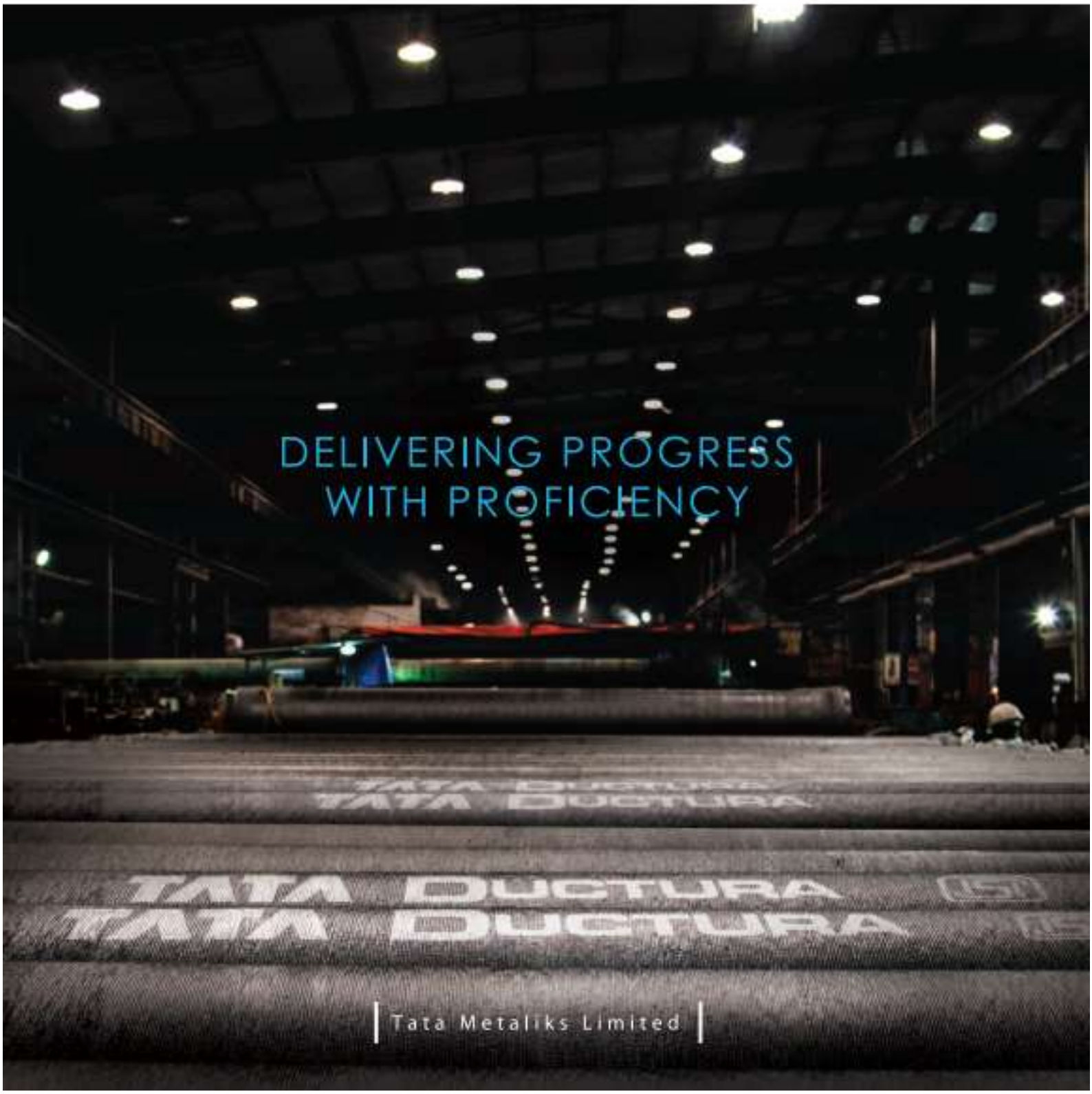
TATA

TATA DUCTURA

Happiness Guaranteed



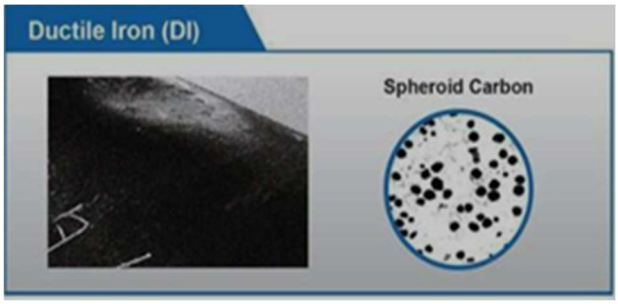
About Tata Metaliks

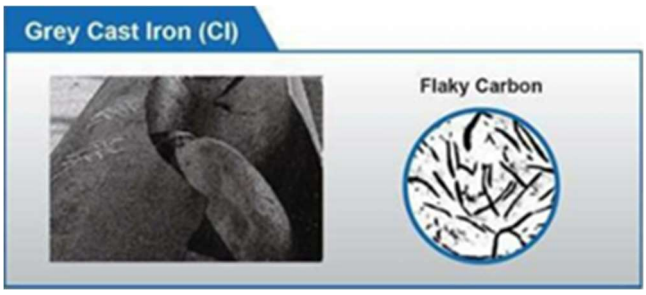
Tata Metaliks, a subsidiary of Tata Steel Limited, is one of India's largest manufacturers of foundry-grade pig iron which is used as raw material in industrial castings. The company was established in 1990 and became operational in 1994 with a state-of-the-art manufacturing facility in Kharagpur, West Bengal, India. In 2007, with an objective to manufacture and sell superior quality Ductile Iron Pipes in a process-oriented manner with the help of experienced and engaged professionals, Tata Metaliks entered into a joint venture with Kubota Corporation, Japan and Metal One Corporation, Japan.

TATA DUCTURA, the DI Pipe brand from Tata Metaliks, thus began its journey in 2009 from its manufacturing plant in Kharagpur with an installed capacity of 110,000 tonnes per annum. The company became a 100% subsidiary of Tata Metaliks in 2013 and was renamed Tata Metaliks DI Pipes Limited (TMDIPL). The plant's capacity has been scaled up to 205,000 tonnes per annum. TMDIPL hac been amalgamated with its parent company Tata Metaliks in 2016.

Ductile iron's superiority

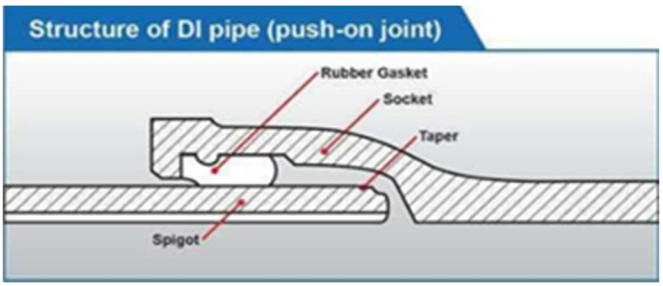
Ductile iron's superiority lies in its spheroid graphite microstructure. Since the graphite structure of grey cast iron is linear, under severe loading, stress builds up unevenly around the ends of particles and weakens the metal. However, in ductile iron, since the graphite structure is spherical, similar stress distributes evenly, thereby maintaining strength. Yet, the basic chemical composition of ductile iron is similar to that of grey cast iron, giving it the same excellent anticorrosive properties. Together, these features give ductile iron, excellent resistance to impact, pressure and corrosion.





Ductile Iron pipe (DI pipe)

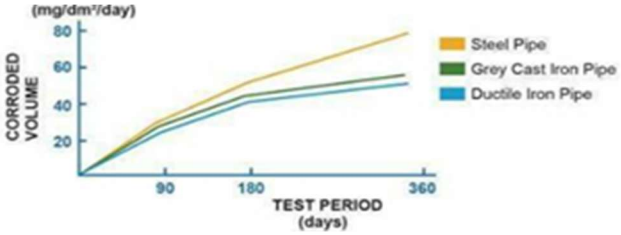
Ductile iron pipes come with socket and spigot ends. A rubber gasket is required as an accessory for all sockets before joining socket and spigot. Ductile iron is known for its longevity. Ductile iron is corrosion resistant and highly durable, which makes it the preferred choice for pipeline networks all over the world.



Excellent corrosion resistance

Ductile iron is nearly identical to grey cast iron in chemical composition. It also contains far more silicon, carbon and other elements than steel. The resistance of ductile iron to corrosion is also similar to that of grey iron.

Pipe Materials	Corroded Volume (gr/cm²)	
	After 45 days	After 90 days
Ductile Iron Pipe (DI)	0.0060	0.0090
Grey Cast Iron Pipe (CI)	0.0060	0.0103
Seamless Steel Pipe (MS)	0.0170	0.0273
Welded Steel Pipe (MS)	0.0294	0.0396



Availability of flexible joints

When pipeline is required to be deflected, ductile iron pipeline can be deflected by means of deflecting the pipeline at joints within their allowable angular deflection. When ground sinking or ground movement occurs, DI pipe lines can be adjusted to ground movement for the sake of each joint flexibility. TMDIPL ductile iron pipe shows higher angle of deflection than others.

DN	Angle of Deflection
80 - 200	5°
250 - 300	4°
400	3°
500 - 600	3°
700 - 800	2°

Manufacturing process

TMDIPL maintains excellent standards in its manufacturing process. Equipped with modern technology like Magnesium treatment by converter process, TMDIPL ensures high process capability and stringent quality control.

Superior mechanical properties

	DI Ductile Iron	MS Mild Steel	uPVC Polyvinyl Chloride	HDPE High Density Polyethylene	GI Galvanized Steel Iron
Tensile Strength (MPa)	420	400	49	20	400
Elongation (%)	10	18	50 to 150	350	18
Elasticity (N/mm²)	1.5 to 1.7 x 10^5	2.1 x 10^5	2.7 to 3.0 x 10^3	1.3 x 10^3	2.1 x 10^5
Hardness	Brinell 230	Brinell 140	Brinell 115	Brinell 163	Brinell 140
Poison Ratio	0.28 to 0.29	0.3	0.37	0.47	0.3
Specific Weight	7.05	7.85	1.43	0.96	7.85
Linear coefficient of expansion (1/°C)	1.0 x 10^{-5}	1.0 x 10^{-5}	6 to 8 x 10^{-5}	1.3 x 10^{-4}	1.1 x 10^{-5}

Highly durable cement mortar lining

Ductile iron pipe for water supply is lined with cement mortar. The lining is done by centrifugal process. The cement mortar applied to pipe achieves complete setting in a short time when subjected to steam curing. Also, by steam curing, cement mortar lining can be finished uniformly without being affected by the weather or temperature conditions. A dense and uniform lining with a smooth surface is obtained, which offers little resistance to running water and has an excellent flow capability. Tests made on DI Pipes showed very high Hazen-Williams coefficient indicating high level of smoothness of cement mortar lining.

Excellent smooth surface

Usually, cement mortar lining has a rough surface because of thin cement layers called laitance. At TMDIPL, an internal grinding procedure after cement mortar lining is done, and the laitance is ground with a grinding wheel. After the grinding process, the pipes show very smooth surface.

Excellent workability

Jointing of ductile iron pipe is very easy. Only a rubber gasket is required as an accessory to join. DI pipes can be jointed in rainy situations or even high ground level and require no special tool or highly skilled workforce. Unlike other pipe materials, ductile iron pipe has an allowable angle of deflection. This easily helps the alignment work.

In an actual pipe laying site, the pipeline is installed avoiding underground obstacles. And unlike the design stage, actual pipeline is not required to be aligned straight. Ductile iron pipe requires no special sand bed before laying due to its high tensile strength. DI pipes are extremely workable and the ease of laying and jointing of these pipes is less expensive compared to pipes made from other materials.

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Product portfolio

Nominal Diameter (mm)	Class	Standard Length (m)
80, 100, 150, 200, 250, 300, 350, 400, 450, 500, 600, 700, 800, 900, 1000	K9, K12	5.5
	C30 - C100	

Tata Metaliks DI Pipes is committed to exceed customers expectations in product quality, supply and service. The company manufactures ductile iron pipes conforming to:

- **EN 545:2006**
- **EN 545:2010**
- **EN 598:2007+A1:2009**
- **IS 8329:2000**
- **ISO2531:1998**
- **ISO2531:2009**
- **ISO7186:2011**

The range comprises ductile iron pipes suitable for push-on joints.

DN	External Diameter DE (mm)		Minimum wall thickness e (mm)					
	Nominal	Limit Deviations	Class 30	Class 40	Class 50	Class 64	Class 100	K9
80	98	+1 / -2.7					**4.7**	6.0 $^{-1.30}$
100	118	+1 / -2.8					**4.7**	6.0 $^{-1.30}$
150	170	+1 / -2.9				**4.0**		6.0 $^{-1.30}$
200	222	+1 / -3.0			**3.9**			6.3 $^{-1.50}$
250	274	+1 / -3.1			**4.8**			6.8 $^{-1.55}$
300	326	+1 / -3.3		**4.6**				7.2 $^{-1.60}$
350	378	+1 / -3.4		**5.3**				7.7 $^{-1.65}$
400	429	+1 / -3.5		**6.0**				8.1 $^{-1.70}$
450	480	+1 / -3.6		**6.8**				8.6 $^{-1.75}$
500	532	+1 / -3.8	**5.6**					9.0 $^{-1.80}$
600	635	+1 / -4.0	**6.7**					9.9 $^{-1.90}$
700	738	+1 / -4.3	**7.8**					10.8 $^{-2.00}$
800	842	+1 / -4.5	**8.9**					11.7 $^{-2.10}$
900	945	+1 / -4.8	**10.0**					12.6 $^{-2.20}$
1000	1048	+1 / -5.0	**11.1**					13.5 $^{-2.30}$

DN	External Diameter DE (mm)		Minimum wall thickness e (mm)					
	Nominal	Limit Deviations	Class 30	Class 40	Class 50	Class 64	Class 100	K12
80	98	+1 / -2.7					**4.7**	7.0 $^{-1.38}$
100	118	+1 / -2.8					**4.7**	7.2 $^{-1.40}$
150	170	+1 / -2.9					**5.9**	7.8 $^{-1.45}$
200	222	+1 / -3.0				**5.0**		8.4 $^{-1.50}$
250	274	+1 / -3.1				**6.1**		9.0 $^{-1.55}$
300	326	+1 / -3.3				**7.3**		9.6 $^{-1.60}$
350	378	+1 / -3.4				**8.5**		10.2 $^{-1.65}$
400	429	+1 / -3.5			**7.5**			10.8 $^{-1.70}$
450	480	+1 / -3.6			**8.4**			11.4 $^{-1.75}$
500	532	+1 / -3.8			**9.3**			12.0 $^{-1.80}$
600	635	+1 / -4.0			**11.1**			13.2 $^{-1.90}$
700	738	+1 / -4.3		**10.4**				14.4 $^{-2.00}$
800	842	+1 / -4.5		**11.9**				15.6 $^{-2.10}$
900	945	+1 / -4.8		**13.3**				16.8 $^{-2.20}$
1000	1048	+1 / -5.0		**14.8**				18.0 $^{-2.30}$

Pipe Class	Thickness Class (K9 & K12) and Pressure Class (C30 - C100)
Internal Lining	Cement mortar lining as per requirement with Ordinary Portland Cement, Sulphate Resisting Cement and Blast Furnace Slag Cement according to ISO 4179 and High Alumina Cement for waste water application
External Protection	Metallic Zinc (130 g/m^2 or 200 g/m^2 or 400 g/m^2 as per customer requirement) complying to ISO 8179 with a finishing layer of Black Bitumen / Epoxy Coating (minimum thickness 70 microns) or any other special coating as per customer requirement. Zn-Al alloy coating with 400g/m2 are also offered as per requirement
Type of Joint	Flexible joint type Tyton. Gasket in EPDM material according to EN681-1 and ISO 4633

Lauded and Recognized

Perhaps the greatest proof of Tata Metaliks DI Pipes' reputation as the market leader in Product Quality stems from the host of certificates and licenses the company has received from various bodies recognised nationally and internationally.

Some of the certifications it has been awarded with are:-

- EN 545: 2006 ISO2531:1998
- EN 545: 2010 ISO2531: 2009
- EN 598: 2007 + A1:2009 ISO 7186:2011
- IS 8329:2000
- ISO 9001:2008
- ISO 14001:2004
- OHSAS 18001:2007

Certifications

IRCLASS
SYSTEMS AND SOLUTIONS PRIVATE LIMITED

CERTIFICATE OF APPROVAL

Issued by Indian Register Quality Systems
(A Division of IRCLASS Systems and Solutions Private Limited)

This is to certify that the Occupational Health & Safety Management System of

Organisation: Tata Metaliks DI Pipes Limited

Address: P.O. Samralpur, Kharagpur, Dist. Midnapore (West), Pin Code - 721 301, West Bengal, India

has been assessed and found conforming to the following requirement

Standard Certified: OHSAS 18001:2007

Scope: Design & Development, Manufacture and Supply of Centrifugally Cast Ductile Iron Pipes

Certificate No.: IRQS/1340707 granted on 2nd September 2015

Originally Certified: 02/09/2015 Current Issue Date: 02/09/2015 Valid Till Date: 01/09/2018

Shashi Nath Mishra
Head IRQS

Head Office: 52A, Adi Shankaracharya Marg,Opp.Powai Lake, Powai, Mumbai - 400 072, India.

WRAS
APPROVED MATERIAL

Approval Number: 1508520

Water Regulations Advisory Scheme Ltd.
Unit 11,
Willow Road,
Pen y Fan Industrial Estate,
Crumlin,
Gwent,
NP11 4EG

20th September 2015

Tata Metaliks DI Pipes Ltd.
Tata Centre,
Jawaharlal Nehru Road,
Kolkata,
70071,
India.

WATER REGULATIONS ADVISORY SCHEME LTD. (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 BS6920:1:2000 and/or 2014 '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.

CONCRETE, CEMENT AND MORTAR - PRESSURE PIPES **S052**

TMDPL Dorma Sulphate Cement. Pale grey coloured cement, intended to line ductile iron pipes. Cured for 6hrs at 40°C then core for 96Hrs at 35°C. For use with water up to 40°C. This material is only approved for the curing conditions that appear on the approval. If the cure conditions are varied from those specified on the approval then the material is not covered by the scope of the approval.

APPROVAL NUMBER: 1508520
APPROVAL HOLDER: TATA METALIKS DI PIPES LTD.

The Scheme reserves the right to review approval.
Approval 1508520 is valid between September 2015 and September 2020.

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

Our Ref: HL/M120193
Test Report: MA435A/0

WRAS
Water Regulations Advisory Scheme

17th January 2014

Tata Metaliks DI Pipes Ltd.
Ductile Iron Pipe Plant,
Tata Centre,
43 Jawaharlal,
Nehru Road,
Kolkata 700 071,
India

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.

CONCRETE, CEMENT & MORTAR – PRESSURE PIPES **S052**

ACC Portland Slag Cement. Grey coloured, factory applied Portland slag cement. Mix and apply as per manufacturer's instructions. Cure for 28 days at 10°C – 30°C. For use with water up to 60°C.

APPROVAL NUMBER: 1203508
APPROVAL HOLDER: TATA METALIKS DI PIPES LTD.

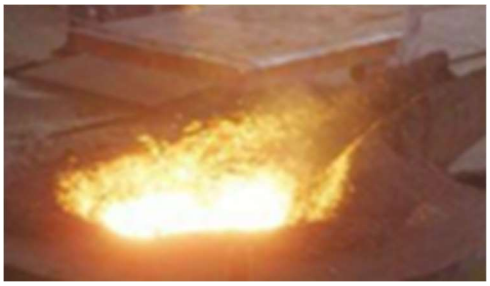
The Scheme reserves the right to review approval. This approval is valid between March 2012 and March 2017.

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



Melting

Ductile pig iron and other raw materials are charged into the induction furnace in controlled quantities and melted. Take samples and check, till to the chemical components and temperature are qualified according to the specification. Ductile iron is produced when a measured volume of this base iron is tapped into a pouring ladle which has been precharged with a weighed amount of inoculants alloy, whilst the nodularised iron occurs the final inoculation.

Pouring metal

The qualified liquid metal will be transferred to the platform for pouring casting, the vacuum pump system will work before pouring in order to keep the sand inside the flask tightened. Then, the liquid metal will be poured into the pattern of castings with a suitable pouring rate to form the fittings. The foam is evaporated as the metal take the shape of the casting cluster. The pouring rate must be as rapid as possible to keep the sprue full to avoid mold collapse and to provide a constant metallostatic head pressure. After pouring, the cluster is allowed to solidify in the flask prior to be shaken out.

Cleaning and Machining

After shaken out, the cluster proceeds to the casting finishing area for sprue, gate and riser removal. The sand is reprocessed by classification and cooling to be re-used. The fittings will be shot-blast, grind the specified surface acceptance standards. Machining and drilling will be done after cleaning. Then a zinc-rich paint layer will be covered on the external surface of fittings.

Hydrostatic Pressure Test

Each fitting will be checked by hydro-test machine in order to guarantee its leak-tightness. Fill water into the fittings, apply with high pressure state in the standards for a duration time not less than 30 seconds, no detect leakage or sweat.

Lining and Coating

Qualified fittings shall receive an internal cement mortar lining in the following type:

a) Ordinary Portland Cement
b) Sulphate Resisting Cement
c) High Alumina Cement

The mortar of lining consists of cement, sand and water, the surface of the cement mortar lining after curing shall be uniformly smooth then curing for at least 48 hours make the mortar solidified, then a bitumen layer will be covered on the external surface of fittings. The fittings will be moved to the warehouse and ready for dispatch.

Request by the client, Fusion Bond Epoxy powder or Polyurethane coating will be applied as the coating and lining.

Fusion Bond Epoxy Coating

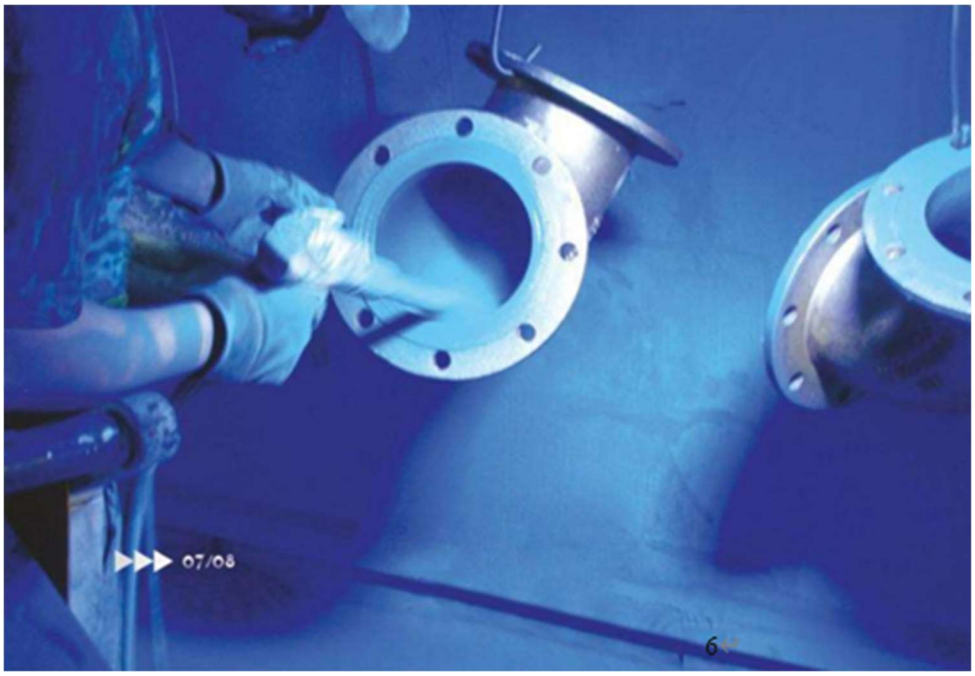
A state-of-the-art automated facility has been created to coat DI fittings with powdered epoxy by fusion bonding process.

Advantages of F. B. E.

- gives high glass and smooth coatings with excellent adhesion
- difficult shapes can be coated evenly
- provides enhanced corrosion resistant properties
- a choice of Blue (WRAS approved) or Red colours for water or sewage applications is available

Applicable Standard

- EN14901
- Film thickness: min 250 microns
- Adhesion: 8.0Mpa, min. 6.0Mpa
- Impact test: 5J by weight drop
- Cross linkage: MIBK test
- Holiday / porosity: high voltage test



Welded flanged pipes

Welded flanged pipes are made by heat shrinkage method using class K9 pipe up to 6.0m length. All flanged pipes are normally lined with cement mortar and has outside zinc and bitumen coating. Screwed Flange pipes are also available.

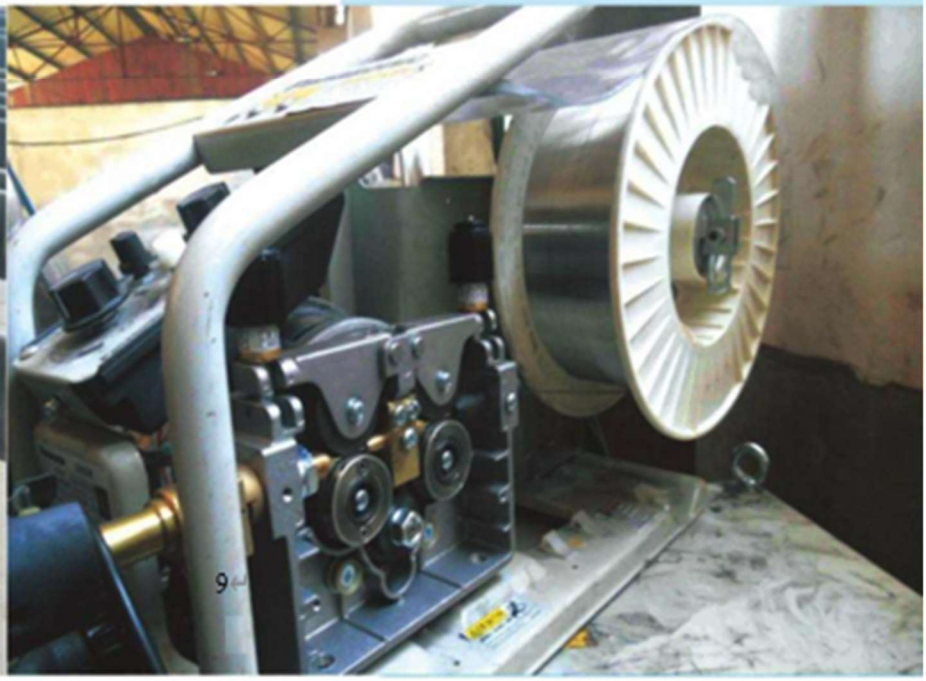













WRAS
TUV NORD
FACTORY APPROVAL CERTIFICATE
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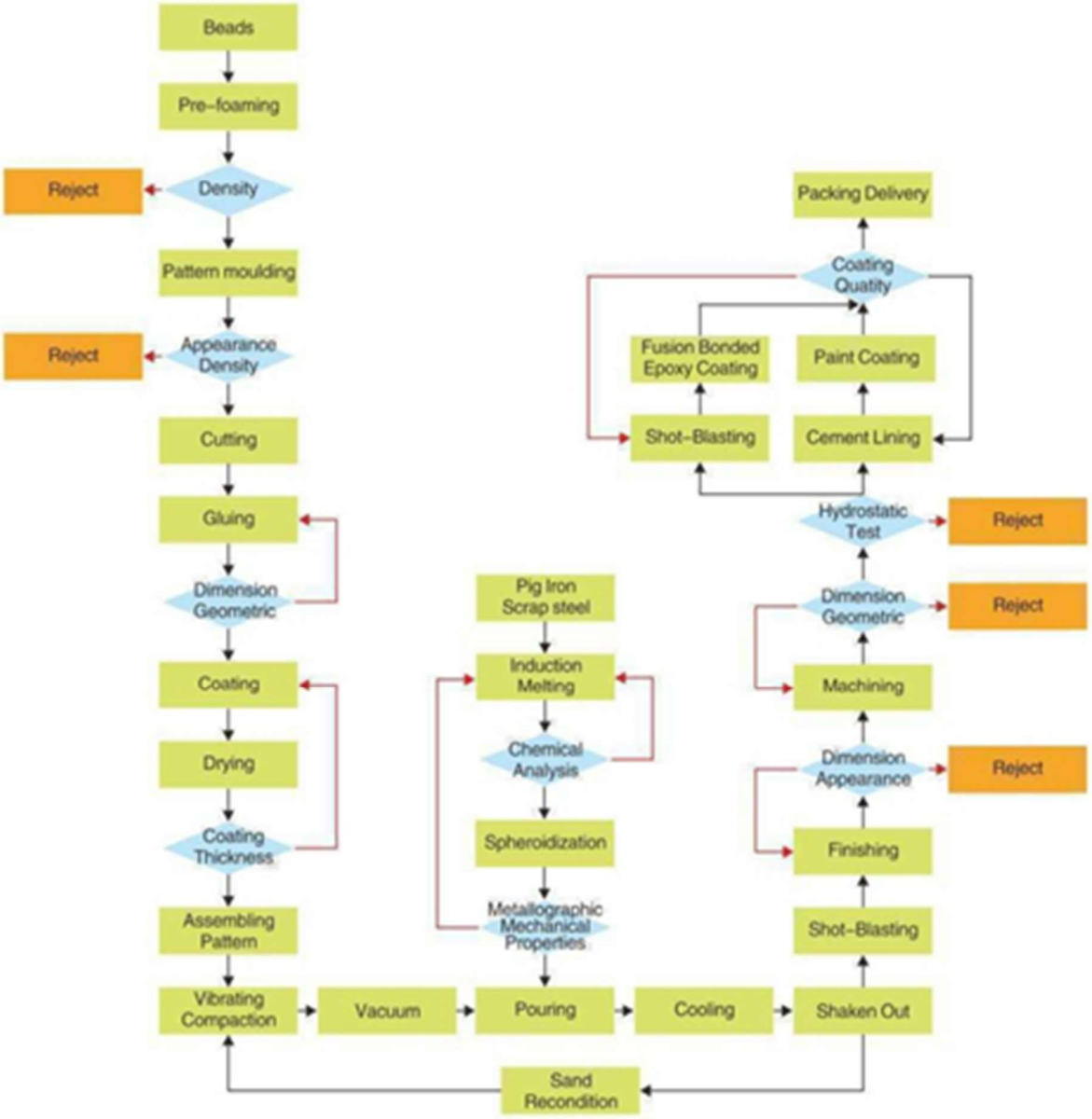
FACTORY APPROVAL CERTIFICATE
SGS

Flow Diagram

Manufacturing Process of Lost Foam

Casting Ductile Iron Fittings



QUALITY CONTROL PLAN

DUCTILE IRON FITTINGS DN 50 to DN 2600mm
(for WATER or SEWERAGE PIPELINES)

Part or all of the following standards according to project specifications	
ISO 9001	Quality management system – Requirements
GB 13295	Ductile iron pipes, fittings and accessories for water or gas applications
EN 545	Ductile iron pipes, fittings, accessories and their joints for water pipelines
EN 598	Ductile iron pipes, fittings, accessories and their joints for sewerage applications.
EN 1092-2	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories
ISO7005-2	Metallic flanges part II –– cast iron flanges
ISO 2531	Ductile iron pipes, fittings, accessories and their joints for water applications
ISO4179	Ductile iron pipes for pressure and non-pressure pipelines--cement mortar lining
ISO8179-2	Ductile iron pipes––External zinc-based coating
ISO 4633	Joint rings for water supply, drainage and sewerage pipelines
EN 14901	Epoxy coating (heavy duty) of ductile iron fittings and accessories
EN 681-1	Materials requirements for pipe joint seals used in water and drainage applications
EN 15655	Ductile iron pipes, fittings and accessories. Internal polyurethane lining for pipes and fittings.
EN12842	Ductile iron fittings for PVC-U or PE piping systems
ANSI/AWWA C110	Ductile-Iron and Gray-Iron fittings for water
ANSI/AWWA C153	Ductile-Iron compact fittings for water service
ASME B16.1	Gray-iron pipe fittings and flanged fittings
ASME B16.5	Pipe flanges and flanged fittings
AS/NZS2280	Ductile iron pipes and fittings
AS/NZS4087	Metallic flanges for waterworks purposes
ISO 2859/1	Sampling procedures for inspection by attributes
NF EN 10204	Metallic products – Types of inspection documents

QUALITY CONTROL PLAN

N°	Inspection ITEM	Checks	CONTROL BY MANUFACTURER		RECOMMENDED SECOND PARTY INSPECTION	
			Method	Frequency	Method	Frequency
1	Induction Furnace	– Chemistry	– Quick Cup chemical analysis	– Each Batch	– Review of Records	
2	Treated Metal	– Chemistry	– Spectrometer analysis	– Each Ladle	– Review of Records	
3	Cast Fittings	– Nodularity & Matrix (Metallurgical)	– Microscopy examination	– Each Ladle	– Review of Records	
4	Type of fittings	– DN – Type of fitting – Type of joint	– Visual – Visual – Visual	– Unit – Unit – Unit	– Visual – Visual – Visual	General inspection of the batch compared to the order
		– Quantity by fitting type	– Counting	– Delivery	– Counting	Each delivery
5	General specifications	– Cast iron aspect (external) – Cast iron aspect (socket) – Dimensional	– Visual – Visual – Templates	– Unit – Unit – Unit	– Visual	General inspection of the batch
6	Mechanical Properties tests	– Mechanical strength (Rm.) – Elongation (A %) – Hardness (HB)	– Standard – Standard – Standard	– Standard – Standard – Standard	– witness test	10% ladles and review all the test record of the order
7	Leak Tightness	– Hydraulic test	– Visual+ anometer	– Unit	– witness test	5%
8	Zinc paint plus Bitumen coating	– Thickness – Aspect	– Magnetic measure – Visual	– 1/shift – Unit	– Magnetic measure – Visual	Sampling and recording according to ISO 2859-1 control level S1
10	Epoxy coating	– Thickness – Aspect	– Magnetic measure – Visual	– Unit – Unit	– Magnetic measure – Visual	Sampling and recording according to ISO 2859-1 control level S1
		– Cross linkage – Impact test 5J	– MIBK test – Weight drop	– 1/shift – 1/shift	– witness	
		– Adhesion	– Punch separation	– 1/shift	– witness	
		– Holiday/porosity	– High voltage test	– 1/shift	– witness	

QUALITY CONTROL PLAN

DUCTILE IRON FITTINGS DN 50 to DN 2600mm
(for WATER or SEWERAGE PIPELINES)

N°	Inspection ITEM	Checks	CONTROL BY MANUFACTURER		RECOMMENDED SECOND PARTY INSPECTION	
			Method	Frequency	Method	Frequency
11	Marking	– Molding marks, sticker, paint, etc...	– Visual	– Unit	Visual : conformity control of each marking in accordance with specificitions of the order	
12	Packaging	– Aspect	– Visual	– Unit	– Visual inspection of the batch	
13	Rubber gaskets	– Conformity to the order – Quantity – Packaging – Marking	– Visual	– Each delivery	– Visual	Each inspection
14	Quality system	– Conformity to ISO 9001-2008	– Approved by accredited third party	– 1 audit yearly	– Check the validity	Once for the order
15	Inspection mark				– Third party logo	Each controlled fitting
16	Certificate of compliance – Certificate of compliance based on production tests. The certificate specifies that the delivery products have been manufactured and controlled in conformity with the applicable standards within the framework of the order.		Certificates prepared by the supplier include : •Mechanical test results (Rm, A%, HB) •Tightness test results •The delivery check (description and quantity)		Control and signature of the certificates	Each inspection
17	Third party inspection report	Writing report including : • Measurement and test apparatuses certificates of conformity for production controls and also for the third party tests. • Recordings carried out by third party inspector. • Manufacturer certificates				Each inspection

Technical specification of Ductile Iron Pipe Fittings

Permissible deviation on lengths of fittings

Type of Fittings	DN(mm)	Deviation(mm)
Flange sockets, Flange spigots, collars, Tapers	80–1200	± 25
	1400–2000	± 35
Tees	80–1200	+50 –25
	1400–2000	+75 –35
90° (1/4) Bends	80–2000	± (15+0.03DN)
45° (1/8) Bends	80–2000	± (10+0.025DN)
22° 30′ (1/16) Bends	80–1200 1400–2000	± (10+0.02DN) ± (10+0.025DN)
11° 15′ (1/32) Bends		



Limit deviations on lengths

Type of Fittings	DN(mm)	Limit Deviations(mm)
Fittings for socketed joints	80–1200	± 25
Pipe and Fittings for Flanged joints	80–2000	± 10



Chemical Analysis

Chemical elements of metal shall fall within below range

Element	C	Si	Mn	S	P	Mg	RE
%	3.4~3.9	2.5~3.0	≤0.4	≤0.02	≤0.08	0.02~0.06	0.02~0.04

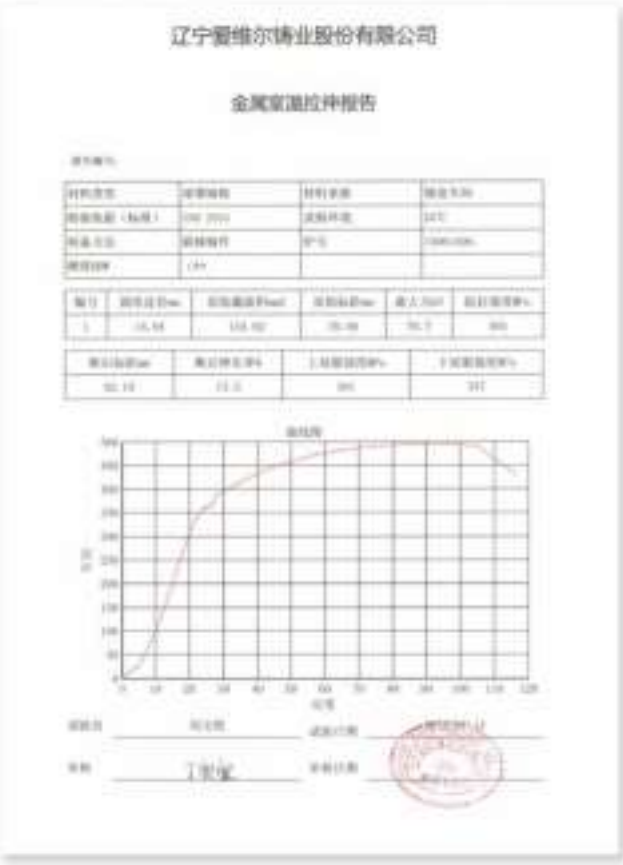
Mettallurgical microscopy examination for last metal in each ladle

Item	Nodulizing Rate	Ferrite	Pearlite	Cementite
%	≥80	≥50	≤30	≤5

Mechanical properties

Fittings and accessories of ductile iron shall have the properties given below

Item	Tensile strength N/MM²	Elongation %	Brinell hardness HB
	≥420	≥5	≤250



辽宁爱维尔铸业股份有限公司

金属室温拉伸报告

Wall Thickness

The minimum wall thickness of fittings is 7mm, limit deviation is −2.3mm

The nominal wall thickness: e=K(0.5+0.001DN), limit deviation is -(2.3+0.001DN)mm

The nominal wall thickness of different size fittings are listed in below table: in mm

DN	80	100	150	200	250	300	350	400	450	500	600	700	800	900	1000	1100	1200	1400	1600	1800	2000
K9	6.0	6.1	6.3	6.4	6.8	7.2	7.7	8.1	8.6	9.0	9.9	10.8	11.7	12.6	13.5	14.4	15.3	17.1	18.9	20.7	22.5
K12	7.0	7.2	7.8	8.4	9.0	9.6	10.2	10.8	11.4	12.0	13.2	14.4	15.6	16.8	18.0	19.2	20.4	22.8	25.2	27.6	30.0
K14	8.1	8.4	9.1	9.8	10.5	11.2	11.9	12.6	13.3	14.0	15.4	16.8	18.2	19.6	21.0	22.4	23.8	26.6	29.4	32.2	35.0
Tolerance	−2.3	−2.4	−2.5	−2.5	−2.6	−2.6	−2.7	−2.7	−2.8	−2.8	−2.9	−3.0	−3.1	−3.2	−3.3	−3.4	−3.5	−3.7	−3.9	−4.1	−4.3

Note: the lower limit only is given, so as to ensure sufficient resistance to internal pressure

Pressure test

The pressure test shall be carried out on all fittings before the application of their external and internal coatings, except for the metallic zinc coating of pipes which may be applied before the test. No leakage or sweating should be detected during test.

DN(MM)	Minimum works test pressure(bar)
80–300	25
350–600	16
700–1600	10

Note: The works hydrostatic test pressure is less for fittings than for pipes because the shape of the fittings makes it difficult to provide sufficient restraint to high internal pressure during the test.

Lining

Fittings are supplied with manually applied cement mortar lining, the mortar of the lining is composed of cement, sand and water. The mortar contains by mass minimum one part of cement to 3.5 parts of sand.

The nominal thickness of the lining and the minimum permissible values are given in the table below

DN（MM）	Nominal lining thickness（mm）	Minimum at one point（mm）
≤300	4	2.5
350-600	5	3
700-1200	6	3.5
1400-2000	9	6

Note:The surface of the cement mortar lining shall be uniform and smooth. Trowel marks, protrusion of sand grains and surface texture inherent to the method of manufacture are acceptable.
Storage of fittings in hot, dry environment can cause metal expansion and mortar shrinkage which can result in dry lining developing areas of disbondment and shrinkage cracks exceeding the above given width. When the lining is re-exposed to water, it will swell by absorption of moisture and the cracks will close to conform to above table and will eventually heal by autogenous process.

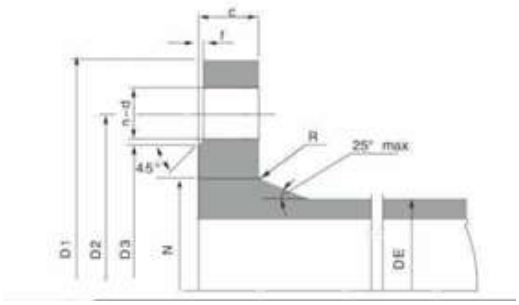
Coating

A layer of zinc-rich coating+bitumen shall be uniformly covered the whole surface of the casting and have a smooth regular appearance.

The mean mass of zinc rich painting shall not be less than 200g/m², the mean thickness of the coating shall be not less than 70 μm and the local minimum thickness shall be not less than 50 μm.

Special Fittings

Special designed fittings are available when requested



PN16 Flange

DN	D1	D2	D3	C	f	N	R	n	d	Bolt Size	Mass (kg)
80	200	160	132	19	3	120	6	8	19	M16*65	2.9
100	220	180	156	19	3	140	6	8	19	M16*65	3.3
150	285	240	211	19	3	190	8	8	23	M20*70	4.9
200	340	295	266	20	3	246	8	12	23	M20*70	6.6
250	400	355	319	22	3	296	10	12	28	M24*90	9.2
300	455	410	370	24.5	4	350	10	12	28	M24*90	12.4
350	520	470	429	26.5	4	410	10	16	28	M24*90	17.2
400	580	525	480	28	4	458	10	16	31	M27*100	21.9
450	640	585	548	30	4	516	12	20	31	M27*100	26.7
500	715	650	609	31.5	4	576	12	20	34	M30*110	37.0
600	840	770	720	36	5	690	12	20	37	M33*120	57.3
700	910	840	794	39.5	5	760	16	24	37	M33*120	55.6
800	1025	950	901	43	5	862	16	24	40	M36*140	74.0
900	1125	1050	1001	46.5	5	962	16	28	40	M36*140	88.2
1000	1255	1170	1112	50	5	1076	16	28	43	M39*150	122.9
1200	1485	1390	1328	57	5	1282	20	32	49	M45*170	185.2
1400	1685	1590	1530	60	5	1482	20	36	49	M45*180	215.9
1600	1930	1820	1750	65	5	1696	20	40	56	M52*190	308.4
1800	2130	2020	1950	70	5	1896	20	44	56	M52*200	362.2
2000	2345	2230	2150	75	5	2100	20	48	62	M56*220	432.2

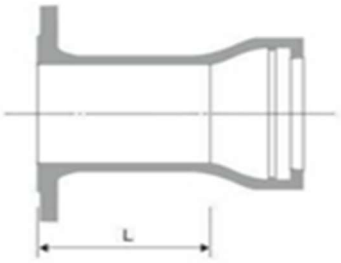
Tolerances on flange dimensions

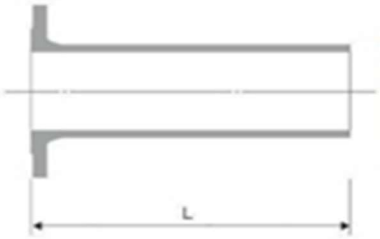
Dimensions and tolerances in millimetres

Dimensions for all types		DN				
		DN50–100	DN125–300	DN350–600	DN700–1200	DN1400–2000
Symbol	Designation	Suggested tolorances				
D1	Outside diameter	Not specified but the minimum shall provide a sufficient bearing area for standard hexagonal bolt				
d3	Facing diameter	+4.5 –4	+5.5 –4.5	+6.5 –5	+8.5 –5.5	+10 –6
f1	Facing height	Height: 2 / 3 / 4 / 5 / 6 Tolerances: +1 –1 / +1.5 –2 / +2 –3 / +2.5 –4 / +3 –5				
b1	Flange thickness at edge	Thickness: < 25 / 26 to 40 / 41 to 55 / 56 to 70 / > 71 Tolerances: ±4 / ±4.5 / ±5 / ±6 / ±7				
L2	Diameter of bolt holes	Diameter of bolt holes: < 20 / > 22 Tolerances: +0.5 0 / +1 0				
D2	Diameter of bole circle	Diameter of bolt circle for bolt size: M10 / M12 to M24 / M27 to M45 / M52 / > M56 Tolerances: ±1 / ±1.5 / ±2 / ±3 / ±3.5				
–	Centre to centre of adjacent bolt holes	Conter to centre for bolt size: M10 / M12 to M24 / M27 to M45 / M52 / > M56 Tolerances: ±0.5 / ±0.75 / ±1 / ±1.5 / ±1.75				
–	Parallelism of bolting surface with joint surface	2° max				

1) b=c–f1



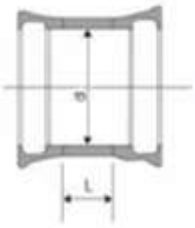


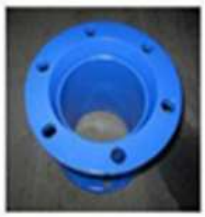
Flanged Socket

DN	L	Mass (kg)
		PN16
80	130	7.4
100	130	9.0
150	135	14.2
200	140	20.0
250	145	27.5
300	150	36.5
350	155	48.0
400	160	60.0
450	165	76.5
500	170	93.0
600	180	135
700	190	159
800	200	208
900	210	258
1000	220	324
1200	240	521
1400	310	820
1600	330	1278
1800	350	1421
2000	370	T.B.C.

Flanged Spigot

DN	L	Mass (kg)
		PN16
80	350	7.8
100	360	9.6
150	380	15.6
200	400	22.5
250	420	31.5
300	440	42.5
350	460	55
400	480	70
450	500	88
500	520	109
600	560	159
700	600	194
800	600	245
900	600	295
1000	600	369
1200	600	520
1400	710	732
1600	780	1024
1800	850	1322
2000	920	1687



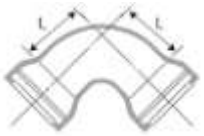


Collar T-type & MJ-K-type (Standard Length)

DN	d	L	Mass (kg)		K type include 2 glands
			T-type	K-type	
80	109	160	7.9	11.6	19.8
100	130	160	9.9	14.7	22.9
150	183	165	15.9	20.3	31.7
200	235	170	23	27.4	42.4
250	288	175	31.5	34.3	53.3
300	340	180	41	51.8	76.2
350	393	185	52	62.4	91.9
400	445	190	64	74.4	109
450	498	195	91	96.2	142
500	550	200	93	98.8	145
600	655	210	129	125	182
700	760	220	172	202	280
800	865	230	223	250	345
900	970	240	282	319	443
1000	1075	250	349	349	477
1200	1285	270	560	560	725
1400	1477	340	816	816	1024
1600	1683	360	1395	1094	1340
1800	1889	380	1822	1426	1750
2000	2095	400	T.B.C.	1818	2210

Collar MJ-K-type (Long Type)

DN	d	L	Mass (kg)	K type include 2 glands
80	109	320	13.5	21.7
100	130	320	16.5	24.7
150	183	325	24.4	35.8
200	235	330	32.6	47.6
250	288	335	42.5	61.5
300	340	400	61.7	86.1
350	393	405	78.6	108
400	445	410	100.4	135
450	498	415	126.9	173
500	550	420	134.6	181
600	655	430	171.9	229
700	760	460	261.5	339
800	865	470	323.4	419
900	970	480	407.7	532
1000	1075	510	454.4	582
1200	1285	530	760	925
1400	1492	600	1076	1284
1600	1699	680	1421	1667
1800	1905	720	1828	2152
2000	2107	760	2301	2693



Double Socket 90° Bend

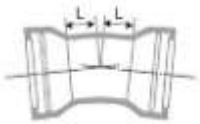
DN	L	Mass (kg)
		T-type
80	100	8.6
100	120	11.4
150	170	20.5
200	220	33
250	270	48.5
300	320	68
350	370	98.4
400	420	129
450	470	163
500	520	204
600	620	303
700	720	436
800	820	595
900	920	793
1000	1020	1045
1200	1220	1624
1400	1220	2419
1600	1290	3444
1800	1320	4283
2000	T.B.C.	T.B.C.

Double Socket 45° Bend

DN	L	Mass (kg)
		T-type
80	55	7.7
100	65	10.1
150	85	17.4
200	110	27
250	130	38.5
300	150	53
350	170	70
400	195	89
450	220	123
500	240	129
600	285	202
700	330	282
800	370	378
900	415	496
1000	460	635
1200	550	986
1400	515	1509
1600	565	2117
1800	610	2615
2000	660	T.B.C.

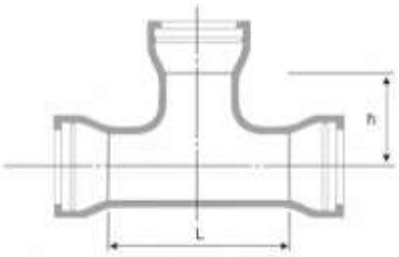
Double Socket 22.5° Bend

DN	L	Mass (kg)
		T-type
80	40	7.3
100	40	9.3
150	55	15.9
200	65	24
250	75	33.5
300	85	44.5
350	95	58
400	110	74
450	120	102
500	130	111
600	150	157
700	175	248
800	195	331
900	220	432
1000	240	550
1200	285	851
1400	260	1241
1600	280	1628
1800	305	2037
2000	330	T.B.C.



Double Socket 11.25° Bend

DN	L	Mass (kg)
		T-type
80	30	7.1
100	30	8.9
150	35	14.8
200	40	22
250	50	30.5
300	55	40.5
350	60	52
400	65	65
450	70	91.9
500	75	96
600	85	134
700	95	216
800	110	286
900	120	374
1000	130	473
1200	150	724
1400	130	1047
1600	140	1376
1800	155	1704
2000	165	T.B.C.



All Socket Tee

Body	Branch	L	H	Mass (kg)
DN	dn			T-type
80	80	170	85	12.4
100	80	170	95	14.8
	100	190	95	16.1
150	80	170	120	21.5
	100	195	120	23.5
	150	255	125	28
200	80	175	145	30
	100	200	145	32
	150	255	150	37
	200	315	155	43
250	80	175	165	40
	100	200	165	42.7
	150	260	175	51.1
	200	315	180	55.9
	250	375	185	63.2
300	80	180	190	51.5
	100	200	195	54.2
	150	260	200	64.3
	200	320	205	69.9
	250	375	210	79.9
	300	435	215	86.2
350	80	180	215	63.6
	100	205	220	67.2
	150	265	225	79.6
	200	320	230	84.9
	250	380	235	96.9
	300	435	240	106
	350	495	245	116
400	80	185	240	76.1
	100	210	245	82.2
	150	265	240	96.7
	200	325	255	102
	250	380	260	116
	300	440	265	126
	350	500	270	137
	400	555	275	150

Body	Branch	L	H	Mass (kg)
DN	dn			T-type
450	80	185	265	101
	100	210	270	106
	150	270	275	116
	200	325	280	127
	250	385	285	138
	300	445	290	149
	350	500	295	161
	400	560	300	173
	450	615	305	186
500	80	190	290	110
	100	215	295	115
	150	270	300	137
	200	330	305	141
	250	390	310	161
	300	445	315	174
	350	505	320	187
	400	560	325	199
	450	620	330	214
	500	680	340	234
600	80	195	340	165
	100	220	345	169
	150	280	350	185
	200	335	355	188
	250	395	360	215
	300	450	365	231
	350	510	370	246
	400	570	375	258
	450	625	380	280
	500	685	390	296
	600	800	400	343
700	80	205	395	217
	100	230	395	224
	150	285	400	241
	200	345	405	259
	250	400	410	277
	300	460	420	297

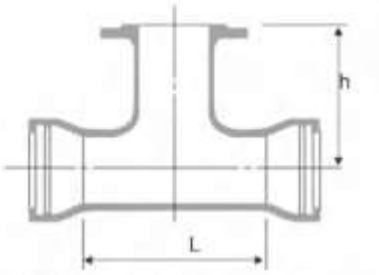
Body	Branch	L	H	Mass (kg)
DN	dn			T-type
700	350	520	425	317
	400	575	430	337
	450	635	435	361
	500	690	440	380
	600	810	450	430
	700	925	460	486
800	80	210	445	278
	100	235	445	287
	150	290	450	307
	200	350	455	330
	250	410	460	352
	300	465	470	374
	350	525	475	398
	400	580	480	420
	450	640	485	448
	500	700	490	472
	600	815	500	526
	700	930	510	586
	800	1045	525	655
900	80	215	495	349
	100	240	495	360
	150	300	500	386
	200	355	505	410
	250	415	410	437
	300	470	515	462
	350	530	525	490
	400	590	530	518
	450	645	535	547
	500	705	540	574
	600	820	550	635
	700	935	560	700
	800	1050	570	774
	900	1170	585	858
1000	80	225	545	433
	100	245	545	443
	150	305	550	474

All Socket Tee

Body	Branch	L	H	Mass (kg)
DN	dn			T-type
1000	200	360	555	502
	250	420	560	533
	300	480	570	564
	350	535	575	594
	400	595	580	626
	450	650	585	659
	500	710	590	690
	600	825	600	758
	700	940	610	831
	800	4060	625	913
	900	1175	635	1000
	1000	1290	645	1096
1200	80	235	645	631
	100	260	645	648
	150	315	650	685
	200	375	655	725
	250	430	660	766
	300	490	670	816
	350	550	65	845
	400	605	680	884
	450	665	685	929
	500	720	690	966
	600	840	700	1054
	700	955	710	1143
	800	1070	725	1239
	900	1185	735	1339
	1000	1300	745	1447
	1200	1535	765	1697
1400	250	250	745	988.8
	270	270	745	1006
	300	330	750	1058
	385	385	755	1110
	445	445	760	1153
	500	500	770	1209

Body	Branch	L	H	Mass (kg)
DN	dn			T-type
1400	350	560	775	1257
	400	620	780	1307
	450	675	785	1357
	500	735	790	1402
	600	850	800	1507
	700	965	810	1627
	800	1080	825	1737
	900	1200	835	1861
	1000	1315	845	1984
	1200	1545	865	2279
	1400	1780	890	2648
1600	80	260	845	T.B.C.
	100	280	845	T.B.C.
	150	340	850	T.B.C.
	200	400	855	1551
	250	455	860	1616
	300	515	870	1674
	350	570	875	T.B.C.
	400	630	880	1797
	450	590	885	T.B.C.
	500	745	890	1946
	600	860	900	2044
	700	980	910	T.B.C.
	800	1095	925	2318
	900	1210	935	T.B.C.
	1000	1325	945	2618
	1200	1560	965	2942
	1400	1790	990	3341
	1600	2020	1010	3800
1800	80	270	945	T.B.C.
	100	295	945	T.B.C.
	150	350	950	T.B.C.
	200	410	955	1897
	250	470	960	1980

Body	Branch	L	H	Mass (kg)
DN	dn			T-type
1800	300	525	970	2063
	350	585	975	T.B.C.
	400	640	980	2208
	450	700	985	T.B.C.
	500	760	990	2353
	600	875	1000	2526
	700	990	1010	T.B.C.
	800	1105	1025	2835
	900	1220	1035	T.B.C.
	1000	1340	1045	3173
	1200	1570	1065	3543
	1400	1800	1090	3983
	1600	2035	1110	4473
	1800	2265	1135	4958
2000	80	280	1045	T.B.C.
	100	305	1045	T.B.C.
	150	365	1050	T.B.C.
	200	420	1055	T.B.C.
	250	480	1060	T.B.C.
	300	540	1070	T.B.C.
	350	600	1075	T.B.C.
	400	655	1080	T.B.C.
	450	710	1085	T.B.C.
	500	770	1090	T.B.C.
	600	885	1100	T.B.C.
	700	1000	1110	T.B.C.
	800	1120	1125	T.B.C.
	900	1235	1135	T.B.C.
	1000	1350	1145	T.B.C.
	1200	1580	1165	T.B.C.
	1400	1815	1190	T.B.C.
	1600	2045	1210	T.B.C.
	1800	2280	1235	T.B.C.
	2000	2510	1255	T.B.C.



Double Socket Tee with Flanged Branch

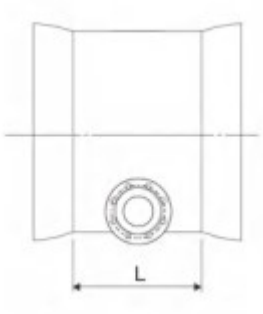
Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
80	80	170	160	13.5
100	80	170	175	15.8
	100	190	180	17.2
150	80	170	205	23
	100	195	210	24.5
	150	255	220	29.5
200	80	175	235	31.5
	100	200	240	33.5
	150	255	250	39
	200	315	260	46
250	80	175	265	44
	100	200	270	43.5
	150	260	280	56.6
	200	315	290	57
	250	375	300	66
300	100	200	300	55
	150	260	310	68
	200	320	320	70
	250	375	330	81
	300	435	340	91
350	100	205	330	68
	150	265	340	81.3
	200	320	350	86
	250	380	360	114
	300	435	370	118
	350	495	380	120
400	100	210	360	83
	150	265	370	98
	200	325	380	102
	250	380	390	118
	300	440	400	131
	350	500	410	146
	400	555	420	456
450	100	210	390	107
	150	270	400	119

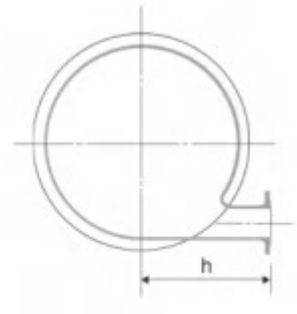
Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
450	200	325	410	129
	250	385	420	140
	300	445	430	154
	350	500	440	169
	400	560	450	185
	450	615	460	200
500	100	215	420	116
	150	270	430	137
	200	330	440	141
	250	390	450	165
	300	445	460	179
	350	505	470	195
	400	565	480	205
	450	620	490	228
	500	680	500	247
600	100	220	480	171
	150	280	490	187
	200	340	500	189
	250	395	510	218
	300	450	520	235
	350	510	530	255
	400	570	540	263
	450	625	550	293
	500	685	560	309
	600	800	580	366
700	100	230	510	242
	150	285	515	246
	200	345	525	242
	300	460	540	300
	350	520	545	315
	400	575	555	325
	450	635	560	378
	500	690	570	406
	600	810	585	445
	700	925	600	475

Double Socket Tee with Flanged Branch

Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
800	100	235	570	304
	150	290	580	308
	200	350	585	306
	250	410	590	351
	300	465	600	371
	400	580	615	403
	500	700	630	537
	600	815	645	605
	700	930	660	635
	800	1045	675	642
900	100	240	630	378
	150	300	635	381
	200	355	645	379
	300	470	660	455
	400	590	675	495
	500	705	690	681
	600	820	705	774
	700	935	720	803
	800	1050	735	823
	900	1170	750	838
1000	100	245	690	461
	150	305	695	464
	200	360	705	462
	250	420	710	521
	300	480	720	552
	400	595	735	596
	500	710	750	867
	600	825	765	973
	700	940	780	1000
	800	1060	795	1021
	900	1175	810	1076
	1000	1290	825	1086
1200	100	260	810	676
	200	375	825	682
	300	490	840	769
	400	605	855	856
	500	720	870	973
	600	840	885	1027
	700	955	900	1184
	800	1070	915	1210
	900	1185	930	1427
	1000	1300	945	1470
	1200	1535	975	1736
1400	100	450	905	1120
	200	565	920	1240

Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
1400	300	680	935	1338
	400	800	950	1449
	500	915	965	1554
	600	1030	980	1706
	800	1260	1010	1926
	1000	1495	1040	2193
	1200	1725	1070	2457
	1400	1960	1100	2747
1600	200	580	1030	1748
	250	635	1040	1809
	300	695	1045	1876
	400	810	1060	2008
	500	925	1075	2143
	600	1040	1090	2285
	800	1275	1120	2829
	1000	1505	1150	2862
	1200	1740	1180	3205
	1400	1970	1210	3539
	1600	2200	1240	3975
1800	200	595	1150	2146
	250	650	1150	2220
	300	705	1155	2294
	400	820	1170	2454
	500	940	1185	2623
	600	1055	1200	2791
	800	1285	1230	3109
	1000	1520	1260	3472
	1200	1750	1290	3856
	1400	1980	1320	4233
	1600	2215	1350	4710
	1800	2445	1380	5188
2000	200	600	1250	T.B.C.
	250	660	1260	T.B.C.
	300	720	1270	T.B.C.
	400	835	1290	T.B.C.
	500	950	1305	T.B.C.
	600	1065	1310	T.B.C.
	800	1300	1340	T.B.C.
	1000	1530	1370	T.B.C.
	1200	1760	1400	T.B.C.
	1400	1995	1430	T.B.C.
	1600	2225	1460	T.B.C.
	1800	2460	1490	T.B.C.
	2000	2690	1520	T.B.C.

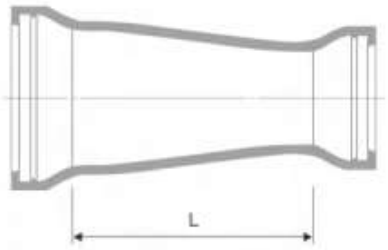




Double Socket Level Invert Tee

Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
200	100	200	240	36.5
	150	250	250	44
250	100	200	270	47.5
	150	255	280	62.6
	200	315	290	65
300	100	205	300	59
	150	260	310	74
	200	320	320	79
350	100	205	330	73
	150	265	340	91.5
	200	325	350	96
400	100	210	360	89
	150	265	370	101
	200	325	380	114
	250	380	390	133
450	100	210	400	114
	150	270	400	130
	200	325	410	142
	250	385	420	154
500	300	445	430	174
	100	215	420	124
	150	274	430	150
	200	330	440	157
	250	390	450	181
	300	445	460	201
600	100	220	480	185
	150	280	490	199
	200	340	500	205
	250	395	510	238

Body	Branch	L	H	Mass (kg)
				T-type
DN	dn			PN16
600	300	450	520	25
	350	510	530	289
	400	570	540	300
700	100	230	510	261
	150	285	515	265
	200	345	525	269
	300	460	540	324
800	100	235	570	328
	150	290	575	335
	200	350	585	336
	250	410	590	379
	300	465	630	401
900	150	300	635	409
	200	355	645	416
	300	470	660	491
	400	590	675	542
1000	100	145	690	449.8
	150	305	695	476.7
	200	360	705	504.4
	300	4850	720	569.6
1200	200	375	825	738.1
	400	605	855	911
1400	200	565	920	1256
	400	800	950	1470
	600	1030	980	1733
1600	400	810	1060	2036
1800	400	820	1170	2492
2000	400	835	1280	T.B.C.
	600	1065	1310	T.B.C.

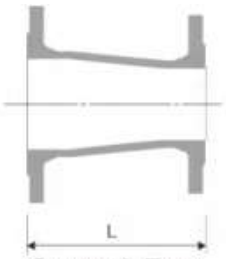


Double Socket Taper / Reducer

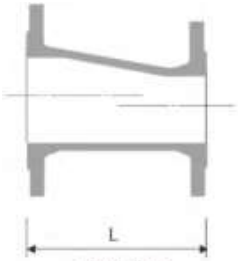
DN	dn	L	Mass (kg)
			T-type
100	80	90	8.5
150	80	190	13.5
	100	150	13.8
200	80	290	20.5
	100	250	20.5
	150	150	21
250	80	390	28.5
	100	300	28.5
	150	250	29
	200	150	29
300	80	490	39
	100	450	39
	150	350	39.5
	200	250	39.5
	250	150	38.5
350	80	600	51.5
	100	560	50
	150	460	52
	200	360	52
	250	260	51
	300	160	49.5
400	80	700	64
	100	660	65
	150	560	66.5
	200	460	67
	250	360	66
	300	260	64
	350	160	62
450	80	760	87.9
	100	760	87.9
	150	660	88.9
	200	560	88.9
	250	460	89.2
	300	360	88.1

DN	dn	L	Mass (kg)
			T-type
450	350	260	86
	400	160	83.1
500	80	900	101
	100	860	101
	150	760	102
	200	660	101
	250	560	101
	300	460	100
	350	360	98
	400	260	94
	450	160	99.5
600	80	1100	152
	100	1060	152
	150	960	153
	200	860	154
	250	760	153
	300	660	152
	350	560	151
	400	460	142
	450	360	149
	500	260	131
700	200	1080	215.9
	250	980	216.1
	300	880	218.5
	350	780	212.4
	400	680	206.7
	450	580	199.6
	500	480	194
	600	280	178
800	400	880	285
	450	780	277.7
	500	680	272.2
	600	480	252
	700	280	229

DN	dn	L	Mass (kg)
			T-type
900	400	1080	387.4
	450	980	372.2
	500	880	366.8
	600	680	349.4
	700	480	318
	800	280	288
1000	600	880	476
	700	680	446.3
	800	480	392
	900	280	354
1200	600	1280	745
	700	1080	729.6
	800	880	710.7
	900	680	674.3
	1000	480	570
1400	600	960	844.4
	700	860	855.6
	800	760	859.5
	900	660	862.8
	1000	560	861.6
	1200	360	711
1600	800	960	1207
	900	860	1220
	1000	760	1211
	1200	560	1212
	1400	360	950
1800	1000	960	1547
	1200	760	1549
	1400	560	1581
	1600	360	1605
2000	1000	1160	T.B.C.
	1200	960	T.B.C.
	1400	760	T.B.C.
	1600	560	T.B.C.
	1800	360	T.B.C.



Concentric Type



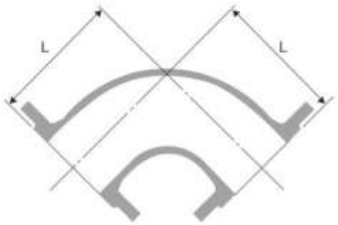
Flat Type

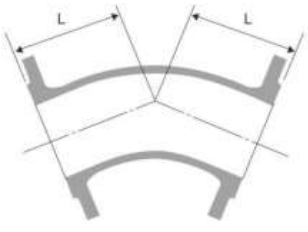
Double Flanged Taper / Reducer

DN	dn	L	Mass(kg) PN16
80	40	200	8.6
	50	200	8.7
	65	200	8.9
100	50	200	9
	65	200	9.1
	80	200	9.3
150	50	300	T.B.C.
	80	400	16.1
	100	300	15
200	80	600	25.1
	100	600	27.5
	150	300	27.5
250	100	600	32.6
	150	600	39.5
	200	300	29.5
300	100	600	43.6
	150	600	46
	200	600	51
	250	300	39.5
350	100	750	55.2
	150	700	58.8
	200	600	60.5
	250	600	67
	300	300	52
400	100	800	69.4
	150	750	73.1
	200	600	71
	250	600	77
	300	600	84
	350	300	67
450	100	900	86

DN	dn	L	Mass(kg) PN16
450	150	800	86.7
	200	750	90.4
	250	600	87.5
	300	600	95
	350	600	104
	400	300	81
500	100	950	105.9
	150	900	110.2
	200	800	110
	250	700	114
	300	600	111
	350	600	121
	400	600	130
	450	300	139
600	100	1050	150.6
	150	100	155.1
	250	900	164.1
	300	800	171
	350	700	167
	400	600	164
	450	600	175
	500	600	190
700	200	1100	195.3
	250	1050	200.6
	300	1100	206.2
	350	900	205.2
	400	80	204.1
	450	700	213
	500	600	208
	600	600	243
800	400	1030	285

DN	dn	L	Mass(kg) PN16
800	450	900	274.8
	500	800	285
	600	600	275
	700	600	285
900	400	1100	339.6
	450	1100	380
	500	1000	377
	600	800	366
	700	600	333
	800	600	352
1000	500	1200	501
	600	1000	487
	700	800	452
	800	600	418
	900	600	438
1200	600	1150	638.5
	700	1345	768
	800	1160	765
	900	975	708
	1000	790	692
1400	700	850	629.6
	800	950	744.2
	900	1100	868.9
	1000	1000	886.5
	1200	850	947
1600	1000	1650	1484
	1200	1000	1205
	1400	910	1273
1800	1000	1760	1770
	1200	1710	1899
	1400	1340	1760





Double Flanged 90° Bend

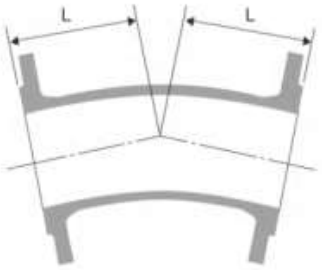
DN	L	Mass (kg)	
		PN16	PN25
80	165	9.6	9.6
100	180	11.9	12.9
150	220	20	22
200	260	30.5	34.5
250	350	49.5	T.B.C.
300	400	70	T.B.C.
350	450	96	T.B.C.
400	500	127	T.B.C.
450	550	160	T.B.C.
500	600	211	T.B.C.
600	700	325	T.B.C.
700	800	416	T.B.C.
800	900	572	T.B.C.
900	1000	745	T.B.C.
1000	1100	990	T.B.C.
1200	1300	1619	T.B.C.
1400	1350	2335	T.B.C.
1600	1450	2983	T.B.C.
1800	1500	3750	T.B.C.
2000	1650	4613	T.B.C.

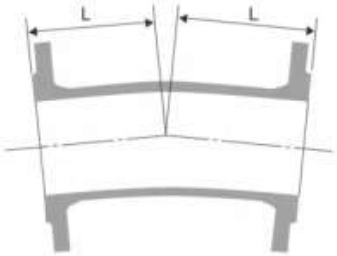
Double Flanged 45° Bend

DN	L	Mass (kg)	
		PN16	PN25
80	130	9.3	9.3
100	140	11.3	12.4
150	160	18.5	20.5
200	180	27	31
250	350	54	T.B.C.
300	400	77	T.B.C.
350	298	83	T.B.C.
400	324	107	T.B.C.
450	349	132	T.B.C.
500	375	175	T.B.C.
600	426	266	T.B.C.
700	478	326	T.B.C.
800	529	442	T.B.C.
900	581	567	T.B.C.
1000	632	751	T.B.C.
1200	750	1178	T.B.C.
1400	775	1524	T.B.C.
1600	845	2119	T.B.C.
1800	910	2717	T.B.C.
2000	980	3455	T.B.C.

Double Flanged Long Radius 90° Bend

DN	L	Mass (kg)	
		R	PN16
80	380	330	18.5
100	400	340	22
150	450	385	49.5
200	500	430	T.B.C.



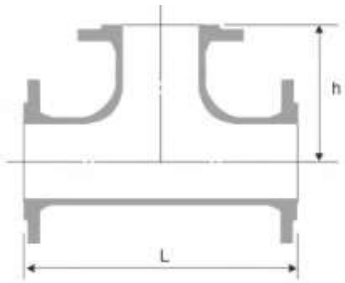


Double Flanged 22.5° Bend

DN	L	Mass (kg)
		PN16
80	105	9.2
100	110	11.5
150	109	18.6
200	131	27
250	190	37.1
300	210	50.3
350	210	67.9
400	239	90.7
450	180	110
500	190	142.9
600	220	215.7
700	300	250.9
800	330	330.3
900	360	416.2
1000	390	552.6
1200	450	853.2
1400	460	1157
1600	470	1468

Double Flanged 11.25° Bend

DN	L	Mass (kg)
		PN16
80	113	9.2
100	115	11.5
150	113	17.2
200	132	24.4
250	165	33.8
300	175	45.7
350	191	61.8
400	205	82.7
450	135	99.3
500	140	128.7
600	160	195.7
700	205	241
800	230	308
900	245	351
1000	265	465
1200	360	755.8
1400	380	995.4
1600	400	1382



All Flanged Tee

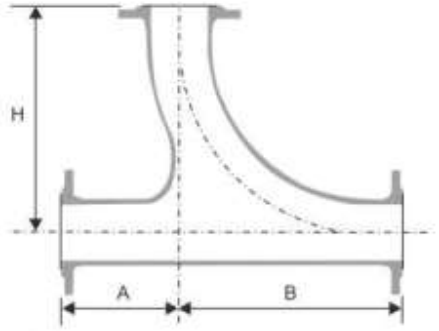
Body	Branch	L	h	Mass (kg)	
DN	dn			PN16	PN25
80	50	330	160	12.5	12.5
	65	330	165	13.6	13.6
	80	330	165	15.6	15.6
100	50	360	175	16.4	46.4
	65	360	175	17.3	18.3
	80	330	170	18.4	19.5
	100	360	180	19.4	21
150	50	360	200	27.5	30
	80	360	200	28.5	31
	100	380	205	29.5	32
	150	440	220	32.5	36
200	50	520	230	T.B.C.	T.B.C.
	80	380	225	41.5	46
	100	400	230	42	47.5
	150	460	245	45	51
	200	520	260	49	56
250	80	700	265	49.3	56.7
	100	700	275	67	75
	150	485	280	71	81
	200	700	325	75	85
	250	600	300	81	93
300	80	800	290	T.B.C.	T.B.C.
	100	800	300	93	105
	150	800	325	97	109
	200	800	350	101	114
	250	800	375	108	121
	300	680	340	115	131
350	100	850	325	122	139
	150	850	325	125	142
	200	850	325	128	146
	250	850	325	134	454
	300	850	425	138	160
	350	760	380	151	176

Body	Branch	L	h	Mass (kg)	
DN	dn			PN16	PN25
400	100	900	350	154	177
	150	900	350	156	181
	200	900	350	159	184
	250	900	350	161	198
	300	900	450	184	213
	350	900	450	183	215
	400	900	450	191	225
450	100	950	375	193	225
	150	950	375	199	231
	200	950	375	207	240
	250	950	375	216	250
	300	950	475	227	263
	350	950	475	240	279
	400	950	475	254	296
	450	950	475	269	315
500	100	1000	400	241	265
	150	1000	400	243	269
	200	1000	400	245	271
	250	1000	400	258	280
	300	1000	500	255	287
	350	1000	500	276	298
	400	1000	500	276	311
	450	1000	500	298	327
	500	1000	500	297	332
600	100	1100	450	329	352
	150	1100	450	340	370
	200	1100	450	358	388
	250	1100	450	360	392
	300	1100	550	374	398
	350	1100	550	380	413
	400	1100	550	387	427
	450	1100	550	417	448
	500	1100	550	420	464
	600	1100	550	434	477

All Flanged Tee

Body	Branch	L	h	Mass (kg)
DN	dn			PN16
700	100	540	510	295
	150	595	515	296
	200	650	525	298
	250	705	530	335
	300	760	540	342
	350	815	545	375
	400	870	555	379
	450	925	560	436
	500	980	570	481
	600	1090	585	523
	700	1200	600	523
800	100	580	570	383
	150	635	575	387
	200	690	585	390
	250	745	590	410
	300	800	600	42
	350	855	605	471
	400	910	615	484
	450	965	620	563
	500	1020	630	599
	600	1350	645	678
	700	1350	660	711
	800	1350	675	715
900	100	620	630	476
	150	675	635	480
	200	730	645	484
	250	785	650	533
	300	840	660	569
	350	895	665	588
	400	950	675	594
	450	1005	680	729
	500	1060	690	784
	600	1500	705	860
	700	1500	720	901
	800	1500	735	913
	900	1500	750	924
1000	100	660	690	572
	150	715	695	582
	200	770	705	629
	250	825	710	703
	300	880	720	739
	350	935	725	753
	400	990	735	755
	450	1045	740	911
	500	1100	750	1007
	600	1650	765	1116
	700	1650	780	1152
	800	1650	795	1116
	900	1650	810	1219
	1000	1650	825	1229

Body	Branch	L	h	Mass(kg)
DN	dn			PN16
1200	100	660	810	1082
	150	715	815	1084
	200	775	825	1086
	250	830	830	1094
	300	890	840	1106
	350	950	845	1113
	400	1005	855	1122
	500	1120	870	1255
	600	1240	885	1256
	700	1355	900	1423
	800	1470	915	1439
	900	1585	930	1662
	1000	1700	945	1664
	1200	1935	975	2321
1400	100	970	905	1361
	200	1085	920	1367
	400	1320	950	1656
	600	1550	980	1818
	800	1780	1010	2041
	1000	2015	1040	2309
	1200	2245	1070	2767
	1400	2480	1100	2985
1600	100	1020	1015	2078
	200	1140	1030	2084
	400	1370	1060	2210
	600	1600	1090	2398
	800	1835	1120	2675
	1000	2065	1150	2986
	1200	2300	1180	3327
	1400	2530	1210	3770
	1600	2760	1240	4192
1800	100	1075	1125	2598
	200	1190	1140	2602
	400	1420	1170	2835
	600	1655	1200	2972
	800	1885	1230	3299
	1000	2120	1260	3669
	1200	2350	1290	4056
	1400	2580	1320	4574
	1600	2815	1350	5147
	1800	3045	1380	5501
2000	100	1125	1235	3142
	200	1240	1250	3146
	400	1475	1280	3314
	600	1705	1310	3642
	800	1940	1340	4459
	1000	2170	1370	4459
	1400	2635	1430	5340
	1600	2865	1460	6033
	1800	3100	1490	6547
	2000	3330	1520	7107



All Flanged Radial Tee

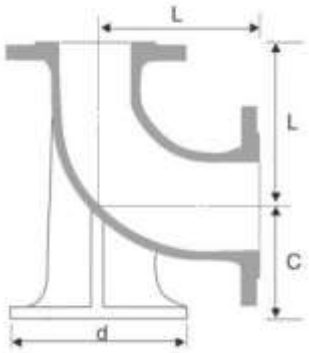
DN	dn	A	B	H	Mass (kg)
					PN16
80	80	165	380	380	24
100	80	180	390	390	28
	100	180	400	400	31
150	80	220	395	415	40
	100	220	405	425	43
	150	220	450	450	52
200	80	220	400	440	53
	100	220	410	450	56
	150	260	455	475	67
	200	260	500	500	80
250	80	220	405	465	70
	100	220	415	475	74
	150	300	460	500	91
	200	300	505	525	104
	250	350	550	550	124
300	80	220	415	490	90
	100	300	425	500	101
	150	300	470	525	114
	200	400	515	550	137
	250	400	560	575	154
	300	400	600	600	174

DN	dn	A	B	H	Mass (kg)
					PN16
350	100	300	430	525	126
	150	300	475	550	140
	200	400	520	575	166
	250	440	565	600	1855
	300	440	605	625	206
	350	450	650	650	235
400	100	300	435	550	160
	150	300	480	575	170
	200	400	525	600	200
	250	400	570	625	218
	300	450	610	650	246
	350	450	655	675	272
	400	500	700	700	307
450	100	300	440	575	185
	150	300	485	600	197
	200	400	530	625	230
	250	450	575	650	260
	300	450	615	675	282
	350	450	660	700	310
	400	550	705	725	355
	450	550	750	750	387

All Flanged Radial Tee

DN	dn	A	B	H	Mass (kg)
					PN16
500	150	300	495	625	241
	200	400	540	650	278
	250	450	585	675	310
	300	450	625	700	335
	350	450	670	725	364
	400	550	715	750	413
	450	650	760	775	446
	500	600	800	800	497
600	150	330	505	675	330
	200	400	550	700	375
	250	450	595	725	413
	300	450	635	750	441
	350	450	680	775	473
	400	550	725	800	532
	450	600	770	825	580
	500	600	810	850	626
	600	700	900	900	748
700	200	400	550	750	500
	250	450	595	775	554
	300	450	635	800	591
	350	450	680	825	632
	400	550	725	850	715
	450	600	770	875	779
	500	600	810	900	835
	600	700	900	950	995
	700	800	1000	1000	1154
800	250	450	595	825	678
	300	450	635	850	719
	350	450	680	875	765
	400	550	725	900	861
	450	600	770	925	934

DN	dn	A	B	H	Mass (kg)
					PN16
800	500	600	810	950	995
	600	700	900	1000	1174
	700	800	1000	1050	1353
	800	900	1100	1100	1565
900	300	450	640	900	851
	350	450	685	925	907
	400	550	730	950	1013
	450	600	775	975	1101
	500	600	815	1000	1167
	600	700	905	1050	1366
	700	800	1005	1100	1568
	800	900	1105	1150	1802
	900	1000	1200	1200	2047
1000	350	450	695	975	1103
	400	550	740	1000	1224
	450	600	785	1025	1323
	500	600	825	1050	1394
	600	700	915	1100	1616
	700	800	1015	1150	1841
	800	900	1115	1200	2099
	900	1000	1210	1250	2369
	1000	1100	1300	1300	2676
1200	450	600	805	1125	1793
	500	600	845	1150	1877
	600	700	935	1200	2148
	700	800	1035	1250	2425
	800	900	1135	1300	2736
	900	1000	1230	1350	3056
	1000	1100	1320	1400	3417
	1100	1200	1410	1450	3785
	1200	1300	1500	1500	4200

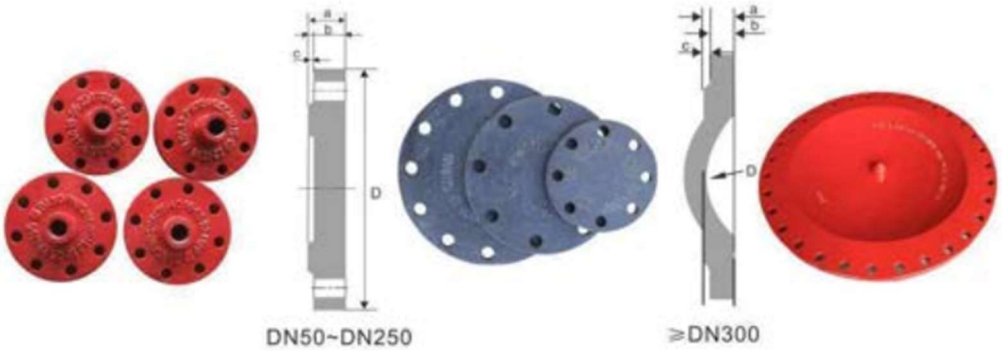


Double Flanged Duckfoot 90° Bend

DN	L	C	d	Mass(kg)
				PN16
80	165	110	180	14
100	180	125	200	17.8
150	220	160	250	30
200	260	190	300	46
250	350	225	350	75
300	400	255	400	105
350	450	290	450	145
400	500	320	500	189
450	550	355	550	249
500	600	385	600	313
600	700	450	700	481
700	800	515	800	741
800	900	580	900	884
900	1000	645	1000	1165
1000	1100	710	1100	1781
1200	1300	840	1300	2709

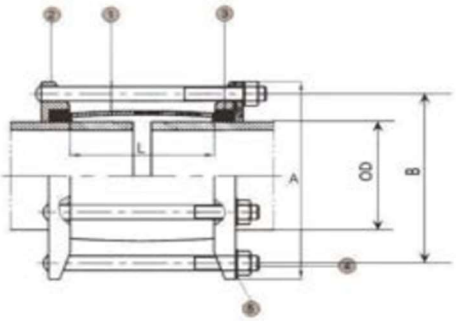
Bell Mouth

DN	L	D	Mass(kg)
			PN16
80	135	160	5.2
100	140	185	6.2
150	155	245	10.1
200	170	310	14.8
250	190	370	20.5
300	210	435	28.5
350	225	495	38
400	245	560	49.5
450	260	620	62
500	280	685	80
600	300	810	120
700	340	945	146
800	380	1055	197
900	420	1165	250
1000	440	1290	331
1200	490	1515	512
1400	515	1725	702
1600	540	1945	995
1800	730	2130	1297
2000	800	2360	1668



Blank Flange PN16

DN	D	a	b	c	Max(kg)
80	200	19	16	3	3.5
100	220	19	16	3	4.3
150	285	19	16	3	7.2
200	340	20	17	3	11
250	400	22	19	3	16.9
300	455	24.5	20.5	4	24
350	505	24.5	20.5	4	29.5
400	565	24.5	20.5	4	36.5
450	615	25.5	21.5	4	46.5
500	670	26.5	22.5	4	56
600	780	30	25	5	85
700	895	32.5	27.5	5	123
800	1015	35	30	5	172
900	1115	37.5	32.5	5	224
100	1230	40	35	5	293
1200	1455	45	40	5	575
1400	1675	46	41	5	739
1600	1915	49	44	5	1239
1800	2115	52	47	5	1717
2000	2325	55	50	5	2272



Material Specification

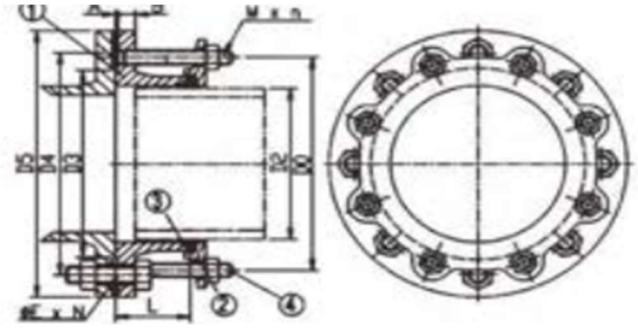
Item No.	Part Name	Material	Specification
1	Center Sleeve	Ductile Iron	EN1563
2	End Ring	Ductile Iron	EN1563
3	Rubber Seal	Rubber	ISO4633
4	Bolt/nut	Zinc Plated Steel	ISO698
5	Washer	Zinc Plated Steel	ISO698

Features

- Ductile Iron GGG50 material with FBE coated
- Equipped with galvanized steel bolts, nuts
- EPDM or NBR rubber seals
- Suitable for Ductile Iron Pipes.

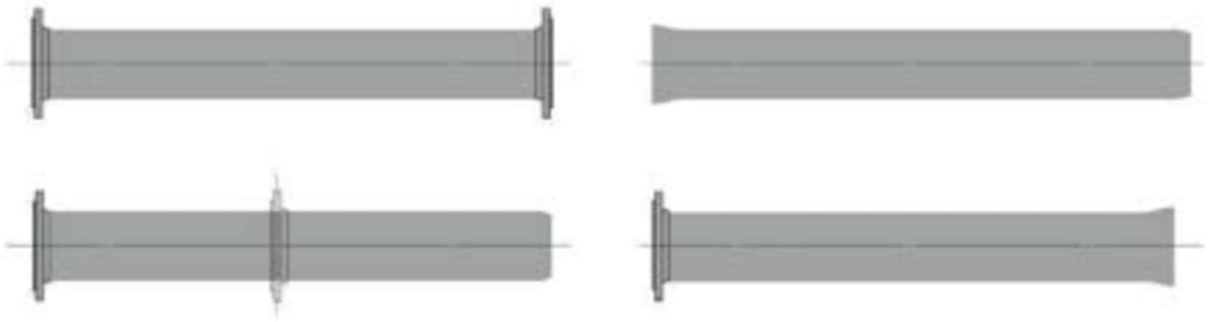
Flexible Coupling for Ductile Iron Pipe

DN	Pipe O.D.	A	B	L	Bolts Nr.	Bolts Size	Mass (kg)
80	98	194	157	102	4	M12 x 180	5.6
100	118	214	178	102	4	M12 x 180	6.5
150	170	270	236	102	4	M12 x 180	10.5
200	222	328	292	102	6	M12 x 180	14
250	274	376	341	102	6	M12 x 180	18.5
300	326	434	397	102	6	M12 x 180	20.6
350	378	498	460	152	6	M16 x 240	35.8
400	429	555	515	152	8	M16 x 240	41.6
450	480	616	580	152	8	M16 x 240	51
500	532	660	620	152	8	M16 x 240	55
600	635	755	75	152	8	M16 x 240	79
700	738	866	826	152	10	M16 x 240	94
800	842	965	925	152	10	M16 x 300	121
900	945	1075	1026	178	12	M16 x 300	163
1000	1048	1186	1140	178	12	M16 x 300	176
1100	1152	1300	1260	178	14	M16 x 300	230
1200	1255	1400	1353	178	14	M16 x 300	258
1400	1462	1616	157	178	16	M20 x 300	378
1600	1668	1830	1780	178	18	M20 x 300	427



Flange Adaptor for Ductile Iron Pipe, PN16

DN	D2	D3	D4	D5	D0	L	A	B	ØE	N	M	n	Mass(kg)
80	98	132	160	200	157	73	3	16	19	8	M12	4	7.3
100	118	156	180	220	178	73	3	16	19	8	M12	4	7.9
125	144	184	210	250	166	76	3	16	19	8	M12	4	12
150	170	211	240	285	236	77	3	16	23	8	M12	4	13.3
200	222	266	295	340	292	78	3	17	23	12	M12	6	18.4
250	274	319	355	400	341	92	3	19	28	12	M12	6	25.3
300	326	370	410	455	397	93	4	20.5	28	12	M12	6	30.5
350	378	432	470	520	460	111	4	22.2	28	16	M16	8	42.6
400	429	480	525	580	515	112	4	24	31	16	M16	8	56.4
450	480	548	585	640	580	113	4	26	31	20	M16	10	68
500	532	609	650	715	620	115	4	27.5	34	20	M16	10	77
600	635	720	770	840	715	115	5	31	37	20	M16	10	93
700	738	794	840	910	826	115	5	34.5	37	24	M16	12	121
800	842	901	950	1025	925	115	5	387	40	24	M16	12	138
900	945	1001	1050	1125	1026	130	5	41.5	40	28	M16	14	174
1000	1048	1112	1170	1255	1140	130	5	45	43	28	M16	14	202
1100	1152	1218	1270	1355	1260	130	5	48.5	43	32	M16	16	296
1200	1255	1328	1390	1485	1353	130	5	52	49	32	M16	16	378
1400	1462	1530	1590	1685	1570	130	5	55	49	36	M16	18	575
1600	1668	1750	1820	1930	1790	180	5	60	56	40	M16	20	855



Straight Pipe & Cast-on Flange

Nominal Diameter	Weight of Pipe Barrel		Cast-on Flange		Socket Weight	K9 pipe
DN (mm)	K9 (kg/m)	K12 (kg/m)	PN16		T-type	kg/6m
			kg/pc	kg/2pcs	kg/socket	
80	12.2	16	2.9	5.8	3.4	77
100	15.1	17.7	3.3	6.6	4.3	95
125	18.3	22.7	4.9	9.8	5.7	116
150	22.8	28	4.9	9.8	7.1	144
200	30.6	39.7	6.8	13.6	10.3	194
250	40.2	53	9.2	18.4	14.2	255
300	50.8	67.3	12.4	24.8	18.6	323
350	63.2	83.1	17.2	34.4	23.7	403
400	75.5	100	21.9	43.8	29.3	482
450	89.3	118	26.7	53.4	28.3	575
500	104.3	138	37.0	74.0	42.8	669
600	137.3	182	57.3	114.6	59.3	882
700	173.9	231	55.6	111.2	79.1	1123
800	215.2	286	74.0	148	102.6	1394
900	260.2	345	88.2	176.4	129.9	1691
1000	309.3	411	122.9	245.8	161.3	2017
1200	420.1	558	185.2	370.4	237.7	2758
1400	547.2	726	215.9	431.8	385.8	3669
1600	690.3	916	308.4	616.8	T.B.C.	T.B.C.
1800	850.1	1129	362.2	724.2	T.B.C.	T.B.C.
2000	1026	1363	432.2	864.4	T.B.C.	T.B.C.
Note: Screwed-on flange pipe also available						



Weld-on Flange(short-neck)

DN	PN16	
	kg/pc	kg/2pcs
80	3.5	7
100	4	8
125	5	10
150	6.1	12.2
200	8.3	16.6
250	11.4	22.8
300	15.2	30.4
350	20.7	41.4
400	26.1	52.2
450	32.7	65.4
500	42.8	85.6
600	64.9	129.8
700	65.3	130.6
800	85.9	171.8
900	102.6	205.2
1000	140.1	280.2
1200	208.5	417
1400	246.3	492.6
1600	346.7	693.4
1800	409.4	818.8
2000	489.2	978.4

Weld-on Flange (long-neck)

DN	PN16	
	kg/pc	kg/2pcs
DN80	4	8
DN100	5	10
DN150	8	16
DN200	11	22
DN250	15	30
DN300	19	38
DN350	29	58
DN400	35	70
DN450	43	86
DN500	60	120
DN600	85	170
DN700	108	216
DN800	117	234
DN900	143	286
DN1000	180	360
DN1200	235	470
DN1400	290	580
DN1600	450	900
DN1800	533	1066

Double flange pipe K12(cast-on)

DN	L	Mass(kg)
		PN16
80	200	9
	250	10
	300	11
	350	12
	400	12.5
	450	13
	500	14
	600	15.5
	700	17
	800	19
100	200	10.5
	250	11
	300	12
	350	13
	400	14
	450	15
	500	15.5
	600	18
	700	19
	800	21
	900	23
	1000	25
150	200	16
	250	17
	300	19
	350	20
	400	21
	450	23
	500	24
	600	27
	700	30
	800	33
	900	35
	1000	38

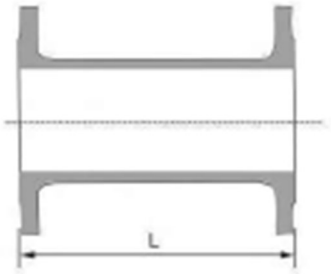
DN	L	Mass(kg)
		PN16
200	200	22
	250	24
	300	26
	350	28
	400	30
	450	32
	500	34
	600	38
	700	42
	800	46
	900	50
	1000	54
250	200	29
	250	32
	300	35
	350	37
	400	40
	450	43
	500	45
	600	51
	700	56
	800	61
	900	67
	1000	72
300	200	39
	250	42
	300	45
	350	49
	400	52
	450	56
	500	59
	600	66
	700	72
	800	79

DN	L	Mass(kg)
		PN16
300	900	86
	1000	93
	1200	106
350	200	51
	250	56
	300	60
	350	64
	400	68
	500	76
	600	85
	700	93
	800	101
	900	110
	1000	118
	1200	135
400	300	74
	400	84
	500	94
	600	104
	700	114
	800	124
	900	134
	1000	144
	1200	164
450	300	89
	400	101
	500	113
	600	125
	700	136
	800	148
	900	160
	1000	172
	1200	195
	1300	207

Double flange pipe K12(cast-on)

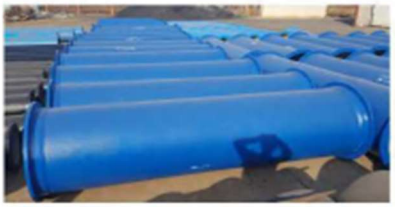
DN	L	Mass(kg)
		PN16
500	300	116
	400	130
	500	143
	600	157
	700	171
	800	185
	900	199
	1000	212
	1500	281
	2000	350
600	300	170
	400	188
	500	206
	600	224
	700	242
	800	261
	900	279
	1000	297
	1500	399
	2000	479
700	300	181
	400	204
	500	227
	600	250
	700	273
	800	296
	900	320
	1000	343
	1500	458
	2000	574

DN	L	Mass(kg)
		PN16
800	300	234
	400	263
	500	291
	600	320
	700	349
	800	377
	900	406
	1000	434
	1500	577
	2000	720
900	300	280
	400	315
	500	349
	600	384
	700	41
	800	453
	900	487
	1000	522
	1500	694
	2000	867
1000	300	370
	400	411
	500	452
	600	493
	700	534
	800	575
	900	616
	1000	657
	1500	863
	2000	1068



1100	1000	764
	1500	1005
	2000	1246
1200	1000	929
	1500	1208
	2000	1487
1400	1000	158
	1500	1521
	2000	1884
1600	1000	1533
	1500	1991
	2000	2449





Double flange pipe (weid-on)

DN	L	Mass (kg)
		PN16
80	1000	24
	2000	40
	3000	45
	4000	57
	5000	69
	5500	76
	5700	78
100	2000	46
	3000	56
	4000	71
	5000	86
	5500	94
	5700	97
150	2000	72
	3000	85
	4000	108
	5000	130
	5500	142
	5700	146
200	2000	102
	3000	114
	4000	145
	5000	175
	5500	191
	5700	197
250	2000	137
	3000	151
	4000	191
	5000	231
	5500	252

DN	L	Mass (kg)
		PN16
250	5700	260
300	2000	173
	3000	191
	4000	242
	5000	292
	5500	318
	5700	328
350	2000	225
	3000	248
	4000	311
	5000	374
	5500	406
	5700	419
400	2000	270
	3000	297
	4000	372
	5000	448
	5500	486
	5700	501
450	3000	354
	4000	444
	5000	533
	5500	578
	5700	596
500	3000	433
	4000	538
	5000	642
	5500	694
	5700	715
600	3000	582

DN	L	Mass (kg)
		PN16
600	4000	720
	5000	857
	5500	926
	5700	953
700	3000	738
	4000	912
	5000	1086
	5500	1173
	5700	1208
800	3000	880
	4000	1095
	5000	1310
	5500	1418
	5700	1461
900	3000	1067
	4000	1327
	5000	1587
	5500	1718
	5700	1770
1000	3000	1288
	4000	1598
	5000	1907
	5500	2062
	5700	2124
1200	3000	1731
	4000	2151
	5000	2571
	5500	2781
	5700	2865

TATA

仲賢行有限公司
CYH Limited

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Production Unit (Pipe)

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PO Samraipur Kharagpur
District Paschim Midnapur 721 301
West Bengal India

Production Unit (Fittings)

Liaoning Ever Metal Forming Tech Co., Ltd
No.7 Shifu Avenue Gaizhou City
Liaoning Province
P.R.C.

1015

Tata Metaliks DI Pipes Limited

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