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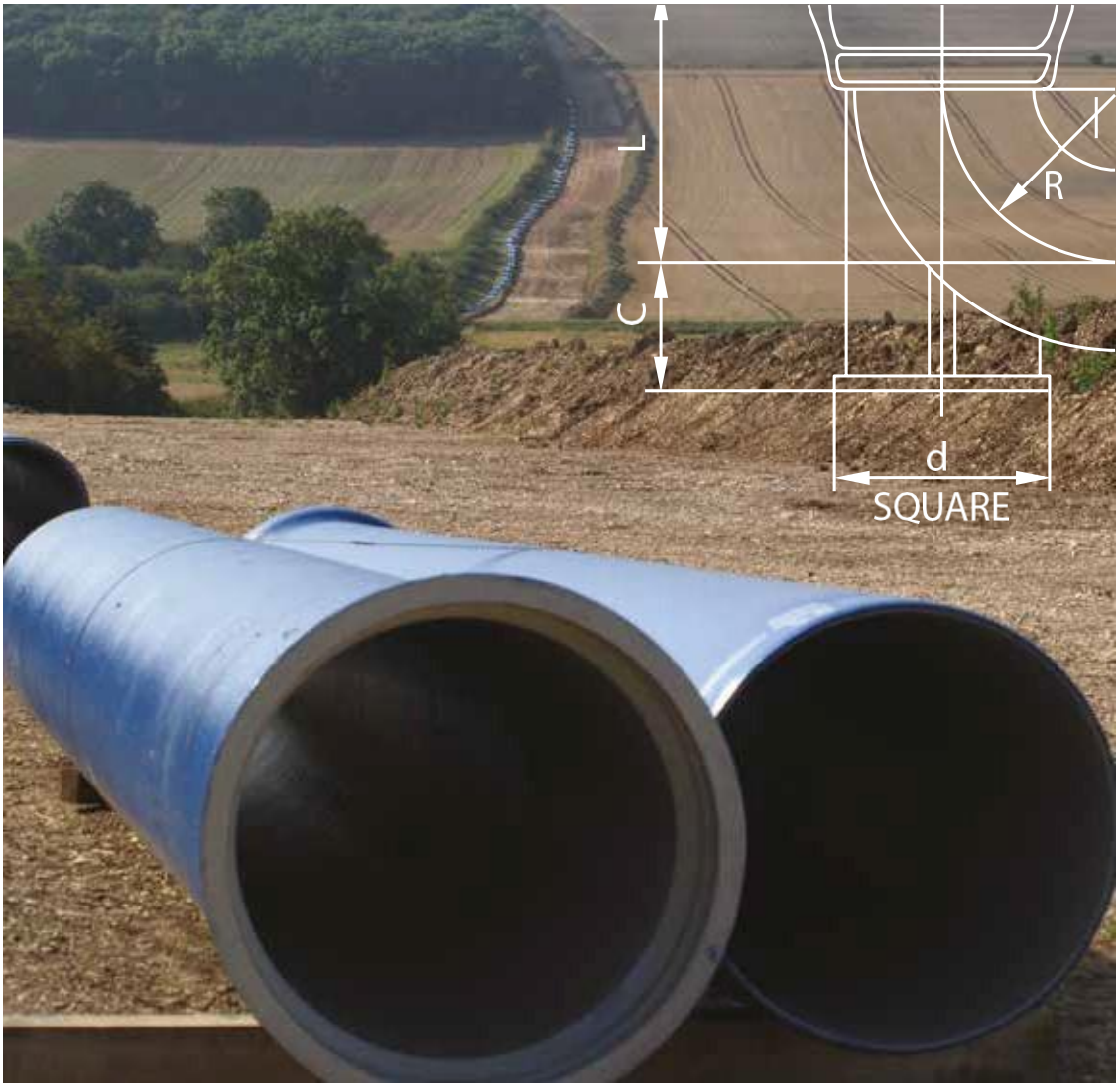
Official **Suppliers of:**

ELECTROSTEEL

Ductile Iron Pipes and Fittings

Carrying life to people

Safe drinking water for all









Electrosteel Castings Ltd

Welcome

Thank you for your interest in Electrosteel Castings (UK) Ltd. We are a leading manufacturer of Ductile Iron Pipes, Fittings and Ancillary Pipeline Products, and we supply to companies all around the globe. Our products fully comply with the many international and European standards for conveyance of potable drinking water, raw water and waste water.

We pride ourselves on providing a tailor-made solution that will meet your requirements, whatever the size or nature of your project.

Working closely with the rest of the Electrosteel family, Electrosteel UK have the ability to manufacture, source, and consolidate product packages enabling our customers to have a single point of responsibility for the management and delivery of the materials ordered. This in turn ensures effective, on-time project completion and peace of mind.



Contents Page

Contents

Company Profile

Electrosteel Profile	4
Quality Assurance	5
Quality Accreditations	6
Electrosteel Worldwide	7-8

Product Ranges

Ductile Iron Properties	9
Product Ranges	10
Applications	11
Various Joining Systems	12 - 15
Pipe Dimensions	16 - 17
Ductile Iron Fittings	18 - 33
External Protection	34 - 35
Internal Protection	36 - 37

Other

Relevant Standards	38
Establishments	39



Company Profile

Electrosteel Castings (UK) is part of a company that has been engaged in the water infrastructure business for over fifty years. We cater to a large customer base in the UK, the Indian subcontinent, Southeast Asia, the Middle East, Europe, Africa, and the USA. We have fulfilled more than 10,000 water supply projects in which our ductile iron spun pipes and fittings were implemented.

We manufacture and supply a range of quality ductile iron pipes, fittings, steel fabrications, and ancillary products which conform to International and European standards for the conveyance of potable drinking water, raw water, and sewage. Whatever the size or nature of the project, we can provide tailor-made solutions to meet any requirements. Our ability to manufacture, source, and consolidate product packages is what enables our customers to have a single pointof responsibility for the management and delivery of the materials requiredto ensure the effective, on-time completion of any project.

Whatever the size or nature of the project, we can provide tailor-made solutions to meet any requirements.

Environment and Energy Management

We are committed to corporate social responsibility. Throughout the company we employ an environment and energy strategy that has been implementedalongside the corporate social responsibility policy.

Our facilities are constantly monitored in order to find ways to reduce pollution and energy consumption levels.



Quality Assurance

By operating to an ISO 9001:2008 Quality Management System, we remain committed to providing products and services which meet customer expectations and needs. We aspire to a process of continuous improvement in all activities throughout the business, which we aim to achieve through teamwork, training, and motivation – we involve our employees in formulating and fulfilling quality objectives for all of the functions and processes we undertake. We also perform frequent reviews to ensure that our quality policy and objectives remain current and relevant to the requirements of the company and our customer base.

Quality Accreditations

UK

France

Germany

EU

Electrosteel in Europe

Recognising the European market's need for a competitive supplier base, we operate established subsidiary companies in the UK, France and Spain. We supply products into many other European markets through these subsidiaries.

In order to service the UK market, Electrosteel UK provides a full service package that includes:

- Comprehensive stock holding of pipes, fittings and flanged pipe
- 'Fast track' manufacture of flanged pipe 'specials'
- Technical advice at the design stage
- Full after-sales support for the product

As part of our strategic European business unit, Electrosteel UK is able to call on the resources and support of its sister companies

Electrosteel Worldwide

We export and supply ductile iron pipes and fittings throughout the world. As well as the UK and India, we have subsidiaries in France, Spain, Italy, Germany, Singapore, Algeria, Abu Dhabi, and the USA. Our supply and distribution network allows us to supply pipes andfittings to local and neighbouring countries from our consistently well-supplied stockyards.

As part of our exceptional service, we offer technical advice at the design stage and later full after sales support to all our customers.



Quality Checks at Every Stage of Manufacturing

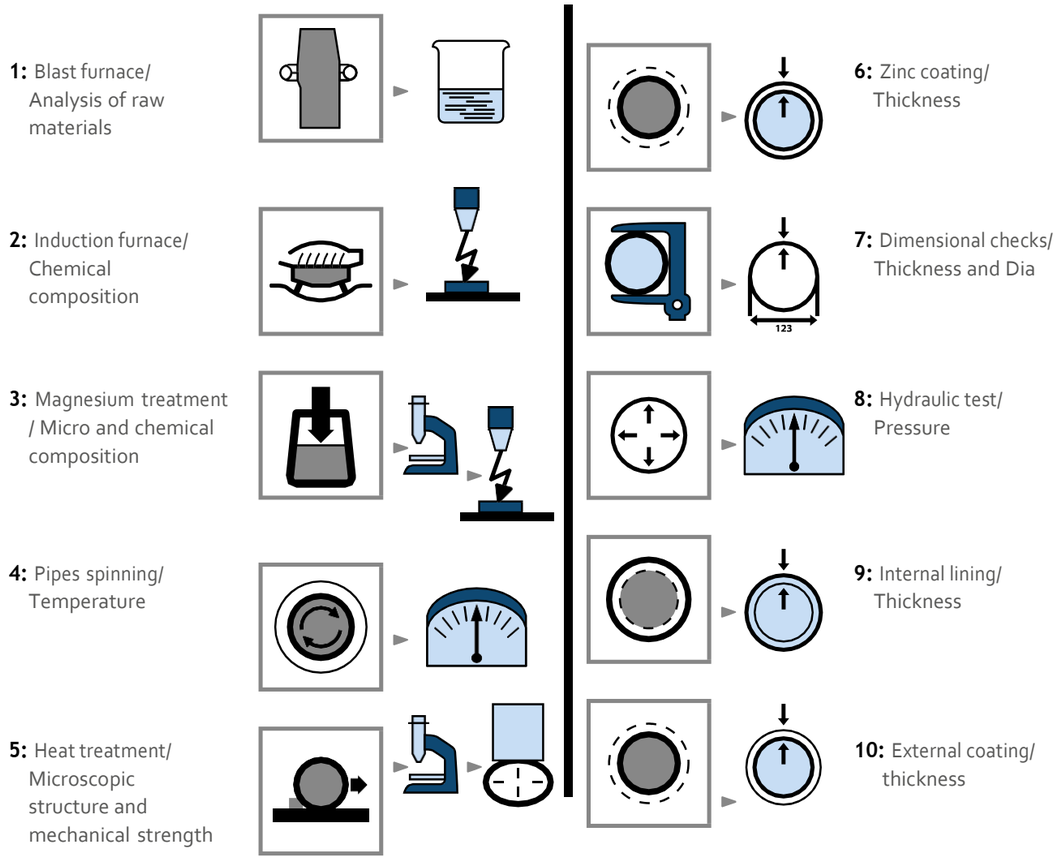
A strict selection of raw materials is an indispensable requirement for production of quality ductile iron pipes and fittings. Electrosteel endeavours to achieve 'quality right the first time' with strict quality control on raw material selection and procurement.

Electrosteel has a Mini Blast Furnace (MBF) at its plant at Khardah using TKES technology, which produces liquid metal suited to the manufacture of ductile iron pipes. The liquid metal is further processed and superheated in induction furnaces. It is then treated with magnesium for nodularisation and transferred to the centrifugal spun casting machine.

Following this, the pipes are then heat treated and hydrostatically tested. Various types of coatings and linings are applied depending on soil corrossivity and aggressivity of the fluid to be transmitted. Special coatings and linings like PU coating or ceramic linings are also available. The in-process inspection and quality control at all points during the production cycle is strictly maintained and documented as per ISO 9001 quality systems.

Electrosteel endeavours to achieve 'quality right the first time' with strict quality control on raw material selection and procurement.

Process / Test



Quality



Ductile Iron - Properties

Ductile cast iron is a material with substantially improved mechanical properties of cast iron. Its minimum elongation of 10% before failure offers adequate strength to bear traffic and top load without being brittle.

Ductile iron pipes are very robust: can withstand mechanical stress and physical abuse, work in unfavourable terrain and operating conditions, and work without failure resulting in a very long service life.

Properties	Ductile Iron Pipes
Tensile Strength	Min. 420 MPa
Elongation (min) at break	10%
Coefficient of Thermal Expansion	$11x10^{-6}$ per °C
Modulus of Elasticity	$1.7x10^{10} kg/m^2$
Hardness	Max. 230 BHN
Density	$7050 kg/m^3$
Bending/Beam Strength	Over 200 MPa
Bursting Strength (min)	Factor of Safety against Bursting is 8 to 10.



Product Range

Electrosteel produces pipes and fittings in the range DN80mm - DN1000m in accordance with the following standards:

- ISO 2531 / EN 545 for water
- ISO 7186 / EN 598 for sewerage
- IS 8329 / IS 9523 for water and sewerage
- AWWA C151



Range of Pipes

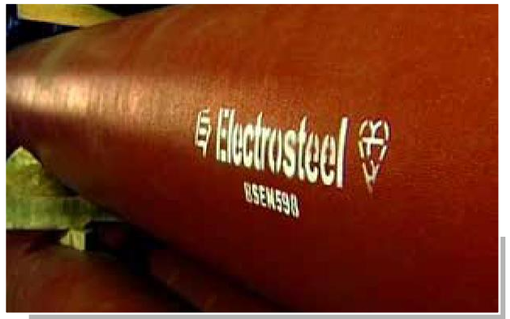
- Socket and spigot pipes with flexible push-on joint pipes
- Restrained flexible joint pipes
- Flange pipes
- Piling pipes



Range of Fittings

Electrosteel produces comprehensive range of fittings and ancillaries including:

- Push on joint socketed fittings
- Flanged fittings
- Rotating flange fittings
- Restrained joint fittings



Our Brands

- Electrofresh pipes and fittings for potable water
- Electrofresh Plus pipes and fitting for potable water
- Electrolock Joint double socket anchored joint
- Electrotuff ceramic covered with epoxy seal coat

Applications

- Raw and clear water transmission (pumping and gravity main)
- Distribution network of potable water

- Water supply for industrial/process plant application
- Ash-slurry handling and disposal system
- Fire-fighting systems – on-shore and off-shore
- Desalination plants

- Sewerage and waste water force main
- Gravity sewerage collection and disposal system
- Storm water drainage piping
- Effluent disposal system for domestic and industrial application
- Recycling system

- Piping work inside water and sewage treatment plants
- Vertical connection to utilities and reservoirs

- Piling for ground stabilisation
- Protective piping under major carriageways







Jointing Systems

Push-on Joint

Socket and Spigot Push-on Joints

The socket and spigot push-fit joint is a simple male-female flexible joint that uses the compression of a synthetic rubber gasket to provide the watertight seal. The simplicity of the joint, coupled with its flexible nature, accommodates angular defection and some longitudinal withdrawal without any loss in performance. The design of the gasket incorporatesa hard 'heel' and softer 'bulb' which ensures that gasket compression is achieved without it being displaced upon insertion of the spigot.

Rubber Gaskets

Gaskets are made of EPDM rubber as per ISO 4633/EN 681. These gaskets are approved by the WRAS in the UK for safe use with potable drinking water. For sewerage applications, gaskets made of NBR rubber are supplied.

Jointing Procedure

1. **Clean:** Clean the inside of the socket and outside of the spigot end of the two pipelines to be joined.
2. **Install the gaskets**: Insert the rubber gasket into the groove of the socket.
3. **Lubrication:** Apply a thin layer of lubricant on the visible surface of the gasket and the plain end of the pipe.
4. **Assembly:** Align the two pipes and insert the plain end into the socket.
5. **Check:** Verify that the gasket is correctly seated in the joint by use of a feeler gauge around the entire circumference.





Electrosteel Ductile Iron Pipe Join Designs are Type Tested

Our socket and the rubber gasket design ensures leak-tight joints through Type Tests as per BSEN:545 and ISO: 2531.

Self Restrained Joints

Normal push-on or mechanical joints in ductile iron pipes and fittings do not provide significant restraint against longitudinal separation. Hydraulic thrust forces are created due to changes in direction, reduction in diameter, and operational pressure upon the ends of pipelines. These forces may cause joint separation if anchor blocks or anchoring devices are not placed in the pipeline.

One of the most common methods of providing resistance to thrust forces is the use of concrete thrust blocks. Resistance is provided by transferring the thrust forcethrough the thrust block and into the soil.

In many cases, site conditions do not have sufficient space to construct a concrete thrust block, and the time it takes to cure the concrete can prove prohibitive.

In these instances, Electrosteel offer a range of self-restraining joint systems to replace the use of concrete thrust blocks.

These include:

- **Anchor gaskets**
- **Weldbead restrained**
- **Electrolock restrained joint**

Remember...

- Restrained joints are for underground application.
- All pipes in the pipeline need not be restrained.
- Restrained length depends on soil type, backfill compaction, pipeline profile and working pressure.
- All bends, reducer end blocks and tees with its adjacent restraining lengths are to be restrained joints.
- Joints on both sides of the fittings are to be restrained
- Electrosteel are able to advise on the pipe lengths to be restrained. To discuss please contact our Technical team on + 44 1246 264222

Anchor Gaskets ''Vi' Type

1: Can be used instead of the standard gaskets in thepush-fit joint.

2: Use specially manufactured steel teeth moulded into the gasket.

3: Gasket is installed like the 'normal' gasket.

4: The jointing process is the same as with the standard gasket.

5: Once the joint is made and pressurised, the steel teeth 'bite' into the spigot, and restrict the withdrawal of the spigot from the socket.

6: The specially designed gasket performs the dual role of 'water seal' and 'restraint'.



	Tyton Type Anchor Gaskets		
DN	Max Operating Pressure (PFA)	Max Test Pressure (PEA)	Max Deflection
80	16	24.2	3°
100	16	24.2	3°
150	16	24.2	3°
200	16	24.2	3°
250	16	24.2	3°
300	16	24.2	3°
350	16	24.2	3°
400	16	24.2	3°
450*	16*	24.2*	2°
500*	16*	24.2*	2°
600*	16*	24.2*	2°

**10bar operating & 17 bar test for EN 598 pipework in these DN sizes*

NB Electrosteel cannot be held responsible for any issues arising with anchor gaskets sourced via a third party

Bolted Restrained Joint 'Ve' type

1: Can be used for higher pressure applications.

2. Specially manufactured pipes are required with a factory produced restraining lip, combined with the weldbead applied to the spigot.

3. The joint comprises of a gland ring, split retainer ring, and specially designed 'hook' bolts with nuts and washers.

4. Standard push fit gaskets are used to create the seal.

5. The bolts being 'hooked' over the socket 'lip' hold the gland and the socket together. The weld bead on the connecting pipes spigot cannot pass through retainer ring housed in the gland, ensuring axial movement is maintained between the two pipes.

6. Easy to assemble and disassemble when required.



Nom. Dia	PFA bar	Gland Bolts		Tightening Torque (Nm)		Max Angular* Deflection
		Hole Size	No. of Holes	PRE	Final (Max)	
80	64	25	4	20	100	2.0⁰
100		25	4	20	80	
150	55	25	6	20	60	
200	44	25	8	20	60	
250	39	30	6	20	70	1.5⁰
300	37	30	8	20	60	
350	32	30	8	10	20	
400	30	30	10	10	20	
450		30	12	10	20	
500		30	16	10	30	
600	27	30	20	10	20	
700	25	30	24	10	10	1.0⁰
750	20	30	28	10	30	
800	16	30	30	20	90	
900		30	30	10	30	
1000		30	30	10	10	

* For higher angular deflection please contact the manufacturer

Electrolock Restrained Joint

1: Designed for high pressure applications.

2. Pipes are manufactured with a double chamber socket; one for normal sealing and one for housing the restraining kit.

3. Seal is provided by the normal push-fit gasket whilst restraint is provided by combination of weld bead and locking 'bar'.

4. Normal push-on joint gasket to be used for sealing.

5. After assembly, the sectional locking bars are inserted into the locking chamber. The weld bead on the spigot is there- by locked in place by the locking bars and resists joint separation forces.

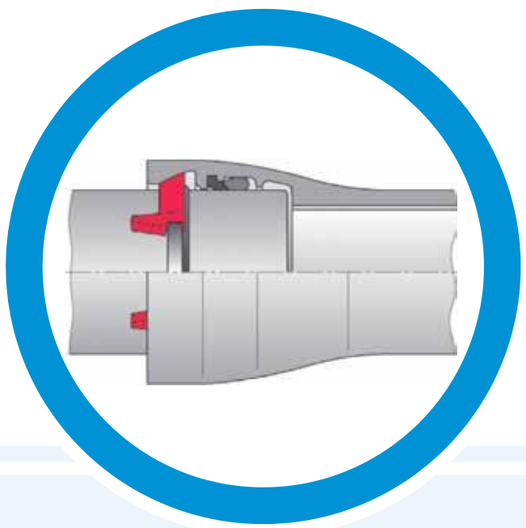
6. Can be used for trenchless applications.

7. Easy to assemble and disassemble when required.

Please contact our Technical team if you are considering this system for snow applications.

Nom. Dia	PFA bar*	No. of Locking Bars/plates	No.of Rubber Segments	Max Angular** Deflection
80	64	2	1	5.0⁰
100	64	4	2	
150	55	4	2	
200	44	4	2	4.0⁰
250	39	4	2	
300	37	4	2	
350	32	4	2	3.0⁰
400	30	4	2	
450	30	8	4	
500	30	8	4	
600	30	8	1 + clamp	
700	30	9	1 + clamp	
800	25	10	1 + clamp	
900	25	11	1 + clamp	
1000	25	12	1 + clamp	

*/**For higher pressure or angular deflection please contact the manufacturer







Flanged Joint

Generally used in above-ground applications such as treatment and process pipework, the flanged joint is a rigid assembly.

1. Acts as a self-restrained joint reducing the requirement of thrust blocks.
2. Ideal for over-ground and exposed installations.
3. Flanged pipes are ideal for vertical pipelines.
4. Used for temporary installations (over pillars) where pipelines need to be disengaged or displaced.
5. Widely used for interconnection in pump houses and treatment plants.

Type of Pipe	Dia. Range and Lengths	PN Ratings
WELDED FLANGED PIPES		
Flanges are welded on either side of a ductile pipe barrel	From 80 to 1000mm diameter, in lengths up to 5.3m.	PN 10, PN 16, PN 25, PN 40
CAST FLANGED PIPES		
Flanged Pipe is cast as a single unit using advanced Lost Foam method.	From 80 to 700 mm diameter, in lengths up to 1.2m.	PN 10, PN 16, PN 25, PN 40

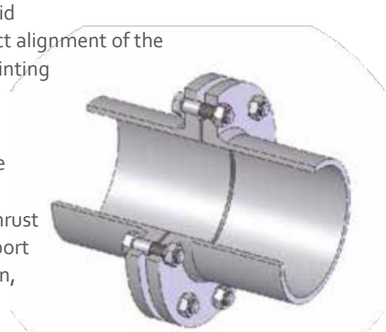
Joint Procedure

- Properly align the pipes.
- Cleanse flange faces by removing rust and dirt.
- Position the gasket, use 3mm thick moulded rubber gaskets with quality conforming to ISO 4633.
- Use lubricated bolts during installation.
- Insert the nut-bolts one by one. Tighten the diametrically opposite bolts to the recommended torque.
- If necessary, re-tighten bolts before pressure testing.

We manufacture flanged pipes using three methods: welded flanged pipes, screwed flanged pipes, and integrally cast flanged pipes (short lengths). The coatings and linings offered as standard finishes are in accordance with the EN545 and EN598 pipe standards. Special coatings are available on request.

Remember...

- Buried installation is **not** recommended.
- A flanged joint is a rigid joint, therefore perfect alignment of the flange faces during jointing and bolt tightening is absolutely vital.
- For very high pressure applications, flanged pipelines may need thrust blocks or further support at changes in direction, blank ends etc.



Pipe Dimensions - Push on Joint

C Class

Dimension of Socket and Spigot Pipes

Nominal Dia. DN (mm)	External Dia. DE (mm)	Tol. On DE (mm)	ISO 2531 Pressure Class	ISO 2531 Nominal Thickness (mm)	EN 545: 2010 Minimum Thickness* (mm)	EN 545: 2010 Allowable Deflection (Degree)
80	98	+1/-2.8	C40	4.4	3.0	5
100	118	+1/-2.8	C40	4.4	3.0	5
150	170	+1/-2.9	C40	4.5	3.0	5
200	222	+1/-3	C40	4.7	3.1	4
250	274	+1/-3.1	C40	5.5	3.9	4
300	326	+1/-3.3	C40	6.2	4.6	4
350	378	+1/-3.4	C30	6.3	4.7	3
400	429	+1/-3.5	C30	6.5	4.8	3
450	480	+1/-3.6	C30	6.9	5.1	3
500	532	+1/-3.8	C30	7.5	5.6	3
600	635	+1/-4	C30	8.7	6.7	3
700	738	+1/-4.3	C25	8.8	6.8	2
800	842	+1/-4.5	C25	9.6	7.5	2
900	945	+1/-4.8	C25	10.6	8.4	1.5
1000	1048	+1/-5	C25	11.6	9.3	1.5

#As per ISO 2531 - 2009 *As per EN 545 - 2010

For Sewerage

Dimension of Socket and Spigot Pipes

Nominal Dia. (mm)	External Dia. (DE) (mm)	Tol. on DE (mm)	Pressure Class Nom Thickness (mm)**	Pressure Class Nom Thickness (mm)#	Allowable Deflection (Degree)
80	98	+1/-2.8	4.4	4.8	5
100	118	+1/-2.8	4.4	4.8	5
150	170	+1/-2.9	4.5	4.8	5
200	222	+1/-3	4.7	4.9	4
250	274	+1/-3.1	4.9	5.3	4
300	326	+1/-3.3	5.1	6.6	4
350	378	+1/-3.4	5.7	6.0	3
400	429	+1/-3.5	6.3	6.3	3
450	480	+1/-3.6	6.4	6.7	3
500	532	+1/-3.8	6.5	7.0	3
600	635	+1/-4	7.5	7.7	3
700	738	+1/-4.3	8.5	9.6	2
800	842	+1/-4.5	9.6	10.4	2
900	945	+1/-4.8	10.6	11.2	1.5
1000	1048	+1/-5	11.6	12.0	1.5

** As per ISO 7186 # As per EN 598

K Class

Dimension of Socket and Spigot Pipes

Nominal Dia. DN (mm)	External Dia. DE (mm)	Tol. On DE (mm)	*Nominal Thickness K7 (mm)	ECL Works Test Pressure K7 (Kg/cm²)	*Nominal Thickness K9 (mm)	ECL Works Test Pressure K9 (Kg/cm²)	Allowable Deflection (Degree)
80	98	+1/-2.8	-	40	6.0	60	5
100	118	+1/-2.8	-	40	6.0	60	5
150	170	+1/-2.9	-	40	6.0	60	5
200	222	+1/-3	6.0	40	6.3	60	4
250	274	+1/-3.1	6.0	40	6.8	60	4
300	326	+1/-3.3	6.0	40	7.2	60	4
350	378	+1/-3.4	6.0	32	7.7	50	3
400	429	+1/-3.5	6.3	32	8.1	50	3
450	480	+1/-3.6	6.6	32	8.6	50	3
500	532	+1/-3.8	7.0	32	9.0	50	3
600	635	+1/-4	7.7	32	9.9	50	3
700	738	+1/-4.3	9.0	25	10.8	42	2
800	842	+1/-4.5	10.4	25	11.7	42	2
900	945	+1/-4.8	11.2	25	12.6	42	1.5
1000	1048	+1/-5	12.0	25	13.5	42	1.5

*As per ISO 2531 - 1998/EN 545 - 2007

Pipe Dimensions - Flanged Joint

Note: All dimensions are in millimeter

Dimension of Flanges

DN	PN-10 Outside Dia.	PN-10 Dia. of Raised Face	PN-10 Pitch Circle Dia.	PN-10 Flange Width	PN-16 Outside Dia.	PN-16 Dia. of Raised Face	PN-16 Pitch Circle Dia.	PN-16 Flange Width	PN-25 Outside Dia.	PN-25 Dia. of Raised Face	PN-25 Pitch Circle Dia.	PN-25 Flange Width	PN-40 Outside Dia.	PN-40 Dia. of Raised Face	PN-40 Pitch Circle Dia.	PN-40 Flange Width
80	200	132	160	16	200	132	160	16	200	132	160	16	200	132	160	16
100	See PN 16 Dimension				220	156	180	16	235	156	190	16	235	166	190	16
125					250	184	210	16	270	184	220	16	270	184	220	20.5
150					285	211	240	16	300	211	250	17	300	211	250	23
200					340	266	295	17	360	274	310	19	375	284	320	27
250	395	319	350	19	400	319	355	19	425	330	370	21.5	450	345	385	31.5
300	445	370	400	20.5	455	370	410	20.5	485	389	430	23.5	515	409	450	35.5
350	505	429	460	20.5	520	429	470	22.5	555	448	490	26	580	465	510	40
400	565	480	515	20.5	580	480	525	24	620	503	550	28	660	535	585	44
450	615	530	565	21	640	548	585	26	670	548	600	30.5	685	560	610	46
500	670	582	620	22.5	715	609	650	27.5	730	609	660	32.5	755	615	670	48
600	780	682	725	25	840	720	770	31	845	720	770	37	890	735	795	53
700	895	794	840	27.5	910	794	840	34.5	960	820	875	41.5				
750	960	857	900	29	970	857	900	36	1020	883	940	45				
800	1015	901	950	30	1025	901	950	38	1085	928	990	46				
900	1115	1001	1050	32.5	1125	1001	1050	41	1185	1028	1090	50.5				
1000	1230	1112	1160	35	1255	1112	1170	45	1320	1140	1210	55				

Summary of Minimum Tightening Torque for Flanged Joints

DN	PN-10 Bolt Size M	PN-10 No. of Bolts	PN-10 Tight Torque N.m	PN-16 Bolt Size M	PN-16 No. of Bolts	PN-16 Tight Torque N.m	PN-25 Bolt Size M	PN-25 No. of Bolts	PN-25 Tight Torque N.m	PN-40 Bolt Size M	PN-40 No. of Bolts	PN-40 Tight Torque N.m
80	16	8	20	16	8	20	16	8	30	16	8	40
100	16	8	20	16	8	30	20	8	50	20	8	70
125	16	8	20	16	8	40	24	8	70	24	8	110
150	20	8	40	20	8	60	24	8	90	24	8	130
200	20	8	60	20	12	60	24	12	100	27	12	160
250	20	12	60	24	12	90	27	12	160	30	12	240
300	20	12	70	24	12	120	27	16	160	30	16	240
350	20	16	70	24	16	**120**	30	16	230	33	16	350
400	24	16	110	27	16	170	33	16	320	36	16	470
450	24	20	110	27	20	170	33	20	320	36	20	490
500	24	20	120	30	20	240	33	20	370	39	20	650
600	27	20	190	33	20	350	36	20	550	45	20	1040
700	27	24	**210**	33	24	**350**	39	24	**600**			
750	27	24	**240**	33	24	410	39	24	700			
800	30	24	300	36	24	490	45	24	880			
900	30	28	320	36	28	520	45	28	930			
1000	33	28	**410**	39	28	690	52	28	1320			

Nuts and Bolts for Flanged Pipes

DN Nom. Dia. (mm)	PN-10 No. of Bolts	PN-10 Bolt Size/ Total Length/ Thread Length (mm)	PN-16 No. of Bolts	PN-16 Bolt Size/ Total Length/ Thread Length (mm)	PN-25 No. of Bolts	PN-25 Bolt Size/Total Length/Thread Length (mm)	PN-40 No. of Bolts	PN-40 Bolt Size/Total Length/ Thread Length (mm)
80	4, 8	M16 x 70/38	8	M16 x 70/38	8	M16 x 70/38	8	M16 x 70/38
100	8	M16 x 70/38	8	M16 x 70/38	8	M20 x 80/46	8	M20 x 80/46
125	8	M16 x 70/38	8	M16 x 70/38	8	M24 x 80/54	8	M24 x 90/54
150	8	M20 x 80/46	8	M20 x 80/46	8	M24 x 90/54	8	M24 x 100/54
200	8	M20 x 80/46	12	M20 x 80/46	12	M24 x 90/54	12	M27 x 100/60
250	12	M20 x 80/46	12	M24 x 90/54	12	M27 x 100/60	12	M30 x 120/66
300	12	M24 x 90/46	12	M24 x 90/54	16	M27 x 100/60	16	M30 x 130/72
350	16	M24 x 90/46	16	M24 x 90/54	16	M30 x 110/66	16	M33 x 140/78
400	16	M24 X 90/54	16	M27 x 100/60	16	M33 x 120/78	16	M36 x 150/84
450	20	M24 X 90/54	20	M27 x 100/60	20	M33 x 120/78	20	M36 x 150/84
500	20	M24 X 100/54	20	M30 x 110/66	20	M33 x 120/78	20	M39 x 160/90
600	20	M27 x 100/60	20	M33 x 120/78	20	M36 x 140/84	20	M45 x 180/102
700	24	M27 x 110/60	24	M33 x 130/78	24	M39 x150/90		
750	24	M27 x 110/60	24	M33 x 130/78	24	M39 x 160/90		
800	24	M30 x 120/66	24	M36 x 140/84	24	M45 x 180/102		
900	28	M30 x 120/66	28	M36 x 150/84	28	M45 x 180/102		
1000	28	M33 x 130/78	28	M39 x 160/103	28	M52 x 200/116		



Ductile Iron Fittings

Manufacturing Procedure

The 'lost foam' process used for manufacturing DI fittings is an advanced technique which has several advantages over other conventional processes.

Lost Foam Technique

- First an exact replica of the fitting is made with 'styro-foam' popularly known as thermo-cole.
- This replica, moulded in special machines, acts as a pattern for the casting. The patterns are then kept in a mechanised moulding boxand packed with sand.
- When hot metal is poured, the styro-foam pattern vaporizes and the metal takes the shape of the fitting by filling up the cavity.
- After cooling, castings are taken out, shot blasted, fettled and cleaned.
- After thorough inspection and fettling, the castings (fittings) are subjected to hydrostatic testing.
- Tested fittings are then zinc coated, cement lined and a bituminous finishing coat is applied from outside. Alternatively fittings are shot blasted, fusion bonded, epoxy coated and lined in our special FBE plant.



Advantages of the Lost Foam Technique

- Higher productivity as casting process is much faster.
- No need for core setting, so no risk of core displacement resulting in uneven thickness.
- Much lower chances of having pinhole, slagor blowhole inclusion.
- Maintains high dimensional tolerance, which is vitalfor proper fitment and leak-tightness. All castings havean excellent finish.
- In flanged fittings no drilling hole is necessary as all the holes are as cast.

Hydrostatic Testing

Ductile Iron fittings are tested at works, at the following test pressure as specified in ISO/EN Standards.

Diameter (mm)	Works Test Pressure (Bar)
80-300	25
350-600	16
700-1000	10

Loose Flange Fittings

We have introduced fittings with adjustable flange or loose flange. Unlike 'as cast' flanged fitting, in this case, separately cast loose flanges are mounted on the fittings. A loose flanged fitting comprises a flange ring (in two or more parts bolted together), which can be fixed onto the fittings end. This loose flange can be freely rotated around the axis of the fittings.

Advantages

- Since the flanges can be freely rotated, bolthole alignment with the mating flange becomes easier.
- As it can be fixed and removed easily, dismantlingof adjoining accessories becomes easier. Small angles can be adjusted.
- The PN rating of the fittings can be changed at will, just by changing the loose flange.

Special Fittings

Apart from push-on joints and mechanical joint fittings, we also manufacture some special fittings, which are extremely useful for practical applications which requirea consistent wall thickness, material and quality tests of standard fittings. These include:

- 4-way crosses.
- Double socket flange level invert tee (scour tee).
- Puddle flange of any required length.
- Special variations on conventional fittings such as:
  - Fittings with one side flange and one side plain-ended /socketed of a particular length.
  - Tees and reducers with other non-standard DN x dn combinations.
  - In fact, due to the immense flexibility of the lost foam method, virtually any combination of socket/flange /plain-end is achievable.

Steel Fabricated Fittings

We recognise that within our industry, there is currently a need to provide alternative solutions to help cope with host lead times. We also recognise that steel fabricated pipes and fittings can sometimes offer greater flexibility where space may be tight, or special configurations are required.

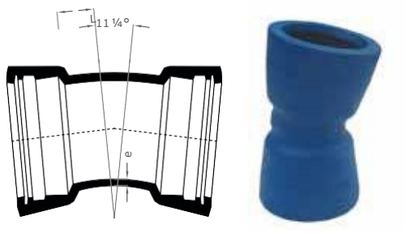
Our facilities in the UK give us the opportunity to manufacture special pipes and fittings from 50mm up to 2000mm. This includes flanged pipes, bends, tees, crosses, and 'Y' pipes, among others.

For more information on our steel fabrication capabilities, see page 32.



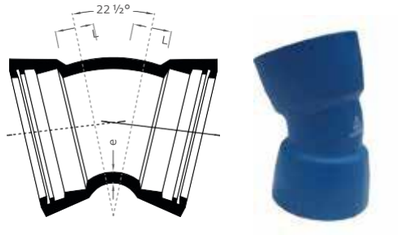


Socket Fittings



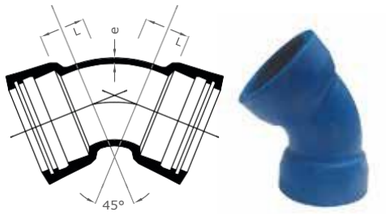
Double Socket 11 ¼° Bend

Nominal Size mm	e mm	L mm
80	7.0	30
100	7.2	30
150	7.8	35
200	8.4	40
250	9.0	50
300	9.6	55
350	10.2	60
400	10.8	65
450	11.4	70
500	12.0	75
600	13.2	85
700	14.4	95
800	15.6	110
900	16.8	115
1000	18.0	120



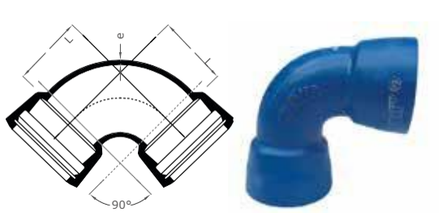
Double Socket 22 ¼° Bend

Nominal Size mm	e mm	L mm
80	7.0	40
100	7.2	40
150	7.8	55
200	8.4	65
250	9.0	75
300	9.6	85
350	10.2	95
400	10.8	110
450	11.4	120
500	12.0	130
600	13.2	150
700	14.4	175
800	15.6	195
900	16.8	205
1000	18.0	210



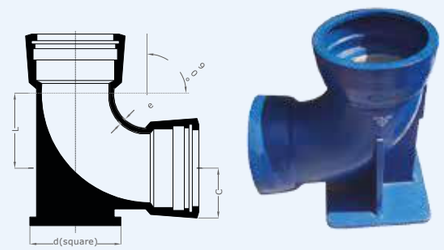
Double Socket 45° Bend

Nominal Size mm	e mm	L mm
80	7.0	55
100	7.2	65
150	7.8	85
200	8.4	110
250	9.0	130
300	9.6	150
350	10.2	175
400	10.8	195
450	11.4	220
500	12.0	240
600	13.2	285
700	14.4	330
800	15.6	370
900	16.8	415
1000	18.0	460



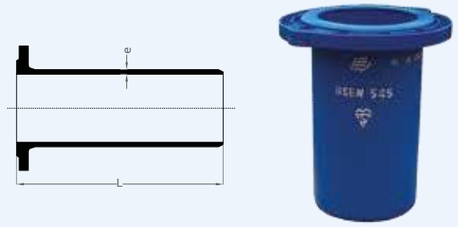
Double Socket 90° Bend

Nominal Size mm	e mm	L mm
80	7.0	100
100	7.2	120
150	7.8	170
200	8.4	220
250	9.0	270
300	9.6	320
350	10.2	370
400	10.8	420
450	11.4	470
500	12.0	520
600	13.2	620
700	14.4	720
800	15.6	820
900	16.8	920
1000	18.0	1020



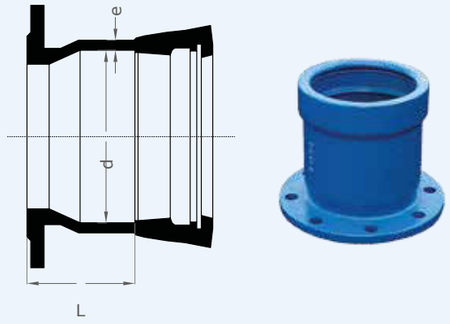
Double Socket 90° Duck Foot Bend

Nominal Size	e	L	H	D
mm	mm	mm	mm	mm
80	7.0	110	110	180
100	7.2	130	125	200
150	7.8	180	160	250
200	8.4	230	190	300
250	9.0	280	225	350
300	9.6	325	255	400
350	10.2	380	290	450
400	10.8	430	320	500
450	11.4	480	355	550
500	12.0	530	385	600
600	13.2	630	450	700
700	14.4	730	515	800
800	15.6	830	580	900
900	16.8	930	645	1000
1000	18.0	1030	710	1100



Flanged Spigot

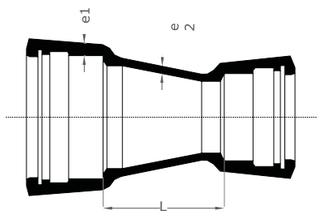
Nominal Dia (DN)	DE	e	L
mm	mm	mm	mm
80	98	7.0	350
100	118	7.2	360
150	170	7.8	380
200	222	8.4	400
250	274	9.0	420
300	326	9.6	440
350	378	10.2	460
400	429	10.8	480
450	480	11.4	500
500	532	12.0	520
600	635	13.2	560
700	738	14.4	600
800	842	15.6	600
900	945	16.8	600
1000	1048	18.0	600



Flanged Socket

Nominal Dia (DN)	e	L	d
mm	mm	mm	mm
80	7.0	130	109
100	7.2	130	130
150	7.8	135	183
200	8.4	140	235
250	9.0	145	288
300	9.6	150	340
350	10.2	155	393
400	10.8	160	445
450	11.4	165	498
500	12.0	170	550
600	13.2	180	655
700	14.4	190	760
800	15.6	200	865
900	16.8	210	970
1000	18.0	220	1075

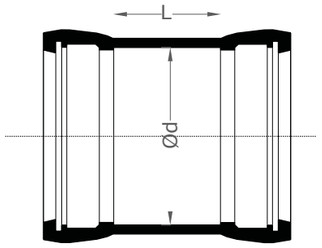




Double Socket Concentric Taper

Nominal Diameter (DN)		e_1	e_2	L
Larger End	Smaller End			
mm	mm	mm	mm	mm
100	80	7.2	7.0	90
150	80	7.8	7.0	190
150	100	7.8	7.2	150
200	100	8.4	7.2	250
200	150	8.4	7.8	150
250	150	9.0	7.8	250
250	200	9.0	8.4	150
300	150	9.6	7.8	350
300	200	9.6	8.4	250
300	250	9.6	9.0	150
350	200	10.2	8.4	360
350	250	10.2	9.0	260
350	300	10.2	9.6	160
400	250	10.8	9.0	360
400	300	10.8	9.6	260
400	350	10.8	10.2	160
450	350	11.4	10.2	260
450	400	11.4	10.8	160
500	350	12.0	10.2	360
500	400	12.0	10.8	260
600	400	13.2	10.8	460
600	500	13.2	12.0	260
700	500	14.4	12.0	480
700	600	14.4	13.2	280
800	600	15.6	13.2	480
800	700	15.6	14.4	280
900	700	16.8	14.4	480
900	800	16.8	15.6	280
1000	800	18.0	15.6	480
1000	900	18.0	16.8	280

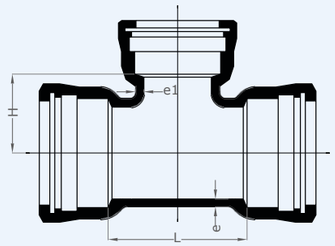




Double Socket Collar

Nominal Dia (DN)	e	L	d
mm	mm	mm	mm
80	7.0	160	109
100	7.2	160	130
150	7.8	165	183
200	8.4	170	235
250	9.0	175	288
300	9.6	180	340
350	10.2	185	393
400	10.8	190	445
450	11.4	195	498
500	12.0	200	550
600	13.2	210	655
700	14.4	220	760
800	15.6	230	865
900	16.8	240	970
1000	18.0	250	1075



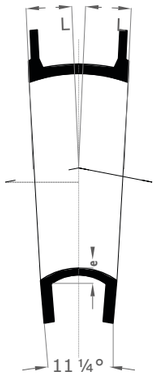


All Socket Tee

Nominal Diameter (DN)		e	e_1	L	H
Body	Branch				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	170	85
100	80	7.2	7.0	170	95
100	100	7.2	7.2	190	95
150	100	7.8	7.2	195	120
150	150	7.8	7.8	255	125
200	80	8.4	7.0	175	145
200	100	8.4	7.2	200	145
200	150	8.4	7.8	255	150
200	200	8.4	8.4	315	155
250	80	9.0	7.0	180	170
250	100	9.0	7.2	200	170
250	150	9.0	7.8	260	175
250	200	9.0	8.4	315	180
250	250	9.0	9.0	375	190
300	100	9.6	7.2	205	195
300	150	9.6	7.8	260	200
300	200	9.6	8.4	320	205
300	250	9.6	9.0	380	215
300	300	9.6	9.6	435	220
350	100	10.2	7.2	205	220
350	150	10.2	7.8	265	225
350	200	10.2	8.4	325	230
350	250	10.2	9.0	380	240
350	300	10.2	9.6	440	245
350	350	10.2	10.2	495	250
400	80	10.8	7.0	185	245
400	100	10.8	7.2	210	245
400	150	10.8	7.8	270	250
400	200	10.8	8.4	325	255
400	300	10.8	9.6	440	270
400	400	10.8	10.8	560	280
450	100	11.4	7.2	215	270
450	250	11.4	9.0	385	290
450	450	11.4	11.4	620	310
500	100	12.0	7.2	215	295
500	200	12.0	8.4	330	305
500	400	12.0	10.8	565	330
500	500	12.0	12.0	680	340
600	200	13.2	8.4	340	355
600	400	13.2	10.8	570	380
600	600	13.2	13.2	800	400
700	200	14.4	8.4	345	405
700	400	14.4	10.8	575	430
700	700	14.4	14.4	925	460
800	200	15.6	8.4	350	455
800	400	15.6	10.8	580	480
800	600	15.6	13.2	815	500
800	800	15.6	15.6	1045	525
900	200	16.8	8.4	355	505
900	400	16.8	10.8	590	530
900	600	16.8	13.2	820	550
900	900	16.8	16.8	1170	585
1000	200	18.0	8.4	360	555
1000	400	18.0	10.8	595	580
1000	600	18.0	13.2	825	600
1000	1000	18.0	18.0	1290	645

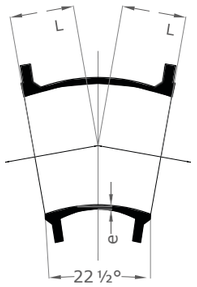






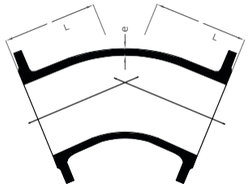
Double Flanged 11 1/4° Bend

Nominal Size DN	e	L
mm	mm	mm
80	7.0	113
100	7.2	115
150	7.8	113
200	8.4	132
250	9.0	165
300	9.6	175
350	10.2	191
400	10.8	205
450	11.4	349
500	12.0	375
600	13.2	426
700	14.4	478
800	15.6	529
900	16.8	581
1000	18.0	632

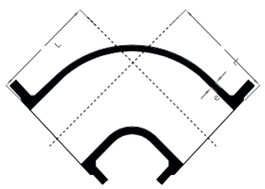


Double Flanged 22 1/2° Bend

Nominal Size DN	e	L
mm	mm	mm
80	7.0	105
100	7.2	110
150	7.8	109
200	8.4	131
250	9.0	190
300	9.6	210
350	10.2	210
400	10.8	239
450	11.4	349
500	12.0	375
600	13.2	426
700	14.4	478
800	15.6	529
900	16.8	581
1000	18.0	632







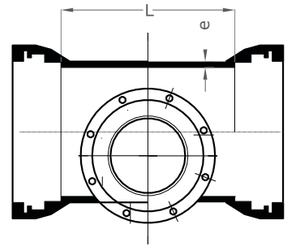


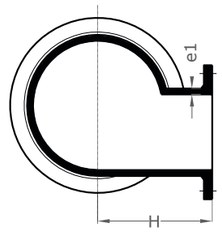
Double Flanged 45° Bend

Nominal Size DN	e	L
mm	mm	mm
80	7.0	130
100	7.2	140
150	7.8	160
200	8.4	180
250	9.0	350
300	9.6	400
350	10.2	298
400	10.8	324
450	11.4	350
500	12.0	375
600	13.2	426
700	14.4	478
800	15.6	529
900	16.8	581
1000	18.0	632

Double Flanged 90° Bend

Nominal Size DN	e	L
mm	mm	mm
80	7.0	165
100	7.2	180
150	7.8	220
200	8.4	260
250	9.0	350
300	9.6	400
350	10.2	450
400	10.8	500
450	11.4	550
500	12.0	600
600	13.2	700
700	14.4	800
800	15.6	900
900	16.8	1000
1000	18.0	1100





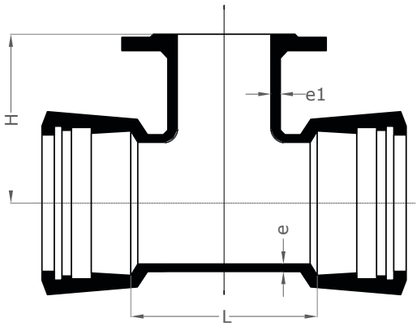


Double Socket Level Invert Tee with Flanged Branch

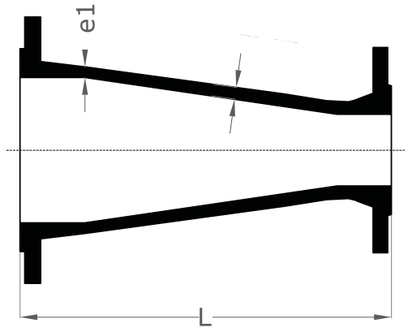
Nominal Diameter (DN)		e	e_1	L	H
Body DN	Branch dn				
mm	mm	mm	mm	mm	mm
100	80	7.2	7.0	170	175
150	80	7.8	7.0	170	205
150	100	7.8	7.2	195	210
200	80	8.4	7.0	175	235
200	100	8.4	7.2	200	240
200	150	8.4	7.8	255	250
250	80	9.0	7.0	180	265
250	100	9.0	7.2	200	270
250	150	9.0	7.8	260	280
250	200	9.0	8.4	315	290
300	80	9.6	7.0	180	295
300	100	9.6	7.2	205	300
300	150	9.6	7.8	260	310
300	200	9.6	8.4	320	320
300	250	9.6	9.0	380	330
350	80	10.2	7.0	185	325
350	100	10.2	7.2	205	330
350	150	10.2	7.8	265	340
350	200	10.2	8.4	325	350
350	250	10.2	9.0	380	360
400	80	10.8	7.0	185	355
400	100	10.8	7.2	210	360
400	150	10.8	7.8	270	370
400	200	10.8	8.4	325	380
400	250	10.8	9.0	385	390
400	300	10.8	9.6	440	400
450	80	11.4	7.0	190	385
450	100	11.4	7.2	215	390
450	150	11.4	7.8	270	400
450	200	11.4	8.4	330	410
450	250	11.4	9.0	385	420
450	300	11.4	9.6	445	430
450	400	11.4	10.8	560	450
500	80	12.0	7.0	195	415
500	100	12.0	7.2	215	420
500	150	12.0	7.8	275	430
500	200	12.0	8.4	330	440
500	250	12.0	9.0	390	450
500	300	12.0	9.6	450	460
500	350	12.0	10.2	505	470
500	400	12.0	10.8	565	480
500	450	12.0	11.4	620	490
600	80	13.2	7.0	200	475
600	100	13.2	7.2	220	480
600	150	13.2	7.8	280	490
600	200	13.2	8.4	340	500
600	250	13.2	9.0	395	510
600	300	13.2	9.6	455	520
600	350	13.2	10.2	510	530
600	400	13.2	10.8	570	540
600	450	13.2	11.4	630	550
600	500	13.2	12.0	685	560
700	80	14.4	7.0	205	505
700	100	14.4	7.2	230	510
700	150	14.4	7.8	285	520
700	200	14.4	8.4	345	525
800	150	15.6	7.8	290	580
800	200	15.6	8.4	350	585
900	150	16.8	7.8	300	640
900	200	16.8	8.4	355	645
1000	150	18.0	7.8	305	700
1000	200	18.0	8.4	360	705

Double Socket Flanged Branch Tee

Nominal Diameter (DN)		e	e_1	L	H
Body	Branch				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	170	165
100	80	7.2	7.0	170	175
100	100	7.2	7.2	190	180
150	80	7.8	7.0	170	205
150	100	7.8	7.2	195	210
150	150	7.8	7.8	255	220
200	80	8.4	7.0	175	235
200	100	8.4	7.2	200	240
200	150	8.4	7.8	255	250
200	200	8.4	8.4	315	260
250	80	9.0	7.0	180	265
250	100	9.0	7.2	200	270
250	150	9.0	7.8	260	280
250	200	9.0	8.4	315	290
250	250	9.0	9.0	375	300
300	100	9.6	7.2	205	300
300	200	9.6	8.4	320	320
300	250	9.6	9.0	380	330
300	300	9.6	9.6	435	340
350	100	10.2	7.2	205	330
350	200	10.2	8.4	325	350
350	350	10.2	10.2	495	380
400	80	10.8	7.0	185	355
400	100	10.8	7.2	210	360
400	150	10.8	7.8	270	370
400	200	10.8	8.4	325	380
400	300	10.8	9.6	440	400
400	400	10.8	10.8	560	420
450	100	11.4	7.2	215	390
450	250	11.4	9.0	385	420
450	450	11.4	11.4	620	460
500	100	12.0	7.2	215	420
500	400	12.0	10.8	565	480
500	500	12.0	12.0	680	500
600	200	13.2	8.4	340	500
600	400	13.2	10.8	570	540
600	600	13.2	13.2	800	580
700	200	14.4	8.4	345	525
700	400	14.4	10.8	575	555
700	700	14.4	14.4	925	600
800	200	15.6	8.4	350	585
800	400	15.6	10.8	580	615
800	600	15.6	13.2	815	645
800	800	15.6	15.6	1045	675
900	200	16.8	8.4	355	645
900	400	16.8	10.8	590	675
900	600	16.8	13.2	820	705
900	900	16.8	16.8	1170	750
1000	200	18.0	8.4	360	705
1000	400	18.0	10.8	595	735
1000	600	18.0	13.2	825	765
1000	1000	18.0	18.0	1290	825



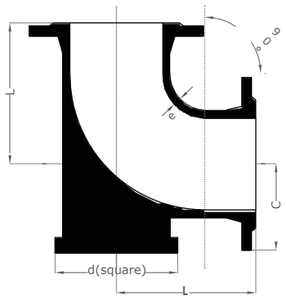






Double Flanged Concentric Tapers

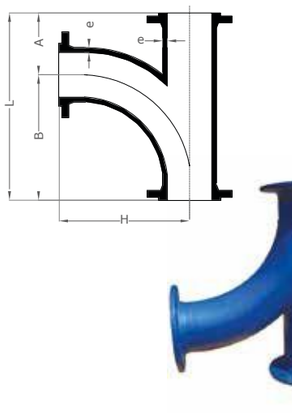
Nominal Diameter (DN)		e_2	e_1	L
Larger End Body	Smaller End Body			
mm	mm	mm	mm	mm
100	80	7.2	7.0	200
150	80	7.8	7.0	230
150	100	7.8	7.2	300
200	80	8.4	7.0	335
200	100	8.4	7.2	290
200	150	8.4	7.8	300
250	80	9.0	7.0	440
250	100	9.0	7.2	400
250	150	9.0	7.8	295
250	200	9.0	8.4	300
300	80	9.6	7.0	550
300	100	9.6	7.2	510
300	150	9.6	7.8	405
300	200	9.6	8.4	300
300	250	9.6	9.0	300
350	80	10.2	7.0	655
350	100	10.2	7.2	615
350	150	10.2	7.8	510
350	200	10.2	8.4	410
350	250	10.2	9.0	305
350	300	10.2	9.6	300
400	100	10.8	7.2	720
400	150	10.8	7.8	615
400	200	10.8	8.4	510
400	250	10.8	9.0	410
400	300	10.8	9.6	300
400	350	10.8	10.2	300
450	150	11.4	7.8	715
450	200	11.4	8.4	610
450	250	11.4	9.0	510
450	300	11.4	9.6	410
450	350	11.4	10.2	305
450	400	11.4	10.8	300
500	200	12.0	8.4	725
500	250	12.0	9.0	625
500	300	12.0	9.6	520
500	350	12.0	10.2	420
500	400	12.0	10.8	600
600	300	13.2	9.6	730
600	350	13.2	10.2	625
600	400	13.2	10.8	525
600	500	13.2	12.0	600
700	600	14.4	13.2	600
800	700	15.6	14.4	600
900	800	16.8	15.6	600
1000	900	18.0	16.8	600





Double Flanged 90° Duck-Foot Bend

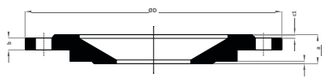
Nominal Size (DN)	e	L	H	D
mm	mm	mm	mm	mm
80	7.0	165	110	180
100	7.2	180	125	200
150	7.8	220	160	250
200	8.4	260	190	300
250	9.0	350	225	350
300	9.6	400	255	400
350	10.2	450	290	450
400	10.8	500	320	500
450	11.4	550	355	550
500	12.0	600	385	600
600	13.2	700	450	700
700	14.4	800	515	800
800	15.6	900	580	900
900	16.8	1000	645	1000
1000	18.0	1100	710	1100



All Flanged Radial Tee

Size		e	A	B	H	L
Body DN	Branch dn					
mm	mm	mm	mm	mm	mm	mm
80	80	7.0	165	380	380	545
100	100	7.2	180	400	400	580
150	150	7.8	220	450	450	670
200	200	8.4	260	500	500	760
250	250	9.0	350	550	550	900
300	300	9.6	400	600	600	1000

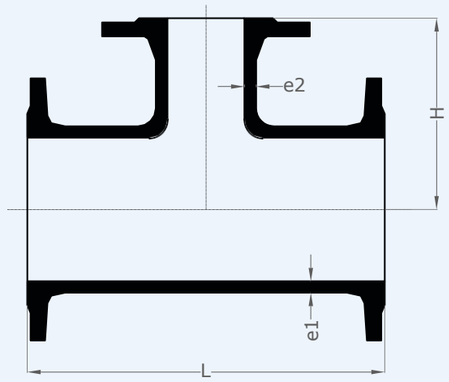




b = 10+0.035DN with a minimum value of 16

Reducing Flanges, Type PN16

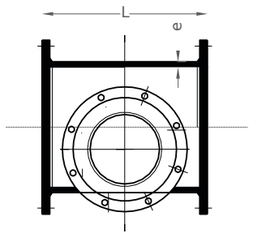
Larger End				Smaller End		
Nominal Dia (DN)	D	b	C_1	Nominal Dia (DN)	C_2	a
mm	mm	mm	mm	mm	mm	mm
200	340	17.0	3	80	3	40
200	340	17.0	3	100	3	40
350	520	22.5	4	250	3	54
400	580	24.0	4	250	3	54
400	580	24.0	4	300	4	55
700	910	34.5	5	500	4	67
900	1125	41.5	5	700	5	73
1000	1255	45.0	5	700	5	73
1000	1255	45.0	5	800	5	77



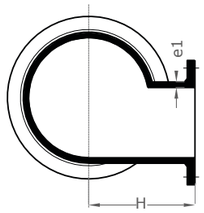


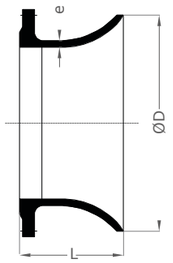
All Flanged Tees

Nominal Diameter		e	e_1	L	H
Body DN	Branch dn				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	330	165
100	80	7.2	7.0	360	175
100	100	7.2	7.2	360	180
150	80	7.8	7.0	440	205
150	100	7.8	7.2	440	210
150	150	7.8	7.8	440	220
200	80	8.4	7.0	520	235
200	100	8.4	7.2	520	240
200	150	8.4	7.8	520	250
200	200	8.4	8.4	520	260
250	80	9.0	7.0	700	265
250	100	9.0	7.2	700	275
250	150	9.0	7.8	700	300
250	200	9.0	8.4	700	325
250	250	9.0	9.0	700	350
300	80	9.6	7.0	800	290
300	100	9.6	7.2	800	300
300	150	9.6	7.8	800	325
300	200	9.6	8.4	800	350
300	250	9.6	9.0	800	375
300	300	9.6	9.6	800	400
350	80	10.2	7.0	850	325
350	100	10.2	7.2	850	325
350	150	10.2	7.8	850	325
350	200	10.2	8.4	850	325
350	250	10.2	9.0	850	325
350	300	10.2	9.6	850	425
350	350	10.2	10.2	850	425
400	80	10.8	7.0	900	350
400	100	10.8	7.2	900	350
400	150	10.8	7.8	900	350
400	200	10.8	8.4	900	350
400	250	10.8	9.0	900	350
400	300	10.8	9.6	900	450
400	400	10.8	10.8	900	450
450	100	11.4	7.2	950	375
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	475
450	350	11.4	10.2	950	475
450	400	11.4	10.8	950	475
450	450	11.4	11.4	950	475
500	100	12.0	7.2	1000	400
500	150	12.0	7.8	1000	400
500	200	12.0	8.4	1000	400
500	250	12.0	9.0	1000	400
500	300	12.0	9.6	1000	500
500	350	12.0	10.2	1000	500
500	400	12.0	10.8	1000	500
500	500	12.0	12.0	1000	500
600	100	13.2	7.2	1100	450
600	150	13.2	7.8	1100	450
600	200	13.2	8.4	1100	450
600	250	13.2	9.0	1100	450
600	300	13.2	9.6	1100	550
600	350	13.2	10.2	1100	550
600	400	13.2	10.8	1100	550
600	450	13.2	11.4	1100	550
600	500	13.2	12.0	1100	550
600	600	13.2	13.2	1100	550
700	200	14.4	8.4	650	525
700	400	14.4	10.8	870	555
700	700	14.4	14.4	1200	600
800	200	15.6	8.4	690	585
800	400	15.6	10.8	910	615
800	600	15.6	13.2	1350	645
800	800	15.6	15.6	1350	675
900	200	16.8	8.4	730	645
900	400	16.8	10.8	950	675
900	600	16.8	13.2	1500	705
900	900	16.8	16.8	1500	750
1000	200	18.0	8.4	770	705
1000	400	18.0	10.8	990	735
1000	600	18.0	13.2	1650	765
1000	1000	18.0	18.0	1650	825









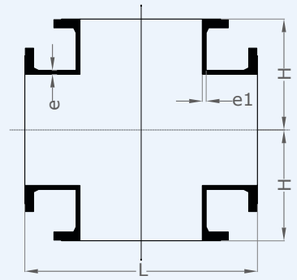


All Flanged Level Invert Tees

Nominal Diameter		e	e_1	L	H
Body DN	Branch dn				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	330	165
100	80	7.2	7.0	360	175
150	80	7.8	7.0	440	205
150	100	7.8	7.2	440	210
200	80	8.4	7.0	520	235
200	100	8.4	7.2	520	240
200	150	8.4	7.8	520	250
250	80	9.0	7.0	700	265
250	100	9.0	7.2	700	275
250	150	9.0	7.8	700	300
250	200	9.0	8.4	700	325
300	80	9.6	7.0	800	290
300	100	9.6	7.2	800	300
300	150	9.6	7.8	800	325
300	200	9.6	8.4	800	350
300	250	9.6	9.0	800	375
350	80	10.2	7.0	850	325
350	100	10.2	7.2	850	325
350	150	10.2	7.8	850	325
350	200	10.2	8.4	850	325
350	250	10.2	9.0	850	325
350	300	10.2	9.6	850	425
400	80	10.8	7.0	900	350
400	100	10.8	7.2	900	350
400	150	10.8	7.8	900	350
400	200	10.8	8.4	900	350
400	250	10.8	9.0	900	350
400	300	10.8	9.6	900	450
450	100	11.4	7.2	950	375
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	475
450	350	11.4	10.2	950	475
450	400	11.4	10.8	950	475
500	80	12.0	7.0	1000	400
500	100	12.0	7.2	1000	400
500	150	12.0	7.8	1000	400
500	200	12.0	8.4	1000	400
500	250	12.0	9.0	1000	400
500	300	12.0	9.6	1000	500
500	350	12.0	10.2	1000	500
500	400	12.0	10.8	1000	500
500	450	12.0	11.4	1000	500
600	80	13.2	7.0	1100	450
600	100	13.2	7.2	1100	450
600	150	13.2	7.8	1100	450
600	200	13.2	8.4	1100	450
600	250	13.2	9.0	1100	450
600	300	13.2	9.6	1100	550
600	350	13.2	10.2	1100	550
600	400	13.2	10.8	1100	550
600	450	13.2	11.4	1100	550
600	500	13.2	12.0	1100	550
700	150	14.4	7.8	595	520
700	200	14.4	8.4	650	525
800	150	15.6	7.8	635	580
800	200	15.6	8.4	690	585
900	150	16.8	7.8	675	640
900	200	16.8	8.4	730	645
1000	300	18.0	9.6	880	720

Flanged Bell-mouth

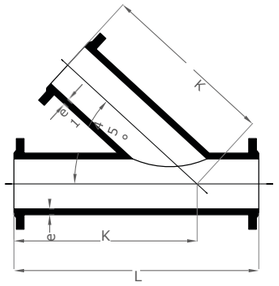
Nominal Size	e	L	D
mm	mm	mm	mm
80	7.0	135	160
100	7.2	140	185
150	7.8	155	245
200	8.4	170	310
250	9.0	190	370
300	9.6	210	435
350	10.2	225	495
400	10.8	245	560
450	11.4	260	620
500	12.0	280	685
600	13.2	300	810
700	14.4	340	945
800	15.6	380	1055
900	16.8	420	1165
1000	18.0	440	1290





All Flanged Cross

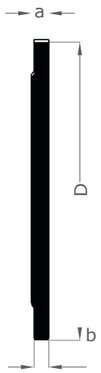
Nominal Diameter		e	e_1	L	H
Body DN	Branch dn				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	330	165
100	80	7.2	7.0	360	175
100	100	7.2	7.2	360	180
150	80	7.8	7.0	440	205
150	100	7.8	7.2	440	210
150	150	7.8	7.8	440	220
200	80	8.4	7.0	520	235
200	100	8.4	7.2	520	240
200	150	8.4	7.8	520	250
200	200	8.4	8.4	520	260
250	80	9.0	7.0	700	265
250	100	9.0	7.2	700	275
250	150	9.0	7.8	700	300
250	200	9.0	8.4	700	325
250	250	9.0	9.0	700	350
300	80	9.6	7.0	800	290
300	100	9.6	7.2	800	300
300	150	9.6	7.8	800	325
300	200	9.6	8.4	800	350
300	250	9.6	9.0	800	375
300	300	9.6	9.6	800	400
350	100	10.2	7.2	850	325
350	150	10.2	7.8	850	325
350	200	10.2	8.4	850	325
350	250	10.2	9.0	850	325
350	300	10.2	9.6	850	425
350	350	10.2	10.2	850	425
400	100	10.8	7.2	900	350
400	150	10.8	7.8	900	350
400	200	10.8	8.4	900	350
400	250	10.8	9.0	900	350
400	300	10.8	9.6	900	450
400	350	10.8	10.2	900	450
400	400	10.8	10.8	900	450
450	100	11.4	7.2	950	375
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	475
450	350	11.4	10.2	950	475
450	400	11.4	10.8	950	475
450	450	11.4	11.4	950	475
500	100	12.0	7.2	1000	400
500	150	12.0	7.8	1000	400
500	200	12.0	8.4	1000	400
500	250	12.0	9.0	1000	400
500	300	12.0	9.6	1000	500
500	350	12.0	10.2	1000	500
500	400	12.0	10.8	1000	500
500	450	12.0	11.4	1000	500
500	500	12.0	12.0	1000	500
600	100	13.2	7.2	1100	450
600	150	13.2	7.8	1100	450
600	200	13.2	8.4	1100	450
600	250	13.2	9.0	1100	450
600	300	13.2	9.6	1100	550
600	350	13.2	10.2	1100	550
600	400	13.2	10.8	1100	550
600	450	13.2	11.4	1100	550
600	500	13.2	12.0	1100	550
600	600	13.2	13.2	1100	550
700	700	14.4	14.4	1200	600
800	800	15.6	15.6	1350	675
900	900	16.8	16.8	1500	750
1000	1000	18.0	18.0	1650	825





All Flanged 45° Angle Branch

Nominal Diameter		e	e_1	K	L
Body DN	Branch dn				
mm	mm	mm	mm	mm	mm
80	80	7.0	7.0	375	500
100	80	7.2	7.0	390	500
100	100	7.2	7.2	405	540
150	80	7.8	7.0	480	590
150	100	7.8	7.2	480	640
150	150	7.8	7.8	480	640
200	80	8.4	7.0	535	635
200	100	8.4	7.2	535	635
200	150	8.4	7.8	560	735
200	200	8.4	8.4	560	735
250	80	9.0	7.0	585	660
250	100	9.0	7.2	610	710
250	150	9.0	7.8	640	830
250	200	9.0	8.4	640	830
250	250	9.0	9.0	640	830
300	80	9.6	7.0	610	685
300	100	9.6	7.2	610	685
300	150	9.6	7.8	660	790
300	200	9.6	8.4	685	865
300	250	9.6	9.0	715	930
300	300	9.6	9.6	715	930
350	100	10.2	7.2	635	685
350	150	10.2	7.8	660	740
350	200	10.2	8.4	710	840
350	250	10.2	9.0	740	880
350	300	10.2	9.6	790	940
350	350	10.2	10.2	790	970
400	100	10.8	7.2	710	760
400	150	10.8	7.8	740	815
400	200	10.8	8.4	760	865
400	250	10.8	9.0	820	970
400	300	10.8	9.6	870	1000
400	350	10.8	10.2	870	1030
400	400	10.8	10.8	870	1070
450	100	11.4	7.2	710	740
450	150	11.4	7.8	760	840
450	200	11.4	8.4	790	890
450	250	11.4	9.0	820	990
450	300	11.4	9.6	900	1040
450	350	11.4	10.2	950	1090
500	150	12.0	7.8	765	790
500	200	12.0	8.4	810	890
500	250	12.0	9.0	840	940
500	300	12.0	9.6	865	990
500	350	12.0	10.2	950	1065
600	150	13.2	7.8	840	890
600	200	13.2	8.4	890	940
600	250	13.2	9.0	915	990
600	300	13.2	9.6	965	1090
700	300	14.4	9.6	1090	1170
800	300	15.6	9.6	1170	1200
900	400	16.8	10.8	1315	1410
1000	400	18.0	10.8	1415	1485





Blank Flanges, Type PN16

DN	D	a	b	c
mm	mm	mm	mm	mm
80	200	19.0	16.0	3
100	220	19.0	16.0	3
150	285	19.0	16.0	3
200	340	20.0	17.0	3
250	400	22.0	19.0	3
300	455	24.5	20.5	4
350	520	26.5	22.5	4
400	580	28.0	24.0	4
450	640	30.0	26.0	4
500	715	31.5	27.5	4
600	840	36.0	31.0	5
700	910	39.5	34.5	5
800	1025	43.0	38.0	5
900	1125	46.5	41.5	5
1000	1255	50.0	45.0	5

Steel Fabrications

The manufacture of ductile iron pipes and fittings used to take place within the UK. We recognised the need to provide a comprehensive pipework package to our customers that would enable an alternative solution to be offered in instances where short lead times were required.

Equally, we recognise that in certain applications a steel fabricated pipework solution may offer greater flexibility – for example, where space may be limited or special configurations required.

Our extensive and quality-focused steel fabrication facilities in the UK enable us to manufacture special pipes and fittings from 50mm up to 2000mm. Typical examples include flanged pipes, bends, tees, crosses, and 'Y' pipes, to name but a few. The beauty of our steel fabrication pipework is that it allows us to work with you to offer greater flexibility to meet your requirements.



Capability

• Flanged Pipes • Bends • Tees • Crosses • Bellmouths • 'Y' Pipes
• Reducers (Concentric and Eccentric) • Hatchboxes • Manifolds

However, with the flexibility that fabricating steel provides, we are able to manufacture items to suit any site dimensions or customer requirement.



Welding Standards

Products are fabricated in accordance with BS 534, with welding procedures in accordance with BS EN ISO 15614 pt 1and welder approval to BS EN 287 pt1.



Product Testing

All fabricated pipeline products are hydrostatically tested to the relevant test pressure and dye penetrant crack tested to BS EN ISO 3452 pt1 as standard.

Coating

In addition we provide a range of fully approved coatings that meet all major standards including DWI Regulation 31. These include Fusion Bonded Epoxy, Scotchkote 206N, Resicoat R4 and Rilsan. Wherever required full test and approvals certificates are available and can be supplied.





External Protection

Protection system for pipes

a) Metallic zinc or zinc aluminium coating with following options:

- Metallic zinc coating having a mass of 130gm/m² or 200gm/m², or 400gm/m².
- Zinc aluminium coating having a mass of 200gm/m² or 400gm/m².

The metallic zinc or zinc aluminium coating is covered with a finishing layer of bitumen or Epoxy.

b) Epoxy coating: This is applied over metallic coating as a finishing coat. Compared to normal bitumen coated pipes it offers:

- More resistance to external galvanic/soil corrosion in aggressive soil.
- More resistance to external chemical (acid, alkali, organic) attack.
- Higher scratch resistance. Much more resistant to coating damage during transportation/handling /laying.
- The coating comes in attractive blue/green (for water) or red (for sewage) colour.

c) Polyurethane coating:
Polyurethane Coating is normally factory applied to a prepared pipe surface.

d) PE tape wrapping:
In highly aggressive soil conditions, additional external protection in the form of a spirally applied anti-corrosion mastic tape may be required. This can either be applied at our works prior to dispatch or, if the facility exists, it may be site applied. The tape wrap provides high electrical resistance and excellent corrosion protection in highly aggressive environments.

The pipe is wrapped from just behind the socket to just prior to the spigot insertion marks. Wrapping can be provided with either a 25mm or 55% overlap. After jointing the jointing area is also wrapped.



Heat shrunk joint sleeves are also available from Electrosteel.

Typical Ground Condition Pipe	Protection System Pipe	Electrosteel Supply
• Soil resistivity ≥ 2500 ohm cm with water table. • Soil resistivity ≥ 1500 ohm cm without water table.	Metallic Zin (130 to 200 g/m² min.) with Bitumen or Epoxy as finishing layer.	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer.
• Soil resistivity ≥ 1500 ohm cm with water table. • Soil resistivity ≥ 1000 ohm cm without water table.	Metallic Zinc (200 g/m² min.) with thicker finishing layer (e.g. 100 µm local minimum thickness of epoxy)	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer.
• Soil resistivity between 1500 and 2500 ohm cm with water table. • Soil resistivity between 500 and 1500 ohm cm without water table.	Metallic Zinc - Aluminium (400 g/m² min.) **or** Metallic Zinc (200 gm² min.) with Bitumen or Epoxy as finishing layer complete with PE sleeving applied.	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer.
• Soil resistivity between 500 and 1500 ohm cm with water table.	Metallic Zinc – Aluminium (400 g/m² min.)	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer.
• Soil resistivity < 500 ohm cm. • Ground with light chemical contamination. • Stray electrical currents • Acidic peaty soils	Coating as per above plus tape wrap (25mm overlap). **or** Alternately Polyurethane coating (min 750 µm)	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer plus tape wrap (25 mm overlap).
• Ground containing clinker, bricks, flint etc. likely to cause mechanical damage . • Ground with heavy chemical contamination. • Tidal water e.g.estuaries, shorelines.	Coating as per above plus tape wrap (55% overlap). **or** Alternately Polyurethane coating (min 1000 µm)	Standard Electrosteel stock pipe consisting of Metallic Zinc – Aluminium (400 g/m² min.) with min. 100 µm Epoxy finishing layer plus tape wrap (55% overlap).



Internal Protection

Protection system for pipes

a) Cement Mortar Linings:
Pipes are generally supplied with centrifugally applied cement mortar lining. This lining creates a mildly alkaline environment at the internal metal surface and protects the pipe from corrosion and tuberculation.

The different types of cement lining offered are:

- Blast furnace slag cement.
- High alumina cement for sewage pipes.

Water Characteristics	Portland Cement	Sulphate Resisting Cements	High Alumina Cement
Min value of pH	6	5.5	4
Max. content (mg/L.) CO_2	7	15	no limit
Sulphates (SO_4-)	400	3000	no limit
Magnesium (Mg++)	100	500	no limit
Ammonium (NH_4+)	30	30	no limit

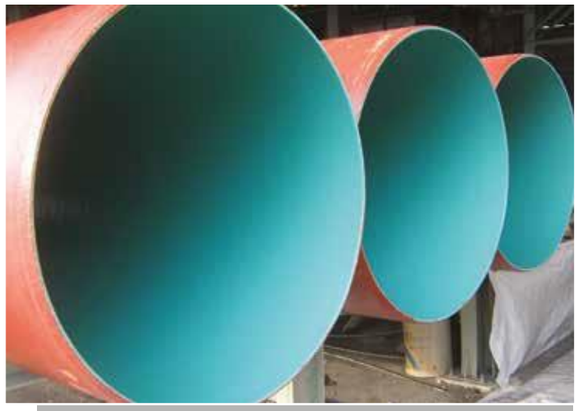
Advantages of Cement Mortar Lining (CML)

- Centrifugally applied CML provides a higher Hazen William's C value of 140 compared to 100 for bare metallic pipes.
- Reduces frictional head loss and pumping cost.
- CML passivates the pipe wall against corrosion through the alkaline reaction of cement.
- CML prevents pitting and tuberculation of pipes and stops the production of red water.
- CML helps to maintain the same area and coefficient of friction over a long period of time.

b) Epoxy Seal coat on cement mortar lining
Seal coats - if specified - are applied to the inside of the cement mortar lined surface of ductile iron pipes.

The main purpose of providing seal coat is to stop leaching of cement compounds from the linings, which affects the water's pH and causes alkalinity to increase.

c) Ceramic Epoxy - Electrotuff
Ceramic epoxy lining is a specialised lining which offers a hard and stable surface with high abrasion resistance. Mainly used for sewage conveyance or ash slurry conveyance,or for conveying corrosive fluids.



Recommendations for Internal Linings

SI	Fluid Condition	Lining for Pipes
1	Potable water/raw water with negative Langelier Index (alkalinity between 25 and 250 ppm $CaCO_3$) and pH between 5.5 and 13 content in the input water.	Cement mortar lining with blast furnace slag cement or sulphate resistant cement, depending on sulphate.
2	Domestic sewage high sulphate content > 3%.	Sulphate resistant cement lining.
3	Very soft water with negative Langelier Index (alkalinity below 25 ppm $CaCO_3$).	Sulphate resistant cement lining or blast furnace slag cement with seal coat (preferably with epoxy).
4	Sewage and industrial effluent having pH minimum 3 to max 13 with aggressive CO_2, Sulphates > 3000 mg/l, magnesium > 500 mg/l, and ammonium > 30 mg/l.	High alumina cement mortar lining.
5	Sea water and ash slurry	High alumina cement mortar lining.

Protection system for fittings

a) Fusion Bonded Epoxy
Fusion bonded epoxy is applied both on the outer and inner surface of the fittings.

b) Ceramic Epoxy - Electrotuff
Ceramic epoxy lining is also applied inside fittings which are to be used with ceramic epoxy lined pipes.

All material coming in contact with potable water are certified by various approving agencies like WRAS, DWI, WRc, DVGW etc.







Relevant Standards

Please note that the recommendations in this catalogue only highlight the important points of the standards. Customers should study the following standards thoroughly when selecting the specification, installation and testing. They must also refer to our user guide for details regarding dos and don'ts, handling, laying and installation.

SI	Standard	Description
1	EN 545	Ductile iron pipes, fittings, accessories and their joints for water pipelines - requirements and test methods.
2	ISO 2531	Ductile iron pipes, fittings, accessories and their joints for water or gas applications.
3	EN 598	Ductile iron pipes, fittings, accessories and their joints for sewerage application - requirements and test methods.
4	ISO 7186	Ductile iron products for sewerage applications.
5	BS 3416	Specification for bitumen based coatings for cold application suitable for use in contact with portable water.
6	ISO 8179	Ductile iron pipes: external zinc coating
		Part 1: Metallic Zinc with finishing layer
		Part 2: Zinc rich paint with finishing layer
7	ISO 4179	Ductile iron pipes for pressure and non-pressure pipelines - centrifugal cement mortar lining - general requirements.
8	BS 2494	Specification for elastomeric seals for joints in pipe-work and pipelines.
9	ISO 4633	Rubber seals-joint rings for water supply, drainage and sewerage pipelines - specification for materials.
10	BS 6076	Specification for tubular polyethylene film for use as protective sleeving for buried iron pipes and fittings
11	ISO 8180	Ductile iron pipes - polyethylene sleeving.
13	ISO 10802	Ductile iron pipelines - hydrostatic testing after installation.
14	ISO 10803	Design method for ductile iron pipes.
15	EN 1092	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, PN designated.
		Part 2: Cast iron flanges.
16	EN 1514	Flanges and their joints. Dimension of gaskets for PN-designated flanges.
		Part 1: Non-metallic flat gaskets with or without inserts.
		Part 2: Spiral bound gaskets for use with steel flanges.
		Part 3: Non-metallic PTFE envelope gaskets.
		Part 4: Corrugated, flat or grooved metallic and filled metallic gaskets for use with steel flanges.
17	ISO 7005	Metallic flanges - cast iron flanges.
18	AWWA C151	Ductile iron pipe, centrifugally cast, for water.
19	AWWA C600	Installation of ductile iron water mains and their appurtenances.



Transport and Delivery

At Electrosteel we offer a broad spectrum of delivery options from 46ft articulated lorries, to man in a van. We can also offer self off load, Transport for London and Crossrail compliant vehicles. It is our aim to offer cost effective, safe and efficient site deliveries. We can also provide a bespoke pre delivery site assessment covering safe access, off loading and storage options. We currently have delivery milk runs travelling to all four corners of the UK, however specific site haulage requirements and delivery schedules can be agreed.

We currently have vehicles in the following areas:

- South West - 2 p/w • South East - 3 p/w • Midlands - 2 p/w • Yorkshire - 2 p/w • Scotland - 1 p/w
- We also offer a competitive next day service

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ELAVUR (TAMIL NADU)
Gummidipoondi Taluk, P.O. Elavur, Dist. Chengai MGR Tamil Nadu, India, Pin: 601 211

HALDIA (WEST BENGAL)
Vill Kasberia, P.O. Shibramnagar, Haldia, Dist. Purba Medinipur, West Bengal, India, Pin: 721 635

UK - Flange Production and External Wrapping Facility
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