

Steel-Wire-Reinforced PE Composite Pipe

Water-supply and drainage systems | DN50–DN5000

Shunfang Pipe Industry Co., Ltd.

Eastern High-Tech Zone, Linyi County, Dezhou, Shandong, China

www.shunfangguanye.com

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1 Company introduction

Founded in October 2011, Shunfang Pipe Industry Co., Ltd. is a private high-tech enterprise manufacturing plastic piping systems. The company is located in the Eastern High-Tech Development Zone of Linyi County, Dezhou, Shandong, with total assets of RMB 500 million, fixed assets of RMB 300 million, a site of 256 mu and 100,000 m² of buildings.

Its fourth-generation product with full intellectual property, the steel-wire-reinforced PE composite pipe, entered the market in early 2019 and large-scale supply in 2020. The company operates steel-wire composite high-molecular-weight PE sheet lines and reinforced PE composite-pipe lines, plus buried double-flat-wall steel-plastic drainage, Type-A structured-wall, double-wall corrugated and blow-moulding lines.

Products serve municipal water supply and drainage, farmland irrigation, long-distance transfer, environmental, chemical, dredging, rural development, seawater desalination and aquaculture works. Shunfang has supplied several hundred projects and is a qualified supplier to major state-owned contractors.

Standards participation

CJ/T 329-2010 Buried double-flat-wall steel-plastic composite drainage pipe

DB37/T 2793-2016 Integrated double-urn funnel septic tanks

T/CWEC 10-2019 Reinforced PE composite pipe

Shandong standard design atlas L16M201 (sponge-city rainwater works)

I Water-supply reinforced PE composite pipe

Product standard: T/CWEC 10-2019 *Reinforced PE Composite Pipe*.

02 — Overview and materials

Material selection, structural design, manufacturing process and jointing are engineered as one system. The pipe resists impact, cracking, corrosion, abrasion, fatigue and ageing, with a smooth non-scaling hygienic bore — suited to town drinking water, water-conservancy transfer, marine transmission, reclaimed water, chemical solutions and crude-oil duties.

Base: high-molecular-weight polyethylene resin with high flexibility and bonding strength. **Wire:** carbon spring-steel wire of about 2000 MPa tensile strength. **Bonding:** high-adhesion, impact- and crack-resistant modified PE.

03 — Structure

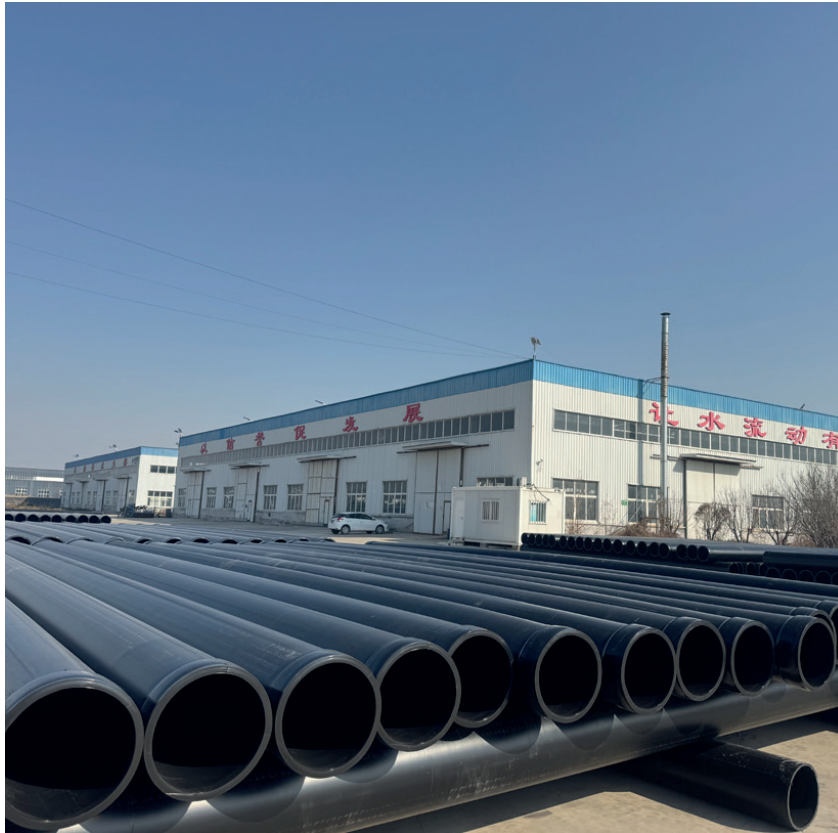
A screw extruder forms steel-wire-reinforced plastic-steel strips; dedicated equipment spiral-winds and hot-bonds them, adds outer wire and PE protection, with additional composite PE and steel-wire reinforcement between neighbouring strips.



Spiral-wound reinforced PE pressure pipe at the Shunfang factory.

04 — Six characteristics

1. Flexibility, impact and corrosion resistance



Special high-molecular-weight LDPE base; interlayer peel strength above 400 N/cm, four times the national standard.

2. High pressure and ring stiffness



Carbon spring-steel wire above 1800 MPa — 6–7 times ordinary steel strip — fused with the base for pressure duty and sealing.

3. Integrated composite wall



Flexible base in full contact with the wire; the wire never meets the environment, so it cannot rust.

4. Flexible production, small footprint



Spiral winding without rotating the whole pipe body, unlike steel-mesh skeleton pipe, greatly reduces space demand.

5. Longitudinal stretch and bending



Spring-like single-direction winding keeps longitudinal flexibility: ground-laid strings can be lowered into the trench as one piece.

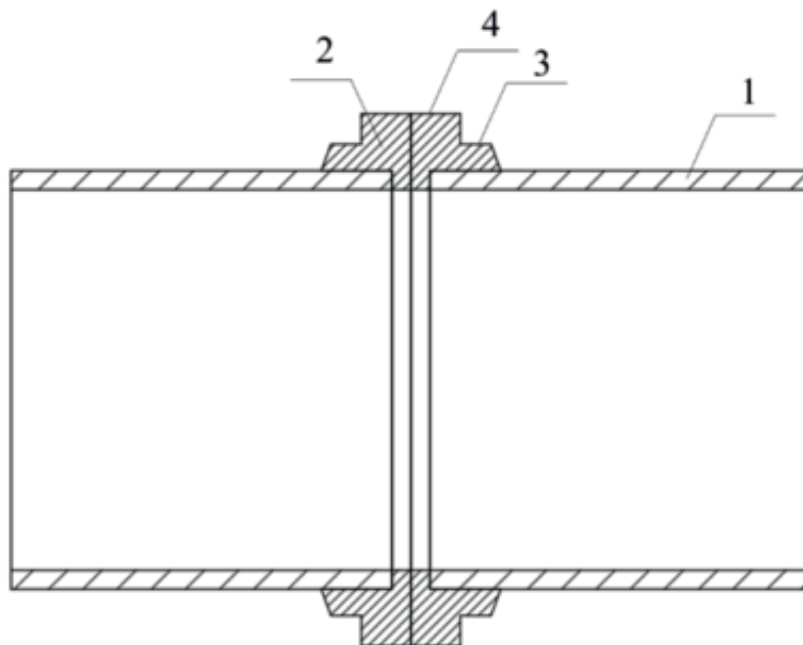
6. Unlimited diameter



Winding — not extrusion — sets the diameter by the steel core mould, filling the gap for large plastic water pipe.

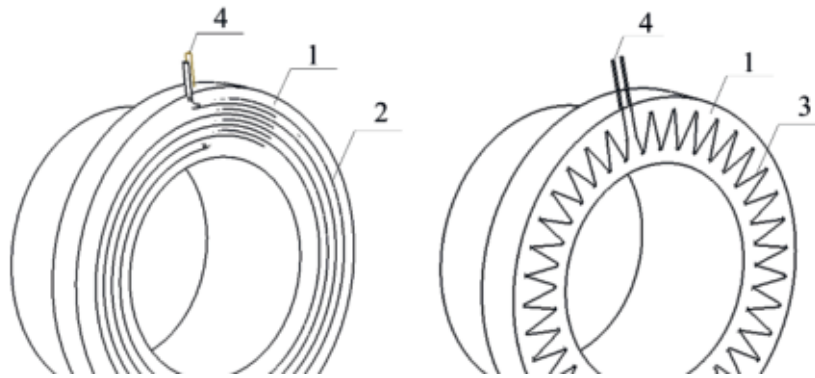
05 — Four jointing methods

1. Butt-fusion welding



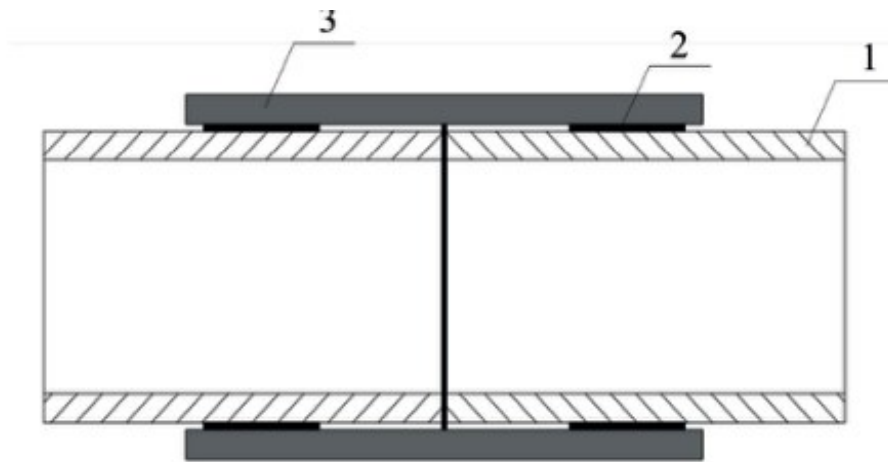
Both ends are prefabricated with double-flat solid-wall profiles and thickened PE joint ends, then butt-fused on site. Callouts: 1 pipe; 2 PE joint end; 3 locating step; 4 weld bead.

2. End-face electrofusion



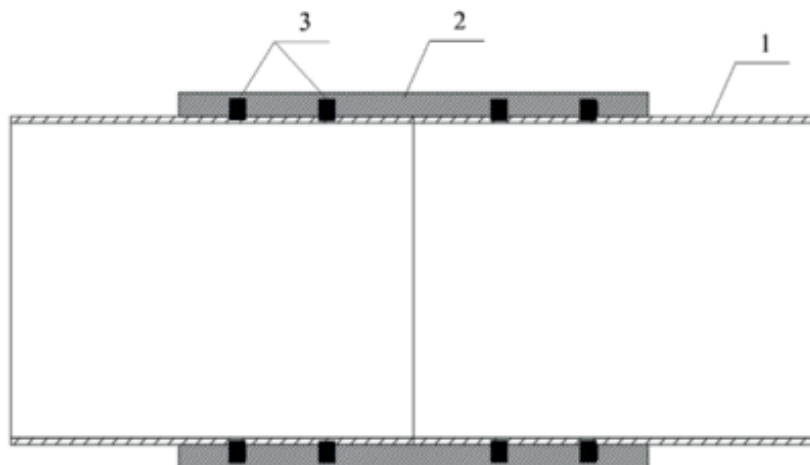
Resistance wires embedded at even spacing in the end faces are energised on site; compact units allow multiple simultaneous welds. Callouts: 1 bead end face; 2 circular wire; 3 W-pattern wire; 4 power terminal.

3. Electrofusion sleeve



Prepared ends enter a PE sleeve with embedded heating wire; after fusion and cooling the internal supports are removed. Callouts: 1 pipe; 2 fusion zone; 3 sleeve.

4. Double-seal sleeve



Two sealing rings compressed between pipe and sleeve give dual sealing with simple installation. Callouts: 1 pipe; 2 sleeve; 3 dual rings.

06 — Applications

Residential drinking water; municipal treatment and utilities; industrial wastewater, corrosive media and circulating water; oil and gas; mine ventilation, gas, water and coal slurry; mine tailings and mineral slurry;

marine transmission; water-conservancy transfer.

07 — Water-supply specification table (mm)

Product standard T/CWEC 10-2019. Reference: CJ/T 427-2013, CJ/T 323-2015, GB/T 32439-2015. A dash (–) means the combination is not offered.

DN	ID min	0.4	0.6	0.8	1.0	1.6	2.0	2.5
50	45	-	-	-	2.1	2.5	2.8	3.2
63	58	-	-	2.2	2.4	2.7	3.0	3.4
75	69	-	2.5	2.6	2.7	3.0	3.2	3.6
90	83	-	3.0	3.0	3.1	3.4	3.6	3.9
110	102	-	3.6	3.6	3.7	4.0	4.2	4.4
125	116	-	4.0	4.0	4.1	4.4	4.6	4.8
160	150	-	4.8	4.5	4.9	5.4	5.6	5.8
200	176	-	4.0	4.8	5.0	5.5	6.0	6.5
225	198	-	4.0	5.0	5.5	6.0	6.5	7.0
250	220	4.0	5.0	5.5	6.0	6.5	7.0	8.0
280	247	5.0	5.5	6.0	6.5	7.0	8.0	9.0
315	278	5.5	6.0	6.5	7.0	8.0	9.0	10.0
350	308	6.0	7.0	8.0	9.0	10.0	11.0	12.0
400	353	8.0	9.0	10.0	11.0	12.0	13.0	14.0
450	397	9.0	10.0	11.0	12.0	13.0	14.0	15.0
500	441	10.0	11.0	12.0	13.0	14.0	15.0	16.0
560	494	11.0	12.0	13.0	14.0	15.5	17.0	18.5
630	556	12.0	13.0	14.0	15.0	17.0	19.0	21.0
710	626	13.0	14.0	15.5	17.0	19.0	21.0	23.0
800	706	14.0	15.0	17.0	19.0	21.0	23.0	25.0
900	794	15.0	16.0	18.0	20.0	22.0	24.0	28.0
1000	882	16.0	17.0	19.0	21.0	23.0	25.0	30.0
1200	1095	18.0	19.0	21.0	23.0	25.0	27.0	-
1400	1235	20.0	21.0	23.0	25.0	27.0	29.0	-
1500	1324	21.0	22.0	24.0	26.0	28.0	31.0	-
1600	1412	22.0	23.0	25.0	27.0	29.0	33.0	-
1800	1588	24.0	25.0	27.0	29.0	31.0	-	-
2000	1765	26.0	27.0	29.0	31.0	33.0	-	-
2250	1986	27.0	28.0	30.0	32.0	34.5	-	-
2400	2118	28.0	29.0	31.0	33.0	36.0	-	-
2800	2471	30.0	32.0	34.0	36.0	-	-	-
3200	2824	32.0	34.0	36.0	40.0	-	-	-
3600	3176	34.0	36.0	40.0	43.0	-	-	-
4000	3529	38.0	42.0	46.0	-	-	-	-
4500	3971	44.0	48.0	52.0	-	-	-	-
5000	4412	48.0	52.0	56.0	-	-	-	-

II Drainage reinforced PE composite pipe

Product standards: T/CWEC 10-2019; GB/T 19472.2-2017 *Buried PE structured-wall systems, Part 2*.

01 / 02 — Overview and structure

Wound from hollow-rib steel-wire-reinforced strips for diameters above 5 m; the layered rib-wire structure reaches the specified ring stiffness. Scientific structure, light yet strong, 100% virgin material. A screw extruder forms double-chamber ribbed strips, spiral-wound and hot-bonded before outer wire and PE protection layers are added.



Steel-wire-reinforced drainage composite pipe at the factory.

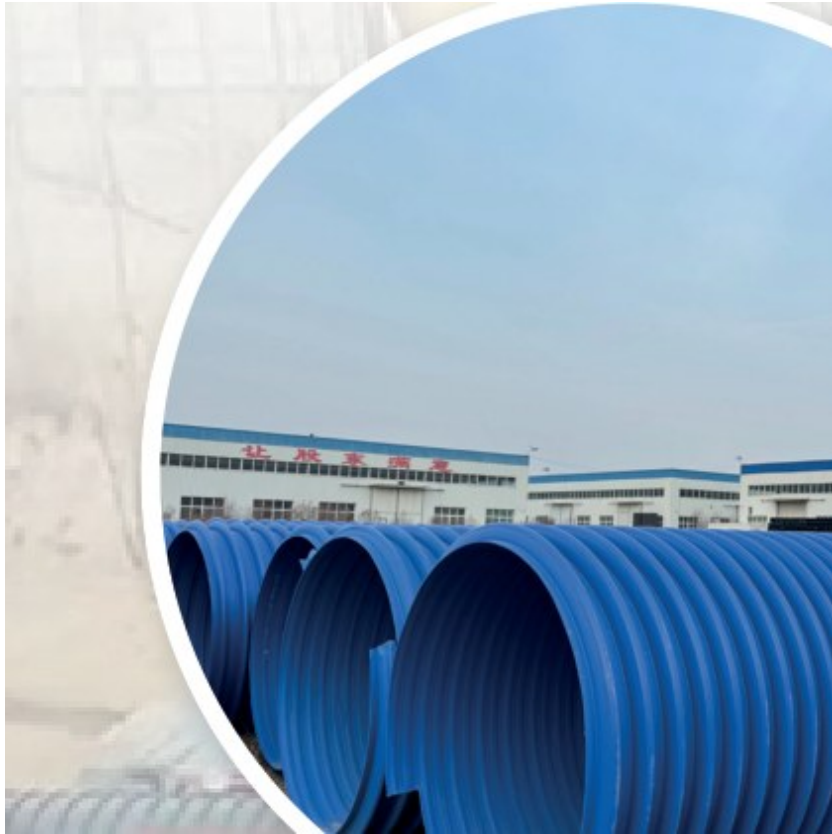
03 — Five characteristics

1. Flexibility, corrosion and fatigue resistance



Virgin PE100/PE80 base; light, strong, no recycled material.

2. Unlimited diameter



Diameter set by the steel core mould, not by extrusion.

3. Integrated wall



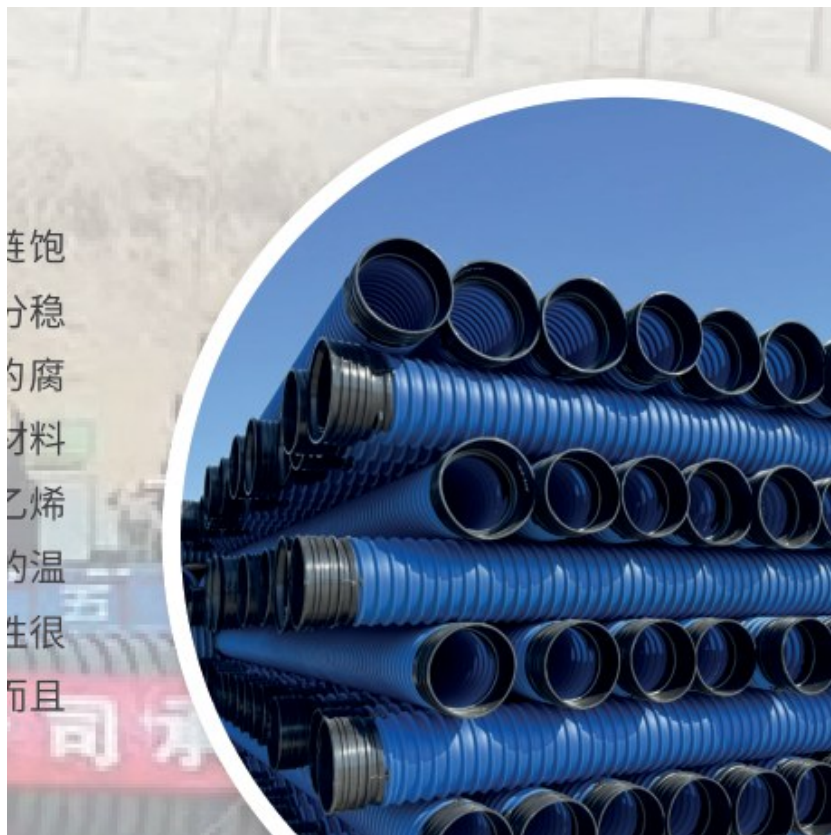
Strips hot-bonded with dedicated adhesive and pressed as one.

4. Bending resistance, high ring stiffness



Carbon spring-steel wire exceeds 1800 MPa tensile strength, about 4.5 times ordinary steel (approx. 400 MPa); strong bending resistance, high ring stiffness, elastic recovery after loading.

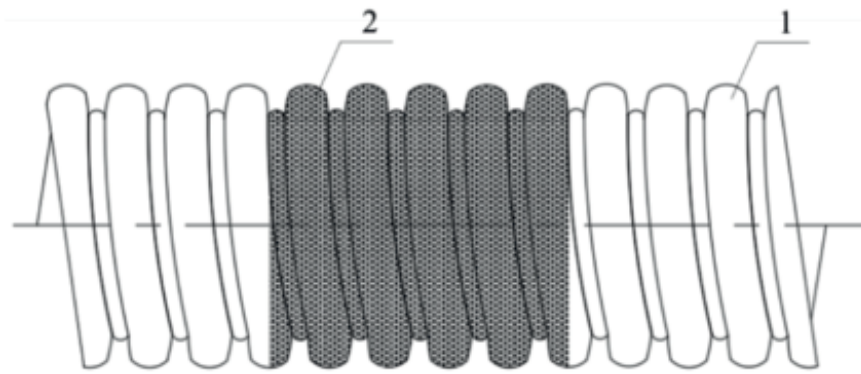
5. Acid, alkali, salt and solvent resistance



Saturated long-chain PE with fully encased wire; 40-year buried service stated.

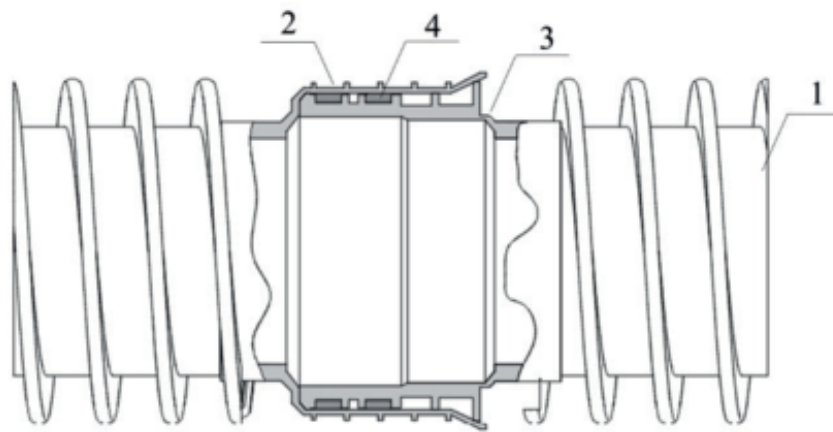
04 — Four jointing methods

1. Heat-shrink sleeve



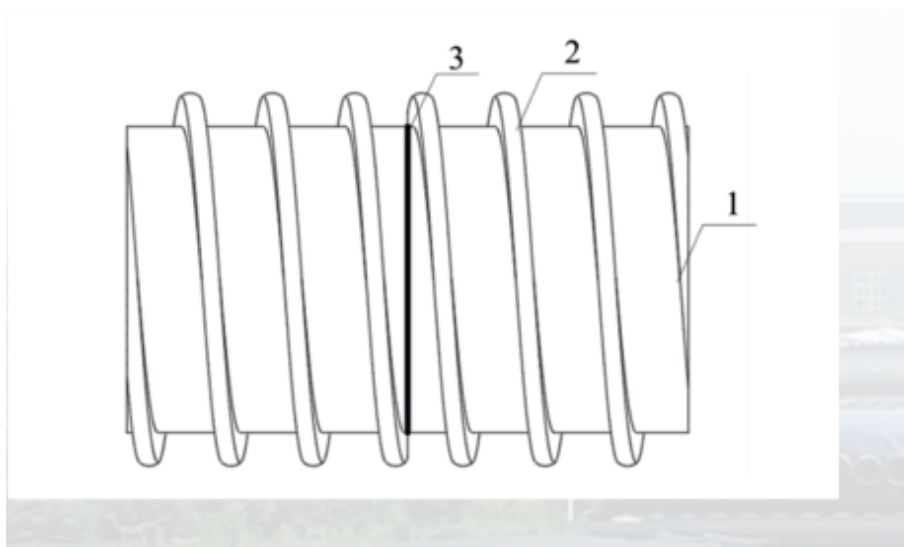
Sized sleeve lined with hot-melt adhesive, heated with an LPG flame to shrink over both ends. Callouts: 1 pipe; 2 sleeve.

2. Sealed socket joint



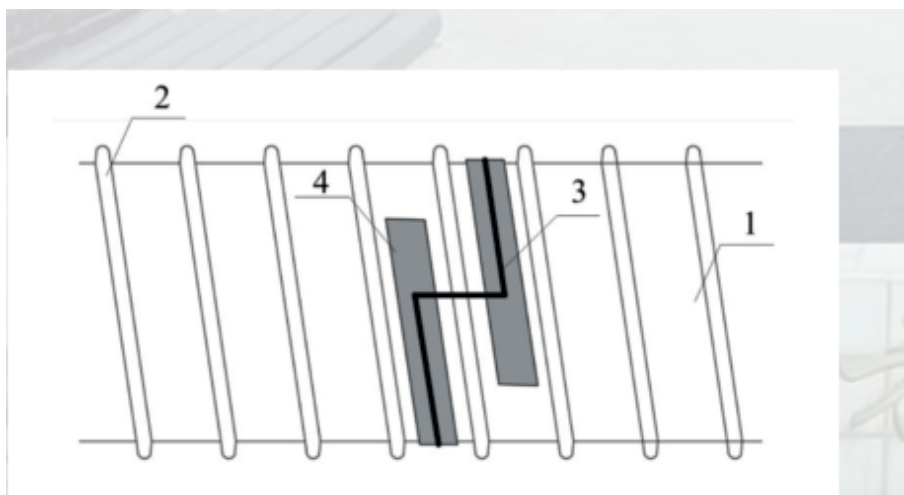
Spigot with sealing rings pushed home into the socket. Callouts: 1 pipe; 2 socket; 3 spigot; 4 ring.

3. Butt-fusion welding



Cleaned squared ends welded with dedicated equipment. Callouts: 1 pipe; 2 rib; 3 weld.

4. Electrofusion band



Band over at least 1.2 rib turns with supports and clamps; seams finished by extrusion welding. Callouts: 1 pipe; 2 rib; 3 joint; 4 band.

05 — Physical performance

No.	Item	Unit	Requirement
1#	Appearance	/	Smooth, uniform appearance
2#	Tensile strength	MPa	≥20
3#	Elongation at break	%	≥200
4#	Flexural modulus	MPa	≥1500
5#	Ring stiffness	kN/m ²	≥12.5 (SN12.5)
6#	Ring stiffness	kN/m ²	≥16 (SN16)
7#	Impact resistance	%	≤10
8#	Creep ratio	%	≤3
9#	Ring flexibility	/	No reverse bending/cracking; tearing < 75 mm
10#	Oven test	/	No bubbles/delamination/cracking
11#	OIT	Min	≥30
12#	Longitudinal reversion	/	≤3%, no delamination/cracking

06 — Applications

Municipal drainage and sewer systems; residential underground drainage; sponge-city rainwater networks; irrigation and water-conservancy works; chemical/mining fluids and ventilation; utility and cable protection sleeves; golf-course subsurface drainage.

07 — Drainage specification table (mm): nominal diameter, minimum mean inside diameter, minimum inner-layer wall

DN	ID min	Wall	DN	ID min	Wall
160	155	1.3	2000	1985	6.0
200	195	1.5	2100	2085	6.0
250	245	1.8	2200	2185	7.0
300	294	2.0	2300	2285	8.0
400	392	2.5	2400	2385	9.0
450	441	2.8	2500	2485	10.0
500	490	3.0	2600	2585	10.0
600	588	3.5	2700	2685	10.0
700	673	4.0	2800	2785	10.0

DN	ID min	Wall	DN	ID min	Wall
800	785	4.5	2900	2885	10.0
900	885	5.0	3000	2985	10.0
1000	985	5.0	3100	3085	10.0
1100	1085	5.0	3200	3185	10.0
1200	1185	5.0	3300	3285	10.0
1300	1285	5.0	3400	3385	10.0
1400	1385	5.0	3500	3485	10.0
1500	1485	5.0	3600	3585	11.0
1600	1585	5.5	4000	3985	12.0
1700	1685	5.5	4500	4485	13.0
1800	1785	6.0	5000	4985	14.0
1900	1885	6.0	-	-	-

III Selected project references

Water-supply references (20 entries)

Project	Location	Specification
Guizhou rural water-supply integration	Guizhou	DN700 · 0.8 MPa · 12 km
Guan County 2021 comprehensive treatment project	Liaocheng, Shandong	DN1400 · 1.0 MPa
Datong water-supply project	Datong, Shanxi	DN500 · 1.0 MPa · 40 km
Hunan rural water-supply integration	Hunan	DN600 · 1.0/1.6 MPa · 25 km
Dongguan Apollo water-storage project	Dongguan, Guangdong	DN2400 · SN12.5
Beijing residential water pipeline	Beijing	DN315 · 1.6 MPa · 50 km
Fengdu water-supply line	Fengdu, Chongqing	DN1000 · 1.25 MPa · 20 km
Congjiang Luoguan water line	Congjiang, Guizhou	DN1000 · 1.6 MPa · 30 km
Shanxi coal-mine water supply	Shanxi	DN400 · 1.0 MPa · 60 km
Sichuan water-supply pipeline	Sichuan	DN1000/DN600 · 1.0 MPa · 18 km
Beijing Fangshan water line	Fangshan, Beijing	DN315/DN400 · 1.6 MPa · 80 km
Hebei water-supply project	Hebei	DN315 · 1.0 MPa · 30 km
Shanxi water-supply project	Shanxi	DN315 · 1.0 MPa · 50 km
Linyi No.2 Reservoir water line	Dezhou, Shandong	DN800/DN900 · 1.0/1.6 MPa · 43 km
Mianyang Xinyong water transfer	Mianyang, Sichuan	DN200 · 1.6 MPa · 20 km
Shenxian WWTP supporting networks	Liaocheng, Shandong	DN600–DN1500 · 1.0/1.6 MPa · 9 km
Hebei contract water-saving project	Hebei	DN160 · 1.6 MPa · 15 km
Zhangqiu Yunhu water plant, phase 1	Jinan, Shandong	DN315–DN800 · 1.0/2.0 MPa · 20 km
Chiping water-source replacement	Liaocheng, Shandong	DN630 · 1.6 MPa · 5.5 km
Jinan 2022 sewer-stormwater separation	Jinan, Shandong	DN300–DN600 · SN12.5 · 30 km

Drainage references (97 entries)

Project	Location	Specification
Chiping water-source replacement	Liaocheng, Shandong	DN630
Shenxian WWTP supporting networks	Jinan, Shandong	DN630/DN800
Zhangqiu Yunhu water plant, section 1	Jinan, Shandong	DN315–DN630
Zhangqiu Yunhu water plant, section 4	Jinan, Shandong	DN630–DN800

Project	Location	Specification
Linyi No.2 Reservoir water line	Dezhou, Shandong	DN800–DN900
Guan County 2021 groundwater over-extraction project	Liaocheng, Shandong	DN1400
Linyi Kaiyuan water project	Dezhou, Shandong	DN110–DN400
Shandong Yixuan Paper plant works	Dezhou, Shandong	DN400
Jinan 2022 sewer-stormwater separation	Jinan, Shandong	DN300–DN600
Tao-Ge (Wujin) water environment, phase 3	Changzhou, Jiangsu	DN300
Laiwu urban drainage phase 1, Jinan	Jinan, Shandong	DN200–DN1000
Shenxian WWTP supporting networks	Liaocheng, Shandong	DN300–DN1500
Shandong Luqiao Heze construction	Heze, Shandong	DN500–DN800
Juye black-water treatment and separation	Heze, Shandong	DN300–DN1000
Lincheng development-zone infrastructure upgrade	Xingtai, Hebei	DN300–DN1000
Rizhao Port project	Rizhao, Shandong	DN1600
Xi'an Chuanze industrial project	Jinan, Shandong	DN400–DN1500
Chiping Zaoxiang Street separation retrofit	Liaocheng, Shandong	DN300–DN1500
Mengsu zero-carbon park WWTP and reuse	Ordos, Inner Mongolia	DN200–DN1000
Jinan Innovation Valley river training	Jinan, Shandong	DN500–DN800
Shanghe water construction	Jinan, Shandong	DN300–DN800
Jinan Yellow River road-bridge group	Jinan, Shandong	DN200–DN300
Cui Zhai South municipal roads, phase 1	Jinan, Shandong	DN400
Changdao roads and networks overhaul	Yantai, Shandong	DN400–DN500
Zhaoyuan Jinquan River separation retrofit	Yantai, Shandong	DN600–DN1200
Zhoukou new-district roads and networks	Zhoukou, Henan	DN400–DN1000
Zhoukou port and logistics park PPP, phase 1	Zhoukou, Henan	DN300–DN1500
Mandula Port networks	Baotou, Inner Mongolia	DN500
Yunzhong Avenue project	Ordos, Inner Mongolia	DN700–DN1400
Beijing No.10 School Huaishuling drainage	Beijing	DN400–DN1000
Arxan wetland park pipelines	Arxan, Inner Mongolia	DN600
Chifeng Hongshan WWTP road widening	Chifeng, Inner Mongolia	DN500–DN800
Huai'an Yunlin Road works	Huai'an, Jiangsu	DN300–DN1500
Qinghe Binjiang Avenue, section 2	Huai'an, Jiangsu	DN300–DN800
Fugou Tongqiu Road rain-sewage works	Zhoukou, Henan	DN1200–DN1500
Jincheng Wenbo Road, phase 2	Jincheng, Shanxi	DN1400
Weifang Kuiwen roads retrofit	Weifang, Shandong	DN300–DN600
Tashan South Road Type-A pipe supply	Yantai, Shandong	DN400–DN1400
Yinan rain-sewage separation	Linyi, Shandong	DN300–DN700
Linquan Xingquan Avenue municipal roads	Fuyang, Anhui	DN300–DN1000
Yinchuan Hedong Airport project	Yinchuan, Ningxia	DN300–DN1200
Taikang Jiaotong Road sewer networks	Zhoukou, Henan	DN500–DN800
Zhoukou Jiaotong Road drainage	Zhoukou, Henan	DN500–DN800
Huai'an Jingyuan Road works	Huai'an, Jiangsu	DN400–DN500
Dongying Port project	Dongying, Shandong	DN1500–DN2000
Zhoukou Hanyang North and Huanghe–Zhongyuan links	Zhoukou, Henan	DN400–DN800
Shijiazhuang bonded-zone roads	Shijiazhuang, Hebei	DN1200
Yinchuan Airport phase-3 networks	Yinchuan, Ningxia	DN300–DN1800

Project	Location	Specification
Shijiazhuang airport-park drainage	Shijiazhuang, Hebei	DN300–DN1200
Pingbao Road realignment	Pingdingshan, Henan	DN1200
Jincheng Taihang Road networks	Jincheng, Shanxi	DN300–DN1100
Rizhao Port west-harbour project	Rizhao, Shandong	DN1600
Huai'an Xuliu park infrastructure	Huai'an, Jiangsu	DN400–DN600
Bayannur west-district networks	Bayannur, Inner Mongolia	DN700–DN1400
Linfen Yaodu east-ring widening	Linfen, Shanxi	DN300–DN1000
Kaifeng Peking University Resources Town	Kaifeng, Henan	DN300–DN1800
Zhoukou east-ring, section 3	Zhoukou, Henan	DN300–DN700
Liaocheng north-ring drainage	Liaocheng, Shandong	DN500–DN2000
Harbour Construction west phase 4	Rizhao, Shandong	DN200–DN1500
Shijiazhuang north drainage retrofit	Shijiazhuang, Hebei	DN2600
Pingdingshan Zhanhe treatment project	Pingdingshan, Henan	DN1800
Tongliao Huolinhe Avenue sewer installation	Tongliao, Inner Mongolia	DN1500
Yinan Aucma Avenue sewer networks	Linyi, Shandong	DN400–DN1000
Beigou No.2 WWTP pipe supply	Yantai, Shandong	DN600–DN800
Yuncheng high-speed-rail business-district roads	Yuncheng, Shanxi	DN300–DN1200
Shenhua Huanghua Port drainage retrofit	Huanghua, Hebei	DN300–DN1800
Provincial culture and arts centre	Jinan, Shandong	DN1500–DN2400
Dezhou Qiaokou Haizi drainage retrofit	Dezhou, Shandong	DN1200–DN1600
Shouguang Zikang Road drainage	Weifang, Shandong	DN800–DN1000
Xuanhua Xingfu Avenue drainage	Zhangjiakou, Hebei	DN600
Hanggin Banner old-town renewal	Ordos, Inner Mongolia	DN300–DN1200
Wugang business-service-zone sewage	Pingdingshan, Henan	DN400–DN800
Taiyuan Zhengyang Street drainage	Taiyuan, Shanxi	DN400–DN700
Linyi Lingang development-zone sewer networks	Linyi, Shandong	DN400–DN800
Hohhot east-station district drainage	Hohhot, Inner Mongolia	DN300–DN700
Taiyuan Dachang Road retrofit	Taiyuan, Shanxi	DN1000
Jinan high-tech-zone Roads 34 and 35	Jinan, Shandong	DN400–DN500
Linyi Xi'an Road HDPE drainage supply	Linyi, Shandong	DN400–DN600
Jinan Gongye North Road drainage	Jinan, Shandong	DN500
Tai'an Lingshan Avenue mid-section	Tai'an, Shandong	DN500–DN800
Chiping Jianshe Road retrofit	Liaocheng, Shandong	DN1000–DN1500
West Ujimqin Baiyinhua logistics park	Chifeng, Inner Mongolia	DN400–DN500
Hohhot Jinshan development-zone project	Hohhot, Inner Mongolia	DN800–DN1000
Dalian Puwan roads and networks	Dalian, Liaoning	DN400–DN600
Jiqi Road retrofit works	Jinan, Shandong	DN600–DN1000
Hohhot Jinqiao WWTP networks, lot A	Hohhot, Inner Mongolia	DN600–DN1400
Kaifeng Qixian Chengdong Road stormwater	Kaifeng, Henan	DN600–DN1200
Shengle park Jing'er Road south section	Hohhot, Inner Mongolia	DN400
PetroChina Qilu power-plant retrofit	Zibo, Shandong	DN300–DN1200
Weifang Kuiwen comprehensive retrofit	Weifang, Shandong	DN500–DN1000
Dongying eco-industrial-park drainage	Dongying, Shandong	DN400
Zhengzhou Hongri Road sewage	Zhengzhou, Henan	DN500–DN600

Project	Location	Specification
Zhongmu Yanming Avenue sewer networks	Zhengzhou, Henan	DN400–DN500
Lianyungang Zong'er Road works	Lianyungang, Jiangsu	DN300–DN1000
Jinan river separation, Lixia section supply	Jinan, Shandong	DN500–DN600
Fengtai Kangxin Road project	Beijing	DN1200
Tancheng WWTP HDPE networks supply	Linyi, Shandong	DN400–DN500

For the complete searchable record and project images, see the Projects page on the Shunfang export website. Final dimensions and performance are confirmed per project.