TATA

TATA DUCTURA

Happiness Guaranteed

Tata Metaliks Limited

About the Tata Group

Founded by Jamsetji Tata in 1868, the Tata Group is a global enterprise, headquartered in India, comprising over 100 independent operating companies. The group operates in more than 100 countries across six continents, with a mission 'To improve the quality of life of the communities we serve globally, through long-term stakeholder value creation based on Leadership with Trust'.

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 has been amalgamated with its parent company Tata Metaliks in 2016. Inspired by the rich heritage of the Tata Group, Tata Metaliks is committed to deliver superior quality DI Pipes. The result is obtained via several levels of quality checks and assurances, ethical business practices and minimal impact to the environment – vouched by the plethora of certifications Tata Ductura has to its name. As of date, Tata Ductura's export footprint is present in several countries like Turkey, Bahrain, Nepal, Sri Lanka, Philippines, Morocco, South Africa and France.

Ductile Iron Pipes & Properties

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 the 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 anti-corrosive properties. Together, these features give ductile iron, excellent resistance to impact, pressure and corrosion.

Grey Cast Iron (CI)

Flaky Carbon

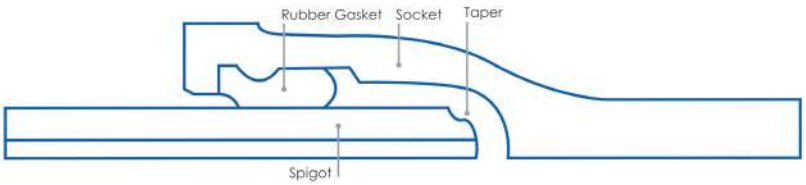
Ductile Iron (DI)

Spheroid Carbon

(Comparison photo of CI and DI)

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. It is corrosion resistant and highly durable which makes it the preferred choice for pipeline networks all over the world.



Structure of DI Pipe (push-on joint)

Availability of Flexible Joints

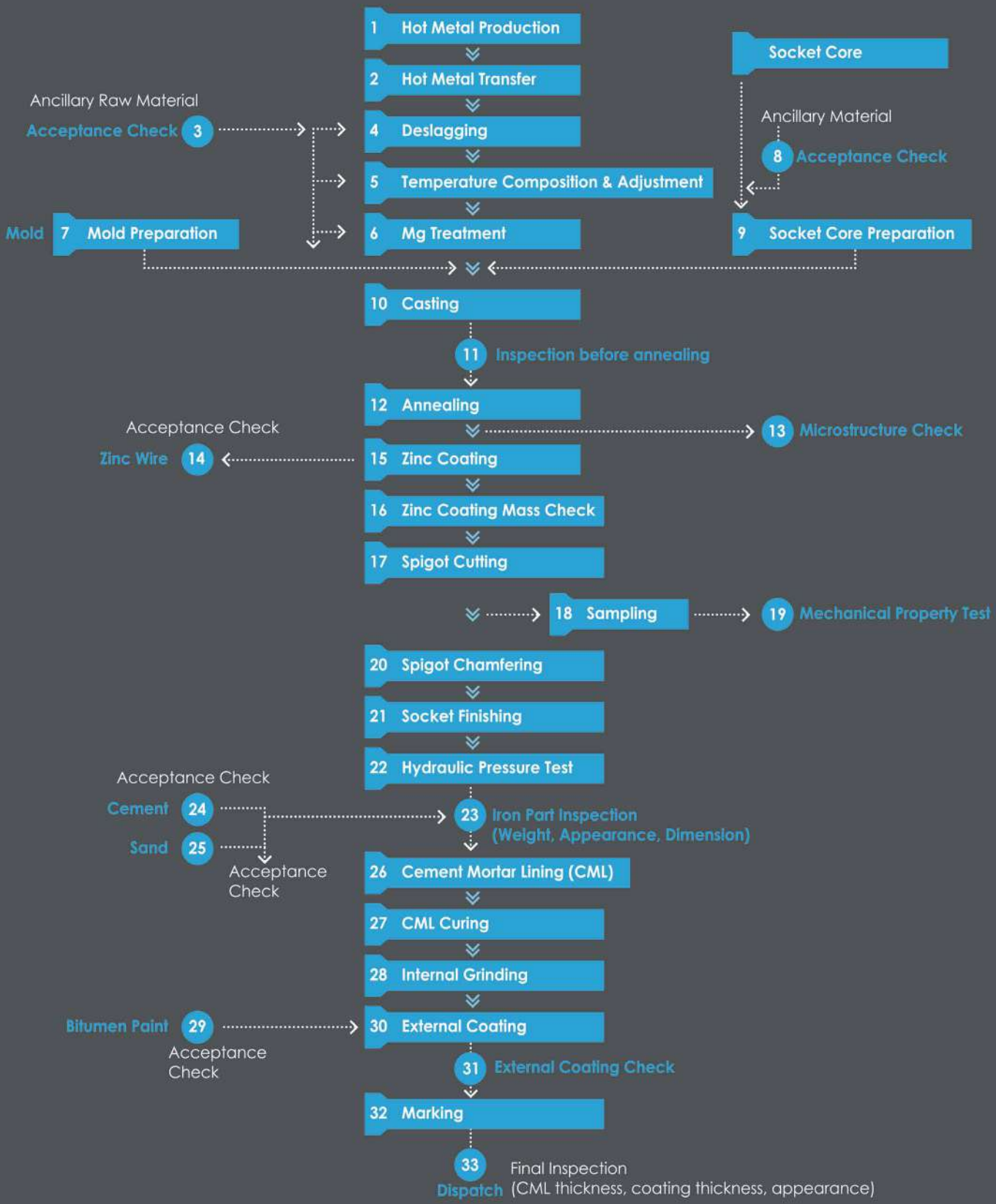
The allowable angular deflection at the joints of the DI Pipes enables them to bend at desirable angles. Flexible joints also enable the DI pipelines to be adjusted as and however necessary based on ground movement, should it occur. The angle of deflection in Tata Ductura's DI Pipes is higher than DI Pipes from other brands.

Different materials of construction comparison

Sl. No.	Properties	Ductile Iron	Mild Steel	Pre-stressed Concrete
1	Tensile Strength (kg/cm^2)	4200	4100	NA
2	Modulus of Elasticity (kg/cm^2)	1.7×10^{10}	2.1×10^{10}	75×10^{10}
3	Beam Strength	High	Medium	Low
4	Minimum Elongation at Break	Over 10%	Over 18%	0
5	Weldability	Good	Good	NIL
6	Maximum Working Pressure	77 - 32 kg/cm^2	Depends upon thickness	7 kg/cm^2
7	Method of Jointing	Push on through Rubber Gasket Socket and Spigot.	Welding or Electrometrically Sealed Joints.	Rubber Gasket Socket and Spigot.
8	Structural Strength (Crushing Strength)	5000 kg/cm^2 (Approx.) Normal Backfill.	4000 kg/cm^2 (Approx.) Compaction of Backfill is essential.	500 kg/cm^2 (Approx.) Normal Backfill.
9	Resistance to Tampering	Very High	High	Medium
10	Corrosion Resistance	Corrosion rate is 0.005 inch per year & hence practically corrosion free.	Corrosion rate is 0.02 inch per year. Failure is rapid in urban areas & salty weather & water condition.	Corrosion of pre-tension wires is very common on account of attack by humic acid formed due to seepage. Corrodes fast in salty weather conditions.
11	Design Friction Coefficient	140	100 (incase of bare pipes) 110 (incase of cement lining done at site)	140
12	Flexibility of Pipe Joint Alignment	20 - 50	Joints are rigid	up to 1/2°
13	Types of Fittings Used	CI/DI	Steel (Fabricated)	Steel (Fabricated)
14	Direct Tapping Facility	Directly by ferrule. Multiple tapping possible.	Saddle Strap used.	Not recommended. Pre-stressing wire will snap.
15	Estimated Design Useful Service Life	Long service life of 50 - 70 years.	Normal service life of 25 - 30 years.	Failure due to crack, corrosion of pre-stressing wire, vulnerable joints are high. Optimistic life of 20 years.
16	Nature & Frequency of Damage	Impact failure or bursting due to crack or water hammer is extremely rare. Frequency of damage is very low.	Internal / external corrosion is main reason for failure. Frequency of damage - increases over time.	Bursting due to cracks, impact damage, joint failure, corrosion of pre-stressed wire is common. Frequency of damage is high.

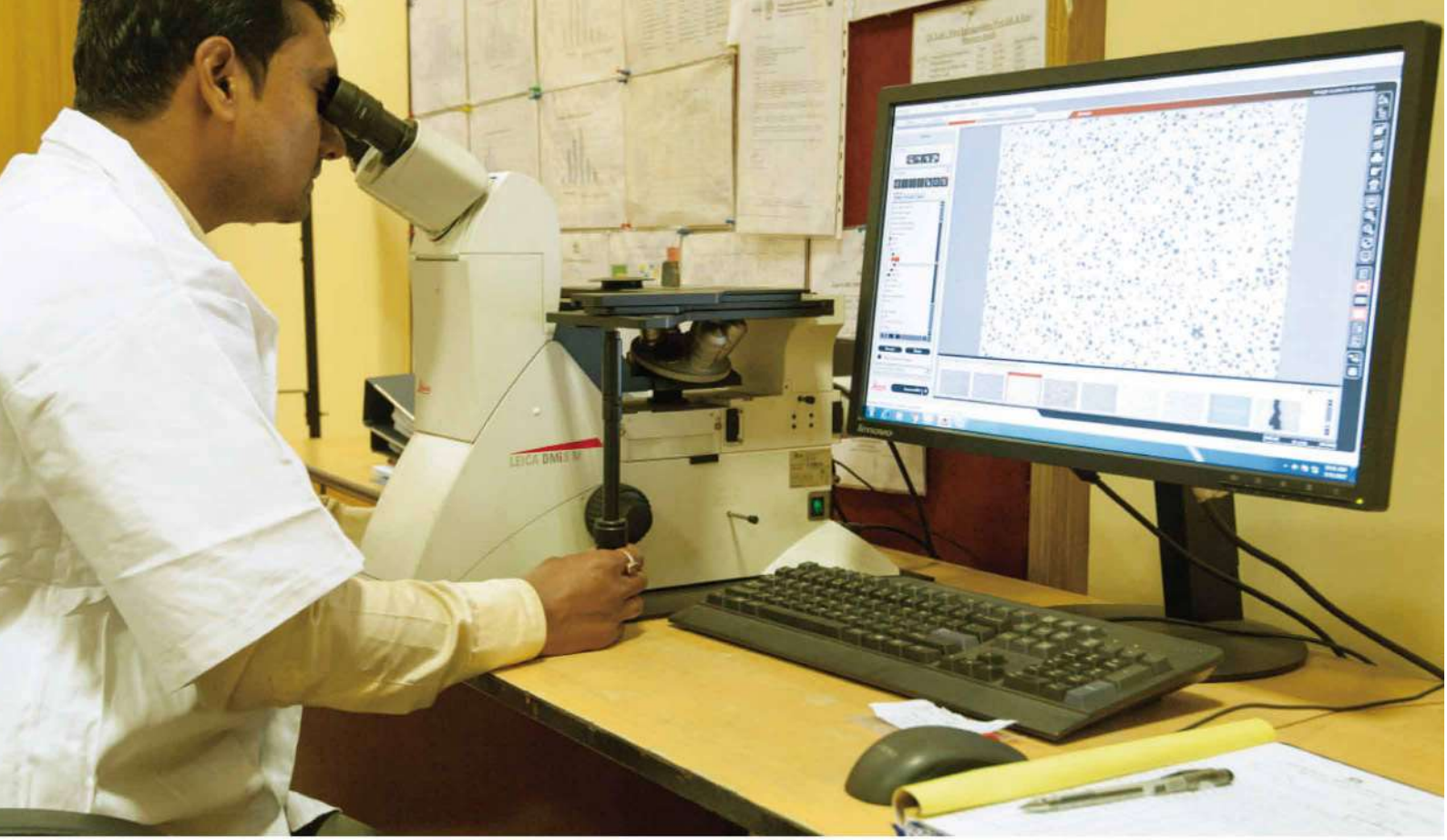
uPVC	HDPE	BWSC	GRP
600 - 800 (decreases with temperature)	265 - 280 (decreases with temperature)	4100 (for Steel Cylinder)	NA
0.03 X 10^{10}	0.009 X 10^{10}	0.35 X 10^{10}	0.00005 X 10^{10}
Low	Low	Medium	Low
Fair	Good	Good	Good
NIL	Fusion Welding	Joints could be welded	NIL
12.5 kg/cm^2	16 kg/cm^2	8 kg/cm^2	15 kg/cm^2
With Chemical Glue or Rubber Gasket Socket and Spigot.	Fusion Welding.	Rubber Sealing Rings.	Socket Joint or Coupling Joint with Rubber Gasket.
100 - 150 kg/cm^2 (Approx.) Compaction of Backfill is essential.	200 - 250 kg/cm^2 (Approx.) Compaction of Backfill is essential.	1274 kg/cm^2 (Approx.) Compaction of Backfill is essential.	250 - 300 kg/cm^2 (Approx.) Compaction of Backfill is essential.
Low	Low	Medium	Medium
Non-corrosive but susceptible to decay in presence of organic contaminants.	Non-corrosive but susceptible to decay in presence of organic contaminants.	Corrosion of wrap wires is due to seepage.	Non-corrosive but susceptible to decay in presence of organic contaminants.
145	145	100	140
Flexible Pipe	Flexible Pipe	Joints are rigid	Flexible Pipe
MS/CI/DI/PVC	MS/CI/DI/HDPE	MS/DI	MS/GRP
Direct tapping not possible. Saddle Strap used.	Direct tapping not possible. Saddle Strap used.	Tapping not recommended.	Direct tapping not possible. Saddle Strap used.
Failure due to crack, impact or third party damage is high. Optimistic life of 20 years.	Failure due to impact live load or third party damage is high. Optimistic life of 20 years.	Joints are vulnerable. Expected service life of 15 - 20 years.	Failure due to impact of live load or third party damage is high. Optimistic life of 20 years.
Being notch sensitive any crack leads to premature failure. Failure due to impact and material degradation is also common. Frequency of damage is high.	Third party damage is high. Failure due to impact and material degradation is also common. Frequency of damage is medium.	Joints being vulnerable occurrence of failure is possible. Frequency of damage is medium.	Failure due to impact of water may happen. Joint failure and material degradations also common. Frequency of damage is medium.

Manufacturing Process



DI Pipe Applications

Ductile Iron Pipes' mechanical properties as well as high ductility and strength make them ideal for usage in supply of water (drinking or waste), irrigation, industrial and high pressure sewage transport.




SPECTROMETER
TMK/MACH/129/QA/0
SPECTROLAB
MGT
Hopper

WORKS PROOF AND LEAK TIGHTNESS TEST PRESSURES

The hydrostatic test for pipes and fittings is carried out prior to lining and coating. The test pressure is maintained for 15 seconds to test for leak, sweat or other defects.

NOMINAL SIZE	WORKS HYDROSTATIC TEST PRESSURE FOR CENTRIFUGALLY CAST PIPE (CLASS K9 OR ABOVE)	WORKS HYDROSTATIC TEST PRESSURE FOR FITTINGS	WORKS HYDROSTATIC TEST PRESSURE FOR FLANGED PIPE
DN	MPa	MPa	MPa
80 - 300	5.0	2.5	2.5
350 - 600	4.0	1.6	1.6
700 - 1000	3.2	1.0	1.0

The hydrostatic test pressure specified in this table are intended primarily to detect casing flaws and bear no relation to the safe working pressures for the pipes or fittings. The application of higher test pressures to fittings is precluded owing to the risk of distortion resulting from the high restraining load which would have to be imposed on the fittings by the standard test apparatis.

LINING

Unless otherwise specified the standard internal lining for TATA DUCTURA Ductile Iron pipes and fittings is Cement Mortar (except some special fittings such as Blank Flanges; Collars; Caps; Plugs; Bellmouth and Pipe Block...etc that may be internally coated with Bitumen as standard).

The Cement Mortar is composed of Cement, Sand and Water. It is not only a physical barrier but also protects the iron by a passivation process. When the Cement Mortar Lining is saturated with Water, it produces a high pH solution next to the iron wall. In these alkaline conditions corrosion is not easy to take place.

The type of Cement used is either Sulphate Resisting Cement (SRC) or High Alumina Cement (HAC). Please note that HAC can only be used in TATA DUCTURA EN 598 sewage pipes and fittings.

Subject to agreement, alternative internal linings may be supplied such as Cement Mortar Lining with Epoxy Seal Coat; Epoxy and Fusion Bonded Epoxy.

Cement Mortar Lining may be found with hairline cracks or radial displacement. They are mainly caused by storage in a hot weather (metal expansion by absorption of haet energy as a result of Cement Mortar Lining shrinkage). However, the hairline cracks will close and radial displacement will swell and re-tighten on continuous exposure of water by an Autogenous Process.

The thickness and the maximum crack width of the Cement Mortar Lining are listed as per below table.

NOMINAL SIZE OF PIPE OR FITTING	NOMINAL THICKNESS	TOLERANCE NEGATIVE ONLY GIVEN	MAXIMUM CRACK WIDTH
DN	mm	mm	mm
80 - 300	4.0	-1.5	0.4
350 - 600	5.0	-2.0	0.5
700 - 1000	6.0	-2.5	0.6

COATING

Unless otherwise specified by the purchaser, all pipes are coated externally with metallic zine covered by a finishing paint layer.

INSPECTION

Pipes and fittings are subject to a quality assurance system regularly audited by **British Standards Institution**.

If the purchaser wiches to inspect the pipes, such an inspection is undertaken at the works of the manufacturer. The equipment and labour necessary to carry out the inspection is provided by the manufacturer.

The inspector may witness the sampling, preparation and testing sampling, preparation and testing of the test pieces, checking of dimensions and weights and hydrostatic testing.

Should the purchaser or his representative not be present for the implementation of these operations at the time agreed, the manufacturer is entitled to proceed with the inspection without the purchaser or his reprsentative being present.

MARKING

Each pipeline component has the following marks legibly cast, stamped or painted on.

PIPES

1 TATA DUCTURA logo.
2 Nominal size.
3 Class designation.
4 Year of manufacture.
5 Day cast.
6 Batch number.
7 Standards reference.

FITTINGS

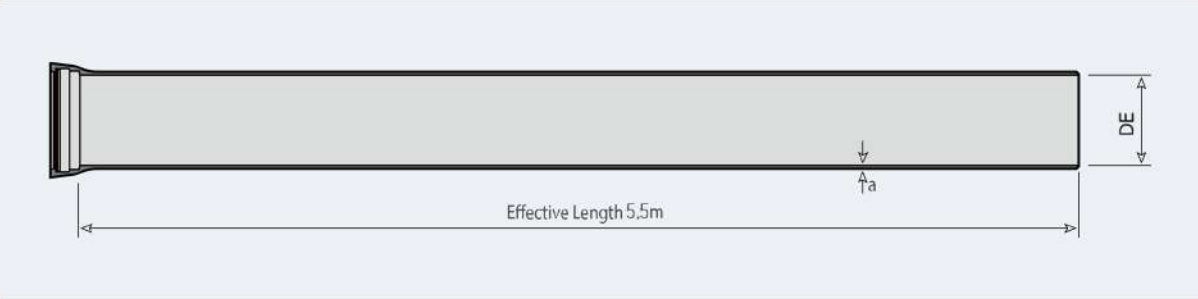
1 DUCTURA or D logo.
2 Nominal size.
3 Date of manufacture.
4 'Ductile' or 'DI'.
5 For bends, relevant angle.
6 Standards reference.

Pipes Data

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
- ISO 2531: 1998

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	



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	179	+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					$13.5^{-2.30}$

Pipes Data

DN	External Diameter DE (mm)		Minimum Wall thickness e (mm)				
	Nominal	Limit Deviations	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 Resisting Cement and Blast Furnace Slag Cement according to ISO 4179 and High Alumina Cement for waste water application
External Protection	Metallic Zine (130g/m2 or 200g/m2 or 400g/m2 as per customer requirement) complying to ISO 8179 with 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 46633

Related Products & Variations

COATINGS

INTERNAL COATINGS:

Tata Ductura DI Pipes are internally lined with cement mortar.
The types of cement used are:

- **Ordinary portland cement (with or without additives)**
- **Portland slag cement**
- **Blast furnace slag cement**
- **Sulphate-resistant cement**
- **High alumina content cement**
- **Cement mortar with seal coat**

ADVANTAGES OF CEMENT MORTAR LINING:

Cement mortar protects the internal pipe wall from corrosion by alkaline reaction of cement. It also prevents pitting and tuberculation. Tata Ductura's cement mortar lining is smooth and helps maintain stable flow area and coefficient of friction over a long period of time. It also helps to control leaching of cement into water.

EXTERNAL COATINGS:

To protect the pipe against corrosion and increase durability the pipes are externally coated with Zinc and finished with a coat of bituminous paint or synthetic resin (Epoxy) coating. In special cases, pipes are coated with zinc alloy, which acts as sacrificial corrosion, thereby delaying the corrosion of iron-based material.

POLYETHYLENE SLEEVING:

Encasement of DI Pipes in loose polyethylene sleeves is an effective protection mechanism in corrosive environments. The dielectric capability of the polyethylene sleeve works as a shield between the DI Pipes and the field.

Related Products & Variations

FITTINGS

Fittings play a major role in seamless functioning of a pipeline network. With the passage of time, various types of jointing systems have evolved - socket and spigot with lead joints, mechanical joints and push-on joints, etc. DI Fittings are available mainly with three types of jointing systems:

- **Socket and spigot flexible push-on joints**
- **Mechanical flexible joints**
- **Flanged joints**

Socket and spigot flexible-push on joints are most widely used as they can be assembled easily with the help of a rubber gasket. The heel portion inserted into the groove retains the gasket while the spigot enters into the socket and gets compressed to do the sealing. Socket and spigot push-on joints are:

- **Stronger than other fittings**
- **Compatible with DI/CI Pipes, therefore cost-effective**

Mechanical flexible joints provide sealing by application of pressure to the gasket by mechanical means. The nut and bolts exert more pressure making the joints leak-proof. Mechanical joints are:

- **Easier to assemble and dismantle**
- **Easily repairable**
- **Highly flexible and have dimensional tolerance**

Flanged joints are self-restrained rigid joints and are recommended for high pressure application.

Restrained joints are special jointing systems which can take care of axial movement in case of thrust. Pipes laid along a hilly terrain or along slopes and inclines work under high static head. This may result in misbalance of forces of hydrostatic or hydrodynamic nature which needs to be restrained adequately to arrest joint separation. Restrained joints are:

- **Cost-effective since they eliminate the use of expensive concrete anchor blocks**
- **More effective where chances of soil erosion are high**

Typical diagram of Restrained Joint is given below.

FLANGED JOINTS

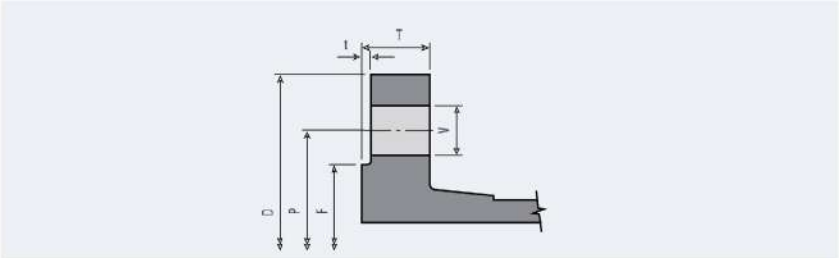
Flanged joints are completely rigid and should not be used for applications where movement of the pipeline is made to accommodate it by, for example, the inclusion of expansion joints.

A pipeline totally constructed from flanged pipework is considered to be self-anchoring and therfore external anchorages are not required at changes of direction and at blank ands.

The joint is used mainly for above ground applications, e.g. pumping stations, water and sewage treatment plants and for industrial pipework. It is also used to facilitate the installation and removal of valves in spigot and socket pipelines and for valve by-pass arrangements.

Particular attention should be paid to pipelines where flanged joint pipe and fittings are to be combined with Push-on Flexible pipe and fittings. In this case, thrust blocks should not be omitted from flanged bends, tees and blank ends before ensuring that there is a sufficient anchoring length of flanged joint and push-on joint sections separating at the change-over points due to the effects of internal pressure.

Flanges are attached to pipes by screwing the pipe and flange with mating threads. These are filled with a recommended epoxy resin before tightening to a predetemined torque. Machining of the flanges is carried out after tightening to ensure ends are parallel and flat. Screwed and intergrally cast flanges are available on request. Flanges on fittings are integrally cast in sand moulds with the body of the fitting.



PN16 FLANGES

Nominal Size	Flange Dimensions					Bolting Details		
	Diameter	Thickness	Diameter of Raised Face	Height of Raised Face	Pitch Circle Diameter	Number of Holes	Diameter of Holes	Fastener Size and Thread
DN	D	T	F	t	P	N	V	
80	200	19.0	132	3	160	8	19	M16
100	220	19.0	156	3	180	8	19	M16
150	285	19.0	211	3	240	8	23	M20
200	340	20.0	266	3	295	12	23	M20
250	400	22.0	319	3	355	12	28	M24
300	455	24.5	370	4	410	12	28	M24
350	520	26.5	429	4	470	16	28	M24
400	580	28.0	480	4	525	16	31	M27
450	640	30.0	548	4	585	20	31	M27
500	715	31.5	609	4	650	20	34	M30
600	840	36.0	720	5	770	20	37	M33
700	910	39.5	794	5	840	24	37	M33
800	1025	43.0	901	5	950	24	40	M36
900	1125	46.5	1001	5	1050	28	40	M36
1000	1255	50	1112	5	1170	28	43	M39

PN25 FLANGES

Nominal Size	Flange Dimensions					Bolting Details		
	Diameter	Thickness	Diameter of Raised Face	Height of Raised Face	Pitch Circle Diameter	Number of Holes	Diameter of Holes	Fastener Size and Thread
DN	D	T	F	t	P	N	V	
80	200	19.0	132	3	160	8	19	M16
100	235	19.0	156	3	190	8	23	M20
150	300	20.0	211	3	250	8	28	M24
200	360	22.0	274	3	310	12	28	M24
250	425	24.5	330	3	370	12	31	M27
300	485	27.5	389	4	430	16	31	M27
350	555	30.0	448	4	490	16	34	M30
400	620	32.0	503	4	550	16	37	M33
450	670	34.5	548	4	600	20	37	M33
500	730	36.5	609	4	660	20	37	M33
600	845	42.0	720	5	770	20	40	M36
700	960	46.5	820	5	875	24	43	M39
800	1085	51.0	928	5	990	24	49	M45
900	1185	55.5	1028.5	5	1090	28	49	M45
1000	1320	60	1140	5	1210	28	56	M52

PUSH-ON FLEXIBLE JOINT PIPELINE FITTINGS

Push-on Flexible pipeline fitting dimensions shown are in accordance with the Standard.

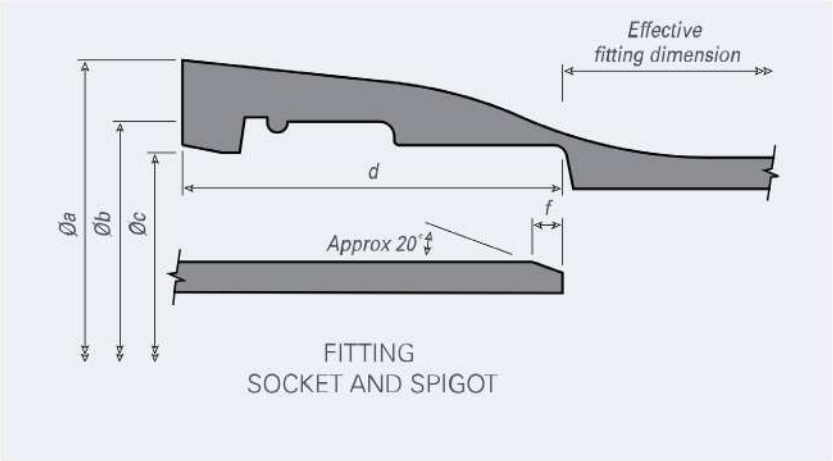
Double socketed fittings are normally used in Push-on Flexible pipelines.

Spigotted fittings may be used in some applications, although their use is mainly limited to installation after construction, where existing pipes are cut and connected to the fitting using couplings.

TEST AND OPERATING PRESSURES

Works hydrostatic leak tightness test pressures for fittings are shown on page 10.

Allowable operating pressures for socketed ductile iron fittings are the same as for Class K9 ductile spun iron pipe in the corresponding nominal sizes.



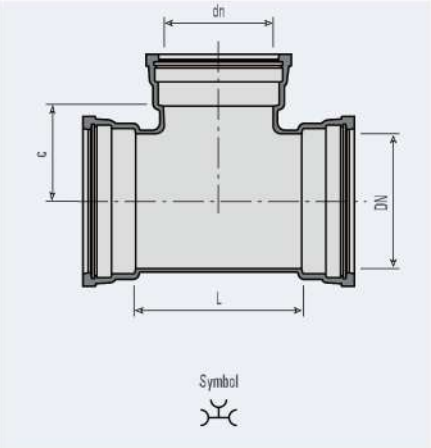
PUSH-ON FLEXIBLE JOINT FITTINGS DIMENSIONS mm

Nominal Size	Dimensions				
DN	a	b	c	d	f
80	140	123.0	100.5	85	6
100	163	143.0	120.5	88	9
150	217	195.0	172.5	94	9
200	278	250.0	224.5	100	9
250	336	301.5	276.5	105	9
300	393	356.5	328.5	110	9
350	448	408.0	380.5	110	9
400	500	462.0	431.5	110	9
450	540	514.0	482.5	120	9
500	604	568.0	534.5	120	9
600	713	673.4	637.5	120	9
700	824	788.0	740.5	150	9
800	943	894.0	844.5	160	9
900	1052	1000	947.5	175	15
1000	1158	1105	1050.5	185	15

FITTINGS - DUCTILE IRON - FLEXIBLE JOINT

ALL SOCKET TEES

NOMINAL SIZE	DIMENSION	
dn	L	c
DN 80		
80	170	85
DN 100		
80	170	95
100	190	95
DN 150		
80	170	120
100	195	120
150	255	125
DN 200		
80	175	145
100	200	145
150	255	150
200	315	155
DN 250		
80	175	165
100	200	165
150	260	175
200	315	180
250	375	185
DN 300		
80	180	190
100	200	195
150	260	200
200	320	205
250	375	210
300	435	215
DN 350		
80	180	215
100	205	220
150	265	225
200	320	230
250	380	235
300	435	240
350	495	245

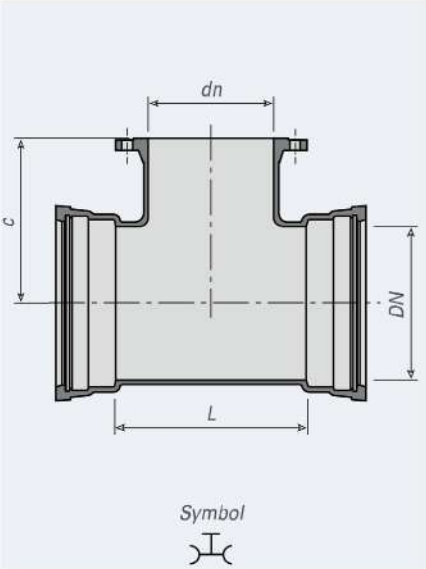


NOMINAL SIZE	DIMENSION	
dn	L	c
DN 400		
80	185	240
100	210	245
150	265	240
200	325	255
250	380	260
300	440	265
350	500	270
400	550	275

NOMINAL SIZE	DIMENSION	
dn	L	c
DN 450		
80	185	265
100	210	270
150	270	275
200	325	280
250	385	285
300	445	290
350	500	295
400	560	300
450	615	305
DN 500		
80	190	290
100	215	295
150	270	300
200	330	305
250	390	310
300	445	315
350	505	320
400	560	325
450	620	330
500	680	340
DN 600		
80	195	340
100	220	345
150	280	350
200	335	355
250	395	360
300	450	365
350	510	370
400	570	375
450	625	380
500	685	390
600	800	400

DOUBLE SOCKET TEES WITH FLANGED BRANCH

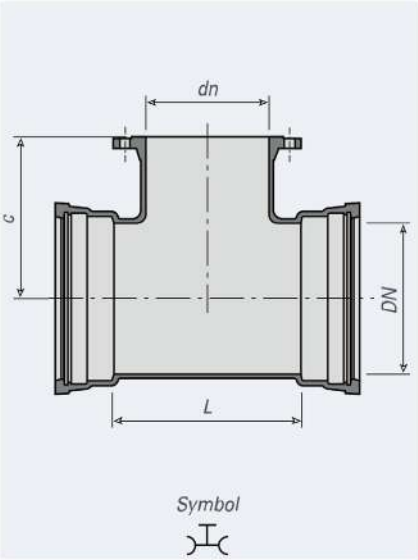
NOMINAL SIZE	DIMENSION	
dn	L	c
DN 80		
80	170	160
DN 100		
80	170	175
100	190	180
DN 150		
80	170	205
100	195	210
150	255	220
DN 200		
80	175	235
100	200	240
150	255	250
200	315	260
DN 250		
80	175	265
100	200	270
150	260	280
200	315	290
250	375	300
DN 300		
100	200	300
150	260	310
200	320	320
250	375	330
300	435	340
DN 350		
80	185	325
100	205	330
150	265	340
200	320	350
250	380	360
300	435	370
350	495	380



NOMINAL SIZE	DIMENSION	
dn	L	c
DN 400		
80	185	355
100	210	360
150	270	370
200	325	380
250	385	390
300	440	400
350	500	410
400	560	420
DN 450		
100	215	390
150	270	400
200	330	410
250	390	420
300	445	430
400	560	450
450	620	460
DN 500		
100	215	420
150	270	430
200	330	440
250	390	450
300	445	460
350	505	470
400	565	480
450	620	490
500	680	500

DOUBLE SOCKET TEES WITH FLANGED BRANCH

NOMINAL SIZE	DIMENSION	
dn	L	c
DN 600		
80	200	475
100	220	480
150	280	490
200	340	500
250	395	510
300	450	520
350	510	530
400	570	540
450	625	550
500	685	560
600	800	580
DN 700		
80	225	505
100	230	510
150	285	515
200	345	525
250	400	535
300	460	540
350	520	545
400	575	555
450	635	560
500	690	570
600	810	585
700	925	600
DN 800		
80	250	565
100	235	570
150	290	580
200	350	585
250	410	590
300	465	600
350	525	610
400	580	615
450	640	625
500	700	630
600	815	645
700	930	660
800	1045	675

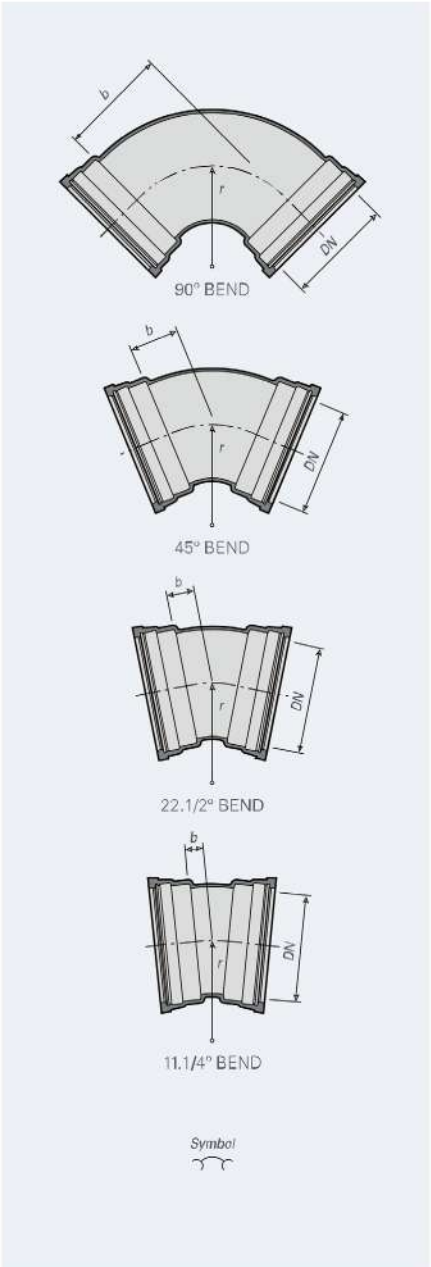


NOMINAL SIZE	DIMENSION	
dn	L	c
DN 900		
80	225	625
100	240	630
150	300	635
200	355	645
250	415	655
300	470	660
350	530	670
400	590	675
450	645	685
500	705	690
600	820	705
700	935	720
800	1050	735
900	1170	750
DN 1000		
80	260	685
100	245	690
150	305	695
200	360	705
250	420	710
300	480	720
350	535	730
400	595	735
450	650	745
500	710	750
600	825	765
700	940	780
800	1060	795
900	1175	810
1000	1290	825

DOUBLE SOCKET BEND

NOMINAL SIZE	DIMENSION
DN	b
90° BENDS	
80	100
100	120
150	170
200	220
250	270
300	320
350	370
400	420
450	470
500	520
600	620
700	720
800	820
900	920
1000	1020

NOMINAL SIZE	DIMENSION
DN	b
22½° BENDS	
80	40
100	40
150	55
200	65
250	75
300	85
350	95
400	110
450	120
500	130
600	150
700	175
800	195
900	220
1000	240

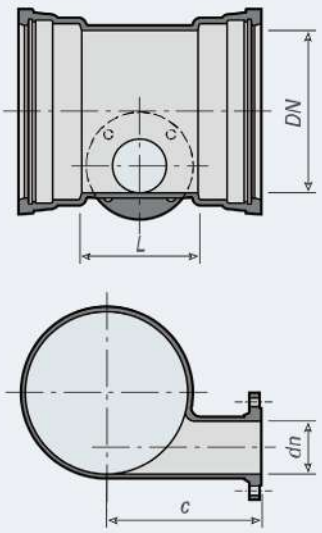


NOMINAL SIZE	DIMENSION
DN	b
45° BENDS	
80	55
100	65
150	85
200	110
250	130
300	150
350	175
400	195
450	220
500	240
600	285
700	330
800	370
900	415
1000	460

NOMINAL SIZE	DIMENSION
DN	b
11¼° BENDS	
80	30
100	30
150	35
200	40
250	50
300	55
350	60
400	65
450	70
500	75
600	85
700	95
800	110
900	120
1000	130

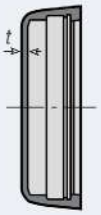
DOUBLE SOCKET LEVEL INVERT TEES

NOMINAL SIZE	DIMENSION		
DN	dn	L	c
200	80	175	235
250	80	180	265
300	80	180	295
350	100	205	330
400	100	210	360
450	100	210	400
500	100	215	420
600	100	220	480
700	150	285	515
700	200	345	525
800	150	290	575
800	200	350	585



INVERT SCOUR TEE

Symbol



CAP

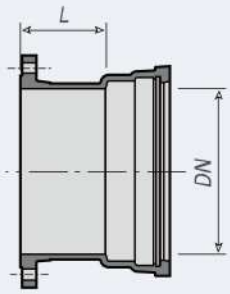
Symbol

CAPS

NOMINAL SIZE	DIMENSION
DN	t
80	18
100	18
150	18
200	18
250	19.5
300	23
350	24
400	25
450	26
500	27
600	29.5
700	31
800	33
900	35
1000	37

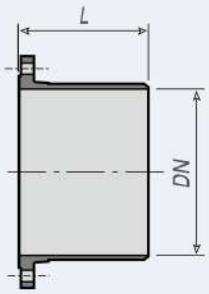
FLANGE SOCKETS
FLANGE SPIGOTS

NOMINAL SIZE	DIMENSION
DN	L
FLANGE - SOCKET	
80	130
100	130
150	135
200	140
250	145
300	150
350	155
400	160
450	165
500	170
600	180
700	190
800	200
900	210
1000	220
FLANGE - SPIGOT	
80	350
100	360
150	380
200	400
250	420
300	440
350	460
400	480
450	500
500	520
600	560
700	600
800	600
900	600
1000	600



FLANGE - SOCKET

Symbol



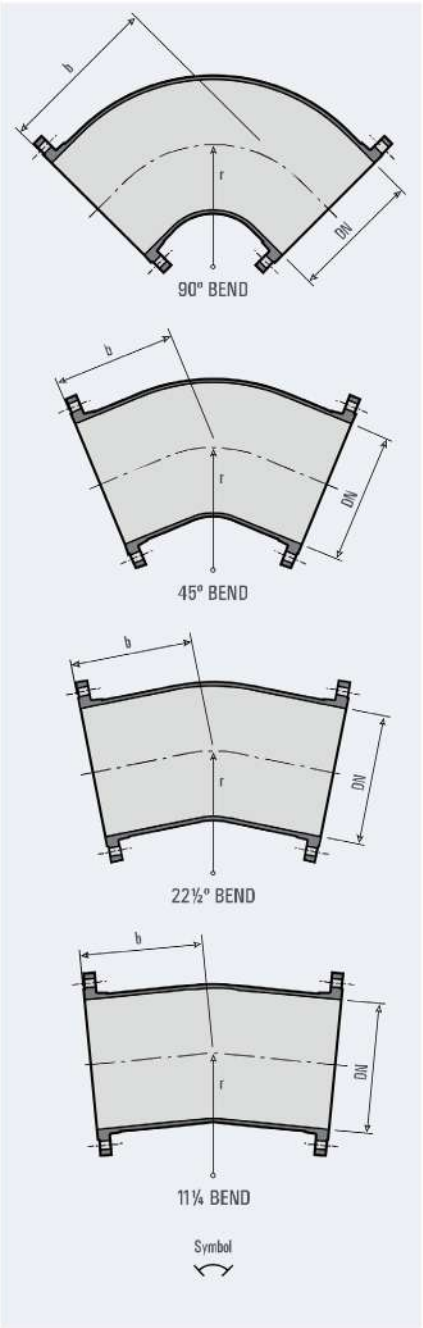
FLANGE - SPIGOT

Symbol

FITTINGS - DUCTILE IRON - FLANGED JOINT

DOUBLE FLANGED BENDS

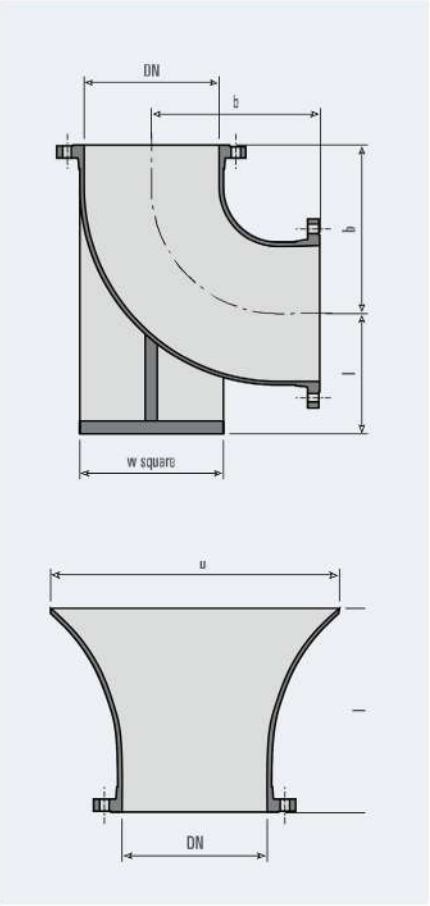
NOMINAL SIZE	DIMENSION
DN	b
90° BENDS	
80	165
100	180
150	220
200	260
250	350
300	400
350	450
400	500
450	550
500	600
600	700
700	800
800	900
900	1000
1000	1100
45° BENDS	
80	130
100	140
150	160
200	180
250	350
300	400
350	298
400	324
450	349
500	375
600	426
700	478
800	529
900	581
1000	632



NOMINAL SIZE	DIMENSION
DN	b
22½° BENDS	
80	105
100	110
150	109
200	131
250	190
300	210
350	210
400	239
450	180
500	190
600	220
700	300
800	330
900	360
1000	390
11¼° BENDS	
80	113
100	115
150	113
200	132
250	165
300	175
350	191
400	205
450	135
500	140
600	160
700	205
800	230
900	245
1000	265

DOUBLE FLANGED DUCKFOOT BENDS

NOMINAL SIZE	DIMENSION		
DN	b	l	w
80	165	110	180
100	180	125	200
150	220	160	250
200	260	190	300
250	350	225	350
300	400	255	400
350	450	290	450
400	500	320	500
450	550	355	550
500	600	385	600
600	700	450	700
700	800	515	800
800	900	580	900
900	1000	645	1000
1000	1100	710	1100

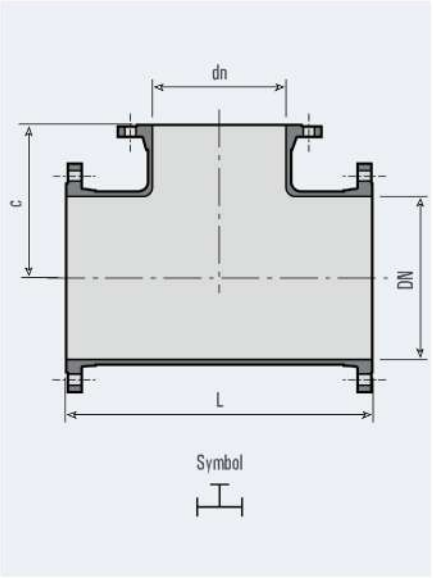


FLANGED BELLMOUTHS

NOMINAL SIZE	DIMENSION	
DN	l	b
80	135	160
100	140	185
150	155	245
200	170	310
250	190	370
300	210	435
350	225	495
400	245	560
450	260	620
500	280	685
600	300	810
700	340	945
800	380	1055
900	420	1165
1000	440	1290

ALL FLANGED TEES

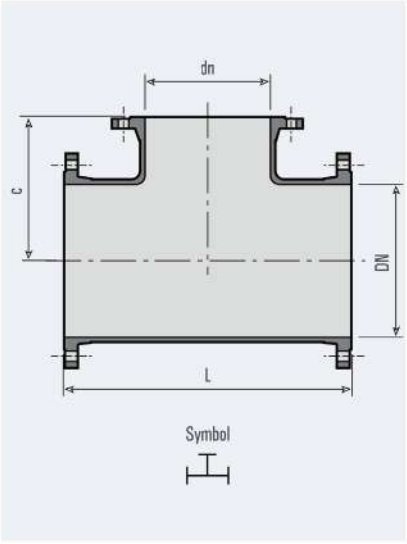
NOMINAL SIZE	DIMENSION	
dn	L	c
DN 80		
50	310	155
65	310	155
80	330	165
DN 100		
50	320	165
65	320	165
80	330	170
100	360	180
DN 150		
50	360	200
80	360	200
100	380	205
150	440	220
DN 200		
50	520	230
80	380	225
100	400	230
150	460	245
200	520	260
DN 250		
80	700	265
100	700	275
150	485	280
200	700	325
250	600	300
DN 300		
80	800	290
100	800	300
150	800	325
200	800	350
250	800	375
300	680	340



NOMINAL SIZE	DIMENSION	
dn	L	c
DN 350		
100	850	325
150	850	325
200	850	325
250	850	325
300	850	425
350	760	380
DN 400		
100	900	350
150	900	350
200	900	350
250	900	350
300	900	450
350	900	450
400	900	450
DN 450		
100	950	375
150	950	375
200	950	375
250	950	375
300	950	475
350	950	475
400	950	475
450	950	475

ALL FLANGED TEES

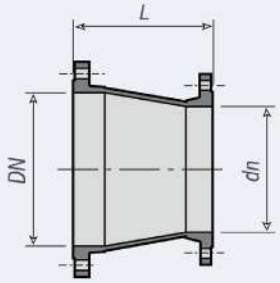
NOMINAL SIZE	DIMENSION	
dn	L	c
DN 500		
100	1000	400
150	1000	400
200	1000	400
250	1000	400
300	1000	500
350	1000	500
400	1000	500
450	1000	500
500	1000	500
DN 600		
100	1100	450
150	1100	450
200	1100	450
250	1100	450
300	1100	550
350	1100	550
400	1100	550
450	1100	550
500	1100	550
600	1100	550
DN 700		
100	540	510
150	595	515
200	650	525
250	705	530
300	760	540
350	815	545
400	870	555
450	925	560
500	980	570
600	1090	585
700	1200	600
DN 800		
100	580	570
150	635	575
200	690	585
250	745	590
300	800	600
350	855	605
400	910	615
450	965	620
500	1020	630
600	1350	645
700	1350	660
800	1350	675



NOMINAL SIZE	DIMENSION	
dn	L	c
DN 900		
100	620	630
150	675	635
200	730	645
250	785	650
300	840	660
350	895	665
400	950	675
450	1005	680
500	1060	690
600	1500	705
700	1500	720
800	1500	735
900	1500	750
DN 1000		
100	660	690
150	715	695
200	770	705
250	825	710
300	880	720
350	935	725
400	990	735
450	1045	740
500	1100	750
600	1650	765
700	1650	780
800	1650	795
900	1650	810
1000	1650	825

DOUBLE FLANGED CONCENTRIC TAPERS

NOMINAL SIZE	DIMENSION	
DN	dn	L
CONCENTRIC		
80	40	200
80	50	200
80	65	200
100	50	200
100	65	200
100	80	200
150	50	300
150	80	400
150	100	300
200	80	600
200	100	600
200	150	300
250	100	600
250	150	600
250	200	300
300	100	600
300	150	600
300	200	600
300	250	300
350	100	750
350	150	700
350	200	600
350	250	600
350	300	300
400	100	800
400	150	750
400	200	600
400	250	600
400	300	600
400	350	300
450	100	900
450	150	800
450	200	750
450	250	600
450	300	600
450	350	600
450	400	300



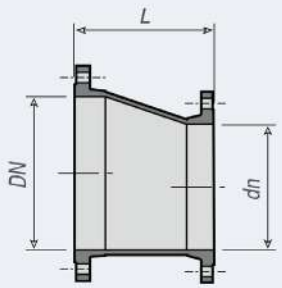
FLANGE - FLANGE
CONCENTRIC

Symbol

NOMINAL SIZE	DIMENSION	
DN	dn	L
CONCENTRIC		
500	100	950
500	150	900
500	200	800
500	250	700
500	300	600
500	350	600
500	400	600
500	450	300
600	100	1050
600	150	1000
600	250	900
600	300	800
600	350	700
600	400	600
600	450	600
600	500	600
700	200	1100
700	250	1050
700	300	1100
700	350	900
700	400	800
700	450	700
700	500	600
700	600	600
800	400	1030
800	450	900
800	500	800
800	600	600
800	700	600
900	400	1100
900	450	1100
900	500	1000
900	600	800
900	700	600
900	800	600
1000	500	1200
1000	600	1000
1000	700	800
1000	800	600
1000	900	600

DOUBLE FLANGED ECCENTRIC TAPERS

NOMINAL SIZE	DIMENSION	
DN	dn	L
CONCENTRIC		
80	40	200
80	50	200
80	65	200
100	50	200
100	65	200
100	80	200
150	50	300
150	80	400
150	100	300
200	80	600
200	100	600
200	150	300
250	100	600
250	150	600
250	200	300
300	100	600
300	150	600
300	200	600
300	250	300
350	100	750
350	150	700
350	200	600
350	250	600
350	300	300
400	100	800
400	150	750
400	200	600
400	250	600
400	300	600
400	350	300
450	100	900
450	150	800
450	200	750
450	250	600
450	300	600
450	350	600
450	400	300



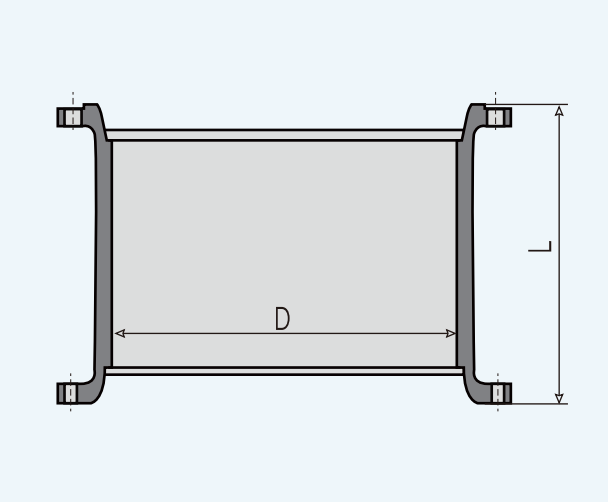
FLANGE - FLANGE ECCENTRIC

Symbol

NOMINAL SIZE	DIMENSION	
DN	dn	L
CONCENTRIC		
500	100	950
500	150	900
500	200	800
500	250	700
500	300	600
500	350	600
500	400	600
500	450	300
600	100	1050
600	150	1000
600	250	900
600	300	800
600	350	700
600	400	600
600	450	600
600	500	600
700	200	1100
700	250	1050
700	300	1100
700	350	900
700	400	800
700	450	700
700	500	600
700	600	600
800	400	1030
800	450	900
800	500	800
800	600	600
800	700	600
900	400	1100
900	450	1100
900	500	1000
900	600	800
900	700	600
900	800	600
1000	500	1200
1000	600	1000
1000	700	800
1000	800	600
1000	900	600

MECHANICAL JOINT COLLAR

NOMINAL SIZE	L	D
80	320	109
100	320	130
150	325	183
200	330	235
250	335	288
300	400	340
350	405	393
400	410	445
450	415	498
500	420	550
600	430	655
700	460	760
800	470	865
900	480	970
1000	510	1075



Product Portfolio

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

Certification Criterion	Coverage	Certifying Authority
Product Certificate	Certificate of Conformity EN 545:2010; ISO 2531:2009	Bureau Veritas Certification
Product Certificate	Certificate of Conformity EN 598:2007 + A1:2009 ISO 7186:2011	Bureau Veritas Certification
Product Certificate	BIS Standard Mark: IS 8329:2000	Bureau of Indian Standards
Product Certificate	Kite Mark Certificate for BS EN 545	BSI Assurance UK Limited
Product Certificate	Kite Mark Certificate for BS ISO 2531	BSI Assurance UK Limited
Product Certificate	ZIK: Certificate of Constancy of Performance	Quality Superintending Company Ltd. ZAVOD ZA ISPITIVANJE KVALITETE
System Certificate	Quality Management System ISO 9001:2008	Indian Register Quality Systems
System Certificate	Environment Management System ISO 14001:2004	Indian Register Quality Systems
System Certificate	Occupational Health & Safety Assessment Series OHSAS 18001:2007	Indian Register Quality Systems
System Certificate	Certificate of Accreditation for Quality Control Laboratory in accordance with ISO/IEC17025:2005	National Accreditation Board for Testing and Laboratories Calibration (NABL)
Potability Certificate	Concrete, Cement and Mortar - Pressure Pipes	Water Regulations Advisory Scheme (WRAS) England
Potability Certificate	Coating, Paints & Lining	Water Regulations Advisory Scheme (WRAS) England
Potability Certificate	CML Water	TUV South Asia
Award for Excellence	Award for Export Excellence	Export Promotion Council

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Plant

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West Bengal, India, Pin code - 721301.
Ph: 03222 - 233290

Production Unit (Fittings)

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Liaoning Province
P.R.C