mech. properties
- other reasons?

Project owner: Avesta Polarit Stainless OY
consultant / engineer: Avestad Polarit, inhouse, Finland
contractor: Lemmingkäinen, Finland

**Pipe Details - material 1:**
- Total pipeline length: 6,000 m
- Pipe lengths supplied: 6 m and 12 m
- Diameter DN min / max (mm): DN 900 / DN 900
- Pressure PN min / max (bar): PN 10 / PN 10
- Stiffness SN min / max (N/m²): SN 5000 / SN 5000
- Joint types: FLOWTITE Standard GRP Couplings
- Fittings used: Elbows, flange ends

**Installation Details:**
- type: ☒ open trench
- trench dimensions: Standard 1.8 x DN
- laying depth: 2 - 5 m
- native soil type: Gr. 3-5, partly old sea bottom
- backfill soil type / compaction: Gr. 2-3, sand and some slag from steel production
- thrust blocks / lockpoints: Trust blocks
- deflection min/max: 1 - 3°
- quality measures during installation: Deflections
- Project duration: Approx. 6 months
- Year start / end: 2001 / 2002

**Summary:** Installation worked perfectly. 3 more orders has been delivered after this one.
**Case Study -6-**

<table>
<thead>
<tr>
<th><strong>PROJECT NAME:</strong></th>
<th>Station de traitement d'eau potable de NANTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community/Country:</strong></td>
<td>Ville de Nantes, France</td>
</tr>
<tr>
<td><strong>Asbestos location:</strong></td>
<td>APS France SAS</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>A GRP pipeline DN 1100 was installed to replace an old one in steel.</td>
</tr>
<tr>
<td><strong>application:</strong></td>
<td>Compensation line</td>
</tr>
<tr>
<td><strong>transported medium:</strong></td>
<td>Potable water</td>
</tr>
<tr>
<td><strong>working pressure:</strong></td>
<td>2 bar</td>
</tr>
<tr>
<td><strong>type of project:</strong></td>
<td>replacement</td>
</tr>
<tr>
<td><strong>demanded standards / specifications / approvals:</strong></td>
<td>ACS</td>
</tr>
<tr>
<td><strong>Special requirement on pipe-system:</strong></td>
<td>Corrosion resistance</td>
</tr>
<tr>
<td></td>
<td>Mechanical resistance</td>
</tr>
<tr>
<td><strong>project value in US$:</strong></td>
<td>US$ 30,000</td>
</tr>
<tr>
<td><strong>chosen pipe system:</strong></td>
<td>FLOWTITE GRP filament wound</td>
</tr>
<tr>
<td><strong>other materials in this project?</strong></td>
<td>-</td>
</tr>
<tr>
<td><strong>why our product?</strong></td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>light weight</td>
</tr>
<tr>
<td></td>
<td>corrosion resistance</td>
</tr>
<tr>
<td></td>
<td>flow characteristics</td>
</tr>
<tr>
<td></td>
<td>chem. properties</td>
</tr>
<tr>
<td></td>
<td>mech. properties</td>
</tr>
<tr>
<td></td>
<td>other reasons?</td>
</tr>
</tbody>
</table>

**Project owner:** Régie des Eaux de la ville de Nantes  
**consultant / engineer:** Régie des Eaux de la ville de Nantes, France  
**contractor:** ATP, France

**Pipe Details - material 1:**
| Total pipeline length: | 60 m |
| Pipe lengths supplied: | |
| **Diameter DN min / max (mm):** | DN 1100 / DN 1100 |
| **Pressure PN min / max (bar):** | PN 6 |
| **Stiffness SN min / max (N/mm²):** | SN 10000 |
| **joint types:** | FLOWTITE Standard GRP Couplings |
| **fittings used:** | Some bends, elbows, tees |

**Installation Details:**
| type: | open trench |
| trench dimensions: | 2.5 m |
| laying depth: | 3 m |
| native soil type: | Mix of sand and gravel |
| backfill soil type / compaction: | Sand |
| thrust blocks /lockjoints: | Thrust block used |
| deflection min/max: | N/A |
| quality measures during installation: | Pressure test with water at 1.5 times the PN |
| Project duration: | 2 months |
| Year start / end: | 2007 |

**Summary:**
### Case Study -7-

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Hagen Hengstey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Hagen, Germany</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>Amitech Germany GmbH</td>
</tr>
<tr>
<td>Description:</td>
<td>GRP-pipe length approx. 250 m. Renovation of potable water pipeline with FLOWTITE GRP-Inliner pipes.</td>
</tr>
<tr>
<td>application: Network relining</td>
<td></td>
</tr>
<tr>
<td>transported medium: Potable water</td>
<td></td>
</tr>
<tr>
<td>working pressure: Up to 10 bar</td>
<td></td>
</tr>
<tr>
<td>type of project: relining</td>
<td></td>
</tr>
<tr>
<td>demanded standards / specifications / approvals: DIN EN 805, ATV-DVVW-M 127, DVGW, KTW, Hygienic testing</td>
<td></td>
</tr>
<tr>
<td>Special requirement on pipe-system: High static load-capacity, low weight, high tightness, small wall thickness, short laying term</td>
<td></td>
</tr>
<tr>
<td>project value in US$: approx. US$ 71,000</td>
<td></td>
</tr>
<tr>
<td>chosen pipe system: FLOWTITE GRP filament wound</td>
<td></td>
</tr>
<tr>
<td>other materials in this project?</td>
<td>Concrete pipes (existing damaged pipe)</td>
</tr>
<tr>
<td>why our product?</td>
<td>Light weight, corrosion resistance, flow characteristics, chem. properties, mech. properties, other reasons?</td>
</tr>
</tbody>
</table>

Project owner: Mark E Aktiengesellschaft
consultant / engineer: Brieske und Partner Beratende Ingenieure GmbH, Germany
contractor: Rode Rohrleitungsbau GmbH, Germany

### Pipe Details - material 1:
| Total pipeline length: | approx. 250 m |
| Pipe lengths supplied: | 2 m, 6 m and 12 m |
| Diameter DN min / max (mm): | DN 600 / DN 800 |
| Pressure PN min / max (bar): | PN 10 / PN 10 |
| Stiffness SN min / max (N/m): | SN 5000 / SN 10000 |
| Joint types: | FLOWTITE Standard GRP Couplings |
| Fittings used: | no fittings |

### Installation Details:
| Type: | slippining |
| Trench dimensions: | no trench |
| Laying depth: | 1.5 m |
| Native soil type: | Soil class: G3 |
| Backfill soil type / compaction: | Cement grout as filler between GRP-pipe and old concrete pipe |
| Thrust blocks / lockjoints: | no thrust blocks/lockjoints |
| Deflection min/max: | no deflection |
| Quality measures during installation: | Field hydro testing |
| Project duration: | approx. 4 weeks |
| Year start / end: | 2006 / 2006 |
| Tunneling equipment (jacking): | Excavator, vibrating plate, tamper |

### Summary:
The old concrete pipeline did not carry any more the soil and traffic loads. The FLOWTITE inliner pipe was able to take and carry the loads. The FLOWTITE pipes with the high static load-capacity, low weight, high tightness, small wall thickness and excellent hygiene properties were ideal for this use.
**Case Study -8-**

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Hannover Raw Water Elze Berkhof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Hannover, Germany</td>
</tr>
<tr>
<td>Amiantit location:</td>
<td>Amitech Germany GmbH</td>
</tr>
<tr>
<td>Description:</td>
<td>Replacement of old ductile iron pipe from wells to water treatment plant</td>
</tr>
<tr>
<td>application:</td>
<td>Compensation line</td>
</tr>
<tr>
<td>transported medium:</td>
<td>Raw water</td>
</tr>
<tr>
<td>working pressure:</td>
<td>10 bar</td>
</tr>
<tr>
<td>type of project:</td>
<td>replacement</td>
</tr>
<tr>
<td>demanded standards / specifications / approvals:</td>
<td>DIN EN 1769, DIN 16688, DVGW</td>
</tr>
<tr>
<td>Special requirement on pipe-system:</td>
<td>Monolithic elbows for cleaning with pigs, manholes for air valves and clean out</td>
</tr>
<tr>
<td>project value in US$:</td>
<td>US$ 1,700,000 total (50% pipe share)</td>
</tr>
<tr>
<td>chosen pipe system:</td>
<td>FLOWTITE GRP filament wound</td>
</tr>
<tr>
<td>other materials in this project?</td>
<td>-</td>
</tr>
<tr>
<td>why our product?</td>
<td>light weight, corrosion resistance, flow characteristics, chem. properties, mech. properties, economical</td>
</tr>
</tbody>
</table>

Project owner: Stadtwerke Hannover AG
consultant / engineer: Stadtwerke Hannover AG, Germany
contractor: Ludwig Pfeiffer Hoch- und Tiefbau GmbH, Germany

**Pipe Details - material 1:**
- **Total pipeline length:** 6,100 m
- **Pipe lengths supplied:** 12 m
- **Diameter DN min / max (mm):** DN 700 / DN 800
- **Pressure PN min / max (bar):** PN 10 / PN 10
- **Stiffness SN min / max (Nm²):** SN 5000 / SN 5000
- **joint types:** FLOWTITE Standard GRP Couplings
- **fittings used:** elbows, F-, FA- pieces with fixed flange, 22 pieces

**Installation Details:**
- **type:** open trench
- **trench dimensions:** 1.5 m
- **laying depth:** 1 m
- **native soil type:** Soll class: G1, sand
- **backfill soil type / compaction:** G1 sand
- **thrust blocks / lockjoints:** Yes, 6
- **deflection min/max:** 2°
- **quality measures during installation:** Field hydro testing
- **Project duration:** 1 year
- **Year start / end:** 2007 / 2008
- **number of shafts (jacking):** 6
- **shaft distance (jacking):** 1000 m

**Summary:** Short laying time
**Project Name:** Budapest-Pocsmegyer

**Community/Country:** Budapest, Hungary

**Amiantit location:** Amitech Germany GmbH

**Description:** Re-lining of an old concrete pipeline with GRP pipes. The pipe transport potable water from wells to the city Budapest.

- **Application:** Network re-lining
- **Transported Medium:** Potable water
- **Working Pressure:** 1 bar
- **Type of Project:** Re-lining
- **Demanded Standards / Specifications / Approvals:** EN 1796 und EN 14364, DIN 19565, DIN 16868, DIN 4060
- **Special Requirements on pipe-system:** EMI-TÜV Hungary and ANTSZ/public health authority/ test of the resin
- **Project Value in US$:** US$ 1,400,000

**Project Owner:** Budapester Wasserwerke AG

**Consultant/Engineer:** Budapester Wasserwerke AG/Fa. Bonex Kft, Hungary

**Contractor:** Fa. Bonex Kft, Hungary

**Pipe Details - Material 1:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total pipeline length</td>
<td>1,704 m</td>
</tr>
<tr>
<td>Pipe lengths supplied</td>
<td>6 m</td>
</tr>
<tr>
<td>Diameter DN min / max (mm)</td>
<td>DN 1500 / DN 1500</td>
</tr>
<tr>
<td>Pressure PN min / max (bar)</td>
<td>PN 1 / PN 1</td>
</tr>
<tr>
<td>Stiffness SN min / max (N/m²)</td>
<td>SN 2500 / SN 2500</td>
</tr>
<tr>
<td>Joint types</td>
<td>FLOWTITE Standard GRP Couplings</td>
</tr>
<tr>
<td>Fittings used</td>
<td>No fittings</td>
</tr>
</tbody>
</table>

**Installation Details:**

- **Type:** Re-lining
- **Trench Dimensions:**
  - Laying Depth: Existing concrete pipeline in depth of -0.5 and -0.4 m
- **Native Soil Type:**
- **Backfill Soil Type / Compaction:**
- **Thrust Blocks / Lockjoints:**
- **Deflection Min/Max:**
- **Quality Measures during Installation:** Optical camera
- **Project Duration:** 6 months
- **Year Start / End:** 2008 / 2008

**Summary:** FLOWTITE GRP pipes were ideal for this use and the contractor approved only GRP pipes for this application.
## Case Study -10-  

**PROJECT NAME:** Pristina  
**Community/Country:** Pristina, Kosovo  
**Amiantit location** APS Norway AS  
**Description:** Turn key project with design, delivery and installation.  
- application: Water network  
- transported medium: Raw water  
- working pressure: 4 - 8 bar  
- type of project: ✗ new installation  
- demanded standards / specifications / approvals: Norwegian std 3629, AWWA M45  
**Special requirement on pipe-system:**  
**project value in US$:** US$ 3,500,000  

![Project Image]

**chosen pipe system:** ✗ FLOWTITE GRP filament wound  
**other materials in this project?** ✗  
**why our product?** ✗ light weight  
- ✗ corrosion resistance  
- ✗ flow characteristics  
- ✗ chem. properties  
- ✗ mech. properties  
- ✗ other reasons?  

**Project owner:** Pristina City  
**consultant / engineer:** Norplan, Norway  
**contractor:** Reg.Water-Board, Batallava with subcontractors, Kosovo  

### Pipe Details - material 1:  
- Total pipeline length: 7,200 m  
- Pipe lengths supplied: 6 m and 12 m  
- Diameter DN min / max (mm): DN 600 / DN 700  
- Pressure PN min / max (bar): PN 10 / PN 10  
- Stiffness SN min / max (N/m²): SN 5000 / SN 5000  
- joint types: FLOWTITE Standard GRP Couplings  
- fittings used: Elbows, reducer, flanges, T-pipes  

### Installation Details:  
- type: ✗ open trench  
- trench dimensions: Std FLOWTITE 1.8 x DN  
- laying depth: 1.5 - 4 m  
- native soil type: Generally Gr. 3  
- backfill soil type / compaction: Gr. 2 -3  
- thrust blocks / lockjoints: Trust blocks  
- deflection min/max: 1 - 3°  
- quality measures: Deflection, position  
- during installation:  
- Project duration: 7 - 8 months  
- Year start / end: 2000 / 2000  

**Summary:** Norwegian financed aid project, fulfilled within budget and schedule.  
**comments from Owner/Consultant/Contractor:** Very happy with the easiness of installation and the support from the supplier.
## Case Study -11-  

**PROJECT NAME:** Planta de Tratamiento de Aguas Residuales Proyecto Tenorio-Villa de Reyes  
**Community/Country:** San Luis Potosí, Mexico  
**Amiantit location:** Amitech México, S.A. de C.V.  

**Description:** The pipeline from the treatment plant is pumping water to a reservoir from where the water will be conveyed by gravity to CFE, the electricity company. Due to the pipeline length and short deadlines, a pipe system offering some quick assembling was required. In addition, a high reliability to withstand transient pressures, considering during operation, was crucial.

<table>
<thead>
<tr>
<th>Application</th>
<th>Water treatment line</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transported Medium</strong></td>
<td>Raw water</td>
</tr>
<tr>
<td><strong>Working Pressure</strong></td>
<td>3 - 7 bar</td>
</tr>
<tr>
<td><strong>Type of Project</strong></td>
<td>✗ new installation</td>
</tr>
<tr>
<td><strong>Demanded Standards</strong></td>
<td>ASTM D3517</td>
</tr>
<tr>
<td><strong>Specifications / Approvals</strong></td>
<td>AWWA C950-1</td>
</tr>
<tr>
<td></td>
<td>AMITECH QUALITY CERTIFICATES</td>
</tr>
<tr>
<td><strong>Special Requirement on Pipe System</strong></td>
<td>Withstand 1.4xPN concerning the water hammer, and the total vacuum.</td>
</tr>
<tr>
<td><strong>Project Value in US$$</strong></td>
<td>&gt; US$ 4,500,000</td>
</tr>
</tbody>
</table>

**Chosen Pipe System:** ✗ FLOWTITE GRP filament wound  
**Other Materials in this Project?**  
- ✗ light weight  
- ✗ corrosion resistance  
- ✗ flow characteristics  
- ✗ chem. properties  
- ✗ mech. properties  
- ✗ low cost

**Project Owner:** Degremont México  
**Consultant/Engineer:** Arturo Dufour, México  
**Contractor:** Grupo Prodin., México  

### Pipe Details - Material 1:

- **Total pipeline length:** 39,126 m  
- **Pipe lengths supplied:** 11.8 m  
- **Diameter DN min / max (mm):** DN 500 / DN 1000  
- **Pressure PN min / max (bar):** PN 7 / PN 10  
- **Stiffness SN min / max (N/m):** SN 2500 / SN 5000  
- **Joint Types:** FLOWTITE Standard GRP Couplings  
- **Fittings used:** 101 fittings in different diameters  

### Installation Details:

- **Type:** ✗ open trench  
- **Trench Dimensions:** 0.40 metres each side of the pipe  
- **Laying depth:** 2.0 meters as average  
- **Native soil type:** 3  
- **Backfill soil type / compaction:** SW / 95%  
- **Thrust blocks / lockjoints:** 45 concrete thrust blocks  
- **Deflection min/max:** up to 1.5°  
- **Quality Measured during Installation:** Hydrostatic Testing according to the BS 8010  
- **Project duration:** approx. 1.5 years  
- **Year start/end:** June 2004 - February 2006  

**Summary:** CFE, the electricity company for the city of San Luis Potosí, required a cooling line for its generators. Originally, the tender included cast iron pipes as the company was sceptical that GRP pipes would withstand the requested pressure. But the final hydrostatic testing as well as the high quality combined with a convenient price convinced them that FLOWTITE GRP pipes were the best choice for this project.
## Case Study -12-  
Montenegro Regional Water Supply Project

### Description:
- **application:** Water network
- **transported medium:** Potable water
- **working pressure:** 10 bar
- **type of project:** New installation
- **demanded standards / specifications / approvals:** AWWA C950, ASTM D3517, ASTM D4161 (for couplings), ISO 10639
- **Special requirement on pipe-system:** DIN EN 14364 / DIN 16868 respectively DIN EN 1796

### Project owner:
- Public Enterprise for „Regionalni vodovod Cmogorsko primorje“

### consultant / engineer:
- IK inženiring, Montenegro

### contractor:
- Strabag AG, Austria

### Pipe Details - material 1:
- **Total pipeline length:** 15,845 m
- **Pipe lengths supplied:** 12 m
- **Diameter DN min / max (mm):** DN 1000 / DN 1100
- **Pressure PN min / max (bar):** PN 10 / PN 10
- **Stiffness SN min / max (N/m²):** SN 10000 / -
- **joint types:** FLOWTITE Standard GRP Couplings
- **fittings used:** Elbows

### Installation Details:
- **type:** Belowground
- **deflection min/max:** 1.5°
- **quality measures during installation:** Deflection measurements, compaction measurements
- **Project duration:** 9 months
- **Year start / end:** 2008 / 2009

### Summary:
High quality, easy installation and security - main advantages. Important Note: while testing the deflection they came across sections with deflection over 1.9 – 2.3, those pipes were taken out and installed again without any problems, without a need for new couplings or any additional materials or works.
Case Study -13-

PROJECT NAME: Ivar
Community/Country: Stavanger, Norway
Amiantit location: APS Norway AS
Description:
- application: Water network
- transported medium: Potable water
- working pressure: 2 - 14 bar
- type of project: ☒ new installation
- demanded standards / specifications / approvals:
  - Norwegian std 3629,
  - Norwegian health institute,
  - approval for potable water
Special requirement on pipe-system:
- project value in US$: US$ 16,000,000

chosen pipe system: ☒ FLOWTITE GRP filament wound

other materials in this project?
- ☒ light weight
- ☒ corrosion resistance
- ☒ flow characteristics
- ☒ chem. properties
- ☒ mech. properties
- ☒ other reasons?

Project owner: IVAR IKS
consultant / engineer: Cowi A/S (Previous Interconsult AS), Denmark
contractor: Vassbakke Stol A/S, T Stangeland Maskin A/S, Brodrene Risa A/S, Norway

Pipe Details - material 1:
- Total pipeline length: 50,000 m
- Pipe lengths supplied: 3 m, 6 m and 12 m
- Diameter DN min / max (mm): DN 400 / DN 1600
- Pressure PN min / max (bar): PN 6 / PN 16
- Stiffness SN min / max (N/mm²): SN 5000 / SN 10000
- joint types: FLOWTITE Standard GRP Couplings
- fittings used: Elbows, T-pipes, reducers, flexible steel couplings

Installation Details:
- type: ☒ open trench
- ☒ sliplining
- trench dimensions: Std FLOWTITE 1.8 x DN, a few places due to soft soil, wider trench.
- laying depth: 1.5 - 6 m
- native soil type: Gr. 1-6
- backfill soil type / compaction: Gr. 1, gravel to 60%DN, 90%SPD, Gr.2 sand for the rest.
- thrust blocks / lockpoints: Trust blocks
- deflection min/max: 1 - 2° in general
- quality measures during installation:
  - Deflection, position, angular deflection and misalignments.
- Project duration: Several projects in the period from 1996 to 2008
- Year start / end: 1996 / 2008 (The main pipeline, 32km DN1200 and 1400, PN16 was put in service in 1996).

Summary:
- Additional information available in an independent report from the main pipeline project.

Comments from Owner/Consultant/Contractor:
- IVAR has only positive experience with Flowtite GRP pipes and with APS Norway as a very serious pipe supplier.
### Case Study -14-

<table>
<thead>
<tr>
<th><strong>PROJECT NAME:</strong></th>
<th>Levanger</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community/Country:</strong></td>
<td>Levanger, Norway</td>
</tr>
<tr>
<td><strong>Amiantit location:</strong></td>
<td>APS Norway AS</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>application:</strong></td>
<td>Water network</td>
</tr>
<tr>
<td><strong>transported medium:</strong></td>
<td>Potable water</td>
</tr>
<tr>
<td><strong>working pressure:</strong></td>
<td>6 - 8 bar</td>
</tr>
<tr>
<td><strong>type of project:</strong></td>
<td>New installation</td>
</tr>
<tr>
<td><strong>demanded standards / specifications / approvals:</strong></td>
<td>Norwegian std 3629</td>
</tr>
<tr>
<td><strong>Special requirement on pipe-system:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>project value in US$:</strong></td>
<td>US$ 270,000</td>
</tr>
</tbody>
</table>

**Project owner:** Levanger community  
**consultant / engineer:** SCC Prosjektering, Norway  
**contractor:** Unknown

### Pipe Details - material 1:

- **Total pipeline length:** 2,178 m  
- **Pipe lengths supplied:** 6 m and 12 m  
- **Diameter DN min / max (mm):** DN 500 / DN 600  
- **Pressure PN min / max (bar):** PN 10 / PN 10  
- **Stiffness SN min / max (N/m²):** SN 10 000 / SN 10 000  
- **joint types:** FLOWTITE Standard GRP Couplings  
- **fittings used:** Elbows

### Installation Details:

- **type:** Open trench  
- **trench dimensions:** Std FLOWTITE 1.8 x DN  
- **laying depth:** 1.5 - 4 m  
- **native soil type:** Gr. 2-5  
- **backfill soil type / compaction:** Gr. 1-2  
- **thrust blocks / lockjoints:** Trust blocks for elbows  
- **deflection min/max:** -  
- **quality measures during installation:** -  
- **Project duration:** 3 - 4 months  
- **Year start / end:** 1999

### Summary:

**comments from Owner/Consultant/Contractor:** Flowtite GRP pipes was easy to install, good service and support from APS as supplier.
**Case Study -15-**

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>RGA-Prosjektet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Drammen-Asker, Norway</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>APS Norway AS</td>
</tr>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td><strong>application:</strong></td>
<td>Water network</td>
</tr>
<tr>
<td><strong>transported medium:</strong></td>
<td>Potable water</td>
</tr>
<tr>
<td><strong>working pressure:</strong></td>
<td>Up to 27 bar</td>
</tr>
<tr>
<td><strong>type of project:</strong></td>
<td>✗ new installation</td>
</tr>
<tr>
<td><strong>demanded standards / specifications / approvals:</strong></td>
<td>Norwegian std 3629-EN1796</td>
</tr>
<tr>
<td><strong>Special requirement on pipe-system:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>project value in US$:</strong></td>
<td>US$ 5,000,000</td>
</tr>
<tr>
<td><strong>chosen pipe system:</strong></td>
<td>FLOWTITE GRP filament wound</td>
</tr>
<tr>
<td><strong>other materials in this project:</strong></td>
<td>Ductile (a few hundred meters)</td>
</tr>
</tbody>
</table>
| **why our product?** | ✗ light weight
✗ corrosion resistance
☐ flow characteristics
☐ chem. properties
☐ mech. properties
☐ other reasons? |

**Project owner:** Asker community and Gletsranverket IKS

**consultant / engineer:** Norconsult, Norway

**contractor:** Isachsen & Lovás AVS, Arne Olav Lund AVS, Oskar & Tormod Wike AVS, Veidkke Entreprenør AS, Norway

**Pipe Details - material 1:**
- **Total pipeline length:** 20,000 m
- **Pipe lengths supplied:** 6 m and 12 m
- **Diameter DN min / max (mm):** DN 500 / DN 800
- **Pressure PN min / max (bar):** PN 16 / PN 32
- **Stiffness SN min / max (N/m):** SN 5000 / SN 10000
- **joint types:** FLOWTITE Standard GRP Couplings
- **fittings used:** Elbows, T-pipes, Pipes with adjusted DN for Ductile couplings

**Installation Details:**
- **type:** ✗ open trench
✗ slippining
- **trench dimensions:** Std FLOWTITE 1.8 x DN
- **laying depth:** 1.5 - 5 m
- **native soil type:** Gr. 1-4
- **backfill soil type / compaction:** Gr. 1
- **thrust blocks / lockpoints:** Trust blocks
- **deflection min/max:** Generally 1 - 2°
- **quality measures during installation:** Yes, deflection, positions, angular deflection and misalignment
- **Project duration:** Approx one year
- **Year start / end:** 2005 / 2006

**Summary:**
### Case Study -16-  

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Simavika</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Tromsø, Norway</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>APS Norway AS</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td></td>
</tr>
<tr>
<td>application:</td>
<td>Water network</td>
</tr>
<tr>
<td>transported medium</td>
<td>Potable water</td>
</tr>
<tr>
<td>working pressure:</td>
<td>2 - 25 bar</td>
</tr>
<tr>
<td>type of project:</td>
<td>× new installation</td>
</tr>
<tr>
<td>demanded standards / specifications / approvals:</td>
<td>Norwegian std 3629</td>
</tr>
<tr>
<td>Special requirement on pipe-system:</td>
<td></td>
</tr>
<tr>
<td>project value in US$:</td>
<td>US$ 500,000</td>
</tr>
</tbody>
</table>

- **chosen pipe system:** FLOWTITE GRP filament wound
- **other materials in this project:** -
- **why our product:**
  - light weight
  - corrosion resistance
  - flow characteristics
  - chem. properties
  - mech. properties
  - other reasons?

<table>
<thead>
<tr>
<th>Project owner:</th>
<th>Tromsø Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>consultant / engineer:</td>
<td>Barlindhaug, Norway</td>
</tr>
<tr>
<td>contractor:</td>
<td>Målseth maskin, Norway</td>
</tr>
</tbody>
</table>

**Pipe Details - material 1:**
- Total pipeline length: 4,500 m
- Pipe lengths supplied: 6 m and 12 m
- Diameter DN min / max (mm): DN 300 / DN 600
- Pressure PN min / max (bar): PN 6 / PN 25
- Stiffness SN min / max (N/m²): SN 5000 / SN 5000
- joint types: FLOWTITE Standard GRP Couplings
- fittings used: Elbows, flange ends, T-pipes

**Installation Details:**
- type: × open trench
- trench dimensions: Std FLOWTITE 1.8 x DN
- laying depth: 1.5 - 3 m
- native soil type: Gr. 1-3
- backfill soil type / compaction: Gr. 1, gravel
- thrust blocks / lockjoints: Thrust blocks
- deflection min/max: -
- quality measures during installation:
- Project duration: Year start / end: 1999 / 2000

**Summary:**
**Case Study -17-**

**PROJECT NAME:** Separator - Bielsko-Biała stage I  
**Community/Country:** Bielsko, Poland  
**Amiantit location:** Amitech Poland Sp. z o.o.  
**Description:** Water supply network is an workaround for the landfill of waste, which passes through the network DN 1200.

<table>
<thead>
<tr>
<th>application:</th>
<th>Water network</th>
</tr>
</thead>
<tbody>
<tr>
<td>transported medium:</td>
<td>Potable water</td>
</tr>
<tr>
<td>working pressure:</td>
<td>16 bar</td>
</tr>
<tr>
<td>type of project:</td>
<td>✗ new installation</td>
</tr>
<tr>
<td>demanded standards / specifications / approvals:</td>
<td>AT COBRTI „Instal”  Hygienic Certificate</td>
</tr>
<tr>
<td>Special requirement on pipe-system:</td>
<td>System easy to install</td>
</tr>
</tbody>
</table>

**chosen pipe system:** ✗ FLOWTITE GRP filament wound  
**other materials in this project?** Steel shapes  
| Water meters            |

**why our product?** ✗ light weight  
| ✗ corrosion resistance  |
| ✗ flow characteristics  |
| ✗ chem. properties       |
| ✗ mech. properties       |
| ✗ other reasons?         |

**Project owner:** AQUA S.A., Bielsko-Biała  
**consultant / engineer:** Biuro Projektów Budownictwa Komunalnego, Poland  
**contractor:** Eko-Textbud 2, Bielsko-Biała, Poland

**Pipe Details - material 1:**  
- **Total pipeline length:** 550 m  
- **Pipe lengths supplied:**  
  - **Diameter DN min / max (mm):** DN 1200  
  - **Pressure PN min / max (bar):** PN 16  
  - **Stiffness SN min / max (N/m²):** SN 10000  
  - **joint types:** FLOWTITE Standard GRP Couplings  
  - **fittings used:** -

**Installation Details:**  
- **type:** ✗ open trench  
- **trench dimensions:** 1.8 m  
- **laying depth:** 2 - 2.5 m  
- **native soil type:** Clay  
- **backfill soil type / compaction:** Sand / 95% Proctor scale  
- **thrust blocks / lockpoints:** reinforced concrete blocks, steel components fastened to chamber walls  
- **deflection min/max:** 1°  
- **quality measures during installation:** Attempts to leakproofness PN 12  
- **Project duration:** 8 months  
- **Year start / end:** 2007 / 2008

**Summary:** The system installed in the winter period allowed to work according to schedule.

**comments from Owner/Consultant/Contractor:** The contractor is very happy with the cutting and fitting pipes, and the possible use of each meter by the use of pipe fittings hand.
## Case Study - 18 -

**Project Name:** Network Renovation Nitrogen Factory in Tarnow  
**Community/Country:** Tarnow, Poland  
**Amiantit location:** Amitech Poland Sp. z o.o.

**Description:** Network renovation of more than 1,500 m with DN1000 mm FLOWTITE GRP pipes.

- **Application:** Network refining
- **Transported Medium:** Raw water
- **Working Pressure:** 6 bar
- **Type of Project:** Relining
- **Demanded Standards/Specifications/Approvals:** COBRTI Instal, Hygienic Certificate
- **Special Requirement on Pipe-system:** Corrosion-resistant and easy to install

**Project Owner:** Zakłady Azotowe Kędzierzyn-Koźle S.A.  
**Consultant/Engineer:** HYDROSAN, Poland  
**Contractor:** ZRIB, Poland

### Pipe Details - Material 1:

- **Total Pipeline Length:** 1,500 m
- **Diameter DN min / max (mm):** DN 800
- **Pressure PN min / max (bar):** PN 6
- **Stiffness SN min / max (N/m²):** SN 5000
- **Joint Types:** FLOWTITE Standard GRP Couplings
- **Fittings Used:** Bends, flanges

### Installation Details:

- **Type:** Sliplining
- **Trench Dimensions:** -
- **Laying Depth:** -
- **Native Soil Type:** -
- **Backfill Soil Type / Compaction:** -
- **Thrust Blocks / Lockjoints:** Thrust blocks
- **Deflection min / max:** -
- **Quality Measures During Installation:** After completion of the renovation pressure test 1 MPa for 30 min.
- **Project Duration:** 3 months
- **Year Start / End:** 2008

### Summary:

Good material density and durability. The contractor could easily install the pipe. Difficult installation environment (swampy) made a light weight and easy to install system necessary.
**Case Study -19-**

**PROJECT NAME:** Lodz - Job number 3  
**Community/Country:** Lodz, Poland  
**Amiantit location:** Amitech Poland Sp. z o.o.  
**Description:** Renovation of old iron pipes water supply network with FLOWTITE pipes by relining. Longest distance between the chambers up to 300m.

- **application:** Network relining  
- **transported medium:** Potable water  
- **working pressure:** 10 bar  
- **type of project:** ✗ relining  
- **demanded standards / specifications / approvals:** DIN16868  
Certificate of PZH  
- **Special requirement on pipe-system:** High static load capacity, low wall thickness

- **chosen pipe system:** ✗ FLOWTITE GRP filament wound
- **other materials in this project?** -
- **why our product?**
  - light weight
  - corrosion resistance
  - flow characteristics
  - chem. properties
  - ✗ mech. properties
  - other reasons?

**Project owner:** Łódzka Spółka Infrastrukturalna Sp. z o.o.  
**consultant / engineer:** HYDROSERWIS, Poland  
**contractor:** PGB S.A, Poland

**Pipe Details - material 1:**
- **Total pipeline length:** 22,818 m  
- **Pipe lengths supplied:**
- **Diameter DN min / max (mm):** DN 600 / DN 800  
- **Pressure PN min / max (bar):** PN 10  
- **Stiffness SN min / max (N/m):** SN 10000  
- **joint types:** FLOWTITE Standard GRP Couplings  
- **fittings used:** -

**Installation Details:**
- **type:** ✗ sliplining  
- **trench dimensions:** -  
- **laying depth:** -  
- **native soil type:** -  
- **backfill soil type / compaction:** -  
- **thrust blocks / lockjoints:** -  
- **deflection min/max:** -  
- **quality measures during installation:** leakproofness PN15  
- **Project duration:** 2-3 years  
- **Year start / end:** 2008 - 2010  
- **number of shafts (jacking):** 250  
- **shaft distance (jacking):** 60 m – 300 m  
- **tunnelling equipment (jacking):** Winch device 10T

**Summary:**
- Reduction in diameter low  
- The speed of assembly is fast,  
- Long-distance between the working chambers (up to 300 m)
**Case Study -20-**

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Shuaibah Power and Desalination Plant Ph-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Jeddah, Saudi Arabia</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>Amiantit Fiberglass Inc. Ltd. (AFIL)</td>
</tr>
<tr>
<td>Description:</td>
<td>Shuaibah Desalination &amp; Power</td>
</tr>
<tr>
<td></td>
<td>Plant is considered as the world largest power and desalination plant. It is located on the coast of red sea, nearby Jeddah. After completion of the 3rd phase, the plant will consist of 14 units with a total capacity of 5,600 MW electricity and millions of gallons water per day. The potable water is being transferred through an 80 km long water pipeline to the national water pipeline network.</td>
</tr>
</tbody>
</table>

| application:                  | Supply line                                 |
| transported medium            | Seawater / Potable water                    |
| working pressure              | 2.81 bar & FV                               |
| type of project               | × new installation                          |
| demanded standards /          | Standard specs as approved by the consultants. |
| specifications / approvals:   |                                            |
| **Special requirement on**    |                                            |
| **pipe-system:**              |                                            |
| project value in US$:         | approx. US$ 21,000,000                       |
|                               |                                            |
|                               | **chosen pipe system:** × FLOWTITE GRP filament wound |
|                               | **other materials in this project?:** -     |
|                               | **why our product?** × light weight        |
|                               | × corrosion resistance                      |
|                               | ○ flow characteristics                      |
|                               | ○ chem. properties                          |
|                               | ○ mech. properties                          |
|                               | × durable, maintenance free and strong after sales services commitments. |

| Project owner:               | Shuaibah Water & Electricity Company (SWEC) Saudi Arabia |
| consultant / engineer:       | Fichtner, Germany                                  |
| contractor:                  | Doosan Heavy Ind. & Const. Ltd., Korea / Siemens AG, Germany |

**Pipe Details - material 1:**

| Total pipeline length:       | 425 m aboveground |
| Pipe lengths supplied:       | 6 m and 12 m      |
| Diameter DN min / max (mm):  | DN 100 / DN 2200  |
| Pressure PN min / max (bar): | PN 3 / PN 7       |
| Stiffness SN min / max (Nm²):| SN 5000 / SN 10000|
| joint types:                 | B/S Joints       |
| fittings used:               |                 |

[Image of pipeline and desalination plant]
### Pipe Details - material 2:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total pipeline length</td>
<td>2,084 m for underground</td>
</tr>
<tr>
<td>Pipe lengths supplied</td>
<td>6 m and 12 m</td>
</tr>
<tr>
<td>Diameter DN min / max (mm)</td>
<td>DN 100 / DN 3900</td>
</tr>
<tr>
<td>Pressure PN min / max (bar)</td>
<td>PN 3 / PN 11</td>
</tr>
<tr>
<td>Stiffness SN min / max (N/m²)</td>
<td>SN 2500 / SN 10000</td>
</tr>
<tr>
<td>joint types</td>
<td>B/S &amp; Coupling Combined System</td>
</tr>
</tbody>
</table>

### Installation Details:

- **type**: × open trench
- **trench dimensions**: varying
- **laying depth**: varying
- **native soil type**: Loose sand
- **backfill soil type / compaction**: gravel
- **thrust blocks / lockjoints**: Thrust blocks were not used
- **deflection min/max**: 0 - 2°
- **quality measures during installation**: Each spool was visually inspected and later on hydro tested
- **Project duration**: approx. one year
- **Year start / end**: 2008

**Summary:** Shuaibah was a huge project and very limited delivery time. However, Amiantit has utilized all its resources and completed the project on time.
### Case Study -21-  

**PROJECT NAME:** Bellville North Water Supply  
**Community/Country:** Bellville, South Africa  
**Amiantit location:** Amitech South Africa (Pty) Ltd  
**Description:** Water for a new residential development to be pumped from an existing reservoir and conveyed through this GRP line. Pipeline routed alongside new road reserve and through existing vineyards.  

- **application:** Water network  
- **transported medium:** Potable Water  
- **working pressure:** 16 bar  
- **type of project:** ☒ new installation  
- **demanded standards / specifications / approvals:** SABS 1748-1, AWWA C950  

**Special requirement on pipe-system:**  
- **project value in US$:** US$ 200,000 (pipe only)  

- **chosen pipe system:** ☒ FLOWTITE GRP filament wound  
- **other materials in this project:** -  
- **why our product:** ☒ light weight  
  - corrosion resistance  
  - flow characteristics  
  - chem. properties  
  - mech. properties  
  - price  

Project owner: City of Cape Town Municipality  
consultant / engineer: Ninham Shand, South Africa  
contractor: Martin & East, South Africa  

### Pipe Details - material 1:  
- **Total pipeline length:** 4,680 m  
- **Pipe lengths supplied:** 12 m  
- **Diameter DN min / max (mm):** DN 300 / DN 400  
- **Pressure PN min / max (bar):** PN 20 / PN 20  
- **Stiffness SN min / max (N/m):** SN 5000 / SN 5000  
- **joint types:** FLOWTITE Standard GRP Couplings  
- **fittings used:** 21 Bends, 22 Flange adapters  

### Installation Details:  
- **type:** ☒ open trench  
- **trench dimensions:** 1000 mm  
- **laying depth:** 1500 mm  
- **native soil type:** Clay  
- **backfill soil type / compaction:** Sand and Clay  
- **thrust blocks / lockpoints:** Thrust blocks  
- **deflection min/max:** 0 - 1°  
- **quality measures during installation:** Pressure test 1.5 times design pressure 30 bar  
- **Project duration:** -  
- **Year start / end:** 2007 / 2008  

### Summary:  
Ductile Iron was originally specified for the project, but GRP was later approved as an alternative material. GRP was eventually selected for economic reasons, as both the delivery time and price was far more competitive. In average about 200 m of pipes were laid per day.
## Case Study -22-  

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Klein Pella Irrigation Scheme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Pella, South Africa</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>Amitech South Africa (Pty) Ltd</td>
</tr>
</tbody>
</table>

### Description:
The Klein Pella farm is renowned for its export grapes and dates. Situated on the border of South Africa and Namibia, water is pumped from the Orange River for irrigation purposes. As a desert region, water is an essential element of life in this region. The pipe supplied was for the bulk water portion of the project.

### Application:
- Irrigation line

### Transported medium:
- Raw water

### Working pressure:
- 12 bar

### Type of project:
- New installation

### Demanded standards / specifications / approvals:
- SABS 1748-1
- AWWA C950

### Special requirement on pipe-system:
- Supply within time limits

### Project value in US$:
- US$ 470,000 (pipe only)

### Chosen pipe system:
- FLOWTITE GRP filament wound

### Other materials in this project:
- -

### Why our product:
- Light weight
- Corrosion resistance
- Flow characteristics
- Chem. properties
- Mech. properties
- Price

---

### Project owner:
- Karsten Group

### Consultant / engineer:
- Andrag Agrico, South Africa

### Contractor:
- Thomas Visser, South Africa

### Pipe Details - material 1:
- **Total pipeline length:** 3,100 m
- **Pipe lengths supplied:** 12 m
- **Diameter DN min / max (mm):** DN 500 / DN 500
- **Pressure PN min / max (bar):** PN 10 / PN 20
- **Stiffness SN min / max (N/m²):** SN 5000 / SN 5000
- **Joint types:** FLOWTITE Standard GRP Couplings
- **Fittings used:** 6 bends; 2 Air Valves; 1 scour

### Installation Details:
- **Type:** open trench
- **Trench dimensions:** 1200 mm
- **Laying depth:** 1500 mm
- **Native soil type:** Gravel, coarse sand and rock
- **Backfill soil type / compaction:** Gravel and coarse sand
- **Thrust blocks / lockjoints:** Thrust blocks
- **Deflection min/max:** 0 - 1°
- **Quality measures during installation:** Pressure test 1.5 times design pressure
- **Project duration:** 2008

### Summary:
This project proved to be a breakthrough in an area where steel pipes were traditionally preferred over other materials due to their ability to withstand higher pressures. The project was a huge success and the extension to the existing farm will provide much needed employment in an area where job creation and community upliftment is paramount. The installation was extremely quick and more than 400m of pipe was laid per day.

### Comments from Owner/Consultant/Contractor:
After installation, the very sceptical contractor commented that whilst he tried his best to find a leak in the line, he could not find any faults with GRP as a piping solution! He was very impressed with the quality of the pipe and how simple it was to install.
## Case Study -23-

<table>
<thead>
<tr>
<th>PROJECT NAME:</th>
<th>Ampliación de la estación de tratamiento de agua potable de l’Ampolla</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community/Country:</td>
<td>Ampolla, Spain</td>
</tr>
<tr>
<td>Amiantit location</td>
<td>Amitech Spain S.A.</td>
</tr>
<tr>
<td>Description:</td>
<td>Treatment plant potable water from Consorci Algues de Tarragona.</td>
</tr>
<tr>
<td>application:</td>
<td>Water network</td>
</tr>
<tr>
<td>transported medium</td>
<td>Potable water</td>
</tr>
<tr>
<td>working pressure</td>
<td>6 bar</td>
</tr>
<tr>
<td>type of project:</td>
<td>new installation</td>
</tr>
<tr>
<td>demanded standards / specifications / approvals:</td>
<td>ACS</td>
</tr>
<tr>
<td>Special requirement on pipe-system:</td>
<td>Light weight, good and easy installation</td>
</tr>
<tr>
<td>project value in US$:</td>
<td>US$ 889,000</td>
</tr>
</tbody>
</table>

**chosen pipe system:** FLOWTITE GRP filament wound

**other materials in this project?** -

**why our product?**
- light weight
- corrosion resistance
- flow characteristics
- chem. properties
- mech. properties
- other reasons?

Project owner: Consorci d’Algues de Tarragona (CAT)
consultant / engineer: Consorci d’Algues de Tarragona (CAT), Spain
contractor: Construcciones Rubau, Spain

### Pipe Details - material 1:
- Total pipeline length: 544 m
- Pipe lengths supplied: 6 m and 12 m
- Diameter DN min / max (mm): DN 1300 / DN 1800
- Pressure PN min / max (bar): PN 6 / PN 6
- Stiffness SN min / max (N/m²): SN 5000 / SN 5000
- joint types: FLOWTITE Standard GRP Couplings
- fittings used: Elbows, Flanges, Wall couplings, Thrust Ring, “T”, “Y”, Reducers

### Installation Details:
- type: buried
- trench dimensions: 3 m
- laying depth: 5 m
- native soil type: Rock
- backfill soil type / compaction: Gravel SC1
- thrust blocks / lockjoints: Concrete thrust blocks
- deflection min/max: 0.5 / 3.0°
- quality measures during installation: Installation acc. to the Installation Brochure.

**Project duration:** 12 months
**Year start / end:** 2007 / 2008

### Summary:
The contractor wanted GRP FLOWTITE in front of Concrete.

### comments from Owner/Consultant/Contractor:
They own and contractor are satisfied of the behaviour of the GRP during the whole process of installation.
### Case Study -30-  

<table>
<thead>
<tr>
<th><strong>PROJECT NAME:</strong></th>
<th>Pungwe Water Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Community/Country:</strong></td>
<td>Mutare, Zimbabwe</td>
</tr>
<tr>
<td><strong>Amiantit location:</strong></td>
<td>APS Norway AS</td>
</tr>
<tr>
<td><strong>Description:</strong></td>
<td>The project was delivered with Norwegian finance, Norad, for the pipe supply.</td>
</tr>
<tr>
<td><strong>application:</strong></td>
<td>Water network</td>
</tr>
<tr>
<td><strong>transported medium:</strong></td>
<td>Potable water</td>
</tr>
<tr>
<td><strong>working pressure:</strong></td>
<td>5 - 32 bar</td>
</tr>
<tr>
<td><strong>type of project:</strong></td>
<td>☑ new installation</td>
</tr>
<tr>
<td><strong>demanded standards / specifications / approvals:</strong></td>
<td>AWWA C950, M45</td>
</tr>
<tr>
<td><strong>Special requirement on pipe-system:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>project value in US$:</strong></td>
<td>US$ 15,000,000</td>
</tr>
</tbody>
</table>

![Image of pipeline installation]

- **chosen pipe system:** ☑ FLOWTITE GRP filament wound
- **other materials in this project:** -
- **why our product:** ☑ light weight  ☑ corrosion resistance  ☑ flow characteristics  ☑ chem. properties  ☑ mech. properties  ☑ other reasons?

<table>
<thead>
<tr>
<th><strong>Project owner:</strong></th>
<th>City of Mutare</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>consultant / engineer:</strong></td>
<td>Knight Piesold, South Africa</td>
</tr>
<tr>
<td><strong>contractor:</strong></td>
<td>Skanska, Sweden</td>
</tr>
</tbody>
</table>

**Pipe Details - material 1:**
- **Total pipeline length:** 79,000 m
- **Pipe lengths supplied:** 6 m and 12 m
- **Diameter DN min / max (mm):** DN 600 / DN 900
- **Pressure PN min / max (bar):** PN 10 / PN 32
- **Stiffness SN min / max (N/m):** SN 2500 / SN 8000
- **Joint types:** FLOWTITE Standard GRP Couplings
- **Fittings used:** Elbows, T-pipes, Flanges

**Installation Details:**
- **Type:** ☑ open trench
- **Trench dimensions:** Std FLOWTITE 1.8 x DN
- **Laying depth:** 1.5 - 6 m
- **Native soil type:** Gr. 1-5
- **Backfill soil type / compaction:** Gr. 2-3
- **Thrust blocks / lockjoints:** Thrust blocks
- **Deflection min/max:** Generally 1 - 2.5°
- **Quality measures during installation:** Deflection, misalignments
- **Project duration:** Approx. 1.5 years
- **Year start / end:** 1997 / 1999

**Summary:**
For Skanska the use of GRP pipes from FLOWTITE and the cooperation with FLOWTITE has been a very positive experience. The pipeline was put into service late 1999, the official inauguration of the project took place in March 2000. The whole pipeline is performing to the full satisfaction to all parties involved.
This handbook is intended as a guide only. All values listed in the product specifications are nominal. Unsatisfactory product results may occur due to environmental fluctuations, variations in operating procedures, or interpolation of data. We highly recommend that any personnel using this data have specialised training and experience in the application of these products and their normal installation and operating conditions. The engineering staff should always be consulted before any of these products are installed to ensure the suitability of the products for their intended purpose and applications. We hereby state that we do not accept any liability, and will not be held liable, for any losses or damage which may result from the installation or use of any products listed in this handbook as we have not determined the degree of care required for product installation or service. We reserve the right to revise this data, as necessary, without notice. We welcome comments regarding this handbook.

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