



clover 

GRP JACKING PIPE

 **SUPERLIT[®]**

AUG 2014

CONTENTS

TECHNOLOGY	4
- Trenchless Technology	
PRODUCT FEATURES	5
- Feature and Benefits	
PRODUCT DATA	6
- Technical Specifications	
- Product Dimensions	
PRODUCT APPLICATIONS	8
- Slip Lining	
- Micro Tunnelling	
- Pipe Jacking	
MANUFACTURING PROCESS	9
- Centrifugal Casting process	
CERTIFICATIONS	10
REFERENCE DOCUMENTS:	
- Clover GRP Pipes and Fittings Product Guide	

For further information relating to GRP Pipe & Fittings or any other Clover product, contact your local Clover branch for assistance.



The products shown form part of our continuous improvement program and as such the product designs, specifications and materials may be changed without notice.

All warranties relating to accuracy, completeness, or suitability for any particular purpose and all liability for any loss, damage or costs incurred relating to the use of this information are excluded.



water, sewer, electrical, gas.

AUSTRALIAN OWNED AND OPERATED

Clover Pipelines is Australia's fastest growing specialist supplier and distributor of innovative pipeline products with years of industry experience for the Australian water, wastewater, electrical and gas infrastructure markets.

KNOWLEDGE YOU CAN TRUST

Specialising in specifying and supplying the most technically advanced pipe and fitting systems for the Australian market, Clover provides complete pipe systems including Australian manufactured products and exclusive international product lines. This ensures our customers get the best solution, every time. To stay ahead of the game, we make sure we don't rest on the past, but focus on our customer's next project and challenge.

A DEEP POOL OF TALENT

People at Clover are a unique group of professionals who actually care. We are to the point and offer no compromises when it comes to quality and the end to end delivery of our products and advice. Clover has an established force employing dedicated professionals in areas including sales, distribution, customer service, manufacturing, technical support, research and development.

FRESH THINKING With innovation at the core of our business, we are always investing in ways to deliver best practice from our technically advanced thermoplastics pipe manufacturing system to our growing distribution network. Our strategic approach of working with industry leaders, research and development through sound investment and innovation, coupled by meticulous quality control and safety has established Clover as a global leader in the thermoplastics industry.

ZERO HARM

As part of our commitment to achieving the principles of health and safety in our workplace, we recognise our moral and legal responsibility to provide a safe and healthy work environment for employees, contractors, customers and visitors. This commitment also extends to ensuring that our operations do not place the local community or environment at risk of injury, illness or damage.

LOOKING AFTER OUR FUTURE

As part of our commitment to achieving the principles of responsible environmental management, sustainability and protection of the natural environment, we recognise our moral and legal responsibility to ensure that our activities, products and services are designed to protect and enhance the environment in the communities in which we operate. Our obligations are to ensure that our operations do not place the natural environment or the local community at risk of harm and to leave the world a better place for our children and their children.

STRIVING TO EXCEED

Our continuous improvement programs examine new materials, process technology, manufacturing equipment and new product developments ensure our leading innovative edge within the pipeline industry. What does this mean? Better products for you and the industry that meet the strictest approval requirements and exceed industry standards. Clover is a quality endorsed company, accredited to ISO9001. With an ongoing commitment to processes and products that comply with all relevant statutory and regulatory requirements.

EVERYWHERE YOU NEED US TO BE

With locations across Australia, Clover has the resources and commitment to deliver infrastructure projects right across Australia, on time and to budget.



TECHNOLOGY

TRENCHLESS TECHNOLOGY

With today's growing urban areas and busy developed cities and towns, it is at times impractical to utilise trench excavation and disrupt the surface conditions to install, replace or repair underground piping systems.

Clover Superlit trenchless technology includes the lining of existing pipes called Sliplining where a new pipe is installed inside an existing deteriorating pipe.

It can also include the micro tunnelling process of boring a hole and jacking a pipe into the newly created excavation.

These technologies offer significant advantages to the community over traditional open trench installations:

- **No trenches means installation savings**
- **Minimal surface disruption**
- **All weather installation, rain, hail or shine**
- **Minimal noise and vibration due to underground installation**
- **Low soil transference and replacement**
- **Small installation space required**
- **Less community impact with installation underground and less traffic congestion**



FEATURES AND BENEFITS

Clover Superlit GRP Jacking pipes offer significant advantages for trenchless applications with its features and benefits:

- **Long service life**
 - 50 years minimum
 - 100 year design capability
- **Versatile manufacturing processes:**
 - Centrifugally Cast process
 - Lengths can be varied to suit application
- **Light weight materials:**
 - Lower transport costs
 - Significant installation & handling savings
- **Superior jacking capabilities:**
 - High compression strength
 - Lowest jacking force required for any drive length
 - Smooth non-absorbing external surface
- **Flush Coupling:**
 - Provides a smooth flush external surface for minimal interference during installation
- **Superior hydraulic performance:**
 - Smooth internal bore means less friction loss
 - Larger bore for higher flow rates
- **Corrosion resistant materials:**
 - Suitable for high Ph applications and aggressive environments
- **Excellent abrasion resistance**
- **Non Conductive materials:**
 - Not affected by induced currents or earth leakage
 - No Cathodic protection required
- **Energy efficient:**
 - Smooth bore means less pumping energy required and less surface build up for lower maintenance and running costs
 - Low carbon footprint



WHY Clover SUPERLIT GRP JACKING PIPE?

Not only does Clover Superlit GRP provide convenient trenchless technology, superior sliplining technology and microtunnelling/jacking capability, it has an under-valued benefit of convenience to the community and environment.

PRODUCT DATA

TECHNICAL SPECIFICATIONS

Clover SUPERLIT GRP JACKING PIPES:

- GRP Jacking Pipes are manufactured using the Centrifugal Casting process in accordance with the relevant ISO standards.
- Pipe Dimensions: Refer to Product Dimensions table
- Size Range: DN 400 to DN 1400
- Jacking Load: 50 to 500 Tonnes
- Lengths: Up to 5.8m
- Pipe Ends: Rebated ends with one Coupling fitted to each pipe length
- Coupling: Body: Stainless Steel Gr 316Ti
Seal: EPDM 60 +/- 5 Shore

DESIGN ASSUMPTIONS:

- Factor of Safety = 3
- Ultimate compressive strength = 90 N/mm²
- Pipe thickness and stiffness values are calculated
- Other pipe sizes and jacking forces may be available upon request

TECHNICAL SUPPORT

We have an infrastructure project team that has the experience and expertise to assist you with your project needs.

Our team will not only help you choose the right products for the job, they can also assist with the design and specification of those products.

Technical Properties of SUPERLIT GRP Pipe and Fitting Parts

Performance Tests



Blasting test Rigidity test

QUALITY CONTROL

SUPERLIT GRP Pipe production technology includes a detailed quality control program. The compliance of the production and testing of the pipes and fittings with the international and Turkish standards is provided by this program.

Quality Control tests
Raw material is tested before the production. Tests include the compliance of the raw materials and the products produced (pipe, sleeve, fitting) with the standards. These tests guarantee the compliance of the pipe materials used with the specified tests. Certification works within the direction of ISO 9000 standards are provided by the total quality concept that is applied with the joint participation of the employees at SUPERLIT.

Measured Qualities	Limits of change
Pipe wall thickness	at single spot [-10% of nominal thickness]
Visual inspection	standard
Pipe length	± 100 mm
Pipe diameter	± 1 mm
Pipe hardness	± 5 Barcol
Pipe stiffness	ASTM D-2412 Standard
Longitudinal tensile strength	ASTM Standard D-638 Standard
Peripheral tensile strength	ASTM Standard D-2290 Standard
Laminate bonding	ASTM Standard D-2584 Standard

Classification of the pipes according to their operation pressures is according to the criterias included in AWWA C 950 Standard and characteristics included in M 45. **SUPERLIT GRP Pipes** absorb 40% of the additional pressure arising of the water hammer.



JACKING PIPE DIMENSIONS

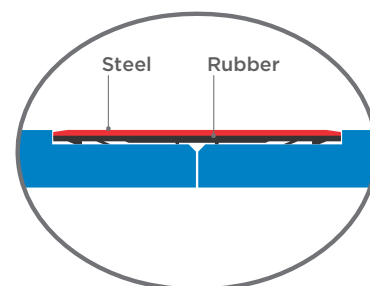
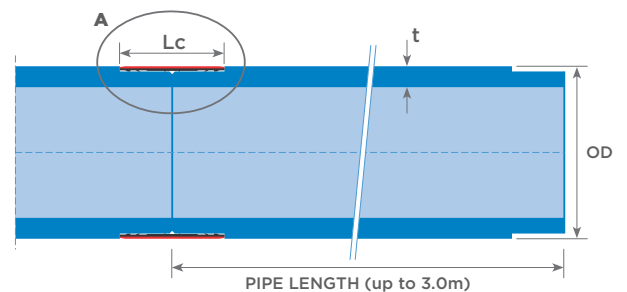
Nominal Diameter	Jacking Load	Pipe Diameter		Pipe Thickness	Pipe Stiffness
DN	Tonnes	OD (mm)	ID (mm)	t/(mm)	SN/(Nm ²)
400	50	427	380	23.3	142278
500	50	530	489	20.5	49614
600	50	617	580	18.6	21455
700	50	719	684	17.3	10867
 					
400	100	427	353	37.2	579028
500	100	530	467	31.7	18345
600	100	617	561	27.9	72379
700	100	719	668	25.3	33987
800	100	821	772	24.3	20174
900	100	923	873	24.9	15245
 					
500	150	530	444	42.8	451515
600	150	617	543	37.2	171564
700	150	719	653	33.2	76802
800	150	821	758	31.3	43114
900	150	923	861	31.1	29703
1000	150	1025	956	34.3	29043
1200	150	1229	1166	31.5	13021
 					
500	200	530	422	54.0	906822
600	200	617	524	46.5	335086
700	200	719	637	41.2	146774
800	200	821	745	38.2	78374
900	200	923	848	37.3	51245
1000	200	1025	945	39.9	45727
1200	200	1229	1157	36.1	19599
1400	200	1433	1362	35.5	11737
 					
600	250	617	524	46.5	579028
700	250	719	637	41.2	249949
800	250	821	745	38.2	129836
900	250	923	848	37.3	81281
1000	250	1025	945	39.9	67363
1200	250	1229	1157	36.1	28294
1400	250	1433	1362	35.5	16168
 					
800	300	821	717	52.2	199983
900	300	923	824	49.7	121225
1000	300	1025	923	51.0	95491
1200	300	1229	1138	45.4	38983
1400	300	1433	1346	43.4	21445
 					
1200	400	1229	1120	54.7	68182
1400	400	1433	1330	51.4	35625
 					
1400	500	1433	1314	59.4	54983

Detail A - COUPLING

Steel: Stainless Steel Gr316Ti

Rubber: EPDM 60 + 5 Shore

Lc = 120mm (DN 400-800)
140mm (DN 900-1400)



PRODUCT APPLICATIONS

SLIPLINING CAPABILITY

The Clover Superlit GRP manufacturing process is unique in a way that it permits a custom product to be made in order to meet the specific project requirements at hand.

With the ability to make custom diameters, the optimum pipe size can match the inside diameter of the existing pipeline.

Superlit GRP sliplining non-pressure pipe is produced with a non-projecting coupling joint which will minimise the outside diameter of the new pipe and enable an easy installation while maintaining as much flow capacity as possible.

The ability to manufacture variable lengths can further help to reduce the installation time which means lower costs and down time for the existing pipeline

FEATURES	BENEFITS
Custom Diameter Capabilities	Minimise interior diameter, maximise flow capabilities
Custom Length	Easier, faster installation, less pipeline service downtime
Non-projecting coupling joint	Easier installation, maximises outside diameter of new pipe



MICROTUNNELLING/ JACKING CAPABILITY

Clover Superlit GRP pipes are designed for microtunnelling and jacking which utilises the attributes of the Centrifugally Cast GRP composite materials.

The GRP internal portion of the pipe wall provides a corrosion resistant barrier which is pressure rated while the inner and outer layers of the composite provide the structural strength to withstand the very high forces needed for jacking the pipe.

The outer layer also provides excellent resistance in aggressive environments.

FEATURES	BENEFITS
Corrosion resistant material	Longer life, reduced maintenance
Smooth flush surface	Less resistance and ideal for long jacking runs
GRP Outer layer	Permits pipe to be jacked in the same manner as non GRP pipes

CENTRIFUGAL CASTING PROCESS (CC)

PRODUCTION PROCESS

Clover Superlit GRP CC Pipes are manufactured using a fully automatic computer controlled system that feeds raw materials into a rotating mould starting from the external surface of the pipe until the required wall thickness is obtained.

This system precisely determines; measures and applies exact quantities of each of the raw materials throughout the process. Process parameters, temperature and thickness are constantly monitored during the process to ensure quality control of the manufactured pipe.

STRUCTURAL STRENGTH

Glass fibres in this process are chopped and do not contain continuous filaments as for CFW process. In this process the glass fibre distribution is controlled by using variable cutters and mould speeds that when applied meet the designed axial and circumferential resistance requirements.

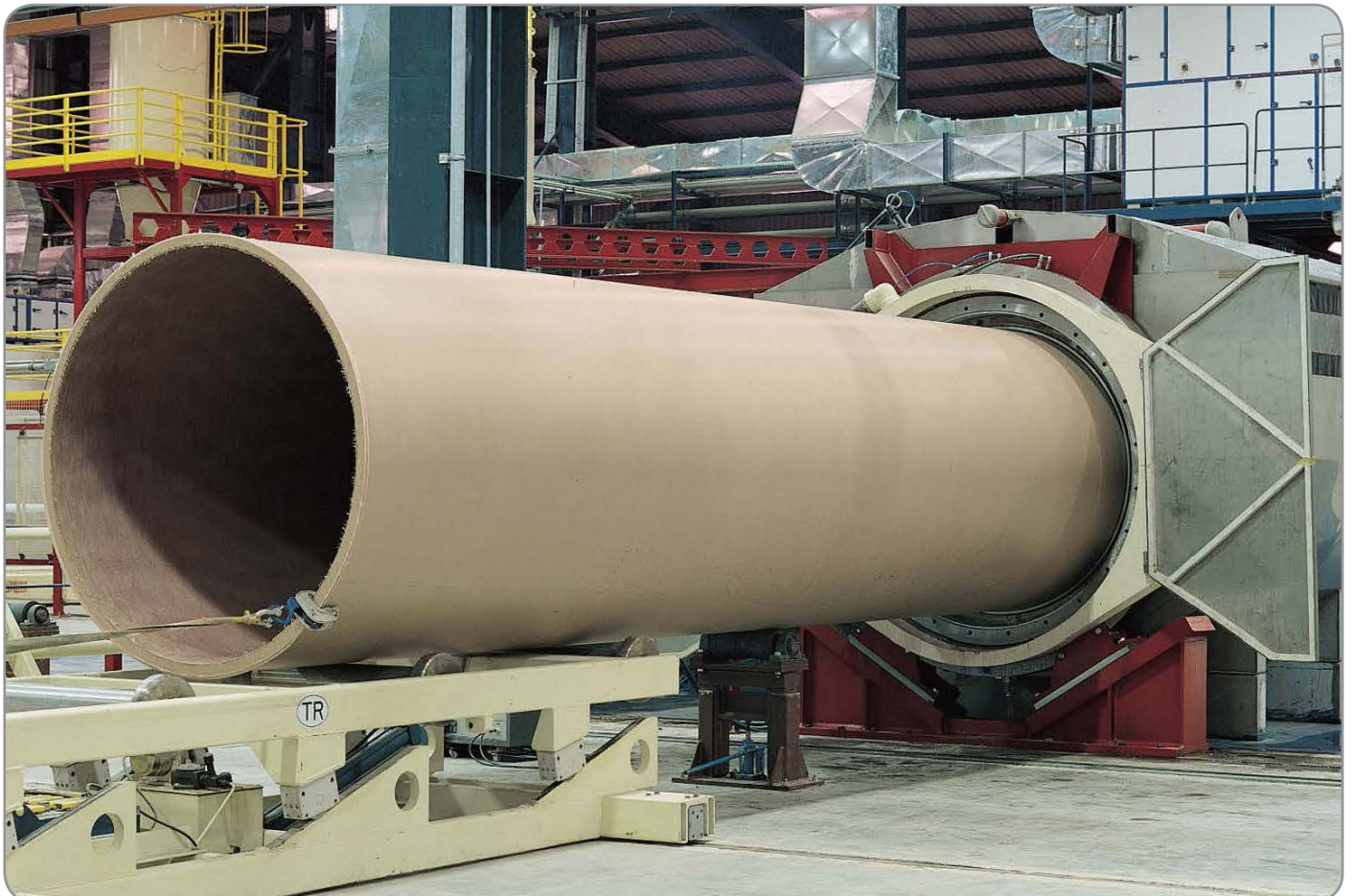
RESIN CONTROL

The GRP Resin is specially formulated to ensure the GRP materials do not polymerise during the filling process.

CURING

Once the materials have been applied, the rotating speed of the mould is increased which in turn raises the internal compression forces.

This process continues until complete compaction is achieved and all air is expelled and will continue until the material is fully cured.



CERTIFICATIONS

Superlit is certified for the Design, Production and Sales of GRP Pipe, Tank and Fittings to ISO9001:2008 Quality Management System; ISO14001:2004 Environmental Management System and BS OHSAS18001:2007 OH&S Management Systems.

Clover is certified for the Warehousing, Sales and Supply of Pipes, Valves and Fittings to ISO9001:2008 Quality Management System and AS/NZS4801:2001 OH&S Management system.

ZERTIFIKAT ◆ CERTIFICATE ◆ CERTIFICADO ◆ CERTIFICAT ◆ 證書 ◆ 證書 ◆ 證書 ◆ 證書 ◆ CERTIFICATE ◆ ZERTIFIKAT



CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

SUPERLIT BORU SAN. A.Ş.
CUMHURİYET CAD. NO:155/3
TR-34367 HARBİYE-İSTANBUL

SUPERLIT BORU SAN. A.Ş.
ÇELE MAH. DÜZCE CAD. NO:33 KAYNAŞLI
TR - 81900 DÜZCE

has established and applies
a Quality Management System for


**DESIGN, PRODUCTION AND SALES OF GRP (GLASSFIBER
REINFORCED PLASTIC) PIPE, TANK AND FITTINGS**

An audit was performed, Report No. 70021356
Proof has been furnished that the requirements
according to

ISO 9001:2008

are fulfilled. The certificate is valid until **2012-10-19**
Certificate Registration No. **12 100 15302 TMS**





Munich, 2009-11-05
QMS-TSA-29-07-02

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CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

SUPERLIT BORU SAN. A.Ş.
CUMHURİYET CAD. NO:155/3
TR-34367 HARBİYE-İSTANBUL

SUPERLIT BORU SAN. A.Ş.
ÇELE MAH. DÜZCE CAD. NO:33 KAYNAŞLI
TR - 81900 DÜZCE

has established and applies
an Environmental Management System for

**DESIGN, PRODUCTION AND SALES OF GRP (GLASSFIBER
REINFORCED PLASTIC) PIPE, TANK AND FITTINGS**

An audit was performed, Report No. 70021356
Proof has been furnished that the requirements
according to

ISO 14001:2004

are fulfilled. The certificate is valid until **2012-11-04**
Certificate Registration No. **12 104 15302 TMS**





Munich, 2009-11-05
EMS-TSA-29-07-02

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CERTIFICATE

The Certification Body
of TÜV SÜD/Türkiye
certifies that

SUPERLIT BORU SAN. A.Ş.
CUMHURİYET CAD. NO:155/3
TR-34367 HARBİYE-İSTANBUL

SUPERLIT BORU SAN. A.Ş.
ÇELE MAH. DÜZCE CAD. NO:33 KAYNAŞLI
TR - 81900 DÜZCE

has established and applies
a Safety Management System for

**DESIGN, PRODUCTION AND SALES OF GRP (GLASSFIBER
REINFORCED PLASTIC) PIPE, TANK AND FITTINGS**

An audit was performed, Report No: **09 M 10644**

Proof has been furnished that the requirements according to

BS OHSAS 18001: 2007
Occupational Health and Safety Management Systems – Specification
are fulfilled

The certificate is valid until **2012-11-10**
if the yearly surveillance audits are performed
Certificate Registration No.: **12 400 0018**
Istanbul, 2009-11-11



Please call
0212-3479810
concerning the certificate



TÜV SÜD Türkiye
System Certification Department

TÜV SÜD / Türkiye • Yıldız Posta Cad. No.17 Kat:5 • TR 34394 Esentepe • İstanbul • Türkiye TÜV®



Certificate of Approval

This certificate confirms that the company below complies with the following standard:

Company Name	Clover Pipelines Pty Ltd
Company Other Name	
Client ID	102368
Certification Standard	AS/NZS ISO 9001-2008: Quality management systems - Requirements
Scope of Certification	Design, purchasing, warehousing and distribution of pipes, conduits, valves and associated fittings for the water supply, sewerage, drainage, electrical, communication, mining, rural and gas industries.
Type of Certification	Product Conformance

CERTIFICATE DATES:

Certification Review Date	14/04/2014
Certification Expiry Date	14/04/2017
Certificate Issue Date	12/05/2014
Certificate Last Update Date	

APPROVED COMPANY/SITE ADDRESS(ES):

137-141 National Boulevard Campbellfield 3061 VIC Australia

The use of the Accreditation Mark indicates accreditation by the Joint Accreditation System of Australia and New Zealand in respect to those activities covered by JAS-ANZ accreditation.
Refer to www.jas-anz.org.au for verification.


This certification remains valid until the above mentioned expiry date and subject to the organisation's continued compliance with the certification standard, and Global-Mark's Terms and Conditions.
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Certification Manager


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CONFIRMATION

The Manager of the Certification Body of
TÜV SÜD Industrie Service GmbH
(a Pressure Equipment Directive Notified Body)
confirms that

SUPERLIT BORU SAN.A.Ş.
Çele Mah. Düzce Cad. No: 33
81900 Kaynaşli - Düzce-TURKEY


has implemented, operates and maintains a quality control and quality assurance system which is subject of periodical assessments by qualified auditors of TÜV SÜD Industrie Service.

Therefore, the company is qualified for manufacturing of GRP (Glass-fiber Reinforced Plastic) pipes, joints and fittings (DN 250 to 3.500, PN 1 to 40, SN 500 to 10.000 pursuant standards below and SN 12.500 to 1.500.000 for jacking application pursuant SUPERLIT standards)

According to:

- BS 5480:** Glass Reinforced Plastics (GRP) Pipes, Joints and Fittings for Use for Water Supply or Sewerage
- AWWA C 950:** Fiberglass Pressure Pipe
- ISO 10639:** Plastics Piping Systems for Pressure and Non-pressure Water Supply, Glass-Reinforced Thermosetting Plastics (GRP) Based on Unsaturated Polyester (UP) Resin
- ISO 10467:** Plastics Piping Systems for Pressure and Non-Pressure Drainage and Sewerage Glass-Reinforced Thermosetting Plastics (GRP) Systems Based on Unsaturated Polyester (UP) Resin
- EN 1796:** Plastics Piping Systems for Water Supply with or Without Pressure-Glass-Reinforced Thermosetting Plastics (GRP) Based On Unsaturated Polyester Resin (UP)
- EN 14364:** Plastics Piping Systems for Drainage and Sewerage With or Without Pressure-Glass-Reinforced Thermosetting Plastics (GRP) Based on Unsaturated Polyester Resin (UP)-Specifications for Pipes, Fittings and Joints
- DIN 16869:** Centrifugally Cast and Filled Glass Fiber Reinforced Polyester Resin Pipes
- ASTM D 3262:** "Fiberglass" (Glass-Fiber-Reinforced Thermosetting - Resin) Sewer Pipe
- ASTM D 3754:** "Fiberglass" (Glass-Fiber-Reinforced Thermosetting - Resin) Sewer and Industrial Pressure Pipe
- ASTM D 3517:** "Fiberglass" (Glass-Fiber-Reinforced Thermosetting - Resin) Pressure Pipe
- TS 4355:** Cam Elyeli İle Tıvlayıcı Plastik Borular ve Bağlantı Parçaları
- AWWA M 45:** Fiberglass Pipe Design
- ATV-DVWK-A 127:** Static Calculations for Waste Water canals and pipes

Confirm No : Z-DGR-0036-QS-09-B-436
valid until August, 2012
İstanbul.02 . 09.2009



Notified Body No. 0036
Zertifizierte Organisation
CONFORMITE EUROPEEN
CEOC
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TASMANIA

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water, sewer, electrical, gas.