



Flowtite Case Studies

- Hydropower -



AMIATIT PIPE SYSTEMS




FLOWTITE GRP piping products and accessories offer many advantages for the use in Hydropower and Penstock applications.

Due to the worldwide product availability, the Amiantit Group has established penstocks all over the world. The following case studies represent only a small extract of the available references. Only in Norway, more than 200 penstocks have been installed with FLOWTITE GRP pipes since 1975. And in many other countries around the world an increasing number of installations were already installed or they 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 hydropower projects are available in our brochure "Flowtite GRP Pipe systems - for Hydropower and Penstock applications - ". Please request it from your local dealer.



Case Study -1-

PROJECT NAME:	Byrkjelo Kraftverk	
Country/Community:	Norway , 2006	
Amiantit location	APS Norway	
Description:	Total length approx 1200 meter, 708 meter of Flowtite GRP and the rest in DI (DN2000)	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	16 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>other materials in this project?</i>	DI
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Byrkjelo kraftverk AS	
consultant / engineer:	Multiconsult AS	
contractor:	Ottar Dvergsdal	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 2200/2000 mm	
<i>pressure classes:</i>	Up to PN 16 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	708 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bend and reducer	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	


Case Study -2-

PROJECT NAME:	Lya Kraftverk	
Country/Community:	Norway , 2007	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
consultant / engineer:	E-Co Vannkraft ASS	
contractor:	T. Engene AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1400/1300 mm	
<i>pressure classes:</i>	Up to PN 20 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1524 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bend and reducer	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	




Case Study -3-

PROJECT NAME:	Djupfjorden 1	
Country/Community:	Norway	
Amiantit location	APS Norway	
Description:	Hydropower penstock, 2007	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	16 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Vesteralskraft Produksjon AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Bulldoser Maskinlag A/S	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 1400 mm	
<i>pressure classes:</i>	Up to PN 16 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	978 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	


Case Study -4-

PROJECT NAME:	Langfjorden Kraftverk	
Country/Community:	Norway, 2005	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	26 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	Helgelandskraft AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Bleikvassli Gruber AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1200 mm	
<i>pressure classes:</i>	PN 32 bar	
<i>stiffness:</i>	SN 10000 N/m ²	
<i>required lengths:</i>	284 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	T-piece	
Installation Details:		
<i>type:</i>	<input type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input checked="" type="checkbox"/> aboveground	



Case Study -5-

PROJECT NAME:	Nordlandselva Kraftverk	
Country/Community:	Norway, 2005	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	20 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Sjofossen Energi AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Moldjord Bygg og Anlegg AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 800 mm	
<i>pressure classes:</i>	Up to PN 20 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1128 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends and T-piece	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	

Case Study -6-

PROJECT NAME:	Nordsvorka Kraftverk	
Country/Community:	Norway, 2006	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	6 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Svorka Energi AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Bleikvassli Gruber AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1800/1600 mm	
<i>pressure classes:</i>	PN 6 bar	
<i>stiffness:</i>	SN 10000 N/m ²	
<i>required lengths:</i>	738 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bend and reducer	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input type="checkbox"/>	




Case Study -7-

PROJECT NAME:	Oftedal Kraftverk 2	
Country/Community:	Norway, 2005	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Smakraft AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Per Ovedal AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1400 mm	
<i>pressure classes:</i>	Up to PN 10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1545 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends and T-piece	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input type="checkbox"/>	

Case Study -8-

PROJECT NAME:	SAFA Kraftverk	
Country/Community:	Norway	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	6 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	SAFA Eiendom AS	
consultant / engineer:	Harald Bjorndal AS	
contractor:	Hordaland Aquatecnic as	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 2400/2200 mm	
<i>pressure classes:</i>	PN 6 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	243 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bend and reducer	
Installation Details:		
<i>type:</i>	<input type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input checked="" type="checkbox"/> aboveground	


Case Study -9-

PROJECT NAME:	Uleberg Kraftverk	
Country/Community:	Norway, 2005	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	Approx 19 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
<i>owner:</i>	Agder Energi Produksjon AS	
<i>consultant / engineer:</i>	Sweco Groner AS	
<i>contractor:</i>	Nomelands Anleggsmaskiner AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1500 mm	
<i>pressure classes:</i>	Up to PN 20 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1476 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends and T-pieces	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input type="checkbox"/>	



Case Study -10-

PROJECT NAME:	Ytre Matre Kraftverk	
Country/Community:	Norway, 2005	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	Approx 30 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Ytre Matre Energi AS	
consultant / engineer:	Opticonsult AS	
contractor:	Byggekompaniet AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 800 mm	
<i>pressure classes:</i>	Up to PN 32 bar	
<i>stiffness:</i>	SN 5000 and SN 10000 N/m ²	
<i>required lengths:</i>	1272 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input type="checkbox"/>	



Case Study -11-

PROJECT NAME:	Vangpollen Kraftverk	
Country/Community:	Norway, 1989	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	32 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Vesterålskraft Produksjon AS	
consultant / engineer:	Sweco Groner AS	
contractor:	Heli Anlegg AS	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 700/800 mm	
<i>pressure classes:</i>	up to PN 32 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	700 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	T-Kay and Straubflex	
Installation Details:		
<i>type:</i>	<input type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input checked="" type="checkbox"/> aboveground	

Case Study -12-

PROJECT NAME:	Mulavirkjun	
Country/Community:	Iceland	
Amiantit location	APS Norway	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	Approx 10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	Norwegian std	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Mulavirkjun	
consultant / engineer:	Orkuver EHF	
contractor:	Afrek EHF	
Pipe Details:		
<i>product:</i>	Flowtite	
<i>diameters:</i>	DN 1400 mm	
<i>pressure classes:</i>	Up to PN 10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1536 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	




Case Study -13-

PROJECT NAME:	Pleissingbach	
Country/Community:	Austria, Salzburg	
Amiantit location	APS Austria	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	National product Standard Önorm B5162	
<i>special requirement on pipe-system:</i>	Pressure class, all in SN 5.000	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input checked="" type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	Sinnegger Steger, Flachau	
consultant / engineer:	Kohlhofer, Salzburg	
contractor:	THT	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 1000 mm	
<i>pressure classes:</i>	PN 10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>supplied lengths:</i>	6 and 12m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	
<i>native soil type:</i>	BG2	
<i>backfill soil type / compaction:</i>	BG1	
<i>thrust blocks/ lockjoints:</i>	Yes	
<i>quality measures during installation:</i>	Deflection	




Case Study -14-

PROJECT NAME:	Rantenbach	
Country/Community:	Austria, Styria	
Amiantit location	APS Austria	
Description:	DN1300 pipes mainly buried agricultural area, almost 2.000m in total	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	National product Standard Önorm B5162	
<i>special requirement on pipe-system:</i>	Pressure class, all in SN 5.000	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input checked="" type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	Mr. Schröcker	
consultant / engineer:	Kelag	
contractor:	MESSNER	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 1300 mm	
<i>pressure classes:</i>	PN 10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>supplied lengths:</i>	6m and 9m, partly 3m;	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	



Case Study -15-

PROJECT NAME:	Twimberg	
Country/Community:	Austria, Kärnten	
Amiantit location	APS Austria	
Description:	DN1800 pipes mainly buried in a curvy road; also included is a pipe laying section in a tunnel of about 200m, 4.500m in total	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	National product Standard Önorm B5162	
<i>special requirement on pipe-system:</i>	Pressure class, all in SN 10.000	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input checked="" type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	Dr. Geiger	
consultant / engineer:	Kelag	
contractor:	Mörtl Bau GmbH, Wolfsberg;	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 1800 mm	
<i>pressure classes:</i>	PN 10	
<i>stiffness:</i>	SN 10.000 N/m ²	
<i>supplied lengths:</i>	2, 3, 6m;	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Bends, Tees;	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input checked="" type="checkbox"/> sliplining <input type="checkbox"/> jacking	



Case Study -16-

PROJECT NAME:	Osmaniye Tahta Shpp	
Country/Community:	Turkey	
Amiantit location	Turkey	
Description:	This is the first SHPP project in Turkey to which SUBOR supplied GRP pipes. 2168 meters of DN 1600 mm pipes are installed above-ground from the regulator to the valve chamber in Southern Turkey	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
<i>demanded standards / specifications / approvals:</i>	TSE 4355, AWWA, ASTM, ISO 9001-ISO 14001	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input checked="" type="checkbox"/> chem. properties <input checked="" type="checkbox"/> mech. properties <input checked="" type="checkbox"/> price
owner:	Özgür Elektrik Üretim A.Ş., Ankara	
consultant / engineer:	BM Engineering, Ankara	
contractor:	Özgür Elektrik A.Ş., Ankara	
Pipe Details:		
<i>product:</i>	GRP Pipe	
<i>diameters:</i>	DN 1600 mm	
<i>pressure classes:</i>	PN 10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	2168 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Flanged GRP Pipes	
Installation Details:		
<i>type:</i>	<input type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking <input checked="" type="checkbox"/> aboveground	
<i>thrust blocks/ lockjoints:</i>	Thrust blocks are used where pipe direction changed	
<i>quality measures during installation:</i>	Dimensional measures	
<i>required period of time</i>	26.05.2006 - 01.10.2006	



Case Study -17-

PROJECT NAME:	SHPP Kataraktis Project	
Country/Community:	Greece	
Amiantit location	APS Greece	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA and ASTM	
	<i>opted pipe system:</i>	Flowtite
	<i>why our product?</i>	<ul style="list-style-type: none"> ✗ light weight ✗ corrosion resistance ✗ flow characteristics ✗ chem. properties ✗ mech. properties ✗ low cost
owner:	DIEKAT ENERGIA S.A. Athens	
contractor:	DIEKAT ENERGIA S.A. Athens	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 600-800 mm	
<i>pressure classes:</i>	up to PN 20 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1650 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows, Flanges, Reducer	
Installation Details:		
<i>type:</i>	Buried	
<i>thrust blocks/ lockjoints</i>	Thrust blocks	
<i>quality measures during installation</i>	Deflection Measurements, Compaction Measurements	

Case Study -18-

PROJECT NAME:	SHPP Loumnitsa	
Country/Community:	Greece	
Amiantit location	APS Greece	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA and ASTM	
	<i>opted pipe system:</i>	Flowtite
	<i>why our product?</i>	<ul style="list-style-type: none"> ✘ light weight ✘ corrosion resistance ✘ flow characteristics ✘ chem. properties ✘ mech. properties ✘ low cost
owner:	Energeiaki Ipirou As Ioannina	
consultant/engineer::	K. Tsitogiannis Ioannina	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 900-1100 mm	
<i>pressure classes:</i>	PN 10-25 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	600 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows, Flanges, Reducer	
Installation Details:		
<i>type:</i>	Buried	
<i>thrust blocks/ lockjoints</i>	Thrust blocks were used at the points, where pipeline changes direction	

Case Study -19-

PROJECT NAME:	SHPP Paliouri Project	
Country/Community:	Greece	
Amiantit location	APS Greece	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA and ASTM	
	<i>opted pipe system:</i>	Flowtite
	<i>why our product?</i>	<ul style="list-style-type: none"> ✗ light weight ✗ corrosion resistance ✗ flow characteristics ✗ chem. properties ✗ mech. properties ✗ low cost
owner:	TECHNIKI ENERGIAKI SA Marousi	
contractor:	TECHNIKI ENERGIAKI SA Marousi	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	DN 1700-1900 mm	
<i>pressure classes:</i>	PN 6-16 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	1267 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows, Flanges, Reducers	
Installation Details:		
<i>type:</i>	Buried	
<i>thrust blocks/ lockjoints</i>	Thrust blocks	
<i>quality measures during installation</i>	Deflection Measurements, Compaction Measurements	




Case Study -20-

PROJECT NAME:	SHPP Loziata, Biala Mesta & Cherna Mesta	
Country/Community:	Bulgaria	
Amiantit location	INFRABULIMPEX Ltd.	
Description:	All three projects are owned by one investor and they are located in 3 neighbor river basins in Velingrad	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA, ASTM, DIN	
		<i>opted pipe system:</i> Flowtite <i>why our product?</i> <ul style="list-style-type: none"> ✗ light weight ✗ corrosion resistance ✗ flow characteristics ✗ chem. properties ✗ mech. properties ✗ low cost
<i>owner:</i>	BRESTIOM AD Sofia	
<i>contractor:</i>	BRESTIOM AD Sofia	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	SHPP Loziata: DN 2000-2200 mm SHPP Cherna Mesta: DN 800-900 mm SHPP Biala Mesta: DN 800-900 mm	
<i>pressure classes:</i>	SHPP Loziata: PN 6-10 bar SHPP Cherna Mesta: PN 6-16 bar SHPP Biala Mesta: PN 6-16 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	SHPP Loziata: 3768 m SHPP Cherna Mesta: 2280 m SHPP Biala Mesta: 3336 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	-	
Installation Details:		
<i>type:</i>	Buried	
<i>thrust blocks/ lockjoints</i>	Thrust blocks	
<i>quality measures during installation</i>	Deflection Measurements, Compaction Measurements	

Case Study -21-

PROJECT NAME:	SHPP Moscani & Prusac1	
Country/Community:	Bosnia & Herzegovina	
Amiantit location	APS Southeast Europe	
Description:	Both projects are owned by one investor and the projects are located in 2 neighbor river basins in Donji Vakuf	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>demanded standards / specifications / approvals:</i>	AWWA and ASTM	
	<i>opted pipe system:</i>	Flowtite
	<i>why our product?</i>	<ul style="list-style-type: none"> ✗ light weight ✗ corrosion resistance ✗ flow characteristics ✗ chem. properties ✗ mech. properties ✗ low cost
owner:	Brugman Group Sarajevo	
contractor:	EGW Sarajevo	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	SHPP Moscani: DN 700 mm SHPP Prusac1: DN 800 mm	
<i>pressure classes:</i>	SHPP Moscani: PN 6-25 bar SHPP Prusac1: PN 6-20 bar	
<i>stiffness:</i>	SHPP Moscani: SN 5000 N/m ² SHPP Prusac1: SN 5000 N/m ²	
<i>required lengths:</i>	SHPP Moscani: 3159 m SHPP Prusac1: 2478 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows, Flanges	
Installation Details:		
<i>type:</i>	Buried	
<i>thrust blocks/ lockjoints</i>	Thrust blocks	
<i>quality measures during installation</i>	Deflection Measurements, Compaction Measurements	


Case Study -22-

PROJECT NAME:	SHPP Jezernica, Mujakovici, Majdan & Botun Projects	
Country/Community:	Bosnia & Herzegovina	
Amiantit location	APS Southeast Europe	
Description:	All four projects are owned by one investor and the projects are located in 4 neighbor river basins in Fojnica. The potential annual output of four projects was calculated as 21.000 MWh	
<i>application:</i>	Industry	
<i>transported medium</i>	Water	
<i>type:</i>	new installation	
<i>working pressure:</i>	SHPP Jezernica: 21,6 bar SHPP Mujakovici: 11,2 bar SHPP Majdan: 20 bar SHPP Botun: 6 bar	
<i>demanded standards / specifications / approvals:</i>	AWWA, ASTM, EN and Turkish Standards	
	<i>opted pipe system:</i>	Flowtite
	<i>other materials in this project:</i>	Steel pipes for the high pressure sections
	<i>why our product?</i>	<ul style="list-style-type: none"> ✗ light weight ✗ corrosion resistance ✗ flow characteristics ✗ chem. properties ✗ mech. properties ✗ low cost
owner:	INTRADE-ENERGIJA d.o.o. Sarajevo BiH	
contractor:	INTRADE-ENERGIJA d.o.o. Sarajevo BiH	
Pipe Details:		
<i>product:</i>	GRP	
<i>diameters:</i>	SHPP Jezernica: DN 450-500 mm SHPP Mujakovici: DN 700 mm SHPP Majdan: DN 700 mm SHPP Botun: DN 800 mm	
<i>pressure classes:</i>	SHPP Jezernica: PN 10-32 bar SHPP Mujakovici: PN 16-25 bar SHPP Majdan: PN 16-32 bar SHPP Botun: PN 6-10 bar	
<i>stiffness:</i>	SHPP Jezernica: SN 5000-10000 N/m ² SHPP Mujakovici: SN 5000 N/m ² SHPP Majdan: SN 5000-10000 N/m ² SHPP Botun: SN 5000 N/m ²	
<i>required lengths:</i>	SHPP Jezernica: 2122 m SHPP Mujakovici: 2579 m SHPP Majdan: 2526 m SHPP Botun: 1390 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows, Flanges	
Installation Details:		
<i>type:</i>	Buried and aboveground	
<i>thrust blocks/ lockjoints</i>	Thrust blocks	
		
<i>quality measures during installation</i>	Deflection Measurements, Compaction Measurements	

Case Study -23-

PROJECT NAME:	Sifón en Línea Hidroeléctrica	
Country/Community:	Bolivia	
Amiantit location	Amitech Argentina	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	10 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	La Paz (Bolivia)	
consultant / engineer:	Hidroeléctrica Boliviana	
contractor:	Hidroeléctrica Boliviana	
Pipe Details:		
<i>product:</i>	PIPES + COUPLING	
<i>diameters:</i>	450 mm	
<i>pressure classes:</i>	10 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	708 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	No	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	

Case Study -24-

PROJECT NAME:	Central Hidroeléctrica El Corcovado	
Country/Community:	Argentina	
Amiantit location	Amitech Argentina	
<i>application:</i>	Hydropower	
<i>transported medium</i>	Water	
<i>working pressure</i>	2-15 bar	
<i>type:</i>	<input checked="" type="checkbox"/> new installation <input type="checkbox"/> relining <input type="checkbox"/> replacement <input type="checkbox"/>	
	<i>opted pipe system:</i>	<input checked="" type="checkbox"/> Flowtite <input type="checkbox"/> Sadip <input type="checkbox"/> Amipox <input type="checkbox"/> C-Tech <input type="checkbox"/> Sarplast <input type="checkbox"/> Amiren <input type="checkbox"/>
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input type="checkbox"/> corrosion resistance <input checked="" type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input type="checkbox"/> price
owner:	El Corcovado Chubut	
consultant / engineer:	Techhydro	
contractor:	Maragua	
Pipe Details:		
<i>product:</i>	PIPES + COUPLING	
<i>diameters:</i>	500 / 600 mm	
<i>pressure classes:</i>	2 / 5 / 7 / 10 / 15 bar	
<i>stiffness:</i>	SN 2500 N/m ²	
<i>required lengths:</i>	708 m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Yes	

Case Study -25-

PROJECT NAME:	Aprovechamiento Hidroeléctrico Del Salto De Boñar	
Country/Community:	Leon (Spain)	
Amiantit location	AMITECH Spain S.A.U.	
Description:	Low pressure GRP channel DN2800/PN6/SN5000 from the Porma dam river to hydropower station. The pipeline got a buried installation parallel to the river. It was projected initially on concrete	
<i>application:</i>	Hydropower	 
<i>transported medium</i>	Raw water	
<i>type:</i>	new installation	
<i>working pressure:</i>	0,23 bar	
<i>demanded standards / specifications / approvals:</i>	UNE 53323 EX	
	Pipeline installation + bend	Elbow DN2800 installation
	<i>opted pipe system:</i>	Flowtite
	<i>other materials in this project:</i>	Channel in concrete
	<i>why our product?</i>	<input checked="" type="checkbox"/> light weight <input checked="" type="checkbox"/> corrosion resistance <input type="checkbox"/> flow characteristics <input type="checkbox"/> chem. properties <input type="checkbox"/> mech. properties <input checked="" type="checkbox"/> installation cost
		
	DN2800 pipe handling	Elbow installation
owner:	BOÑAR ENERGÍA S.L.	
contractor:	BEGAR	
Pipe Details:		
<i>product:</i>	GRP Pipe	
<i>diameters:</i>	DN 2800 mm	
<i>pressure classes:</i>	PN 6 bar	
<i>stiffness:</i>	SN 5000 N/m ²	
<i>required lengths:</i>	12m – Total = 1640m	
<i>joint types:</i>	Flowtite Reka Type Double Bell Coupling	
<i>fittings used:</i>	Elbows	
Installation Details:		
<i>type:</i>	<input checked="" type="checkbox"/> open trench <input type="checkbox"/> micro tunneling <input type="checkbox"/> subaqueous <input type="checkbox"/> sliplining <input type="checkbox"/> jacking	
<i>trench dimensions:</i>	4.8m width, 5m depth	
<i>laying depth</i>	2m	
<i>native soil type</i>	Granular, loose (4-8 blows/ft)	
<i>backfill soil type / compaction</i>	SC1 (gravel)	
<i>thrust blocks/ lockjoints</i>	Thrust block	
Owner/Consultant/ Contractor comments:	The installation of pipe was quite easy & it reduces installation cost to the contractor.	

