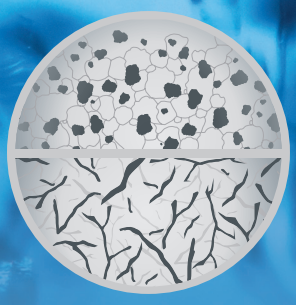
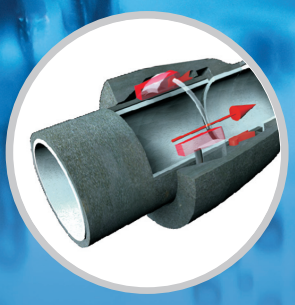
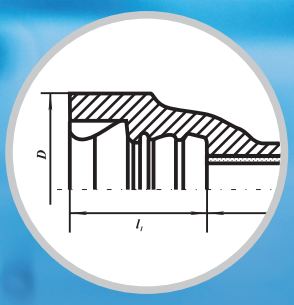
DUCTILE IRON PIPES AND FITTINGS DN 80-1000 mm

SVOBODNY SOKOL

THE WAY TO PURE WATER







THE WAY TO PURE WATER.

Conservation of pure water, assurance of drinking water quality, reduction of losses in everyday consumption becomes a vital problem for the mankind.

According to the United Nation data losses of potable water caused by supply system failures (pipelines, distribution devices) equal to its total consumption (!!!).

Developing countries having no modern and reliable pipeline systems suffer most from lack of proper quality portable water and its losses.

One more global problem is the transportation of household and industrial waste water with minimal losses, which means elimination of nature poisoning with human activity biowastes.

Ductile Iron Pipes are the most reliable, durable and cost-effective material for transportation of potable water, industrial and household waste water and for a great number of technological solutions.

Lipetsk Pipe Company Svobodny Sokol makes its contribution to nature conservation producing and supplying different kinds of pressure ductile iron pipes and fittings to them.

Capitals of about 100 countries are equipped with high-duty ductile iron pipelines. Over 1000 cities in various climatic zones of the world have chosen ductile iron pipelines.

ABOUT PLANT

Lipetsk Pipe Company Svobodny Sokol is one of the oldest operations in central Russia successfully working in metallurgical production field for more than one hundred years.

Today it is a modern production consisting of seven shops and operating departments with well-developed infrastructure. Production of pressure ductile iron pipes is a core business of the factory.

The pipe-casting plant has modern equipment furnished by the leading world companies.

Lipetsk Pipe Company Svobodny Sokol is proud to offer his partners extended range of pressure Ductile Iron Pipes (DIP) DN 80 – 1000 mm.

The 6 m ductile iron pipes are manufactured with internal lining and external protective coatings. All pipe products are certified according to international and Russian standards and have the expert report of the Federal Supervision Agency for Customer Protection and Human Welfare.

The main strategic aim of the plant is to become the leader in the local and international market, manufacturing high-quality and consumer oriented products, providing ecological and industrial safety of manufacture and a safe work environment.

For this purpose, we have the System of Management functioning at a production plant certified according to the requirements of International standards ISO 9001, ISO 14001 and OHSAS 18001. All products are certified and manufactured in strict compliance with standards ISO 2531, EN 545, EN 598 and ISO 4179.

Lipetsk Pipe Company Svobodny Sokol is ready for mutually profitable and effective cooperation with local and foreign partners on the supply of high-quality pressure ductile iron pipes and fittings.

MECHANICAL PROPERTIES OF DUCTILE IRON

Ductile iron properties are the result of the adjunction of a small quantity of magnesium to the grey iron. After adjunction of magnesium to the iron, carbon crystallizes into graphite spheres enhancing the exceptional mechanical properties of the ductile of spheroidal graphite iron close to the low carbon steel properties. In addition to excellent tensile strength, yield strength and elongation ductile iron has a high-level corrosion resistance.

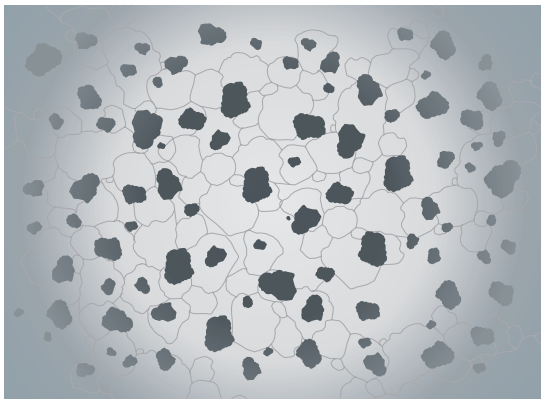
Improved mechanical properties are explained by the chemical composition of iron and high temperature annealing which makes it possible to use the pipes under alternating load, earth motion and sagging.

Ductile iron pipes and pipelines can bear great diametral deflection during operation without losing all their functional properties; that permits them to withstand high thickness of earth and great traffic load.

Parameters	Ductile Iron
Tensile strength σ_B MPa (kgf/mm^2), not less	420 (42,8)
Conventional yield point $\sigma_{0,2}$ MPa (kgf/mm^2), not less	300 (30,6)
Breaking elongation %, not less	10

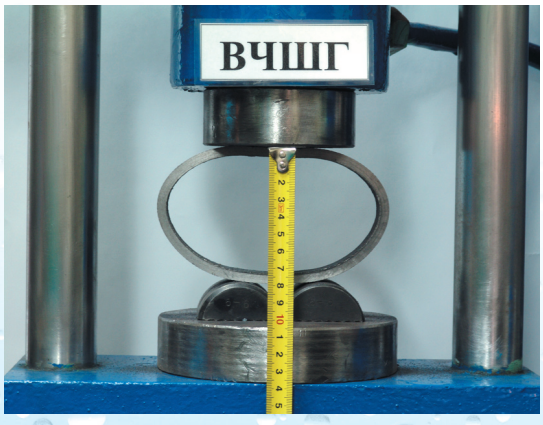
Metallographic Structure

Grey iron



Ductile Iron

Demonstration of Ductile Iron Pipes Mechanical Properties



DUCTILE IRON PIPES ADVANTAGES

Ductile iron pipes have been used in the world already sixty years. Today ductile iron pipes are the most promising regarding such parameters as «price + quality + ecological safety»

Ductile Iron Pipes Mean:

Longevity

Total Corrosion , mm/year		
	Ductile Iron	Steel 20
Sea water	0,01-0,06	0,1-0,8
Steam and hot water pipelines	0,011	0,048
Petroleum containing liquids	0,013	0,053

- The expected faultless service life of ductile iron pipeline systems:
  - In water supply networks under condition of soil corrosion, stray current and absence of cathodic protection is 80 to 100 years.
  - In sewage networks with hydrogen sulphure it reaches 50 to 60 years
- Corrosion resisting properties of ductile iron pipes are in 5-10 times higher than steel pipes

Ease of Installation

- Power costs, special equipment and highly qualified stuff, at the ductile iron pipe laying are not required.
- Laying directly in the ground at a depth of 8-10 m. without bed preparation is possible.
- Installation works at negative temperatures are allowed.

Energy Saving

- Inside cement mortar lining of the ductile iron pipes does not only ensure observation of the hygienic requirements at potable water transportation, but also improves the hydraulic properties of the ductile iron pipelines.

Roughness factor (as per COLEBROOK formula) of the inner surface of the ductile iron pipe with inside cement-mortar lining is K - 0,03 for a single pipe. It is recommended to take K-0,1 for DN 80-250 mm.; K=0,08 for DN 300-700 mm.; K=0,05 for DN 700-1000 mm. for calculations when designing pipeline systems out of ductile iron so that all friction losses in the assembled pipeline system are considered. That means that ductile iron pipes with inside cement-mortar lining permit to reduce hydraulic losses through friction in the pipeline to a considerable extent and correspond to all the modern energy conservation requirements.

Besides, big flow section of ductile iron pipes compared to polyethylene pipes (with the equal value of nominal bore DN) makes possible a considerable pumping cost reduction of the transported liquid.

Reliability

■ Unique properties of ductile iron ensure for pipelines:

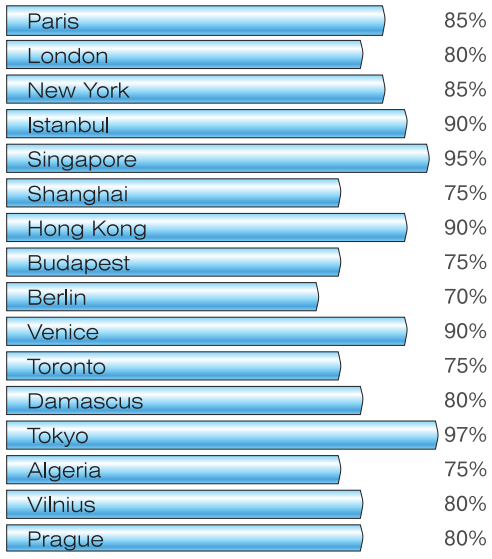
- no corrosion in conjunction with high mechanical properties and functional features of spigot and socket connections;
- high safety margin compared to other pipeline systems;
- cold resistance (impact strength of ductile iron pipes does not change in the range from plus 20°C to mines 60°C)

■ Ductile iron pipes have less failure compared to pipelines of other materials.

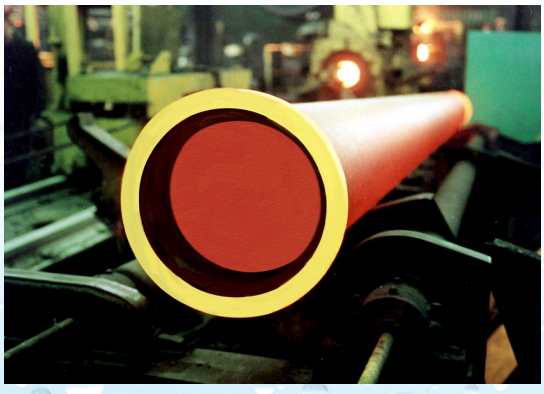
Numerous tests have proven that along with the estimated permissible load ductile iron pipes have sufficient reserve reliability. It is ideal for complicated laying conditions.

Ductile Iron Pipes Application

Ductile iron pipes have been used already 60 years in the world. During the whole period of exploitation the material has approved itself as one of the best, confirming all the benefits listed above. As a result, world consumption of ductile iron pipes is more than 7 million tons a year and continues to increase. Capitals of about 100 countries are equipped with ductile iron pipelines. Over 1000 cities in various climatic zones of the world have chosen ductile iron pipelines.



Shares of ductile iron pipeline systems in the water supply systems of the largest cities in the world



Environmental Friendly

- Ductile Iron Pipelines with inside cement-mortar lining guarantee high quality of transported water that meet all the requirements of hygienic safety (water PH up to 12,0)
- Ductile iron pipeline systems are impermeable for hydrocarbons and chemical substances that can be found in environing soils.
- Complete recycling of the pipes after the service.

Sourses of Information

1. Japan Water Works Association «Damage to water Pipelines at the 1995 Hyogoken-Nanbu Earthquake».

2. Iain Tromans Department of Civil and Environmental Engineering Imperial College of Science, Technology and Medicine London, «Behaviour of buried water supply pipelines in earthquake zones», January 2004.

3. Kuraoka S., Rainer J.H.«Damage to water distribution system caused by the 1995 Hyogo- Ken Nanbu earthquake» Canadian Journal of Civil Engineering, 23, (3), pp. 665-677, June 01, 1996.

4. M. Nakano, S. Katagiri and S. Takada «An experimental study on the anti-seismic performance of a U-PVC water supply pipeline with enlarged expansion joints» ASIAN JOURNAL OF CIVIL ENGINEERING (BUILDING AND HOUSING) VOL. 10, N0.5(2009)

5. Eidinger, J. M. (1998). «Water Distribution System» The Loma Prieta, California, Earthquake of October 17, 1989 .

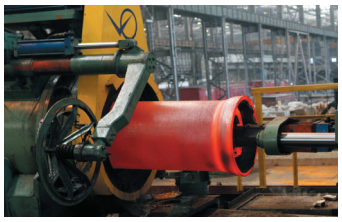
6. Anil Kkumar Sinha, Senior Technical Advisor, Asian Disaster Reduction Center « THE GUJARAT EARTHQUAKE 2001».

7. V. Thiruppugazh, Joint Chief Executive Officer Gujarat State Disaster Management Authority, India « WHAT HAS CHANGED AFTER GUJARAT EARTHQUAKE 2001».

8. «DAMAGE BEHAVIOR OF LARGE-DIAMETER BURIED STEEL PIPELINES UNDER FAULT MOVEMENTS» LIU Ai-wen(1) , HU Yu-xian(1) , LI Xiao- jun(1) , ZHAO Fen-xin(1) , TAKADA Shiro(2) (1. Institute of Geophysics, China Earthquake Administration, Beijing 100081, China; 2. Kobe University, Japan).

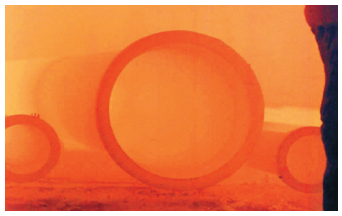
PIPE MANUFACTURING PROCESS

1. Melting. Magnesium treatment.

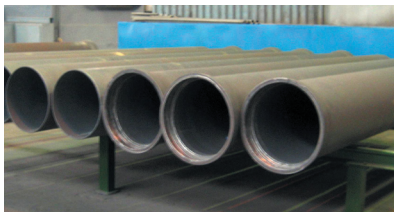


2. Centrifugal casting

Core making



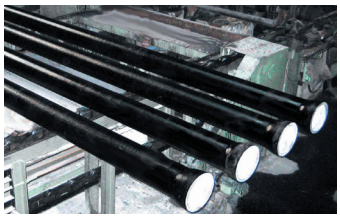
3. Heat treatment in annealing furnace



4. Ductility testing and additional processing, hydraulic test

5. Zinc coating

6. Cement lining and curing



7. Painting and finishing

8. Packing and shipment preparation

9. Stock area

10. Shipment

APPLICATION FIELD

- **Water Supply**

Outdoor networks and structures.

Industrial water-desalinating plant.

- **Sewer System**

Outdoor networks and structures.

- **Heat Supply**

Outdoor heat networks with water temperature up to 120 °C

- **Pipelines For Drainage And Irrigation**

- **Pipelines For Fire-Extinguisher Systems**

- **Electrochemical Protection Of The Underground Metal Constructions**

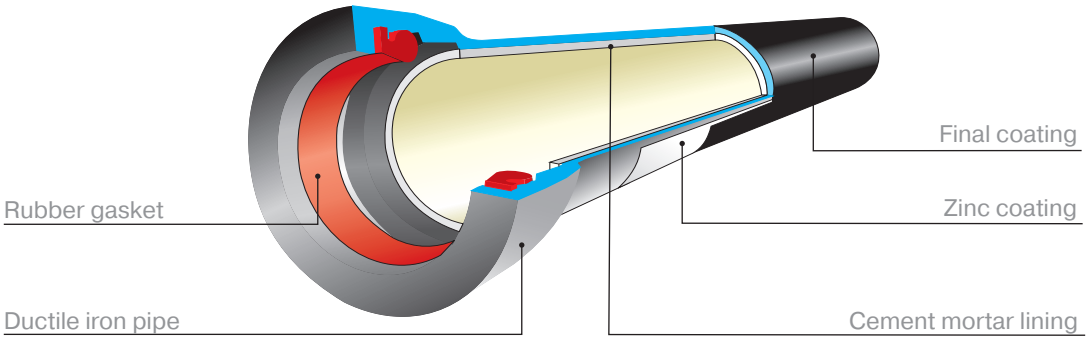
- **Oil And Gas Production**

Transportation of oil wells products to separate facilities. Transportation of technical liquids that provide operation of oil deposits

Ductile iron pipes application in other areas is specified by the Manufacturer.

DUCTILE IRON PIPES

The 6 m ductile iron pipes are manufactured with internal lining and external protective coatings by the Lipetsk Pipe Company Svobodny Sokol in accordance with GOST P ISO 2531, EN 545



Outer Coating Of The Ductile Iron Pipes

Zinc and final coatings are applied to the outer pipe surface according to ISO 8179.

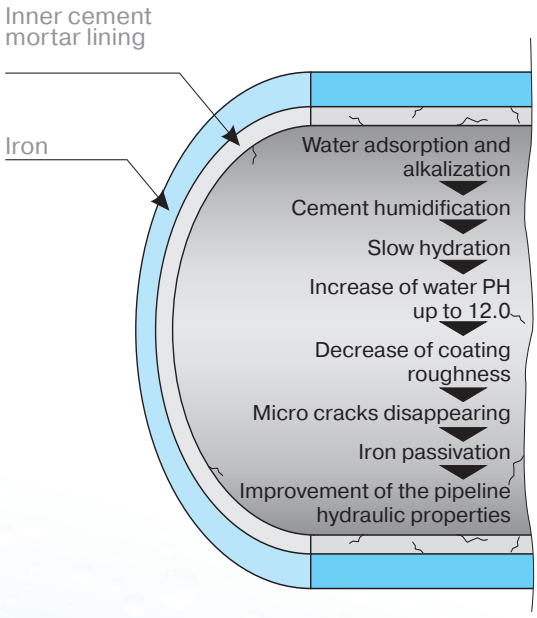
Ductile Iron Pipes Lining

The inner surface of the pipe may have cement mortar lining (CML). (Thickness and properties to ISO 4179).

The unique properties of the cement mortar lining lie in both passive and active protective effect.

In case of aggressive soil or transported liquid other types of coatings can be used. It is recommended to consult the manufacturer on their application.

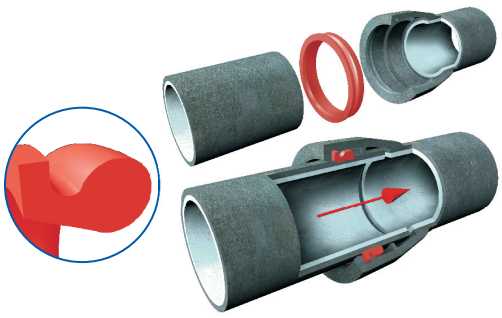
Cement Mortar Lining Functioning



RANGE OF JOINTS

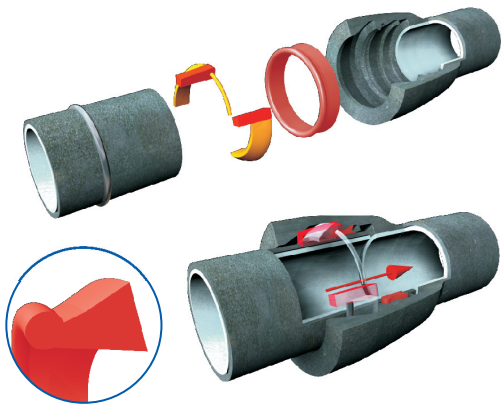
Socket «Tyton» Joint

Socket «Tyton» joint, with rubber gasket for use with the operating pressure from 3.0 to 6.4 MPa (depending on the diameter) for pipelines DN 80-1000 mm.



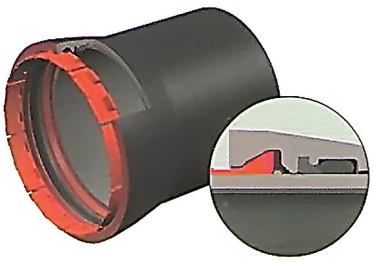
«RJ» Joint

Restrained socket joint with rubber gasket for use with the operating pressure from 2.5 to 8.8 MPa (depending on the diameter) for pipelines DN 80-500 mm.



«RJS» Joint

Restrained socket joint with rubber gasket for use with the operating pressure from 1.6 to 3.2 Mpa (depending on the diameter) for pipelines DN 600-1000 mm.



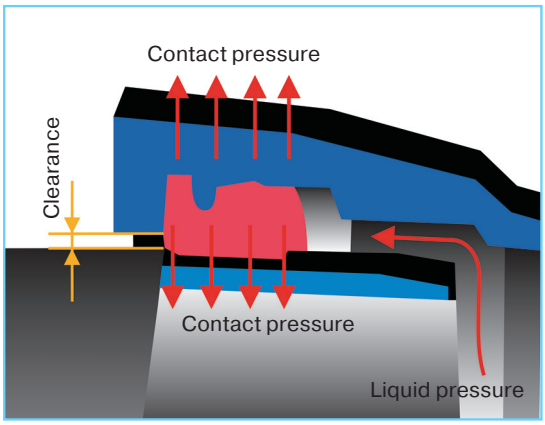
The joint type and pipe application may vary.

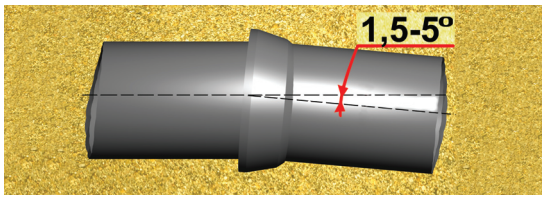
For the maximum allowable loads refer to the Manufacturer.

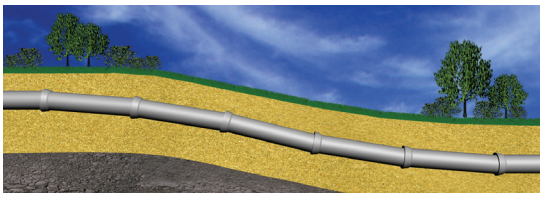
FUNCTIONAL FEATURES OF SOCKET AND SPIGOT JOINTS

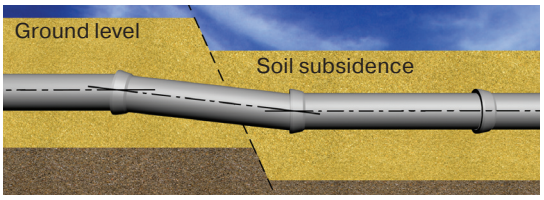
Socket joints are made in such a way that perfect tightness is ensured due to the contact pressure between the rubber gasket and the pipe material as well as due to the water pressure.

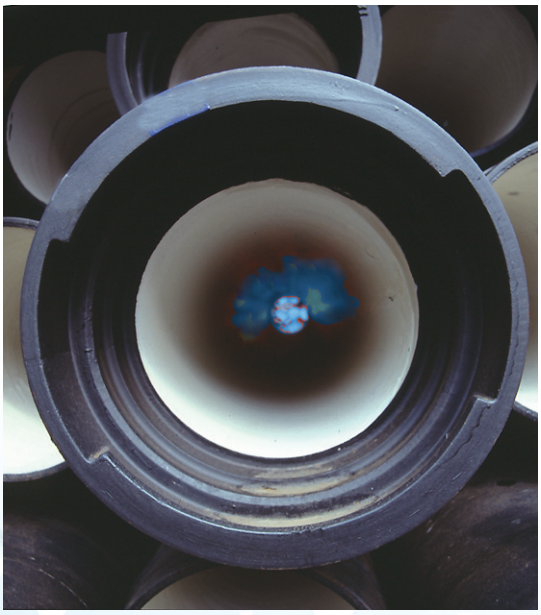
Socket type connection is not rigid and permits the connected pipes to move to the corner from 1.5 to 5° without joints losing tightness, it offers certain advantages when laying pipes and adjusting to the soil movement, besides it permits to lay pipes in a circle of big radius without fittings, and make adjustment to the pipeline route.







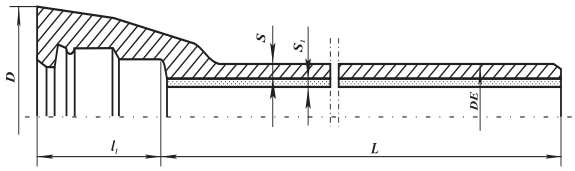




TYPE OF JOINTS

«Tyton» Joint

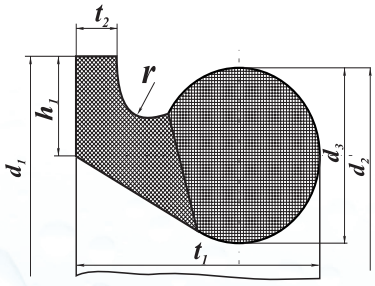
Socket-Joint Pipes for «Tyton» joint are furnished with rubber gaskets. Material composition and properties of the rubber gaskets are specified by the normative documentation.



Basic dimensions, weight, allowable operating pressure, angular deflection

Dimensions, mm						Allowable operating pressure, MPa	Allowable angular deflection, °	Pipe weight with socket and cement-mortar lining, kg, effective length L, mm	
DN	D	DE	S	S_1	l_1			5800	6000
80	140	$98^{+1,0}_{-2,7}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	80	6,4	5	85,0	88,0
100	163	$118^{+1,0}_{-2,8}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	88	6,4	5	106,0	109,0
125	190	$144^{+1,0}_{-2,9}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	91	6,4	5	132,0	136,0
150	217	$170^{+1,0}_{-2,9}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	94	6,4	5	159,0	164,0
200	278	$222^{+1,0}_{-3,0}$	$6,3^{-1,5}$	$3^{+2,0}_{-1,5}$	100	6,2	4	215,0	222,0
250	336	$274^{+1,0}_{-3,1}$	$6,8^{-1,6}$	$3^{+3,0}_{-1,5}$	105	5,4	4	281,0	290,0
300	393	$326^{+1,0}_{-3,3}$	$7,2^{-1,6}$	$3^{+3,0}_{-1,5}$	110	4,9	4	352,0	364,0
350	448	$378^{+1,0}_{-3,4}$	$7,7^{-1,7}$	$5^{+3,5}_{-2,0}$	110	4,5	3	461,0	476,0
400	500	$429^{+1,0}_{-3,5}$	$8,1^{-1,7}$	$5^{+3,5}_{-2,0}$	110	4,2	3	553,0	571,0
500	604	$532^{+1,0}_{-3,8}$	$9,0^{-1,9}$	$5^{+3,5}_{-2,0}$	120	3,8	3	756,0	780,0
600	713	$635^{+1,0}_{-4,0}$	$9,9^{-1,9}$	$5^{+3,5}_{-2,0}$	120	3,6	3	983,0	1015,0
700	824	$738^{+1,0}_{-4,2}$	$10,8^{-2,0}$	$6^{+4,0}_{-2,5}$	150	3,4	2	1273,0	1314,0
800	943	$842^{+1,0}_{-4,5}$	$11,7^{-2,1}$	$6^{+4,0}_{-2,5}$	160	3,2	2	1556,0	1606,0
900	1052	$945^{+1,0}_{-4,8}$	$12,6^{-2,2}$	$6^{+4,0}_{-2,5}$	175	3,1	1,5	1870,0	1930,0
1000	1158	$1048^{+1,0}_{-5,0}$	$13,5^{-2,3}$	$6^{+4,0}_{-2,5}$	185	3,0	1,5	2210,0	2281,0

Rubber Gasket For «Tyton» And «RJS» Joints



Basic dimensions and weight

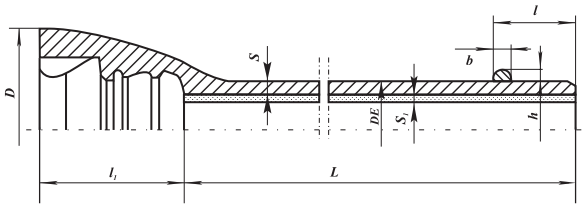
Dimensions, mm								weight, kg (for reference)
DN	d_1	d_2	d_3	h_1	t_1	t_2	r	
80	$126^{\pm1,0}$	$124^{\pm1,0}$	$16^{+0,5}$	$10^{+0,3}$	26	$5^{+0,4}_{-0,2}$	3,5	0,13
100	$146^{\pm1,0}$	$144^{\pm1,0}$	$16^{+0,5}$	$10^{+0,3}$	26	$5^{+0,4}_{-0,2}$	3,5	0,21
125	$173^{\pm1,0}$	$171^{\pm1,0}$						0,29
150	$200^{\pm1,5}$	$198^{\pm1,5}$						0,36

Part 2 of table 14

Dimensions, mm								weight, kg (for reference)
DN	d_1	d_2	d_3	h_1	t_1	t_2	r	
200	$256^{\pm1,5}$	$254^{\pm1,5}$	$18^{+0,5}$	$11^{+0,3}$	30	$6^{+0,4}_{-0,2}$	4,0	0,50
250	$310^{\pm1,5}$	$308^{\pm1,5}$			32			0,72
300	$366^{\pm1,5}$	$364^{\pm1,5}$	$20^{+0,5}$	$12^{+0,3}$	34	$7^{+0,4}_{-0,2}$	4,5	0,94
350	$420^{\pm2,0}$	$418^{\pm2,0}$						1,25
400	$475^{\pm2,0}$	$473^{\pm2,0}$	$22^{+0,5}$	$13^{+0,3}$	38	$8^{+0,5}_{-0,3}$	5,0	1,54
500	$583^{\pm3,0}$	$581^{\pm3,0}$	$24^{+0,5}$	$14^{+0,3}$	42	$9^{+0,5}_{-0,3}$	5,5	2,45
600	$692^{\pm3,0}$	$690^{\pm3,0}$	$26^{+0,5}$	$15^{+0,3}$	46	$10^{+0,5}_{-0,3}$	6,0	3,34
700	$809^{+5,0}_{-2,5}$	$803^{\pm3,5}$	$33,5^{+0,5}$	$20^{\pm0,3}$	55	$16^{+0,5}_{-0,3}$	7	4,55
800	$919^{+5,0}_{-2,5}$	$913^{\pm3,5}$	$35,5^{+0,5}$	$21^{\pm0,3}$	60		8	5,51
900	$1026^{+6,0}_{-2,0}$	$1020^{\pm4,0}$	$37,5^{+0,5}$	$22^{\pm0,3}$	65	$18^{+0,5}_{-0,3}$	9	6,30
1000	$1133^{+7,0}_{-2,0}$	$1127^{\pm4,0}$	$39,5^{+0,5}$	$23^{\pm0,3}$	70			7,04

«RJ» Joint

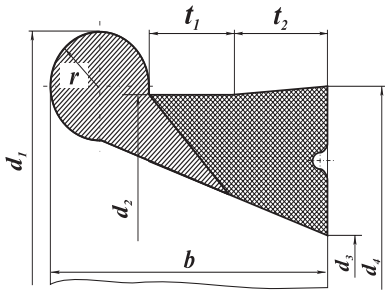
Due to the «RJ» joint the pipe does not get disconnected when laid in a rough terrain, at the places with the danger of sagging or in case of impact load. Circular bead at the pipe spigot and two stoppers inserted into the recess of the socket after connection and fixed with a retaining wire stop the pipes from disconnecting. It is especially important when pipelines are laid in unstable soil, mountainous areas and in vertical position. The «RJ» joint is recommended for pipelines laying by the trenchless methods. Areas of application are - cold water supply, heating system, sewage system. Spigot and socket pipes with «RJ» joint are equipped with rubber gaskets and stoppers.

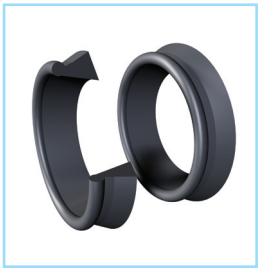


Basic dimensions, weight, allowable operating pressure, angular deflection

Dimensions, mm									Allowable operating pressure, MPa	Allowable angular deflection, °	Pipe weight with socket and cement-mortar lining, kg, effective length L, mm	
DN	D	DE	S	S_1	l	l_1	h	b			5800	6000
80	156	$98^{+1,0}_{-2,7}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	85	127	5,0	$8^{\pm2}$	8,8	5	87,0	90,0
100	176	$118^{+1,0}_{-2,8}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	91	135	5,0	$8^{\pm2}$	7,5	5	108,0	112,0
125	205	$144^{+1,0}_{-2,8}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	95	143	5,0	$8^{\pm2}$	6,3	5	135,0	139,0
150	230	$170^{+1,0}_{-2,9}$	$6,0^{-1,3}$	$3^{+2,0}_{-1,5}$	101	150	5,0	$8^{\pm2}$	6,3	5	163,0	168,0
200	288	$222^{+1,0}_{-3,0}$	$6,3^{-1,5}$	$3^{+2,0}_{-1,5}$	106	160	5,5	$9^{\pm2}$	4,9	4	222,0	229,0
250	346	$274^{+1,0}_{-3,0}$	$6,8^{-1,6}$	$3^{+3,0}_{-1,5}$	106	165	5,5	$9^{\pm2}$	3,6	4	290,0	299,0
300	402	$326^{+1,0}_{-3,3}$	$7,2^{-1,6}$	$3^{+3,0}_{-1,5}$	106	170	5,5	$9^{\pm2}$	3,4	4	363,0	375,0
350	452	$378^{+1,0}_{-3,4}$	$7,7^{-1,7}$	$5^{+3,5}_{-2,0}$	110	180	6,0	$10^{\pm2}$	3,0	3	473,0	488,0
400	513	$429^{+1,0}_{-3,5}$	$8,1^{-1,7}$	$5^{+3,5}_{-2,0}$	115	190	6,0	$10^{\pm2}$	2,5	3	568,0	586,0
500	618	$532^{+1,0}_{-3,8}$	$9,0^{-1,8}$	$5^{+3,5}_{-2,0}$	120	200	6,0	$10^{\pm2}$	2,5	3	776,0	800,0

Rubber Gaskets For «RJ» Joint





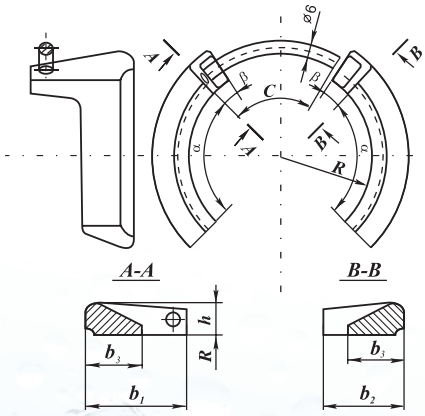
Basic dimensions and weight

Dimensions, mm									weight, kg (for reference)
DN	d_1	d_2	d_3	d_4	b	t_1	t_2	r	
80	$122{,}0^{\pm1{,}0}$	$111{,}0^{\pm1{,}0}$	$80{,}5^{\pm1{,}0}$	$116{,}5^{\pm1{,}0}$	28	5,5	13,3	4,5	0,12
100	$146{,}5^{\pm1{,}0}$	$134{,}5^{\pm1{,}0}$	$99{,}5^{\pm1{,}0}$	$140{,}5^{\pm1{,}0}$	30	5,5	14,3	5,0	0,17
125	$172{,}5^{\pm1{,}0}$	$160{,}5^{\pm1{,}0}$	$123{,}0^{\pm1{,}0}$	$167{,}0^{\pm1{,}0}$	31	5,5	15,3	5,0	0,28
150	$203{,}5^{\pm1{,}5}$	$189{,}5^{\pm1{,}5}$	$151{,}0^{\pm1{,}5}$	$196{,}0^{\pm1{,}5}$	32	5,5	15,3	5,5	0,41
200	$260{,}0^{\pm1{,}5}$	$244{,}0^{\pm1{,}5}$	$202{,}0^{\pm1{,}5}$	$250{,}0^{\pm1{,}5}$	33	5,5	15,3	6,0	0,50
250	$315{,}0^{\pm1{,}5}$	$299{,}0^{\pm1{,}5}$	$257{,}0^{\pm1{,}5}$	$305{,}0^{\pm1{,}5}$	33	5,5	15,3	6,0	0,63
300	$369{,}0^{\pm1{,}5}$	$353{,}0^{\pm1{,}5}$	$311{,}0^{\pm1{,}5}$	$359{,}0^{\pm1{,}5}$	33	5,5	15,3	6,0	0,95
350	$424{,}0^{\pm2{,}0}$	$406{,}0^{\pm2{,}0}$	$361{,}0^{\pm2{,}0}$	$413{,}0^{\pm2{,}0}$	36	5,5	16,0	7,0	1,14
400	$477{,}0^{\pm2{,}0}$	$459{,}0^{\pm2{,}0}$	$414{,}0^{\pm2{,}0}$	$465{,}0^{\pm2{,}0}$	36	5,5	16,0	7,0	1,35
500	$587{,}0^{\pm3{,}0}$	$568{,}0^{\pm3{,}0}$	$529{,}0^{\pm3{,}0}$	$576{,}0^{\pm3{,}0}$	38	5,5	17,1	7,5	2,43

Stoppers For «RJ» Joint

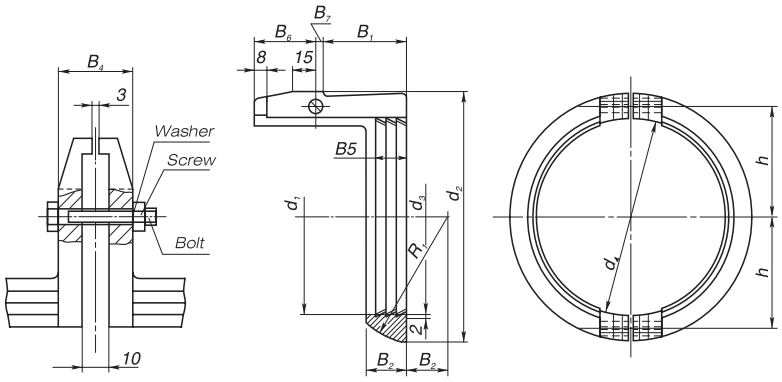
Basic dimensions and weight

DN, mm	b_1, mm	b_2, mm	b_3, mm	h, mm	R, mm	α°	β°	c°	c, mm	Weight of stoppers	
										left with the retaining wire, kg	right, kg
80	48	38	24	17	49	78	12	92	90	0,23	0,20
100	50	38	24	17	59	78	11	93	107	0,26	0,22
125	52	40	25	18	72	78	10	94	128	0,37	0,32
150	55	43	26	18	85	78	9	95	152	0,43	0,38
200	60	48	26	19	111	78	8	96	197	0,60	0,54
250	65	53	28	21	137	80	7	97	243	0,85	0,77
300	70	58	30	22	163	50	6	56	167	0,77	0,70
350	75	63	34	23	189	50	5,5	54,5	188	0,99	0,92
400	80	67	38	24	214	50	5	53	207	1,18	1,10
500	85	72	38	24	266	48	4,5	51,5	248	1,46	1,38



Clamping Ring For «RJ» Joint

Clamping ring is applied to fix the joint at pipes shortening.

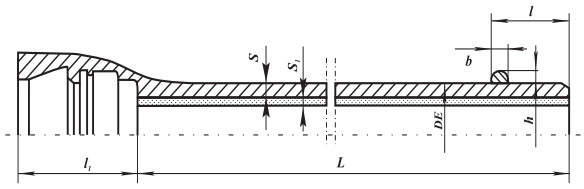


Basic dimensions and weight

DN, mm	Dimensions, mm													Weight, kg	Bolt GOST 7798-70	Screw GOST 591570	Washer GOST 6402-70
	d_1	d_2	d_3	d_4	B_1	B_2	B_3	B_4	B_5	B_6	B_7	H	R_1				
100	$119^{\pm0,3}$	$152^{\pm1,0}$	$117^{\pm0,3}$	121	50	24	25	37	18	40	5	68	80	1,4	M 8*70	M 8,5	8,65 g
150	$171^{\pm0,3}$	$206^{\pm1,0}$	$169^{\pm0,3}$	173	58	26	32	46	21	40	5	95	108	2,1			
200	$223^{\pm0,5}$	$260^{\pm1,5}$	$221^{\pm0,5}$	225	58	26	40	46	21	40	5	121	136	2,6			
250	$275^{\pm0,5}$	$316^{\pm1,5}$	$273^{\pm0,5}$	277	60	28	50	46	24	40	5	148	166	3,7			
300	$327^{\pm0,5}$	$370^{\pm1,5}$	$325^{\pm0,5}$	329	62	30	55	46	24	35	10	175	193	4,6			

«RJS» Joint

The push-on restrained joint «RJS» with rubber gasket for DN 600mm - DN 1000mm are recommended for pipelines laying in unstable soils, mountainous, earthquake pron areas and swampy grounds. The pipes with this type of joint can be successfully used for trenchless pipelaying. The «RJS» system provides joint efficiency due to the bead on the spigot end of pipe and stoppers sliding into the socket opening when the joint assembled.

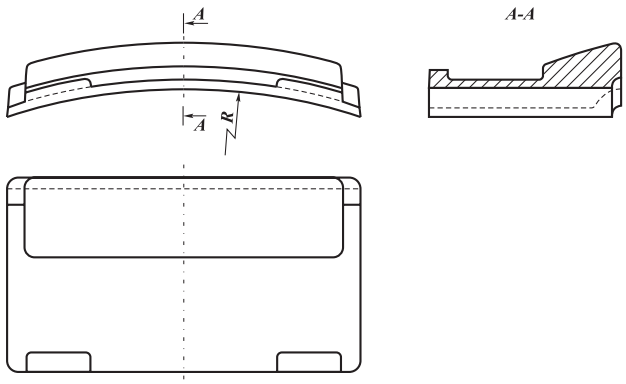


The restrained push-on joint pipes are supplied complete with «TYTON» rubber gaskets and stoppers which should be fixed with metal strip for moving of assembled pipeline string.

Basic dimensions, weight, allowable operating pressure, angular deflection

Dimensions, mm								Allowable operating pressure, MPa	Allowable angular deflection	Pipe weight with socket and cement-mortar lining, kg, effective length L, mm			
DN	DE	S	S_1	l	l_1	$h^{+0,5}_{-1,0}$	$b^{\pm2}$			5800		6000	
600	$635^{+1,0}_{-4,0}$	$9,9^{-1,9}$	$5^{+3,5}_{-2,0}$	120	200	7,0	11,0	3,2	3	888,2	1010,0	916,0	1048,0
700	$738^{+1,0}_{-4,2}$	$10,8^{-2,0}$	$6^{+4,0}_{-2,5}$	150	235	7,0	11,0	2,5	2	1129,0	1314,0	1164,0	1355,0
800	$842^{+1,0}_{-4,5}$	$11,7^{-2,1}$	$6^{+4,0}_{-2,5}$	160	245	7,0	11,0	1,6	2	1403,0	1608,0	1446,0	1658,0
900	$945^{+1,0}_{-4,8}$	$12,6^{-2,2}$	$6^{+4,0}_{-2,5}$	175	260	7,5	11,5	1,6	1,5	1703,0	1934,0	1755,0	1994,0
1000	$1048^{+1,0}_{-5,0}$	$13,5^{-2,3}$	$6^{+4,0}_{-2,5}$	185	270	7,5	11,5	1,6	1,5	2033,0	2288,0	2095,0	2359,0

Stoppers For «RJS» Joint



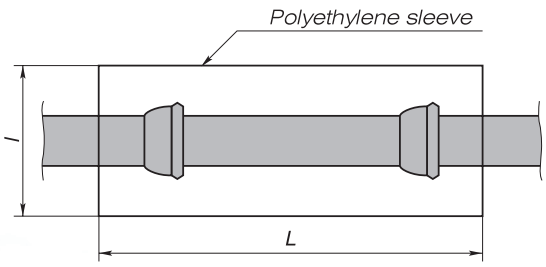
Basic dimensions and weight

DN, mm	R, mm	Quantity of stoppers, pcs.	Weight of stoppers, kg	
			Weight of one stopper	Weight of set for one joint
600	317,5	10	3,3	33
700	369,0	10	4,6	46
800	421,0	10	6,0	60
900	472,5	13	6,8	88
1000	524,0	14	8,2	115

Polyethylene Sleeve

Basic dimensions

Nominal bore of the pipe, mm	L, mm	l*, mm
80	6600	300
100	6600	300
125	6600	400
150	6600	400
200	6600	600
250	6600	600
300	6600	800
350	6600	850
400	6600	950
500	6600	1150
600	6600	1300
700	6600	1600
800	6600	1800
900	6600	2200
1000	6600	2200



* – Width of the sleeve in a flat (folded twice) condition.

CAST FITTINGS

Characteristics Of Fittings

The fittings are manufactured of ductile iron by casting method and comply with the ISO 2531 requirements.

Main characteristics of the fittings are listed in the table below:Inner Lining

Cement mortar lining is applied to the inner surface of the pipes according to the ISO 4179 requirements.

Outer Coating

The protective coating of bituminous paint is applied on outside surface of fittings.

Marking

The fittings shall bear paint or cast marks at the outside surface indicating:

- manufacturer's mark;
- ductile iron symbol;
- nominal diameter;
- year of manufacture.

Main characteristics of the fittings are listed in the table below:

Parameter	Value
Tensile strength σ_B, not less MPa (kgf/mm^2)	420 (42,8)
Conventional yield point $\sigma_{0,2}$, not under MPa (kgf/mm^2)	300 (30,6)
Breaking elongation, not less, %	5,0
Hardness	Max 250 HB
Pressure test, MPa	1,0 — 2,5

SPECIFIC APPLICATION:
Horizontal Directional Drilling

Application of ductile iron pipes in trenchless technologies, in particular, in horizontal directional drilling.

Horizontal directional drilling is a technology of pipe laying that does not demand trench opening or carrying out works on the ground surface and provide the alternative pipe laying.

It is used when traditional (trench) pipe lying is impossible or limited by the necessity to cross natural (rivers, gullies, lakes, forests, specific grounds, etc.) or artificial (exclusion zones of power lines, main gas-, oil pipelines, compact planning, railroads, highways, etc.) obstacles.

Mechanical properties of ductile iron pipelines produced by SVOBODNY SOKOL allow using them for trenchless pipe laying. Application of the horizontal directional drilling is specified by the documentation of the Manufacturer.

Range, types and dimensions of fittings are specified by the technical documentation of the Manufacturer.

PIPES SHIPPING SETS AND STORAGE

Pipes and fittings are furnished with stoppers (for «RJ» and «RJS» joints) and rubber gaskets designed for water supply systems, the material of the rubber gaskets is approved by the Federal Supervision Agency for Customer Protection and Human Welfare.

Number of rubber gaskets required for 1 km of pipes: 167 pieces.

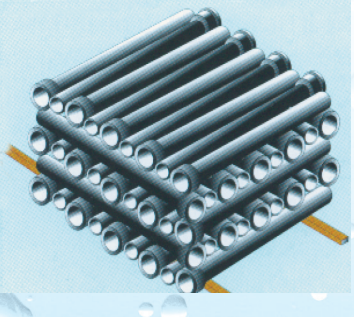
Pipe Storage

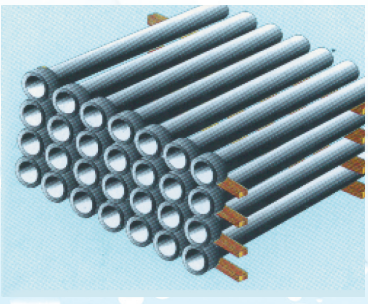
1. The pipe storage area should be flat.
2. Before pipes go into stock they should be inspected and, if some damage (damage of inner or outer coating) is found it has to be fixed.
3. Pipes are in stacked according to diameter and to the stock plan
4. The time the pipes are in stacks should be reduced to a minimum.
5. Crane hook for pipe handling should be covered with protection (e.g. rubber) to avoid breaking of the inner lining.
6. Wooden spacers used for stacking should be straight and of good quality.
7. Pipes can be stored on special shelves preventing rolling and damaging of pipes.
8. The stack height should not exceed 2.5 m at storage.

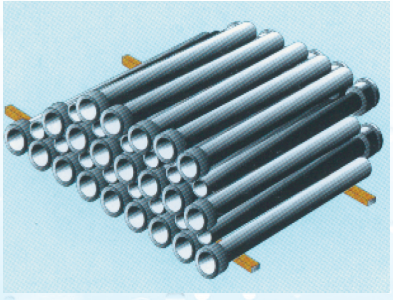
Rubber Gaskets Storage

The rubber gaskets should be stored under the following conditions:

1. Conditions of rubber gaskets storage should prevent any kind of their deformation. Temperature of rubber gaskets storage should be lower than 0° and not exceeding 35°C at a distance 1 meter from heaters.
2. Rubber gaskets should be protected from direct sunlight, artificial light with high UV share and substances destroyed rubber. Ozone is especially harmful for rubber gaskets, so in the storage room there should be no equipment generating ozone or powerful electrical equipment which could provoke appearance of electric sparks or slow electrical discharge.
3. It is allowed to store rubber gaskets in unheated warehouses, at a temperature not under 40°C, preventing all kinds of deformation. After storage at negative temperatures, rubber gaskets should be kept minimum 24 hours at a temperature (20±5)°C before mounting.







ASSEMBLING PIPES AND FITTINGS

Prior to beginning of installation works the inner surface of the pipe and fittings (especially the circular slot for the ring) and the outside surface of the straight end of the pipes and fittings should be cleaned from dirt and foreign objects before putting the pipes to the trench.

Pipes and fittings should be held with special devices when lowering into the trench, so that any damage at the grip spot could be avoided and the item do not hit each other and other objects.

When assembling a pipe with fittings it is necessary to strictly observe the designed contour of the pipeline.

Connection of pipes and fittings is sealed with a rubber gasket, due to its radial compression in the socket-joint circular slot.

Insertion depth of the pipe spigot into the socket is marked for «Tyton» joint. «RJ» and «RJS» joints are not marked.

The rubber gasket is inserted in the circular slot; the accuracy position should be checked.

The outside surface of the straight pipe end up to the special mark, and the inner surface of the rubber gasket are greased. It is necessary to avoid grease getting under the outer surface of rubber gasket.

The fitting to be installed is brought to the pipe laid before, centered against the conical surface of the rubber gasket and inserted into the socket up to the special mark with the help of the installation tools or pointed rabble (if the pipe diameter is small). The figure on page 21 shows mounting devices for pipe connection.

When the mounting device force is relieved the mounted fitting goes 5 to 7 mm back. If the fitting goes further, it is necessary to check the distance between the socket and the rubber gasket end, the distance should be constant along the whole perimeter. Irregular distance indicates that the rubber gasket is pushed out from the socket slot, so it is necessary to repeat the mounting, otherwise the joint will leak at pressure test.

When assembling pipes with RJ joint after connection it is necessary to:

1. Insert the right stopper in the socket slot and move it to the right up as far as it will go;
2. Insert the left stopper (with the retaining wire) in the socket slot and move it to the left as far as it will go;
3. Bend the retaining wire into the socket slot.

The laid pipeline with the RJ joint is capable of axial elongation in the joint due to the technological gap between the welded roll and the lug in the socket part of the pipe.

If elongation has to be avoided by all means it is necessary to stretch the pipeline in the process of laying, section by section, with the help of the rope.

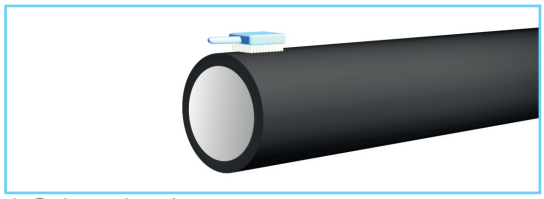
The laid pipes can be disconnected if necessary. First the stoppers are removed then the pipes are pulled out either manually or with the help of a rack jack and a built-up yoke. When reconnecting use new rubber gasket.

Pipes assembling with «RJS» and «RJ» joints is similar.

When pipes are shortened at the site it is necessary to round the straight pipe end or to make a 5x30° facet.

ASSEMBLING PIPES AND FITTINGS

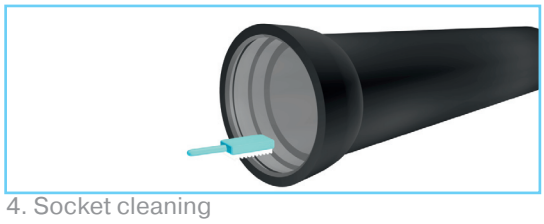
Assembling Of The Push-In System Joint «Tyton»



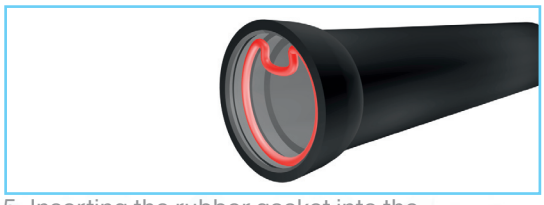
1. Spigot cleaning

2. Insertion special mark on the straight pipe end

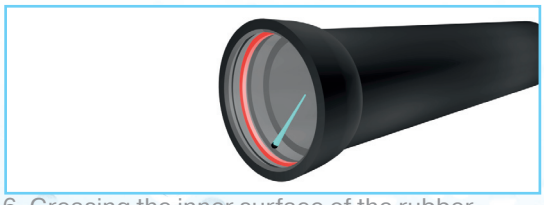
3. Greasing of the outside surface of the straight pipe end



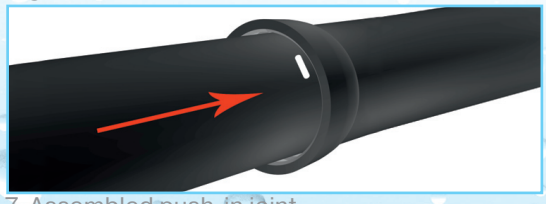
4. Socket cleaning



5. Inserting the rubber gasket into the socket

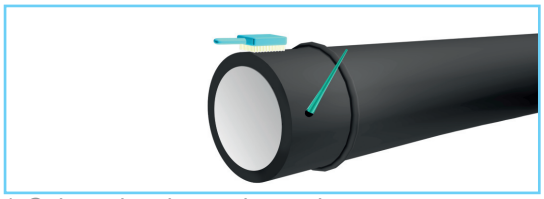


6. Greasing the inner surface of the rubber gasket

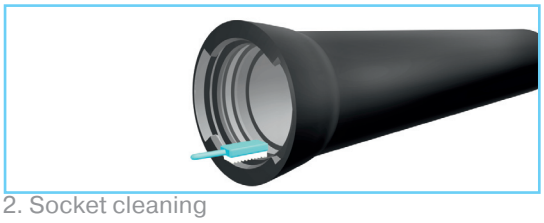


7. Assembled push-in joint

Assembling Of The «RJ» Joint

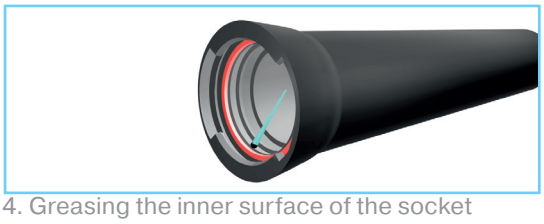


1. Spigot cleaning and greasing

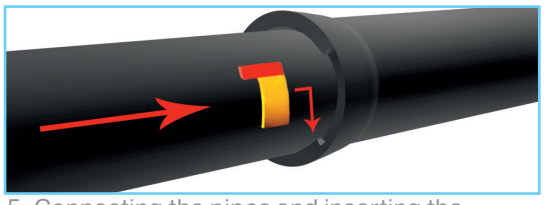


2. Socket cleaning

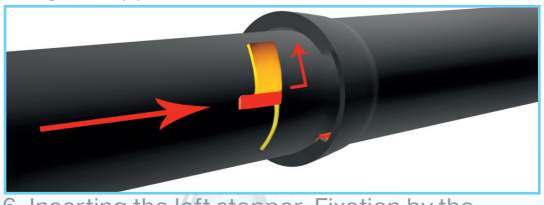
3. Inserting the rubber gasket into the socket



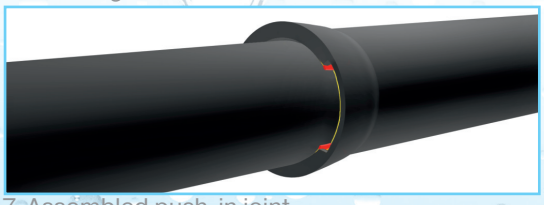
4. Greasing the inner surface of the socket



5. Connecting the pipes and inserting the right stopper

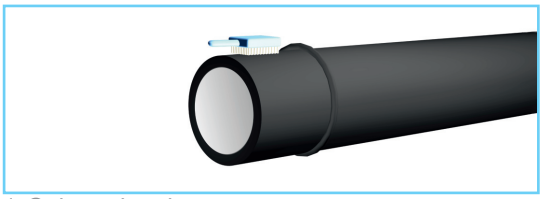


6. Inserting the left stopper. Fixation by the retaining wire

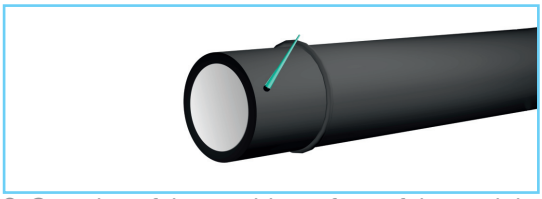


7. Assembled push-in joint

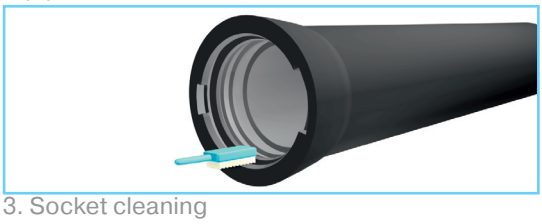
Assembling Of The «RJS» Joint



1. Spigot cleaning

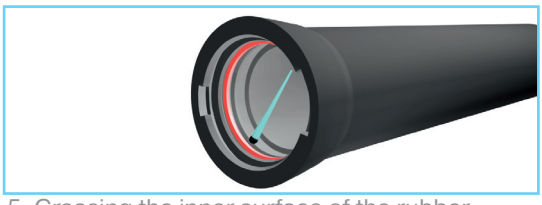


2. Greasing of the outside surface of the straight pipe end

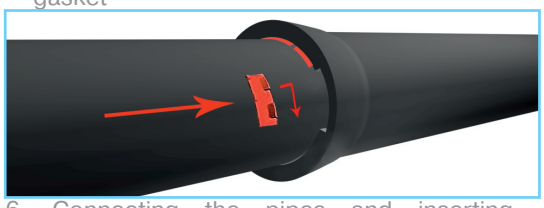


3. Socket cleaning

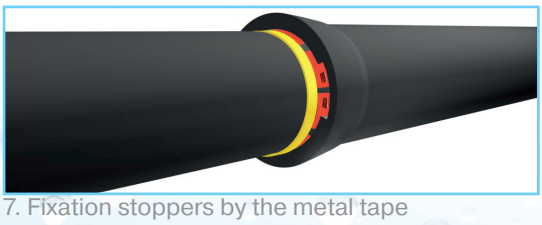
4. Inserting the rubber gasket into the socket



5. Greasing the inner surface of the rubber gasket

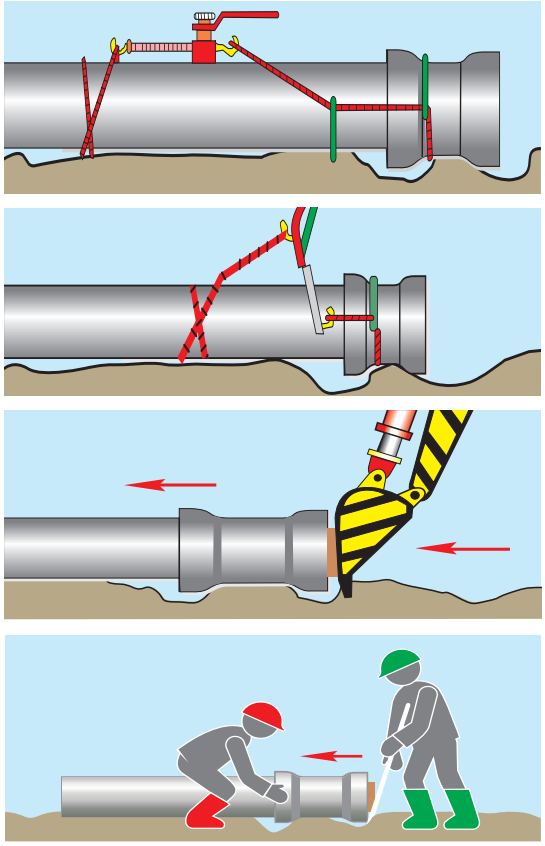


6. Connecting the pipes and inserting stoppers



7. Fixation stoppers by the metal tape

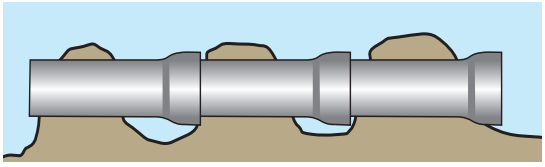
Mounting Devices For Pipe And Fitting Assembly



Filling Of The Pipeline Trenches

The pipeline covering should be done in two steps – partial covering before the preliminary test and the final covering after the preliminary hydraulic test.

First the filling of pockets and partial covering of the pipes to the height of not less than 0.5 m. is done in layers of 0.15-0.20 m., at the same time levering of the curved pipeline sections is carried out. Joints and sinks must remain open.



Partial covering of the pipeline for hydro testing

The final filling of the trench is done after the preliminary test of the pipeline. Pockets are filled and the joints are covered first, with thorough earth compaction.

MANAGEMENT SYSTEM CERTIFICATION

FIRST QUALITY CERTIFICATION

FQC
FIRST QUALITY CERTIFICATION

CERTIFICATE

This certificate is granted to the organization:

OAO "LIPETSK IRON WORKS" SVOBODNY SOKOL"

1, Zavodskaya Sq. 398007 Lipetsk, Russia

DEVELOPING AND MANUFACTURING OF DUCTILE IRON PIPES, FITTINGS AND SHAPED CASTINGS. PRODUCTION OF FOUNDRY AND PIG IRON

EA 17

according to the scope:

ISO 9001:2008

certifies that the management of the quality management system in accordance with the standards established and implemented.

First Date of Issue	**: 09.04.2013**
Date of Issue	**: 09.04.2013**
Certificate Period	**: 3 Years**
Reissue Date	**: 08.04.2014**
Certificate No	**: 01.13.3813.8608.D**

First Quality Certification
System Certification Approved
İstanbul, 2013.04.09

Deutscher Akkreditierungs Rat
DAR
TGA-ZM-13-08-00

FQC Uluslar Arası Belgelendirme ve Eğitim Hizmetleri Limited Şirketi
Hanımeli Caddesi Prestij İş Merkezi No:10 Kat:7 Zümrütevler - Maltepe / İSTANBUL / TÜRKİYE T: 444 2 141 / +90 216 457 69 08 F: +90 216 457 98 69
Bu belge, müşterinin FQC'nin kurallarına ve sözleşme şartlarına uyduğu sürece geçerlidir. Sertifika geçerlilik durumu FQC internet sitesinden takip edilebilir.
www.fqcert.com info@fqc.com.tr

FIRST QUALITY CERTIFICATION

FQC
FIRST QUALITY CERTIFICATION

CERTIFICATE

This certificate is granted to the organization:

OAO "LIPETSK IRON WORKS" SVOBODNY SOKOL"

1, Zavodskaya Sq. 398007 Lipetsk, Russia

DEVELOPING AND MANUFACTURING OF DUCTILE IRON PIPES, FITTINGS AND SHAPED CASTINGS. PRODUCTION OF FOUNDRY AND PIG IRON

EA 17

according to the scope:

OHSAS 18001:2007

certifies that the OSH management system in accordance with the provisions of the standard are developed and implemented.

First Date of Issue	**: 09.04.2013**
Date of Issue	**: 09.04.2013**
Certificate Period	**: 3 Years**
Reissue Date	**: 08.04.2014**
Certificate No	**: 03.13.3813.3731**

First Quality Certification
System Certification Approved
İstanbul, 2013.04.09

FQC Uluslar Arası Belgelendirme ve Eğitim Hizmetleri Limited Şirketi
Hanımeli Caddesi Prestij İş Merkezi No:10 Kat:7 Zümrütevler - Maltepe / İSTANBUL / TÜRKİYE T: 444 2 141 / +90 216 457 69 08 F: +90 216 457 98 69
Bu belge, müşterinin FQC'nin kurallarına ve sözleşme şartlarına uyduğu sürece geçerlidir. Sertifika geçerlilik durumu FQC internet sitesinden takip edilebilir.
www.fqcert.com info@fqc.com.tr

FIRST QUALITY CERTIFICATION

FQC
FIRST QUALITY CERTIFICATION

CERTIFICATE

This certificate is granted to the organization:

OAO "LIPETSK IRON WORKS" SVOBODNY SOKOL"

1, Zavodskaya Sq. 398007 Lipetsk, Russia

DEVELOPING AND MANUFACTURING OF DUCTILE IRON PIPES, FITTINGS AND SHAPED CASTINGS. PRODUCTION OF FOUNDRY AND PIG IRON

EA 17

according to the scope:

ISO 14001:2004

to certify that Enviromental Management System in accordance with standard's clauses is established and being implemented.

First Date of Issue	**: 09.04.2013**
Date of Issue	**: 09.04.2013**
Certificate Period	**: 3 Years**
Reissue Date	**: 08.04.2014**
Certificate No	**: 02.13.3813.5197.D**

First Quality Certification
System Certification Approved
İstanbul, 2013.04.09

Deutscher Akkreditierungs Rat
DAR
TGA-ZM-13-08-60

FC Belgelendirme ve Eğitim Hizmetleri Limited Şirketi
Hanımeli Caddesi Prestij İş Merkezi No:10 Kat:7 Zümrütevler - Maltepe / İSTANBUL / TÜRKİYE T: +90 216 444 2 141 / +90 216 457 69 08 F: +90 216 457 98 69
Bu belge, müşterinin FQC'nin kurallarına ve sözleşme şartlarına uyduğu sürece geçerlidir. Sertifika geçerlilik durumu FQC internet sitesinden takip edilebilir.
www.fqcert.com info@fqc.com.tr

PRODUCT CERTIFICATION

dwi

guardians of drinking water quality

DRINKING WATER INSPECTORATE
Area 4a, Ergon House
Horseferry Road
London SW1P 2AL
Direct Line: 0300 068 6403
Enquiries: 0300 068 6400
Facsimile: 0300 068 6401

E-mail: Joanna.hunt@defra.gsi.gov.uk
DWI Website: http://www.dwi.gov.uk

OAO Lipetsk Iron Works "Svobodny Sokol"
Zavodskaya Sq., 1
Lipetsk
Russia
398007

Date 18th July 2011

Dear Mr Minchenkov

APPROVAL GIVEN UNDER REGULATION 31(4)(a) OF THE WATER SUPPLY (WATER QUALITY) REGULATIONS 2000 No. 3184 & THE WATER SUPPLY (WATER QUALITY) REGULATIONS 2001 (WALES) No.3911

We are pleased to enclose the "Product Approval Confirmation" for your product for use in England and Wales. The Drinking Water Inspectorate advises both the Secretary of State for Environment, Food and Rural Affairs (DEFRA), and the National Assembly of Wales (collectively referred to as "the Authorities") on the approval of products used in the provision of public water supplies.

This approval is given on the basis that there is no objection on health grounds to the use of this product in the provision of public water supplies. Approval does not include consideration of fitness for purpose of the product, and cannot be taken as a favourable assessment of the performance or technical merits of it. This approval relates only to the product described in the "Product Approval Confirmation" when it is used in accordance with the "Conditions of use and approval" specified in that document; failure to comply with these or any other condition of approval could lead to revocation of approval. This approval is valid for 5 years.

You are **not** authorised to use either the Inspectorate's logo or that of DEFRA in advertisements of any other literature relating to the approved product. Since this approval is given by the Authorities, you should not refer to approval by the Drinking Water Inspectorate. Advice on acceptable claims for your approved product is given on our website - http://www.dwi.gov.uk/31/pdf/FAQ2.pdf .

Finally it is important that you complete, sign and return the enclosed "Ack
Receipt of Product Approval Confirmation and Conditions of Use" as soon a
cannot add your product to the "List of Approved Products for use in Public
United Kingdom" until this is received. Upon receipt full details of your pro
the Scottish Government and the Department for Regional Development, N
they can review your product for approval in their respective parts of the U

Yours sincerely

Joanna Hunt
Inspector

Department for Environment, Food and Rural Affairs

Home Page: www.dwi.gov.uk
E mail: dwi.enquiries@defra.gsi.gov.uk

ACCREDIA

CERTIFICAZIONE DI PRODOTTO
PRODUCT CERTIFICATION

ICIM

CERTIFICATO N° / CERTIFICATE N° **008CO/0**

PER LA CONCESSIONE DEL DIRITTO DI USO DEL MARCHIO DI CONFORMITA' ICIM / FOR THE AUTHORIZATION TO USE ICIM MARK OF CONFORMITY

ALL'AZIENDA / TO THE FIRM

OAO Lipetskii Metallurgicheskii Zavod "SVOBODNY SOKOL" (OAO Lipetsk Iron Works "SVOBODNY SOKOL")
1, Zavodskaya Sq., Lipetsk, 398007, Russia

UNITA' OPERATIVE / OPERATIVES UNITS

PER I SEGUENTI PRODOTTI / FOR THE FOLLOWING PRODUCTS

TUBI, RACCORDI E ACCESSORI DI GHISA SFEROIDALE E LORO ASSEMBLAGGI PER CONDOTTE D'ACQUA
DUCTILE IRON PIPES, FITTINGS, ACCESSORIES AND THEIR JOINTS FOR WATER PIPELINES

CON DENOMINAZIONE COMMERCIALE / WITH TRADE NAME/S

"TYTON PUSH-ON JOINT"

Giunti elastici automatici da DN80 a DN1000, guarnizioni "Tyton" in accordo ad EN681-1 tipo WA+WC, rivestimento di zinco in accordo ad ISO 8179-1; rivestimento di malta in accordo a ISO 4179

Push-in flexible joint from DN80 to DN1000, "Tyton" seals in accordance to EN681-1 type WA+WC, Metallic zinc coating with finishing layer in accordance with ISO 8179-1, cement mortar, in accordance to ISO 4179

Classi di Pressione / Pressure classes		
Da / From DN 80 a / to DN 300	Da / From DN 350 a / to DN 600	Da / From DN 700 a / to DN 1000
C40	C30	C25

"RJ" PUSH-ON JOINT WITH RESTRAINING SYSTEM

ni elastici anti sfilamento da DN80 a DN500, guarnizioni "Tyton" in accordo ad EN681-1 tipo WA+WC, rivestimento di zinco in accordo ad ISO 8179-1, rivestimento di malta in accordo a ISO 4179

ained flexible joint from DN80 to DN500, "Tyton" seals in accordance to EN681-1 type WA+WC, Metallic coating with finishing layer in accordance with ISO 8179-1, Cement mortar, in accordance to ISO 4179

Classi di Pressione / Pressure classes	
Da / From DN 80 a / to DN 300	Da / From DN 350 a / to DN 500
C40	C30

CONFORMEMENTE ALLA NORMA ED AL DOCUMENTO NORMATIVO ICIM
IN COMPLIANCE WITH THESTANDARD AND WITH ICIM NORMATIVE DOCUMENT

UNI EN 545:2010 - ISO 2531:2009 - ICIM 70R050-8

CON CLASSIFICAZIONE / WITH CLASSIFICATION

Emissione corrente / Current issue: 15/02/2013
Data di scadenza / Expiring date: 01/02/2014
ICIM S.p.A.

Our Ref: HL/M120217
Test Report: MA4476/D

WRAS
Water Regulations Advisory Scheme

1st March 2013

OAO Lipetsk Iron Works 'Svobodny Sokol',
1 Zavodskaya Sq.
Lipetsk,
398007,
Russia

WATER REGULATIONS ADVISORY SCHEME (WRAS)
MATERIAL APPROVAL

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS 6920-1:2000 'Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

FACTORY APPLIED PIPE & FITTING COATINGS **5030**

SPCML. Factory applied, grey coloured, Portland slag cement-based mortar lining. Mix and apply as per manufacturer's instructions. Cure for 8 hours at 60°C – 70°C. For use with water up to 60°C.

APPROVAL NUMBER: 1206544
APPROVAL HOLDER: OAO LIPETSK IRON WORKS 'SVOBODNY SOKOL'

The Scheme reserves the right to review approval. This approval is valid between June 2012 and June 2017.

An entry, as above, will accordingly be included in the Water Fittings Directory on-line under the section headed, "Materials which have passed full tests of effect on water quality".

The Directory may be found at: www.wras.co.uk/directory

Yours faithfully

Jason Furnival
Approvals & Enquiries Manager
Water Regulations Advisory Scheme

Water Regulations Advisory Scheme Ltd, 20 Fern Close, Pen-Y-Fan Industrial Estate Cwmbrân, Gwent, NP11 3EH
Tel: +44 (0) 333 207 0330. Fax: +44 (0) 1495 249 040
Email: info@wras.co.uk. Website: www.wras.co.uk

The Water Regulations Advisory Scheme Ltd Registered in England No. 3486950
Registered Office: 1 Queen Anne's Gate, London, SW1H 9BT

DVGW CERT

DVGW-Baumusterprüfzertifikat
DVGW type examination certificate

Anwendungsbereich *field of application*	Produkte der Wasserversorgung *products of water supply*
Zertifikatinhaber *owner of certificate*	Polskie Produkty Plus Sp. z o.o. ul. Serbska 6B/18, PL-61-696 Poznan
Vertreiber *distributor*	Polskie Produkty Plus Sp. z o.o. ul. Serbska 6B/18, PL-61-696 Poznan
Produktart *product category*	Guss- und Stahlrohre für erdverlegte Leitungen: Rohre aus duktilem Gusseisen (7801)
Produktbezeichnung *product description*	Rohre aus duktilem Gusseisen für die Trinkwasserversorgung
Modell *model*	Ductile Iron Pipes "Svobodny Sokol"
Prüfberichte *test reports*	Baumusterprüfung: 11 003749 vom 20.09.2011 (MPG) KTW-Prüfung: C-157354-07-Ko/st vom 07.12.2007 (WHY) Mikrobiologische Prüfung: W-163906-07-SI vom 14.08.2007 (WHY) KTW-Prüfung: C-172063-Ä-09-Ko vom 06.01.2009 (WHY) Mikrobiologische Prüfung: W-169256-08-SI vom 23.10.2008 (WHY)
Prüfgrundlagen *test basis*	DVGW GW 337-P (01.09.2010) DIN EN 545 (01.12.2010) DVGW W 347 (01.04.2006) DVGW W 348 (01.09.2004) BGA KTW (07.01.1977) DVGW W 270 (01.11.2007)
Ablaufdatum / AZ *date of expiry / file no.*	20.09.2016 / 09-0201-WNE

06.10.2011 [illegible]
Datum, Beamtenzeichen, Leiter Technical Certification, Ausstellungsstelle
date, issued by, sheet, head of certification body

DVGW CERT GmbH ist von der DAkkS nach DIN EN 45011:1998 akkreditierte Stelle für die Zertifizierung von Produkten der Energie- und Wasserversorgung.

DVGW CERT GmbH is an accredited body by DAkkS according to EN 45011:1998 for certification of products for energy and water supply industry.

DAkkS Deutsche Akkreditierungsstelle D-ZE-16028-01-01

DVGW-CERT GmbH
Josef-Wimmer-Straße 1-3
53123 Bonn
Telefon: +49 228 91 88-888
Telefax: +49 228 91 88-993
eMail: info@dvgw-cert.com

DNV

DET NORSKE VERITAS

CERTIFICATE OF COMPLIANCE

CERTIFICATE No. **STP-10-00202**

This is to certify that

ings and accessories with automatic push-on joint (TYTON) DN 80mm, DN 150mm, DN 200mm, DN 250mm, DN 300mm, DN 350mm, DN 400mm, mm, DN 600mm, DN 700mm, DN 800mm, DN 900mm, DN 1000 mm;

Ductile Iron pipes, fittings and accessories with restrained push-on joint (RJ) DN 80mm, DN 100mm, DN 125mm, DN 150mm, DN 200mm, DN 250mm, DN 300mm, DN 350mm, DN 400mm, DN 500mm
Ductile Iron pipes, fittings and accessories with restrained push-on joint (RJS) DN 80mm, DN 100mm, DN 125mm, DN 150mm, DN 200mm, DN 250mm, DN 300mm, DN 350mm, DN 400mm, 450 mm, DN 500mm, DN 600mm, DN 700mm, DN 800mm, DN 900mm, DN 1000 mm;

Manufactured by

OAO Lipetskii Metallurgicheskii Zavod (Lipetsk Iron Works) "Svobodny Sokol"
1, Zavodskaya Sq., Lipetsk, 398007, Russian Federation

Is found to comply with

requirements of the Standard EN 598:2007+ A1:2009

Application:

pipelines for sewerage applications

Place and date
St. Petersburg, 2010-09-02

This Certificate is valid until
2014-09-01

for DET NORSKE VERITAS AS

Dag Eberhardson
Country Manager

Local Office
DNV St.Petersburg

Vladimir Karklin
Senior Surveyor

OOO «LIPETSK PIPE COMPANY
«SVOBODNY SOKOL»

1, Zavodskaya Sq., Lipetsk, Russia, 398007

Export Sales Department

Tel.: +7 (4742) 42-33-20
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Fax: +7 (4742) 35-27-88

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komdir@svsokol.lipetsk.ru

www.ltk.svsokol.ru