

TAPERED LOW PROFILE SLIPLINING (TLPS) JOINT **FIBERSTRONG®**

FRP PIPES FOR SLIPLINING APPLICATIONS

RELIABILITY IN HIGH ANTI-CORROSSION GLASS REINFORCED VINYLESTER LINED PIPE SYSTEMS EMPLOYED FOR 100 YEAR DESIGN LIFE

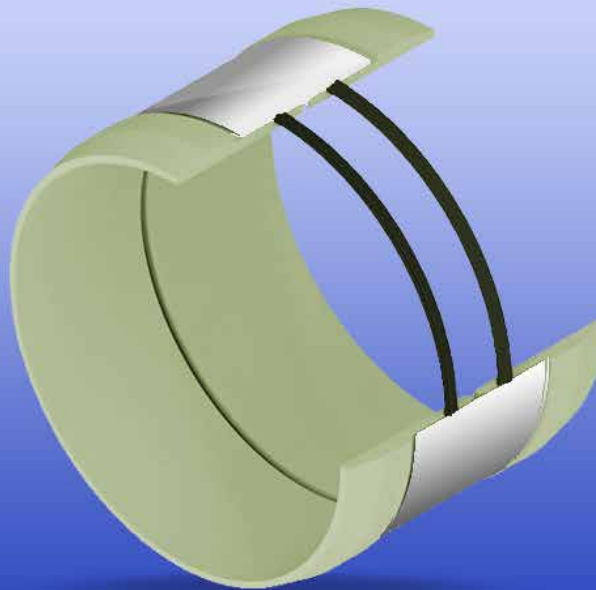
SUMMARY:

Buried piping systems are subjected to deterioration over time, which includes misalignments in pipe segments or leaking joints, thus challenging the joint integrity. Such dilapidated piping systems permit substantial leakage or infiltration of groundwater, thereby reducing the hydraulic capacity of the existing pipeline. Excavating and restoring these deteriorated structures by means of open trench technologies, incur high operations cost and are not economically viable. Moreover, it may disrupt the intended service of the original line.

An alternate method introduced by FPI for restoration and rehabilitation of deteriorated pipelines is the Sliplining installation systems with specially adapted FRP pipes. The TLPS joint is formed by a Stainless-Steel Sleeve with Grooved Spigot and sealed by means of Specialized Rubber Gaskets. This allows the pipes to adapt to the existing pipelines, being able to take angular deflection in the joint according to the standards.

The main applications of Sliplining rehabilitation systems are as follows:

- Sanitary Sewage
- Storm Water
- Drains
- Irrigation
- Industrial Waste Lines



Salient features of Sliplining systems include the following:

- Designed for 100 years service life
- Cost effective system that provides structural strength to the existing failing piping integrity
- Minimum disruption of pipeline intended service or surface traffic
- Minimum property damages caused by extensive excavation and replacement of dilapidated pipeline system
- Eliminates infiltration or exfiltration and maintains the hydraulic flow capacity of the system
- Reduces erosion of soil bed surrounding the pipe structure and avoids soil pollution
- Requires only common tools and equipment widely available with pipeline contractors.

PRODUCT SPECIFICATIONS:

- FPI offers GRP Sliplining piping systems, applicable for stiffness classes SN5,000 & SN10,000, with a maximum pressure capacity of PN3 bar for the following diameters:

Table 1: Standard product range

Diameter Range (DN)* mm (in)	
400 (16")	450 (18")
500 (20")	600 (24")
700 (28")	800 (32")
900 (36")	1000 (40")
1100 (44")	1200 (48")
1300 (52")	1400 (56")
1500 (60")	1600 (64")
1700 (68")	1800 (72")
1900 (76")	2000 (80")

*The product can be customized as per the client design, up to DN 4000mm (160")

- The applicable design standards include:
 - **ASTM D 3262** Glass Fiber (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe
 - **ASTM D 3754** Glass Fiber (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer & Industrial Pressure Pipe
 - **AWWA C950** Fiberglass Pressure Pipe
 - **AWWA M45** Fiberglass Pipe Design
 - **ISO 10639** Plastics Piping Systems for Pressure and Non-Pressure Water Supply-Glass-Reinforced Thermosetting Plastics (GRP) Systems 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

- Pipes can be used in standard lengths up to 12m. Any custom lengths can be supplied based on project requirements.
- The annular space between the carrier pipe (GRP) and the host pipe may be filled with sand or grouted to restrict pipe movements. Special designs are available for systems where grouting is not feasible.
- Typical cross-sections of Sliplining spigot and joint with elastomer seal are shown in Figure.1 & Figure.2.

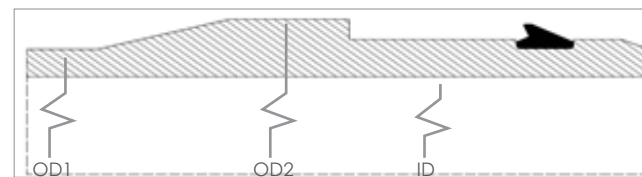


Figure.1: Typical Cross-Section of Sliplining Spigot

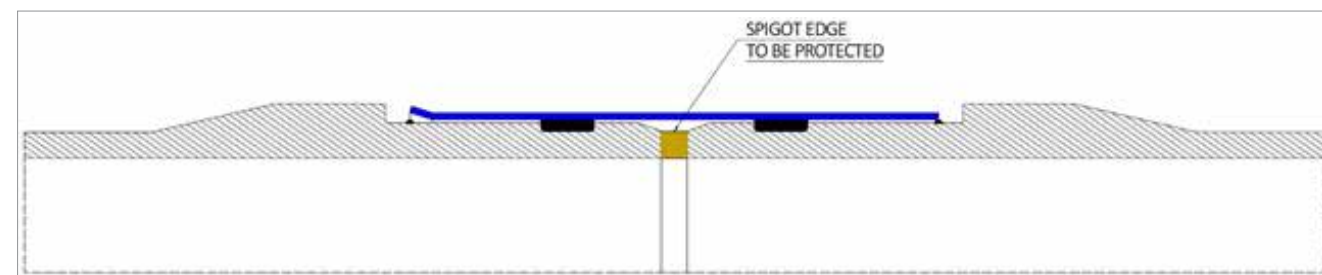


Figure.2: Typical Cross-Section of Sliplining Joint

Table 2: Fiberstrong™ Sliplining Pipes SN 5,000 (36 psi)

DN ¹		ID		OD1		OD2		Force		Unit Weight	
mm	in	mm	in	mm	in	mm	in	N	lb	kg/m	lb/ft
400	16	399.1	15.71	412.5	16.24	438.0	17.24	18,600	4,189	17	11
450	18	448.5	17.66	463.5	18.25	489.0	19.25	20,300	4,583	21	14
500	20	498.1	19.61	514.5	20.26	540.0	21.26	22,300	5,014	25	17
600	24	597.1	23.51	616.5	24.27	642.0	25.28	26,100	5,871	36	24
700	28	696.5	27.42	718.5	28.29	744.0	29.29	30,400	6,836	47	32
800	32	795.5	31.32	820.5	32.30	846.0	33.31	34,100	7,686	61	41
900	36	894.8	35.23	922.5	36.32	948.0	37.32	38,400	8,651	76	51
1,000	40	994.0	39.14	1024.5	40.33	1050.0	41.34	42,600	9,586	93	63
1,100	44	1092.9	43.03	1126.5	44.35	1152.0	45.35	46,100	10,379	113	76
1,200	48	1192.5	46.95	1228.5	48.37	1254.0	49.37	50,900	11,457	132	89
1,300	52	1291.7	50.85	1330.5	52.38	1356.0	53.39	54,900	12,365	155	104
1,400	56	1390.4	54.74	1432.5	56.40	1462.0	57.56	58,200	13,100	181	121
1,500	60	1490.0	58.66	1534.5	60.41	1564.0	61.57	63,000	14,180	205	137
1,600	64	1589.0	62.56	1636.5	64.43	1666.0	65.59	66,700	14,999	233	156
1,700	68	1688.3	66.47	1738.5	68.44	1768.0	69.61	71,000	15,963	262	176
1,800	72	1787.5	70.37	1840.5	72.46	1870.0	73.62	75,000	16,868	293	196
1,900	76	1886.6	74.28	1942.5	76.48	1972.0	77.64	79,000	17,773	325	218
2,000	80	1985.4	78.17	2044.5	80.49	2074.0	81.65	82,400	18,534	362	243

¹ Imperial units are given for guidance.

Table 3: Fiberstrong™ Sliplining Pipes SN 10,000 (72 psi)

DN ²		ID		OD1		OD2		Force		Weight	
mm	in	mm	in	mm	in	mm	in	N	lb	kg/m	lb/ft
400	16	396.0	15.59	412.5	16.24	438.0	17.24	17,700	3,995	21	14
450	18	445.1	17.52	463.5	18.25	489.0	19.25	19,500	4,404	26	17
500	20	494.5	19.47	514.5	20.26	540.0	21.26	21,800	4,922	31	21
600	24	592.9	23.34	616.5	24.27	642.0	25.28	25,700	5,783	44	29
700	28	691.1	27.21	718.5	28.29	744.0	29.29	29,500	6,643	59	40
800	32	789.9	31.10	820.5	32.30	846.0	33.31	34,000	7,659	75	51
900	36	888.4	34.97	922.5	36.32	948.0	37.32	38,000	8,561	95	63
1,000	40	986.8	38.85	1024.5	40.33	1050.0	41.34	42,000	9,462	116	78
1,100	44	1085.2	42.72	1126.5	44.35	1152.0	45.35	46,000	10,343	140	94
1,200	48	1183.5	46.59	1228.5	48.37	1254.0	49.37	49,800	11,200	166	112
1,300	52	1282.4	50.49	1330.5	52.38	1356.0	53.39	54,500	12,261	192	129
1,400	56	1380.8	54.36	1432.5	56.40	1462.0	57.56	58,400	13,142	223	149
1,500	60	1479.1	58.23	1534.5	60.41	1564.0	61.57	62,300	14,019	255	171
1,600	64	1577.6	62.11	1636.5	64.43	1666.0	65.59	66,300	14,922	290	195
1,700	68	1676.2	65.99	1738.5	68.44	1768.0	69.61	70,600	15,891	326	218
1,800	72	1774.2	69.85	1840.5	72.46	1870.0	73.62	73,900	16,630	367	246
1,900	76	1873.1	73.74	1942.5	76.48	1972.0	77.64	78,500	17,669	406	272
2,000	80	1971.0	77.60	2044.5	80.49	2074.0	81.65	81,700	18,389	452	303

² Imperial units are given for guidance.

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