



FLOWTITE Case Studies

- Sewer Gravity • Sewer Pressure -



AMIATIT PIPE SYSTEMS

The FLOWTITE GRP piping products and accessories sold by the AMIANTIT Group offer many advantages for the use in sewer applications.




The worldwide product availability of FLOWTITE GRP pipes has established sewer projects all over the world. This case study brochure represents only a small extract of the available 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 the available product range of our GRP pipes for the use in sewer projects are available in our sewer gravity and sewer pressure brochures. Please request them from your local dealer.



Case Study -1-

PROJECT NAME:	Cloaca Maxima Cordoba	
Community/Country:	Cordoba, Provincia de Cordoba, Argentina	
Amiantit location	AMITECH Argentina	
Description:	Installation of 6.3 kilometers of 800mm pipeline from the Barrio San Vicente collectors across the Suquia river to the San Vicente pumping station. This project connects more than 160,000 inhabitants.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	IRAM 13432 AWWA C950	
<i>Special requirement on pipe-system:</i>	Light weight, fast and easy installation	
		
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	■ light weight
Project owner:	Municipalidad de Cordoba, Cordoba	
consultant / engineer:	Enohsa, Buenos Aires	
contractor:	Electroingenieria – Paschini Michelotti – Estructuras (Ute), Cordoba	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	6,500	
<i>Diameter DN min / max (mm):</i>	1600 / 1700 / 1800	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Reducer, concentric tees	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	3	
<i>laying depth (m):</i>	2.50 / 7.50	
<i>native soil type:</i>	Slightly Compact	
<i>backfill soil type / compaction:</i>	Soil class SC2	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	max. 3°	
<i>quality measures during installation:</i>	Tightness test per section	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2009 / 2011	
		




Case Study -2-

PROJECT NAME:	Cloaca Maxima Rawson	
Community/Country:	Rawson, Provincia de San Juan, Argentina	
Amiantit location	AMITECH Argentina	
Description:	This mega work will provide sewer service for public network to an area of high population density and limited services. The project includes the laying of the primary system, large collector pipes, three pumping stations and driving in Rawson.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	IRAM 13432 AWWA C950	
<i>Special requirement on pipe-system:</i>	Light weight, fast and easy installation	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	■ light weight
Project owner:	ENOHSA, Bs, As	
contractor:	ISOLUX-CORSAN	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	20,000	
<i>Diameter DN min / max (mm):</i>	1000	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Manholes	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	2	
<i>laying depth (m):</i>	2 / 4	
<i>native soil type:</i>	Soft	
<i>backfill soil type / compaction:</i>	Soil class SC2	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	max. 3°	
<i>quality measures during installation:</i>	Tightness test per section	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2006 / 2008	
		




Case Study -3-

PROJECT NAME:	Colector Cloacal y Estaciones Elevadoras Rosario	
Community/Country:	Rosario, Provincia De Santa Fe, Argentina	
Amiantit location	AMITECH Argentina	
Description:	This project provides sewer service for public network to an area of high population density and limited services. It includes the laying of the primary system, large collector pipes, three pumping stations and driving in the west of Rosario.	
<i>application:</i>	Sewer Pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	10 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	IRAM 13432 AWWA C950	
<i>Special requirement on pipe-system:</i>	Light weight, fast and easy installation	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	■ light weight
Project owner:	ENOHSA, Bs, As	
contractor:	WERK – OBRING, Rosario	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	26,884	
<i>Diameter DN min / max (mm):</i>	300 / 700	
<i>Pressure PN min / max (bar):</i>	1 / 10	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	none	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	0.60 to 1.20	
<i>laying depth (m):</i>	1.20 / 6	
<i>native soil type:</i>	Slightly Compact	
<i>backfill soil type / compaction:</i>	Soil class SC1 / SC2	
<i>thrust blocks / lockjoints:</i>	Yes	
<i>deflection min/max:</i>	max. 3°	
<i>quality measures during installation:</i>	Permanent sheeting	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2009 / 2011	
		


Case Study -4-

PROJECT NAME:	Proyecto Interceptor Izquierdo Canal del Rio Fucha		
Community/Country:	Bogotá / Colombia		
Amiantit location	O-tek Internacional S.A.		
Description:	The project installed parallel to the Fucha River Canalization is collecting the sewage of the south East Populations of Bogotá City. The 3,200 mm GRP pipes were installed mainly in open trench but the pass beneath the Ciudad de Cali Avenue and Agoberto Mejía Street was installed with tunnel liner system (40m each case).		
<i>application:</i>	Sewer		
<i>transported medium</i>	Sewage		
<i>working pressure</i>	Gravity		
<i>type of project:</i>	■ new installation		
<i>demanded standards / specifications / approvals:</i>	NTC 3870 AWWA C950 ASTM D 3262		
<i>Special requirement on pipe-system:</i>	Rapid installation time. Light weight.		
<i>project value in US\$:</i>	US\$ 4,400,000		
	<i>chosen pipe system:</i>	■ GRP round filament	
	<i>other materials in this project?</i>	Reinforced Concrete pipes	
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ flow characteristics ■ mech. properties 	
Project owner:	Empresa de Acueducto de Bogotá, Colombia		
consultant / engineer:	H.M.V. Ingenieros, Medellin, Colombia		
contractor:	U.T. Canal del Fucha, Bogota, Colombia		
Pipe Details - material 1: GRP		Pipe Details - material 2: Concrete	
<i>Total pipeline length (m):</i>	3,096	<i>Total pipeline length (m):</i>	600
<i>Diameter DN min / max (mm):</i>	2800 / 3200	<i>Diameter DN min / max (mm):</i>	2400
<i>Pressure PN min / max (bar):</i>	2	<i>Pressure PN min / max (bar):</i>	1
<i>Stiffness SN min / max (N/m²):</i>	2500	<i>Stiffness SN min / max (N/m²):</i>	2500
<i>joint types:</i>	FLOWTITE standard couplings	<i>joint types:</i>	Spigot & Socket Joint with rubber gasket
<i>fittings used:</i>	None	<i>fittings used:</i>	None
Installation Details:			
<i>type:</i>	<ul style="list-style-type: none"> ■ open trench ■ micro tunneling ■ sliplining 		
<i>trench dimensions (m):</i>	5.0		
<i>laying depth (m):</i>	7.0		
<i>native soil type:</i>	Soft Cohesive soil (Type 4)		
<i>backfill soil type / compaction:</i>	SC2 – Clean, coarse-grain soils with <12% fines		
<i>thrust blocks / lockjoints:</i>	No		
<i>deflection min/max:</i>	0.5		
<i>quality measures during installation:</i>	Diameter deflection control plan.		
<i>Project duration:</i>	18 months		
<i>Year start / end:</i>	2007 / 2009		



Case Study -5-

PROJECT NAME:	Refurbishing of the Sewer Treatment plant in Avignon	
Community/Country:	Avignon, France	
Amiantit location	APS France SAS	
Description:	The existing sewer treatment plant has been put into service in 1994. Due to capacity problems, the refurbishing will ensure a waste water clean-up of 7400 m ³ /hour peak rate against 3000 m ³ /hour currently.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ replacement	
<i>demanded standards / specifications / approvals:</i>	Avis Techniques CSTB	
<i>Special requirement on pipe-system:</i>	Corrosion resistance Total tightness	
<i>project value in US\$:</i>	US\$ 400,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	■ corrosion resistance
Project owner:	Communauté d'Agglomération d'Avignon, Avignon	
consultant / engineer:	DEGREMONT – Aix en Provence	
contractor:	RAMPA TP – Miramas, France	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	700	
<i>Diameter DN min / max (mm):</i>	500 / 1400	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Tees, special manholes	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1,5*DN	
<i>laying depth (m):</i>	1 - 3	
<i>native soil type:</i>	Soil classes G3 / G4	
<i>backfill soil type / compaction:</i>	Gravel	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	max. 1°	
<i>quality measures during installation:</i>	Tightness was proven by testing the complete pipeline with air at 0.4b according NF EN1610	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2009 / 2010	
comments from Owner/ Consultant/ Contractor:	At the beginning the project was expected in Ductile Iron. But due to the cost and the various tailor made fittings to be used, DEGREMONT finally choose GRP FLOWTITE pipes.	
		

Case Study -6-

PROJECT NAME:	Alimentation de la station d'Épuration de Wingles	
Community/Country:	Wingles, FRANCE	
Amiantit location	APS France SAS	
Description:	GRP FLOWTITE pipes were used to replace an old and not well design concrete pipeline that transports sewer from town to the new sewage treatment plant.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ replacement	
<i>demanded standards / specifications / approvals:</i>	Avis Techniques CSTB	
<i>Special requirement on pipe-system:</i>	Corrosion resistance Total tigness Hydraulic properties	
<i>project value in US\$:</i>	US\$ 470,000	
		
<i>chosen pipe system:</i>	■ GRP round filament	
<i>why our product?</i>	■ corrosion resistance	
Project owner:	Wingles municipality, Wingles France	
consultant / engineer:	Service Eau et Assainissement de Wingles, France	
contractor:	SADE - France	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	1,500	
<i>Diameter DN min / max (mm):</i>	1000 / 1400	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Tees	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1.5*DN	
<i>laying depth (m):</i>	1 - 3	
<i>native soil type:</i>	Soil classes G3 / G4	
<i>backfill soil type / compaction:</i>	Gravel	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	max 1.5°	
<i>quality measures during installation:</i>	Tightness was proven by testing the complete pipeline with air at 0.4b according NF EN1610	
<i>Project duration:</i>	6 months	
<i>Year start / end:</i>	2007 / 2008	
		

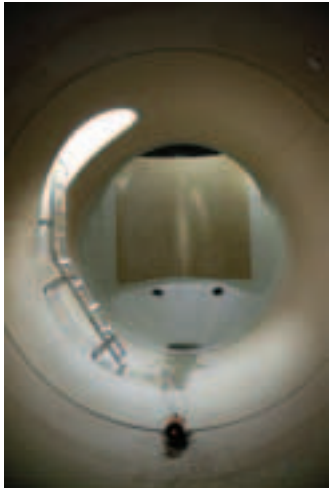

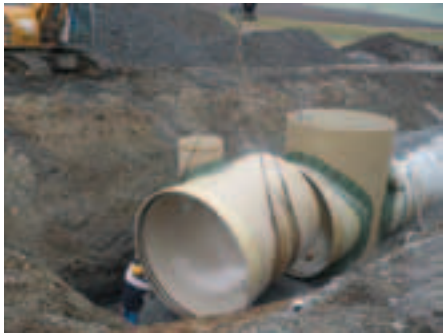
Case Study -7-

PROJECT NAME:	Kiel Fuhlenseebrücke	
Community/Country:	Kiel / Germany	
Amiantit location	AMITECH Germany GmbH	
Description:	Aboveground sewage pipeline of the city Kiel; installed as double pipeline on bearings.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ replacement	
<i>demanded standards / specifications / approvals:</i>	DIBT – Deutsches Institut für Bautechnik	
<i>Special requirement on pipe-system:</i>	UV resistance; aboveground installation	
<i>project value in US\$:</i>	US\$ 395,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ chem. properties ■ UV resistance, resistance to bird excrement and thermal variations, fast and easy installation
Project owner:	Stadtentwässerung, Kiel	
consultant / engineer:	Ingenieurteam Trebes, Kiel	
contractor:	Bunte Wittenförden-Schwerin	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	460	
<i>Diameter DN min / max (mm):</i>	1200	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	F-pieces, elbows	
Installation Details:		
<i>type:</i>	■ aboveground	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	max 2°	
<i>quality measures during installation:</i>	Construction supervision by the Institut für unterirdische Infrastruktur GmbH.	
<i>Project duration:</i>	36 months	
<i>Year start / end:</i>	2006 / 2009	
Summary:	<p>FLOWTITE GRP pipes of 1,200 mm diameter were laid aboveground as a double pipeline installed on bearings. Decisive in winning this order were the outstanding product properties of the FLOWTITE pipes. They had no problems with the requested mandatory requirements on the pipe material, such as corrosion and UV resistance, as well as resistance to bird excrement and thermal variations.</p>	

Case Study -8-

PROJECT NAME:	GRP double pipes in Hof / Saale	
Community/Country:	Hof / Saale	
Amiantit location	AMITECH Germany GmbH	
Description:	GRP double pipe for highly loaded waste water in an ecologically sensitive nature reserve.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Heavily contaminated waste water	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	EN 1610	
<i>Special requirement on pipe-system:</i>	Highest safety standard; tightness test EN 1610	
<i>project value in US\$:</i>	US\$ 127,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ chem. properties ■ high product life; fast and easy installation; economical; highest safety standard
Project owner:	Tiefbauamt Stadt Hof	
consultant / engineer:	Ingenieur Consult Schneider & Partner, Kronach	
contractor:	Günther-Bau GmbH, Stadtsteinach	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	152	
<i>Diameter DN min / max (mm):</i>	300 / 500	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	None	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1.2	
<i>laying depth (m):</i>	0.8 - 2.80	
<i>native soil type:</i>	Soil class G3 - bonding compound soil	
<i>backfill soil type / compaction:</i>	Soil class G1 - sand & gravel	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	No	
<i>quality measures during installation:</i>	Tightness test EN 1610	
<i>Project duration:</i>	12 months	
<i>Year start / end:</i>	2008 / 2009	
Summary:	The waste water canal in Hof demanded a channel in double pipe technology. AMITECH Germany supplied a FLOWTITE double pipes system containing an inside sewer pipe. The inside pipe is centred with plastic insulators.	
		



Case Study -9-

PROJECT NAME:	Cascade sewer with storage capacity and overflow in Berg, Hardermannsgrün	
Community/Country:	Berg Hardermannsgrün, Germany	
Amiantit location	AMITECH Germany GmbH	
Description:	Worldwide first „cascade sewer with storage capacity and overflow“ to defuse hydraulic bottlenecks in sewer systems; a combination of pipes with storage capacity and special sewer constructions from the continuously winded pipes of the FLOWTITE system.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	None	
<i>Special requirement on pipe-system:</i>	installation of a pipeline without construction way; buoyancy protection; fast installation; special construction; individual solution.	
<i>project value in US\$:</i>	US\$ 743,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ high product life, fast and easy installation; economical; variable system/material; less maintenance as result of self cleaning effect
Project owner:	Gemeinde Berg	
consultant / engineer:	USS Consult, Nail	
contractor:	Vogtländische Straßen-, Tief- und Rohrleitungsbau GmbH, Rodewisch	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	750	
<i>Diameter DN min / max (mm):</i>	500 / 2900	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Tailomade spools	
Installation Details:		
<i>type:</i>	■ open trench	
<i>laying depth (m):</i>	1.0 - 5.80	
<i>native soil type:</i>	Soil class G3	
<i>backfill soil type / compaction:</i>	Soil class G1 - sand & gravel; grain size of 8/16mm and 16/32mm	
<i>quality measures during installation:</i>	Laminated on construction site	
<i>Project duration:</i>	12 months	
<i>Year start / end:</i>	2007 / 2008	
Summary:	Worldwide first „cascade sewer with storage capacity and overflow“.	
		




Case Study -10-

PROJECT NAME:	AS Sentralrenseanlegget RA2 – Purification plant	
Community/Country:	Strommen, Norway	
Amiantit location	APS Norway AS - Vera AS	
Description:	Pipes for ventilation and sewer, with tailor – made fittings.	
<i>application:</i>	Ventilation and sewer	
<i>transported medium</i>	Ventilation air and sewer	
<i>working pressure</i>	1 - 3 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	NS 2628 / AWWA	
<i>Special requirement on pipe-system:</i>	Three different colors, yellow, orange and green pipes were supplied to separate the process in the treatment plant	
<i>project value in US\$:</i>	US\$ 1,500,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ price
Project owner:	Nedre Romerike Vannverk A/L, Lillestrom, Norway	
consultant / engineer:	Cowi AS, Frederikstad, Norway	
contractor:	Peab AS, Oslo, Norway	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	3,000 / 4,000	
<i>Diameter DN min / max (mm):</i>	400 / 1200	
<i>Pressure PN min / max (bar):</i>	1 / 3	
<i>Stiffness SN min / max (N/m²):</i>	1250 / 5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Different types of standard fittings	
Installation Details:		
<i>type:</i>	■ aboveground	
<i>thrust blocks / lockjoints:</i>	Thrust blocks	
<i>Year start / end:</i>	1971 (first project); 2001 (second project)	
Summary:	The first delivery of pipes, was back in 1971. When ordering the extended project second time in 2001, there were 30 years of experience in mind from our pipes. Included, there were quite a lot of fittings, specially design for this application.	
		

Case Study -11-

PROJECT NAME:	„Czajka” Sewage Treatment Plant in Warsaw - Part 1	
Community/Country:	Warsaw, Poland	
Amiantit location	AMITECH Poland Sp. z o.o.	
Description:	Modernization and expansion of the existing Czajka Sewage Treatment Plant in Warsaw, the largest sewage treatment plant in Poland so far.	
<i>application:</i>	Rainwater, Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	Technical Approval AT-2002-1285-04	
<i>Special requirement on pipe-system:</i>	Leak tightness	
<i>project value in US\$:</i>	US\$ 4,800,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ corrosion resistance ■ chem. properties ■ mech. properties
Project owner:	Miejskie Przedsiębiorstwo Wodociągów i Kanalizacji, Warsaw	
consultant / engineer:	ILF Consulting Engineers Polska Sp. z o.o., Warsaw	
contractor:	Warbud S.A., Warsaw	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	8,556	
<i>Diameter DN min / max (mm):</i>	150 / 2800	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Wells and different types of fittings	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	0.7 - 3.8	
<i>laying depth (m):</i>	From 0.5m to 7m below ground level	
<i>native soil type:</i>	Medium sand	
<i>backfill soil type / compaction:</i>	Medium sand, 98% standard Proctor	
<i>thrust blocks / lockjoints:</i>	Yes	
<i>deflection min/max:</i>	None	
<i>quality measures during installation:</i>	Leakproof test	
<i>Project duration:</i>	4 months	
<i>Year start / end:</i>	2008 / 2009	
		



Case Study -12-

PROJECT NAME:	Gdańsk – Ołowianka II Trunk Sewer	
Community/Country:	Gdańsk, Poland	
Amiantit location	AMITECH Poland sp. z o.o.	
Description:	Municipal sewage pressure pipeline between Ołowianka sewage pumping station (drainage area of old Sewage Treatment Plant in the city centre), and Wschód Sewage Treatment Plant.	
<i>application:</i>	Sewer Pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	4 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	DIN 16868 DIN 19565	
<i>Special requirement on pipe-system:</i>	Use of a biaxial pipe system; no thrust blocks necessary	
<i>project value in US\$:</i>	US\$ 4,000,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>other materials in this project?</i>	GRP FLOWTITE – Biaxial
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ corrosion resistance ■ chem. properties ■ no thrust blocks
Project owner:	Gdańska Infrastruktura Wodno-Kanalizacyjna Sp. z o.o., Gdańsk	
consultant / engineer:	Biuro Studiów i Pomiarów Proekologicznych EKOMETRIA Sp. z o.o., Gdańsk	
contractor:	<ul style="list-style-type: none"> - Hydrobudowa 9 - Poznań - Przedsiębiorstwo Wielobranżowe Instalacyjno-Sanitarne i Remontowo-Budowlane „Skibiński” Mieczysław Skibiński, Sierakowice 	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	6,583	
<i>Diameter DN min / max (mm):</i>	1200	
<i>Pressure PN min / max (bar):</i>	10	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	FLOWTITE standard couplings / biaxial lock joints	
<i>fittings used:</i>	Elbows with lock joints having angles of 0 – 45 degrees	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	3 m	
<i>laying depth (m):</i>	Trench bottom stabilised by foundation made of crushed stone and sandy gravel. Wrapped in geotextile mesh forming mattress under the pipeline	
<i>native soil type:</i>	Acc. to ATV 127P-GA. Silt, peat and other unstable cohesive soils.	
<i>backfill soil type / compaction:</i>	Sand and gravel soil; Compaction degree of bedding material $D_{pr}=95\%$	
<i>thrust blocks / lockjoints:</i>	Lock joints	
<i>deflection min/max:</i>	max 2 % vertical diameter of pipeline	
<i>quality measures during installation:</i>	Leakproof test with pressure 10 bar and ovalization measurements.	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2007 / 2009	
		




Case Study -13-

PROJECT NAME:	Renovation of sewer collector Prosna at the sewage treatment plant in Kuchary	
Community/Country:	Kuchary, Poland	
Amiantit location	AMITECH Poland sp. z o.o.	
Description:	The collector sewer was built in 1991 made of concrete pipes and due to aggressive sewage it has corroded and began to collapse at some sections.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ relining	
<i>demanded standards / specifications / approvals:</i>	Pipes with flush connector as per AT	
<i>Special requirement on pipe-system:</i>	Pipes with flush connector as per AT pH 1-10 resistance	
<i>project value in US\$:</i>	US\$ 875,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance
Project owner:	Spółka wodno-ściekowa w Kucharach, Kuchary	
consultant / engineer:	Amitech Poland Sp. z o.o. – Technical Department, Poznań	
contractor:	ZISBD, Wrocław	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	3,700	
<i>Diameter DN min / max (mm):</i>	1400	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	10000	
<i>joint types:</i>	Flush sliplining	
<i>fittings used:</i>	7 GRP manholes	
Installation Details:		
<i>type:</i>	■ renovation	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	1.5° / 3°	
<i>quality measures during installation:</i>	Tightness test acc. EN 1610	
<i>Project duration:</i>	24 months	
<i>Year start / end:</i>	2008 / 2009	
Summary:	Only GRP pipes provided appropriate resistance to the aggressive sewage in the pipeline.	
		




Case Study -14-

PROJECT NAME:	WWTP Galati Project	
Community/Country:	Galati / Romania	
Amiantit location	SUBOR Boru Sanayi ve Ticaret A.Ş.	
Description:	Galati is located in eastern part of Romania with a population of 300,000. The project will improve the sewage network of the county.	
<i>application:</i>	Sewer Pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	6 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	All International and European Standards	
<i>Special requirement on pipe-system:</i>	High resistance against corrosive effect of sewage	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>other materials in this project?</i>	HDPE
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ price
Project owner:	Water and Sewage Authorization of Galati County, Romania	
consultant / engineer:	Proiect SA - Galati	
contractor:	Sistem Yapı Construction, Turkey, Kavacık-Istanbul	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	11,000	
<i>Diameter DN min / max (mm):</i>	500 / 2000	
<i>Pressure PN min / max (bar):</i>	6	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Wall couplings, elbows, tees, reducers	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1.1 / 2.8	
<i>laying depth (m):</i>	1.5	
<i>thrust blocks / lockjoints:</i>	55 thrust blocks	
<i>deflection min/max:</i>	0.5° / 2°	
<i>quality measures during installation:</i>	Hydrostatic test	
<i>Project duration:</i>	36 months	
<i>Year start / end:</i>	2007 / 2009	
Summary:	<p>Since long, Galati had been suffered from lack of sewage infrastructure. Sewage was discharged directly to the Blacksea. Due to its high chemical resistance, short delivery time and fast installation, FLOWTITE GRP pipes were the preferred choice for the new sewer line. To reduce transport costs, all goods were delivered by river type vessels to Galati.</p>	




Case Study -15-

PROJECT NAME:	Sewer Network Faysalia East, Dammam – Saudi Arabia	
Community/Country:	Dammam – Saudi Arabia	
Amiantit location	Amiantit Fiberglass Industries Limited (AFIL)	
Description:	A housing project developed by Dammam municipality to meet growing demand of housing in the city. FLOWTITE GRP pipes of different diameters were used for sewer network.	
<i>application:</i>	Sewer pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	3 - 10 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	ASTM D-3262, AWWA C950	
<i>Special requirement on pipe-system:</i>	Fast delivery, installation support and high quality product	
<i>project value in US\$:</i>	US\$ 5,300,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ flow characteristics ■ chem. properties ■ mech. properties
Project owner:	Water and Sewerage Authority (Ministry of Water)	
consultant / engineer:	Al-Sughair – Dammam	
contractor:	Al-Yamama, Dammam	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	24,390	
<i>Diameter DN min / max (mm):</i>	300 / 1600	
<i>Pressure PN min / max (bar):</i>	6 / 12	
<i>Stiffness SN min / max (N/m²):</i>	5000 / 10000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Elbows (90 and 45 degrees)	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1.5 - 2.0	
<i>laying depth (m):</i>	2.3 - 4.4	
<i>native soil type:</i>	Sometimes unstable, sometimes semi stable	
<i>backfill soil type / compaction:</i>	Crushed Stones as bedding, Clean sand as pipe zone backfill compacted to 90% standard proctor	
<i>thrust blocks / lockjoints:</i>	Thrust blocks	
<i>deflection min/max:</i>	average 1.1% at 2.1 m D.O.C.	
<i>quality measures during installation:</i>	Crushed stoned bedding compacted; Pipe zone sand compacted in layers of each 300 mm. Achieved required SPD (Standard Proctor Density) values.	
<i>Project duration:</i>	8 months	
<i>Year start / end:</i>	2009 / 2010	
		

Case Study -16-

PROJECT NAME:	ETAR Alverca	
Community/Country:	Portugal – Distrito de Lisboa – Freguesia de Alverca no Concelho de Vila Franca de Xira	
Amiantit location	AMITECH Spain	
Description:	Pipeline between treatment plant and outfall in the Tejo river.	
<i>application:</i>	Sewer pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	6 - 10 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	AENOR certificate	
<i>Special requirement on pipe-system:</i>	Pressure characteristics	
<i>project value in US\$:</i>	US\$ 500,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>other materials in this project?</i>	HDPE
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ price ■ possibility to connect to concrete;
Project owner:	SIMTEJO, S.A – Lisboa	
consultant / engineer:	PROCESL (SOMAGUE Group), Amadora, Portugal	
contractor:	Consorcio Somague/Mota-Engil/Degremont, Sintra/Porto/Lisboa	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	692	
<i>Diameter DN min / max (mm):</i>	1200 / 2000	
<i>Pressure PN min / max (bar):</i>	6 / 10	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Elbows 42°, 45° and 90°; tee's 1600x200 and 1600x800; flanges DN 1200	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	5.0	
<i>laying depth (m):</i>	4.0	
<i>native soil type:</i>	Unstable soil	
<i>backfill soil type / compaction:</i>	Gravel wrapped in geotextile	
<i>thrust blocks / lockjoints:</i>	No	
<i>deflection min/max:</i>	1,5° / 3°	
<i>Project duration:</i>	6 months	
<i>Year start / end:</i>	2008 / 2009	
Summary:	At the beginning the contractor wanted to install Polyethylene but when they knew FLOWTITE GRP Characteristics, they changed the material. For the stiffness, facilities to install and final price.	
		



Case Study -17-

PROJECT NAME:	Parking del Hospital Provincial de Castellón	
Community/Country:	Castellón, Spain	
Amiantit location	AMITECH Spain	
Description:	This is the first Spanish project in GRP pipes for sewer in the city.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>Special requirement on pipe-system:</i>	Light weight	
<i>project value in US\$:</i>	US\$ 45,500	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance
Project owner:	Castellón Council, Castellón	
consultant / engineer:	Lubasa, Castellón	
contractor:	Lubasa, Castellón	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	176	
<i>Diameter DN min / max (mm):</i>	1100	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	none	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	1.3	
<i>laying depth (m):</i>	2	
<i>native soil type:</i>	Gravel-Sound SC2	
<i>backfill soil type / compaction:</i>	Concrete	
<i>thrust blocks / lockjoints:</i>	no	
<i>deflection min/max:</i>	1,5° / 3°	
<i>Project duration:</i>	2 days - 90m per day	
<i>Year start / end:</i>	2008	
		

Case Study -18-

PROJECT NAME:	Sorfert Fertiliser Complex	
Community/Country:	Arzew Industrial Zone, Wahran province - ALGERIA	
Amiantit location	AMITECH Spain	
Description:	Cooling System for a Fertilizer plant; Production of ammonia and urea.	
<i>application:</i>	Sewer	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	Gravity	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA, C950, M-45	
<i>Special requirement on pipe-system:</i>	Vinylester, Sea Water at very high Temperature (up to 65°C)	
<i>project value in US\$:</i>	US\$ 1,600,000	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ corrosion resistance ■ chem. properties ■ mech. properties ■ tightness
Project owner:	Sorfert Algerie Spa- Oran (Jv 51% Orascom – 49% Sonatrach)	
consultant / engineer:	Uhde (Thyssen Krupp) – Dortmund, Germany	
contractor:	Orascom Construcion Industries	
Pipe Details - material:		
<i>Diameter DN min / max (mm):</i>	2400	
<i>Pressure PN min / max (bar):</i>	1	
<i>Stiffness SN min / max (N/m²):</i>	2500	
<i>joint types:</i>	FLOWTITE standard couplings / Kroll and Ziller	
<i>fittings used:</i>	38 manholes + 4 end caps made of steel	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	5.3	
<i>laying depth (m):</i>	5.6 max	
<i>native soil type:</i>	Unstable soil	
<i>backfill soil type / compaction:</i>	Gravel	
<i>Project duration:</i>	4 months	
<i>Year start / end:</i>	2009	
Summary:	Industrial application with high temperature (65°C) and tightness requirements.	
		

Case Study -19-

PROJECT NAME:	Mersin Sewer Project	
Community/Country:	Mersin, Turkey	
Amiantit location	SUBOR Boru Sanayi ve Ticaret A.Ş.	
Description:	Installation of sewage pipes; the project ensures to collect sewage from Mersin.	
<i>application:</i>	Sewer Pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	6 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	TSEN 1796 ASTM AWWA	
<i>Special requirement on pipe-system:</i>	corrosion resistance	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	■ light weight ■ price
Project owner:	Water and Sewage Authorization of Mersin (MESKI), Turkey	
consultant / engineer:	Water and Sewage Authorization of Mersin (MESKI), Turkey	
contractor:	Sistem Yapı Construction, Turkey, Istanbul	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	26,857	
<i>Diameter DN min / max (mm):</i>	800 / 2000	
<i>Pressure PN min / max (bar):</i>	6	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Elbows, tees, flanges	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	2.5	
<i>laying depth (m):</i>	1.5	
<i>native soil type:</i>	-	
<i>backfill soil type / compaction:</i>	Sand	
<i>thrust blocks / lockjoints:</i>	135 thrust blocks	
<i>deflection min/max:</i>	1°	
<i>quality measures during installation:</i>	Hydrostatic test	
<i>Project duration:</i>	26 months	
<i>Year start / end:</i>	2007 / 2009	
Summary:	FLOWTITE GRP pipes were the preferred pipe material due to delivery advantages and easy and fast installation features in the project.	

Case Study -20-

PROJECT NAME:	İSKİ Beylerbeyi Sewer Project	
Community/Country:	Beylerbeyi, Turkey	
Amiantit location	SUBOR Boru Sanayi ve Ticaret A.Ş.	
Description:	Installation of sewage pipes; project collectssewage from Beylerbeyi which part of Istanbul.	
<i>application:</i>	Sewer Pressure	
<i>transported medium</i>	Sewage	
<i>working pressure</i>	6 bar	
<i>type of project:</i>	■ new installation	
<i>demanded standards / specifications / approvals:</i>	TSEN 1796 ASTM AWWA	
<i>Special requirement on pipe-system:</i>	corrosion resistance	
	<i>chosen pipe system:</i>	■ GRP round filament
	<i>why our product?</i>	<ul style="list-style-type: none"> ■ light weight ■ corrosion resistance ■ flow characteristics ■ mech. properties ■ price
Project owner:	Water and Sewage Authorization of Istanbul (İSKİ), Istanbul	
consultant / engineer:	Water and Sewage Authorization of Istanbul (İSKİ), Istanbul	
contractor:	Çelikler Construction Company, Turkey, Ankara	
Pipe Details - material:		
<i>Total pipeline length (m):</i>	1,800	
<i>Diameter DN min / max (mm):</i>	2100 / 2400	
<i>Pressure PN min / max (bar):</i>	6	
<i>Stiffness SN min / max (N/m²):</i>	5000	
<i>joint types:</i>	FLOWTITE standard couplings	
<i>fittings used:</i>	Elbows, tees, reducers, flanges	
Installation Details:		
<i>type:</i>	■ open trench	
<i>trench dimensions (m):</i>	8.5	
<i>laying depth (m):</i>	1.5	
<i>backfill soil type / compaction:</i>	Crashed stone / Impact Compactor, Plate Compactor	
<i>thrust blocks / lockjoints:</i>	10 thrust blocks	
<i>deflection min/max:</i>	0.5°	
<i>quality measures during installation:</i>	Diameter deflection control plan	
<i>Project duration:</i>	2 months	
<i>Year start / end:</i>	2005	
Summary:	In the project, three parallel lines of GRP pipes were installed in the same trench and production and installation of the pipes were completed in 2 months.	

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.



■ ■

Saudi Arabian Amiantit Company

- European Headquarters -

Am Seestern 18

D-40547 Düsseldorf

Germany

Tel.: + 49 211 550 270 0

Fax: + 49 211 550 270 98

info@amiantit.de

www.amiantit.com

■ ■

Distributed by: ■