

PE SPIRAL PIPE





INTRODUCTION

There is an increasing awareness of serious corrosion problems of conventional materials and growing concern about exfiltration problems are the main reasons for the application of our innovative, light, inert and large diameter SPIRAL high density polyethylene pipeline system.

SPIRAL pipe system offers a wide range of fittings, manholes and other by-products (eg float, rubbish chute & etc), which are also manufactured by specially designed profile-extrusion process and fabricated by extrusion welding.

GENERAL SPECIFICATION

Material:

PE100

Certified Standard:

DIN 16961 : PART 2: 2010

Size:

ID 300mm through 3000mm availability

Colour:

Black

ADVANTAGE

- Tough
- Light Weight and Easy to Transport
- High Chemical Resistance
- High Abrasion Resistance Compare to Other Pipe Material
- Corrosion Resistance
- Longer Service Life
- Excellent Hydraulics
- Economical / Easier Installation
- Low Cost Handling at Site

APPLICATION

- Sewerage Pipelines
- Drainage Pipelines
- Culverts
- Effluent Lines
- Slurry Lines
- Irrigation
- Waste Gas Ducts and Ventilation
- Manhole / Manhole Drop
- Sea Outfall
- Relining of Old Pipelines
- Slotted Drain Application
- Floats
- Rubbish Chutes for High-Rise Buildings
- On Site Detention System (OSD)
- Pipe Jacket – to protect chilled steel water pipe, its annular space filled with foam for insulation
- Pipe Sleeve – to repair or erect new jetty pillar and for marine pile protection and rehabilitation.

PRODUCTION

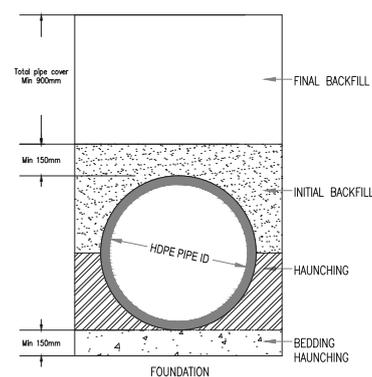


Spiral PE pipe are manufactured from weather resistant Polyethylene using a unique process by which a specially designed extruded profile strip is spirally wound over a pre-heated and revolving mandrel. Overlap on the edge is fused homogeneously together while it is in the hot plastic state, producing a smooth internal surface. The profile wall thickness is designed according to the ring stiffness required to withstand the loading on the pipe.



DESIGN CONSIDERATION

- Polypropylene conduits coated with Polyethylene are used as outer profile of 'SPIRAL' pipe due to its extra hardness compared with PE which make it more resistant against loading force. The spacing between each profile differs with different pipe class, which closer spacing denotes higher class.
- Spiral profile pipes must be installed and embedded with the same care that is necessary for all traditional underground flexible pipe systems. The main contribution to deflection control can be achieved by use of suitable embedment materials and proper embedding procedure, both factors should be optimized as much as possible.
- The more thoroughly the soil between pipe and trench wall has been compacted, the lower will be the pipe deformation necessary for achieving the equilibrium of forces. All material used for bedding and backfilling in the pipe zone must be stable and compactable to ensure sufficient support to low distribution of soil reaction during the planned life time of the pipeline.
- Compactable materials are sand, gravel, crusher run and others. As final backfill, the excavated material can be used.
- Trench will be used by welders to weld the bottom area of the pipes.
- The depth of the trench corresponds to the particular project for which the Spiral profile has been designed.
- The width of the trench can be assumed for internal diameters 750mm to 1500mm approximately 1.6 x the outside diameter, and for 300mm to 750mm approximately 2.0 x the outside diameter.
- In case of traffic, site vehicles or heavy machinery are crossing over the pipeline, the depth of cover has to be minimum 1.2m up to 1.5m to guarantee an optimum distribution of the traffic load.



PIPE EMBEDMENT MATERIALS

STANDARD DETAILS

Profile Dimension of SPIROLITE HDPE Spiral Pipe

Profile No	Cross Section	A cm	s cm	H cm	d cm	l cm ⁴ /cm	e cm	S _{eff} cm
3		-	0.95	-	-	0.072	0.475	0.950
5		12.00	0.60	3.70	3.00	0.960	0.843	2.259
6		8.50	0.60	3.70	3.00	1.257	0.982	2.471
7		7.00	0.60	3.70	3.00	1.455	1.066	2.594
9S		8.50	0.65	3.75	3.00	2.113	1.235	2.938
10S		7.00	0.65	3.75	3.00	2.623	1.364	3.157
11S		7.00	0.70	3.80	3.00	3.263	1.466	3.396
12S		7.00	0.80	3.90	3.00	4.092	1.568	3.662
12S2	7.00	0.90	4.00	3.00	4.341	1.590	3.735	
14S		20.00	0.60	7.40	3.00	9.864	2.491	4.910
14S2		20.00	1.00	8.20	3.00	12.436	2.586	5.304
15S		11.00	0.60	7.40	3.00	13.077	2.729	5.394
16S		8.00	0.80	7.80	3.00	17.486	2.899	5.942
18S		8.00	1.00	8.20	3.00	19.206	2.967	6.131
20S		-	0.60	8.00	3.00	23.713	3.844	6.577
20S2		-	0.75	8.45	3.00	25.927	3.841	6.776
20S3		-	0.90	8.90	3.00	28.140	3.843	6.964
20S4		-	1.00	9.20	3.00	29.619	3.848	7.084
23S		12.00	0.60	11.10	3.00	44.272	4.664	8.099
23S2		12.00	0.90	12.00	3.00	50.811	4.676	8.480
23S3		12.00	1.00	12.30	3.00	53.001	4.684	8.600
26S		8.00	1.00	12.30	3.00	62.019	5.006	9.062

"SPIRAL" Pipes Data
Pipe Standard : DIN 16961

RS (N/cm ²)	0.4, Series 2, Class E			0.8, Series 3, Class F			1.6, Series 4, Class G		
	Profile No	Overall Thickness mm	Weight kg/m	Profile No	Overall Thickness mm	Weight kg/m	Profile No	Overall Thickness mm	Weight kg/m
300	-	-	-	-	-	-	5	37.0	11
400	-	-	-	-	-	-	5	37.0	14
450	-	-	-	-	-	-	5	37.0	15
500	-	-	-	-	-	-	5	37.0	17
533	-	-	-	-	-	-	5	37.0	18
600	-	-	-	5	37.0	20	6	37.0	24
750	5	37.0	25	6	37.0	29	9S	37.5	30
800	5	37.0	26	6	37.0	31	10S	37.5	34
900	5	37.0	29	9S	37.5	36	12S	39.0	43
1000	6	37.0	38	10S	37.5	42	14S	74.0	93
1200	9S	37.5	47	12S2	40.0	61	14S	74.0	111
1500	12S	39.0	69	14S	74.0	137	18S	82.0	193
1800	14S	74.0	164	16S	78.0	190	23S	111.0	289
2000	14S	74.0	181	20S	80.0	298	23S	111.0	319
2365	16S	78.0	248	23S	111.0	373	-	-	-
3000	23S	111.0	467	-	-	-	-	-	-

STANDARD DETAILS

"SPIRAL" Pipes Data

Pipe Standard : DIN 16961

SR 24 N/cm ²			
RS (N/cm ²)	0.4	0.8	1.6
ID	Class E	Class F	Class G
300	-	-	10.62
400	-	-	4.67
450	-	-	3.32
500	-	-	2.45
533	-	-	2.03
600	-	1.44	1.86
750	0.75	0.97	1.60
800	0.62	0.80	1.63
900	0.44	0.94	1.78
1000	0.42	0.85	3.00
1200	0.40	0.82	1.78
1500	0.40	0.93	1.78
1800	0.55	0.96	2.30
2000	0.40	0.93	1.70
2365	0.43	1.05	-
3000	0.53	-	-

P N/m			
RS (N/cm ²)	0.4	0.8	1.6
ID	Class E	Class F	Class G
300	-	-	6,177
400	-	-	3,617
450	-	-	2,897
500	-	-	2,372
533	-	-	2,100
600	-	1,674	2,162
750	1,089	1,410	2,325
800	961	1,245	2,528
900	765	1,641	3,110
1000	809	1,651	5,816
1200	942	1,901	4,136
1500	1,166	2,711	5,183
1800	1,913	3,348	8,010
2000	1,562	3,611	883
2365	1,983	4,808	-
3000	3,061	-	-

Quick Guide on Burial Depth of Spirolite Spiral Pipe:

- Assumption: 160mm crusher run surrounds the pipe with 95% proctor density compaction
- Approximately Depth of Burial
- Class F : 1m to 4m
- Class G : 4m to 8m
- Standard Pipe Length :
- ID 300mm to 1500mm : 6 m/length
- ID 1800mm to 3000mm : 4 m/length
- Longer length can be custom made upon request (Maximum length is 12m)

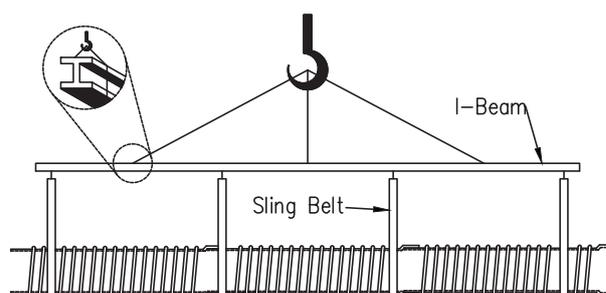
Remarks:

- Above specifications subject to +/- 5% tolerance
- Other size can be custom made upon request

STACKING & HANDLING

- SPIRAL Pipes are flexible pipes and must be handled with proper care.
- For short lengths at any diameter, it can be lifted via forklift (at the center of the pipe length)
- For long lengths (pipe joined together to create long lengths) lifting and moving, the pipe must be based on few sling belts connected to a spreader beam.

"I" Beam Hooked Up On Crane (For Lifting of Pipes)

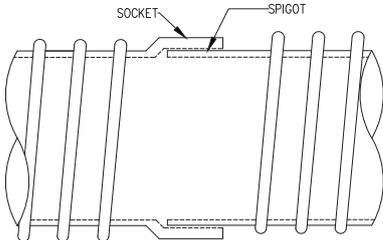


JOINTING

Types of Jointing for 'SPIRAL' Pipes

The following are the standard pipe joints used as per DIN 16961-1:2011-01

i



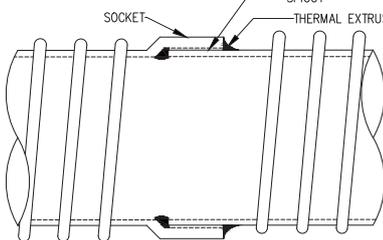
The diagram shows two spiral pipes joined at their ends. One pipe has a 'SOCKET' end and the other has a 'SPIGOT' end. The spigot is inserted into the socket.

'SPIRAL' SOCKET AND SPIGOT JOINT

Socket and Spigot joint

- The pipes are produced with socket and spigot at both ends
- 2 pipe lengths are joined by slotting the spigot end into the socket end.

ii



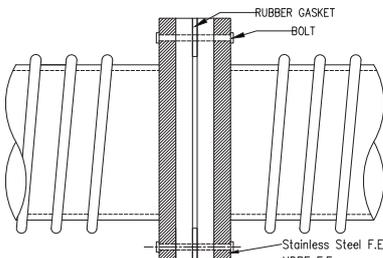
The diagram shows two spiral pipes joined at their ends. One pipe has a 'SOCKET' end and the other has a 'SPIGOT' end. The spigot is inserted into the socket, and a 'THERMAL EXTRUSION WELDED' joint is formed at the connection point.

'SPIRAL' THERMAL EXTRUSION WELDED JOINT

Thermal Extrusion Welded Joint

- The pipes are produced with socket and spigot at both ends
- 2 pipe lengths are joined by slotting the spigot into the socket. Extrusion welding is performed either internally, externally or both at the joint.
- <900 ID External Weld Only
- >900 ID Internal Weld and External Weld Only

iii



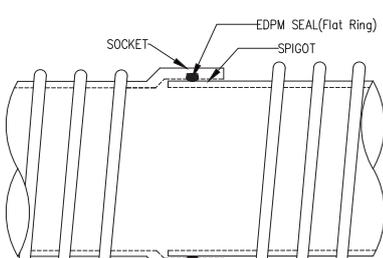
The diagram shows two spiral pipes joined at their ends. Each pipe has a 'Stainless Steel F.E.' (Flange End) and an 'HDPE F.E.' (High Density Polyethylene Flange End). A 'RUBBER GASKET' and a 'BOLT' are used to secure the joint.

'SPIRAL' BOLTED FLANGE JOINT

Bolted Flanged Joint

- PE flanges are made and welded to the actual pipe.
- Steel backing flanges are used to bolt the pipes together to enhance the strength of the PE flange
- Flanges of various type of standard can be provided
- Number of bolt holes varies with pipe diameters and applications

iv



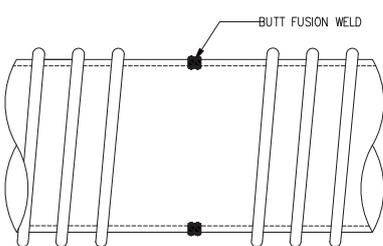
The diagram shows two spiral pipes joined at their ends. One pipe has a 'SOCKET' end and the other has a 'SPIGOT' end. An 'EDPM SEAL (Flat Ring)' is used to seal the joint between the spigot and the socket.

'SPIRAL' RUBBER RING JOINT

Elastomeric Ring Joint

- The pipes are produced with socket and spigot at both ends
- 2 pipe lengths are joined by slotting the spigot into the socket with elastomeric ring.
- This only available up to ID1200mm.

v

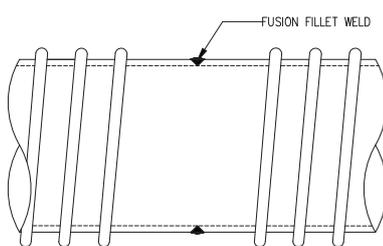


The diagram shows two spiral pipes joined at their ends. The joint is formed by a 'BUTT FUSION WELD'.

'SPIRAL' BUTT FUSION WELD JOINT

Butt Fusion Weld Joint

vi



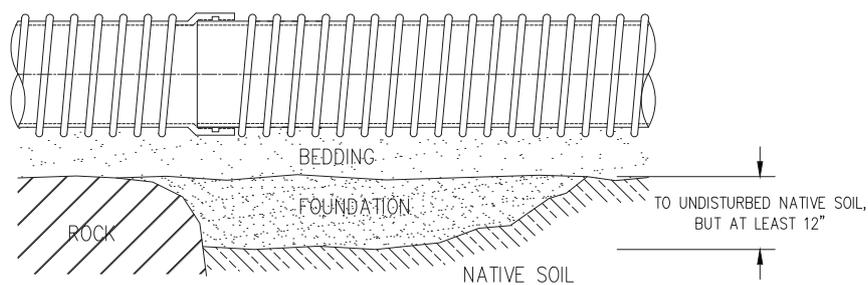
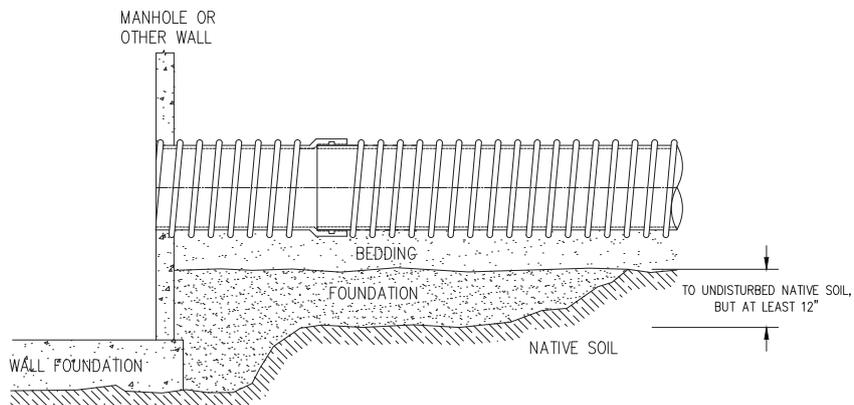
The diagram shows two spiral pipes joined at their ends. The joint is formed by a 'FUSION FILLET WELD'.

'SPIRAL' FUSION FILLET WELD JOINT

Fusion Fillet Weld Joint

LAYING PROCEDURE

- SPIRAL Pipes are normally buried pipes, either under soil or under water (submarine).
- For submarine pipelines, the joints of the pipes must be protected well, and sunk using well designed ballast weights with appropriate selection of its weight and spacing to ensure the pipelines can withstand the hydrodynamic force of waves and current. Pipelines need to be floating on water surface before sinking down to sea bed during laying of the pipeline
- For buried pipes, a trench must be made according to design to ensure soil compaction is sufficient.





SPIROLITE (M) SDN. BHD.

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