

Carrying Water, Establishing Lifeline

About Rashmi Group



Rashmi Group envisions a future of innovation, sustainability, and global collaboration. Together, we lead with purpose, pioneering solutions that enrich lives and inspire progress for generations to come. , ,

Rashmi Group stands as a prominent Business Conglomerate in India, recognized for its expansive operations. Pioneering the integration of Iron & Steel Products, Cement, Power, and Ferro Alloys, the group is under the astute guidance of **Mr. Sajjan Kumar Patwari** along with his three sons - **Mr. Sunil Kumar Patwari, Mr. Sanjib Kumar Patwari, and Mr. Sanjay Kumar Patwari**.

Strategically headquartered in Kolkata, the group maintains its operational footprint through strategically positioned manufacturing facilities in Kharagpur and Jhargram. The product portfolio boasts a diverse array, encompassing DI Pipes and Fittings, TMT Bars, Pig Iron, Wire Rods, MS Billets, Sponge Iron, Sinter, Ferro Alloys, Pellets, Cement, Nitrile Gloves, Seamless Pipes & Tubes, Digital Networking Devices, and Dredging solutions.

Rashmi Group holds a notable position as a prime exporter of Iron Ore Fines to China & various South East Asian nations, while simultaneously catering to global markets with mineral-based products. This achievement is underscored by the accolade of "**Ultra Mega Project**" status conferred upon the group by the West Bengal government, further complemented by its distinction as one of the earliest recipients of environmental and pollution clearances within the state.



Introduction to **Rashmi Metaliks**

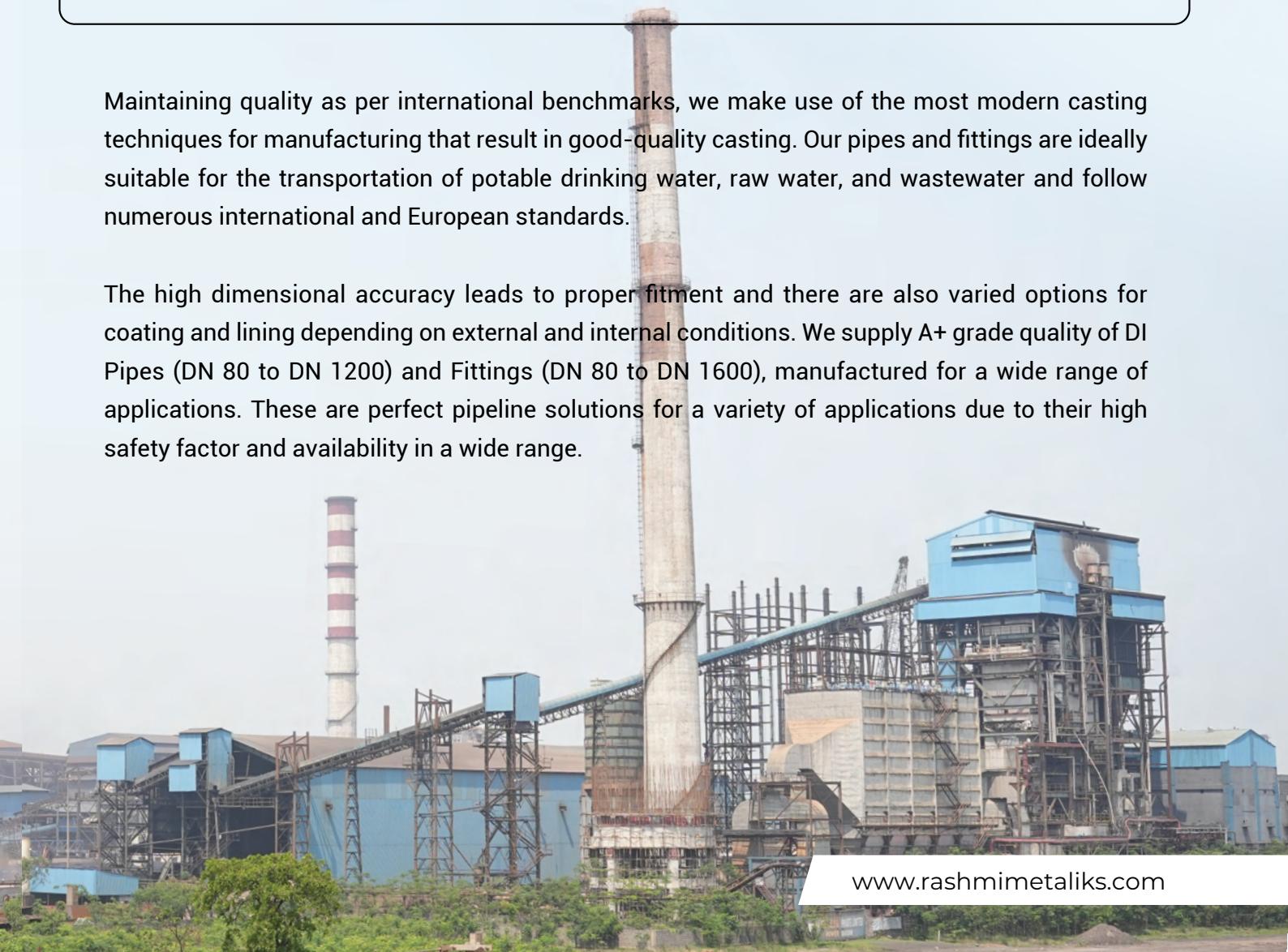
Rashmi Metaliks Limited is a name synonymous with reliability & quality in Eastern India's iron & steel manufacturing industry. It is one of the flagship companies of Rashmi Group, incorporated in the year 2004 in West Bengal. We have a State-Of-The-Art Integrated Steel manufacturing facility comprised of Pellet, Sinter, Pig iron, Sponge Iron, Ductile Iron Pipe and Fittings, Billet, TMT & Wire Rod.

Rashmi Metaliks is one of the leading manufacturers of DI Pipes & Fittings in India. We have a substantial number of jointing options with various internal and external coating types when it comes to fittings. Since its inception, Rashmi Metaliks has been expanding at an unbeatable CAGR of 62%. We have upgraded our production to **7,70,000 Metric Tonnes of DI Pipes & 26,000 Metric Tonnes of DI Fittings** annually.

Today, Rashmi Metaliks stands as the largest manufacturer of DI Pipes & Fittings in India and holds the second position in the globe.

Maintaining quality as per international benchmarks, we make use of the most modern casting techniques for manufacturing that result in good-quality casting. Our pipes and fittings are ideally suitable for the transportation of potable drinking water, raw water, and wastewater and follow numerous international and European standards.

The high dimensional accuracy leads to proper fitment and there are also varied options for coating and lining depending on external and internal conditions. We supply A+ grade quality of DI Pipes (DN 80 to DN 1200) and Fittings (DN 80 to DN 1600), manufactured for a wide range of applications. These are perfect pipeline solutions for a variety of applications due to their high safety factor and availability in a wide range.





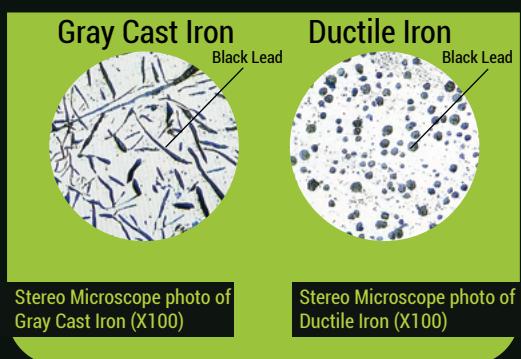
DUCTILE IRON (DI)

DELIVERING LIFE (WATER) TO DISTANT LANDS

Ductile Iron (DI) Pipes have emerged as the best choice for water supply and pressure sewerage systems worldwide. While having a chemical composition similar to cast iron, ductile iron stands out for its spheroidal microstructure, offering numerous advantages including enhanced pressure-bearing capacity, superior impact resistance, and heightened corrosion resistance. These properties make it highly desirable for a range of applications, contributing to its widespread adoption in various infrastructure projects.

BENEFITS OF USING DUCTILE IRON PIPES

- High Tensile Strength
- Corrosion Resistant
- Flexible and Leak Resistant
- Durable Cement Mortar Lining
- Excellent Workability



Ductile Iron

Pipes and Fittings

Renowned for our superior quality Ductile Iron Pipes & Fittings, Rashmi Metaliks is the favored choice for water supply and pressure sewerage applications. Our adherence to stringent standards and commitment to quality assurance has garnered us a dominant stand in the market.

To fulfill the growing demand for Ductile Iron Pipes and Fittings, we have elevated our production capacity to a phenomenal 7,70,000 MT per annum for Pipes & 26,000 MT for Fittings. Our adoption of state-of-the-art casting methodologies ensures precision in casting with exact dimensional accuracy, guaranteeing optimal fitment. Additionally, we offer a range of coating and lining options tailored to external and internal conditions, enhancing the durability of our products.

At Rashmi Metaliks, we are dedicated to propelling the industry forward with innovation, quality, and reliability.



Ductile Iron Pipe

Casting Process



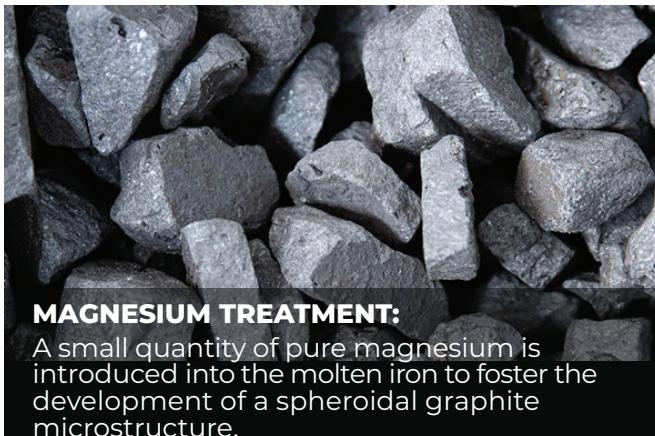
SELECTION OF MATERIAL:

Refined liquid iron directly from the blast furnace.



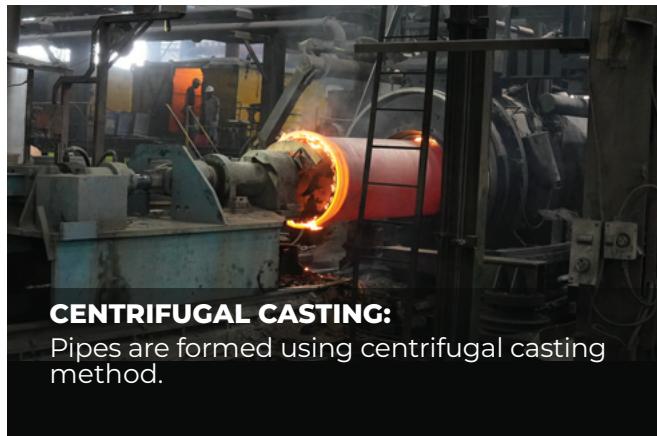
COMPOSITION ADJUSTMENT:

If the molten iron composition deviates from established standards, it is rectified by introducing alloy and other elements.



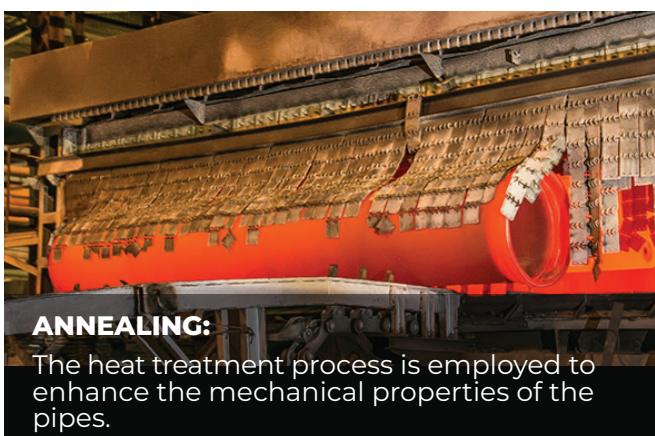
MAGNESIUM TREATMENT:

A small quantity of pure magnesium is introduced into the molten iron to foster the development of a spheroidal graphite microstructure.



CENTRIFUGAL CASTING:

Pipes are formed using centrifugal casting method.



ANNEALING:

The heat treatment process is employed to enhance the mechanical properties of the pipes.



CUTTING AND GRINDING:

Pipes are subjected to spigot end cutting and grinding to attain the required end chamfer. (Applicable for sampling)



HYDROSTATIC PRESSURE TESTING:

To perform the leak test, hydrostatic pressure is applied internally and is steadily maintained for 10 seconds.



CEMENT MORTAR LINING:

The lining thickness is 3 mm for DN 80 – DN 300, 5 mm for DN 350 – DN 600 and 6 mm for DN 700 – DN 1200 pipes.

Ductile Iron Pipe

Finishing & Despatch



ZINC COATING:

Zinc coating, due to the galvanizing effect, increases the corrosion resistance of the pipe.



BITUMINOUS COATING:

Bituminous paint is applied uniformly by a spraying machine. The mean thickness of the coating is 70 µm.



QUALITY TESTING:

The pipes are rigorously tested on all predefined parameters to ensure the highest quality standards.



STORAGE:

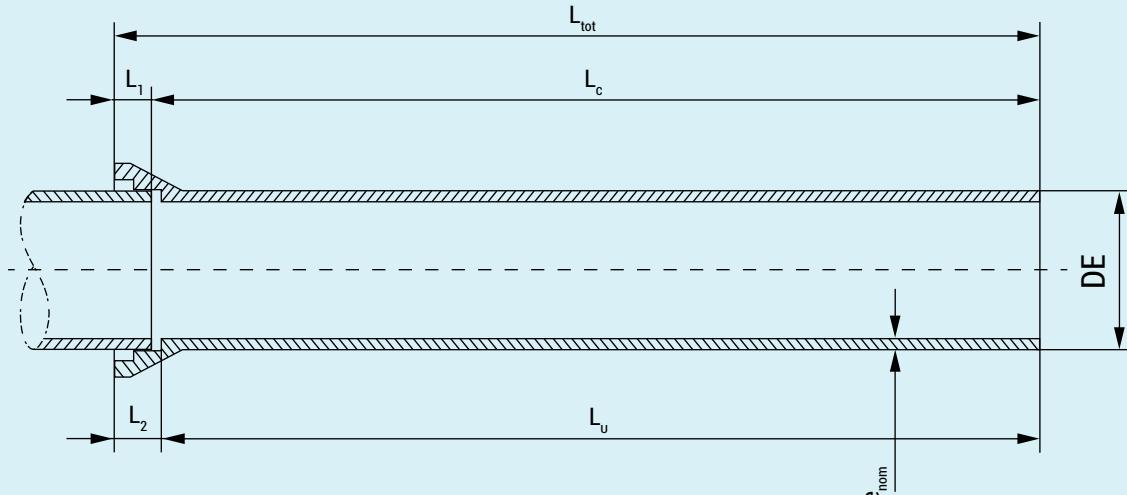
The quality-approved pipes are stacked in a controlled environment and marked for transportation.

TRANSPORT



PUSH-ON JOINTS

DIMENSION DETAILS



Key

OL = overall length in meters
 DOS = depth of socket in meters
 $L_u = OL - DOS$; standardized length in meters

e = nominal wall thickness in mm
 DE = nominal external diameter of spigot in mm

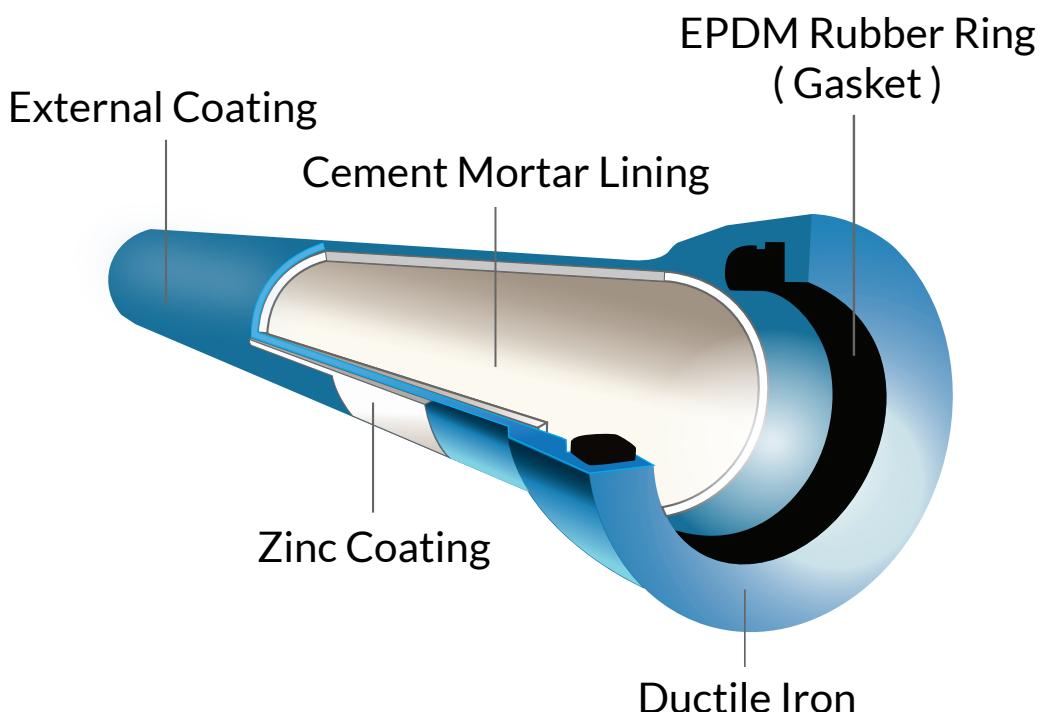
NOMINAL WALL THICKNESS CHART FOR VARIOUS CLASSES OF DI PIPES PUSH ON JOINT

Nominal Diameter	External Diameter		Nominal Pipe Wall Thickness, e (mm), Various Classes of Pipes									
			C 25	C 30	C 40	C 50	C 64	C 100	As Per BS EN 598 (Pressure Pipe)		K7	K9
80	98	+1/-2.7			4.4	4.4	4.4	4.8	4.8		5.0	6.0
100	118	+1/-2.8			4.4	4.4	4.4	5.5	4.8		5.0	6.0
125	144	+1/-2.8			4.5	4.5	4.8	6.5	4.8		5.0	6.0
150	170	+1/-2.9			4.5	4.5	5.3	7.4	4.8		5.0	6.0
200	222	+1/-3.0			4.7	5.4	6.5	9.2	4.9		5.0	6.3
250	274	+1/-3.1			5.5	6.4	7.8	11.1	5.3		5.3	6.8
300	326	+1/-3.3		5.1	6.2	7.4	8.9	12.9	5.6		5.6	7.2
350	378	+1/-3.4	5.1	6.3	7.1	8.4	10.2	14.8	6.0		6.0	7.7
400	429	+1/-3.5	5.5	6.5	7.8	9.3	11.3	16.5	6.3		6.3	8.1
450	480	+1/-3.6	6.1	6.9	8.6	10.3	12.6	18.4	6.7		6.6	8.6
500	532	+1/-3.8	6.5	7.5	9.3	11.2	13.7	20.2	7.0		7.0	9.0
600	635	+1/-4.0	7.6	8.7	10.9	13.1	16.1	23.8	7.7		7.7	9.9
700	738	+1/-4.3	8.8	9.9	12.4	15.0	18.5	27.5	9.6		8.4	10.8
750	790	+1									8.8	11.3
800	842	+1/-4.5	9.6	11.1	14.0	16.9	21.0		10.4		9.1	11.7
900	945	+1/-4.8	10.6	12.3	15.5	18.8	23.4		11.2		9.8	12.6
1000	1048	+1/-5.0	11.6	13.4	17.1	20.7			12.0		10.5	13.5
1100	1152	+1/-6.0	12.6	14.6	18.6	22.6			14.4		11.2	14.4
1200	1255	+1/-6.2	13.6	15.8	20.2	24.5			15.3		11.9	15.3

TECHNICAL SPECIFICATIONS

Product	Ductile Iron (DI) Pipes suitable for Push-on-Joints*
Size Range	DN 80 to DN 1200
Class of DI Pipes	C20, C25, C30, C40, C50, C64, C100, PP, K-7 & K-9
Standard Length (in Meters)	5.5
Internal Linings	Cement Mortar Lining of OPC/BFSC / SRC / HAC Cement Mortar Lining with Epoxy Seal Coat Cement Mortar Lining with Bituminous Seal Coat
External Coating – 1	Zinc Coating (130 gm/m ² or 200 gm/m ² or 400 gm/m ²) Alloy of Zinc & Aluminium (ZnAl) with minimum mass of 400 gm/m ²
External Coating - 2	Bitumen Coating Blue / Red Epoxy Polyurethane Coating
Outside OnSite Protection	Polyethylene Sleeving
Coating of Joint Area	Bitumen / Epoxy as per customer requirement
Conforming Specifications	EN 545:2010 / EN 545:2006 ISO 2531:2009 / ISO 2531:1998 EN 598:2007 / ISO 7186:2011 IS 8329 : 2000

* RML also provides customize pipe joint design suitable for Restrained/Anchor Joints as per customer requirement.



ADVANTAGE OF DUCTILE IRON PIPES

- High corrosion resistance after suitable protection
- Excellent hydraulic flow
- High tensile strength
- Good elastic modulus and excellent ductility
- Suitable for high stress applications subjected to pressure surge
- High working pressure compared to other metallic pipes
- Ease of installation
- Long service Life
- Can accommodate ground movement



APPLICATIONS OF DUCTILE IRON PIPES

- Raw and clear water transmission
- Distribution network of potable water
- Water supply for industrial/process plant application
- Ash-Slurry Handling & Disposal system
- Fire-Fighting systems
- Sewerage and waste water main
- Gravity sewerage collection and disposal system
- Storm water drainage piping
- Effluent disposal system for domestic and industrial application
- Piping work inside water and sewerage treatment plants
- Vertical connection to utility and reservoirs
- Piling for ground stabilization
- Protective piping under major carriage-ways
- Irrigation water networks



PIPE STORAGE

GENERAL RECOMMENDATIONS

- The storage area must be flat. The ground must not be marshy or unstable and it must not contain corrosive material.
- On arrival in storage area the goods must be inspected and if there is any damage (degradation of internal and external coating), it must be repaired before going into stock.
- The pipes must be stocked in the respective stakes according to diameter in accordance with a stock plan.
- It is always advisable to protect coating from the effects of weathering and prolonged exposure in the sun.
- Use shaped hooks covered with special protection of plastic material or, rubber, to avoid any damage to the internal coating of pipes. Wooden spacers (timber, wedges etc...) must be strong enough and of good quality.
- Precaution must be taken when the pipes have special coating.



Typical Ground Conditions	Soil Corrosivity	Protection System
<ul style="list-style-type: none"> ○ Natural soils with resistivity above 2500 ohm.cm ○ Natural soils with resistivity between 1500 and 2500 ohm.cm without water table. 	Non Aggressive	Zinc & Bitumen
<ul style="list-style-type: none"> ○ Natural soil with resistivity between 1500 and 2500 ohm.cm with seasonal water table or permanent waterlogging. ○ Natural soils with resistivity between 750 and 1500 ohm.cm without water table. 	Aggressive	Zinc & Bitumen Plus PE Sleevng
<ul style="list-style-type: none"> ○ Natural peaty soils ○ Natural soils containing coal, ironstone or shale without water table ○ Natural soils with pH range 5 <pH<6 without water table ○ Made up ground containing clinker, brick, flints and other materials likely to cause mechanical damage without water table 	Aggressive	Zinc & Bitumen Plus PE Sleevng Plus Imported Backfill
<ul style="list-style-type: none"> ○ Natural soils with resistivity below 750 ohm.cm ○ Natural soils with resistivity below 1 500 ohm.cm with seasonal water table or permanent waterlogging ○ Natural soils containing coal, ironstone or shale with seasonal water table or permanent waterlogging ○ Natural soils with pH<5 ○ Natural soils with pH range 5 <pH <6 with seasonal water table or permanent waterlogging ○ Made up ground with light chemical contaminations e.g. refuse sites, farmyard waste ○ Stray electrical currents e.g. close proximity to cathodically protected pipelines and DC traction systems 	Highly Aggressive	Zinc & Bitumen Plus Tape Wrap 25mm Overlap
<ul style="list-style-type: none"> ○ Made up ground containing clinker, brick, flints and other materials likely to cause mechanical damage with seasonal water table or permanent waterlogging ○ Made up ground with heavy chemical contaminations, e.g. disused gas plants, industrial sites, mines, chemical plants ○ Tidal waters e.g estuaries, shorelines 	Highly Aggressive	Zinc & Bitumen Plus Tape Wrap 55% Overlap

WHY SELECT DUCTILE IRON PIPE

Attributes	uPVC Pipe	HDPE Pipe	DI Pipe	GI Pipe
Type of Pipe	Rigid	Flexible	Rigid	Rigid
Available Length	6m or 12m	6m or 12m rolls upto 15m	5.5 m or 6m	6m
Tensile Strength	7,000 psi	3,500 psi	60,000 psi	40,000 psi
Pressure Rating	6, 8, 10, 12	2.55 to 16.3	upto 100 bars	Class-B: 30 at test and 20 at working; Class-C: 50 at test and 30 at working
Hydraulic Efficiency (Hazen's Roughness Coefficient)	145	145	140	100
Jointing process	Fast	Slower	Fast	Fast
Flexibility of joints	Limited	High	"Can take up to 5 degrees of deflection"	Can take up to 2.5 degree of deflection
Corrosion resistance	Corrosion resistant	Corrosion resistant	Corrosion resistant	Susceptible to corrosion in long run
Life (Years)	50 yrs	50 yrs	Upto 100 yrs	30 yrs
Damage during laying	Moderate	Moderate	Least	High
Storage Requirement	To be stored under covered space. Pipe becomes brittle if exposed to Sun for long	Can be stored anywhere	Can be stored anywhere	Can be stored anywhere
Bedding Requirement	Sand bedding is required to avoid deflection of pipe	Excavated material can be refilled after removal of hard sharp edge material	Excavated material can be refilled after removal of hard sharp edge material	Excavated material can be refilled after removal of hard sharp edge material
Requirement of special equipment for laying and jointing	Not required	Requires sophisticated moulding equipment for butt fusion	Not required	Not required
Thermal Expansion	Yes	Yes	No	No

Standard Specifications

Approvals and Certificates

Specifications

ISO 2531 - Ductile iron pipes, fittings, and accessories for pressure pipelines.

ISO 7186 - Ductile iron products for sewage applications.

BSEN 545 - Ductile iron pipes, fittings, and accessories and their joints for water pipelines.

BSEN 598 - Ductile iron pipes, fittings, and accessories and their joints for sewerage applications.

ISO 4179 - Ductile iron pipes for pressure and non-pressure pipelines – centrifugal cement mortar lining general requirements.

BS 4027 - Specification for sulfate-resisting Portland cement. Requirements for composition, strength, physical, and chemical properties of three strength classes.

ISO 8179 - Ductile iron pipes – external zinc coating.

BS 3416 - Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water.

ISO 4633 - Rubber seals-joint rings for water supply, drainage, and sewerage pipelines – specs for materials.

BS 2494 - Specification for elastomeric seals for joints in pipework and pipelines.

ISO 8180 - Ductile iron pipes-polyethylene sleeving.

ISO 7005-2 - Metallic flanges – part 2 cast iron flanges.

ISO 4014 - Hexagon head bolts – produced grades A and B.

ISO 4032 - Hexagon nuts, style 1 – produced grades A and B.

SASO 1020 - Ductile cast iron pipes, fittings, and accessories for pressure pipelines - general requirements

SASO 1014 - Socket and spigot ductile cast iron pipes (GS 766) for pressure pipelines.

SASO 1016 - Ductile cast iron pipes - external coating (GS 768) with zinc metal spraying and bituminous material finishing layer: methods of test

SASO 1017 - Ductile cast iron pipes - external coating (GS 769) with zinc metal spraying and bituminous material finishing layer

GSO 771/1998 - Ductile cast iron pipes, fittings, and accessories for pressure pipelines - test methods

SASO 1022 - Ductile cast-iron pipes for pressure (GS 773) pipelines - centrifugal cement mortar lining - methods of test

GSO 774/1997 - Ductile cast iron pipes for pressure pipelines - centrifugal cement mortar lining - general requirements

Approvals

Bahrain:

Approved by Ministry of Electricity and Water – EWA

Kuwait:

1. MEW - Ministry of Electricity & Water
2. MPW - Ministry of Public Works
3. MOD - Ministry of Defense
4. KED - Kuwait Fire Dept.
5. PAHW - Public Authority for Housing Welfare

Qatar:

1. Kahramaa (Qatar General Electricity & Water Corporation) approval pipes and fittings for water applications and repair & maintenance.
2. ASHGHAL (Public Work Authority) approval pipes and fittings for sewer applications
3. Civil Defense - Fire Fighting Systems

Kingdom of Saudi Arabia:

1. NWC (National Water Company)
2. Ministry of Water & Electricity
3. Ministry of Municipal & Rural Affairs
4. RCJY (Royal Commission for Jubail & Yanbu)
5. ARAMCO & SABIC

Turkey:

Approved by ISKI (Istanbul Water and Sewerage Administration)

UAE:

- ADWEA (Abu Dhabi Water & Electricity Authority)
- ADSSC (Abu Dhabi Sewage Service Company).

Others:

Approvals for water and/or sewerage in Egypt, Iraq, Yemen, Jordan, Lebanon, Syria, Libya, Romania

Certificates

TUV NORD – ISO 9001/2008

TUV NORD – Compliance with ISO 2531

BUREAU VERITAS – Compliance with ISO 2531 & all standards related to Ductile Iron Products

SASO – Compliance with SASO standards for Ductile Iron Products

FM Approved – Certificate of Compliance

Type of Joints

Rashmi Metaliks offers 3 types of joints to meet all requirements:

- Push-on joints
- Flanged joints
- Mechanical joints

Features of Joints

Features	Push-on Joint	Flanged Joint	Mechanical Joint
End play	Yes	No	Yes
Angular deflection	Yes	No	Yes
Resistance to axial forces	No	Yes	No
Ease of assembly	Very easy	Simple	Simple
Jointing force required	Yes	No	No
Joint corrosion	No	Yes	Yes
Manufacturing Cost	Low	High	Very High
Replacement	Difficult	Easy	Easy
Leakage possibility	Not possible	Possible	Possible

Our fittings have a tremendous amount of strength thanks to the exceptional qualities of ductile iron for pipe fittings of grade 500/7, as well as our cutting-edge production facility and exacting quality control systems.

Moreover, the material's ductility increases its potential to absorb work load or energy outside of its elastic range.

The Ductile Iron fittings made by Rashmi Metaliks offer a significant safety margin above the typical permitted working pressure.

All fittings are hydro-tested at pressures over the rated pressure at our testing facility. Rashmi Metaliks' Ductile Iron fittings are hence capable of withstanding internal pressure that is greater than typical working conditions, such as increased service pressure and water hammer.

Jointing Pre-requisites:

Jointing procedures will vary according to the type of joint being used. Basic conditions which should be ensured for all types of joints are:

- Cleanliness of all parts
- Correct placement of components
- Correct alignment of socket and spigot ends
- Strict compliance with jointing instructions

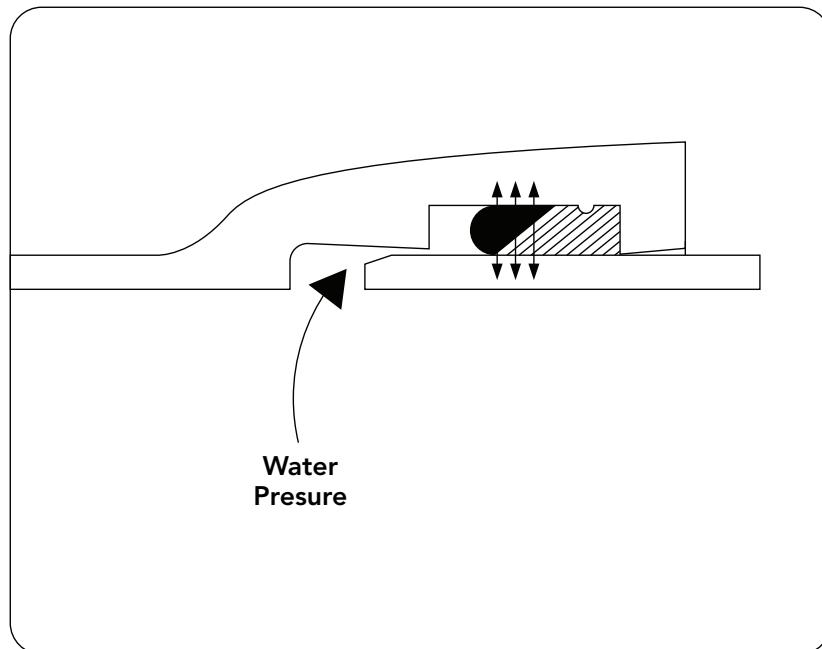
Push-on Socket Joints

Introduction

Push-on joints are quickest and easiest to construct for underground applications. The joint is made out of a single rubber gasket that is inserted into a groove within the socket at the pipe's bell end. The bevelled end of the pipe is pushed past the gasket after the joint has been greased, compressing it to create a pressure-tight and durable seal. These are the typical water pipeline joints. These are high-performance push-fit joints that provide several significant advantages.

Advantages

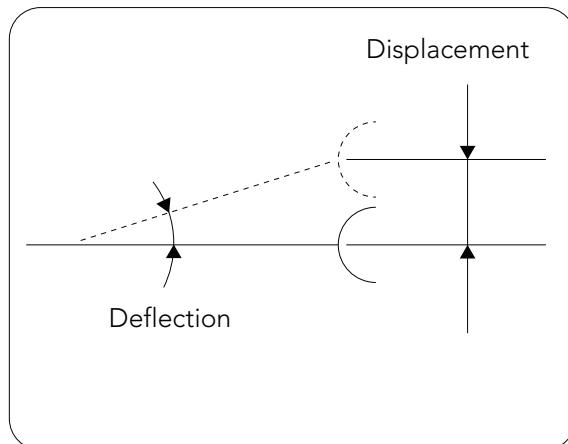
- Quick and easy installation
- Can be assembled under wet-trench conditions
- Capable of angular deflection and longitudinal withdrawal without loss of performance
- Capable of accommodating small adjustments or minor alignments in the pipeline route during laying
- Socket joints are able to accept end play enabling pipeline to accommodate small expansion and contraction movements
- Excellent performance in cases of ground movement or undermining by soil scouring
- Sealing achieved by compression of an elastomeric gasket, a servo action joint, where the seal is enhanced as the pressure in the main increases



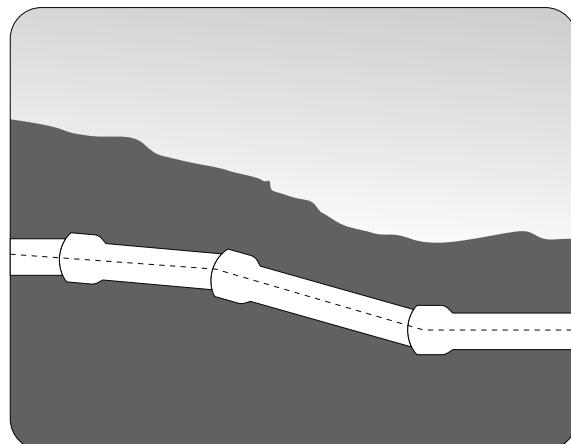
Angular Deflection of Push-on Joint

As mentioned earlier, socket joints are capable of angular deflection. socket joints have an angular deflection capability. Joints can deflect up to 4° depending on the diameter. Nonetheless, the spigot end must be straight and free of any angular deviation at the time of jointing.

Maximum permissible angular deflection for various diameter is listed below:



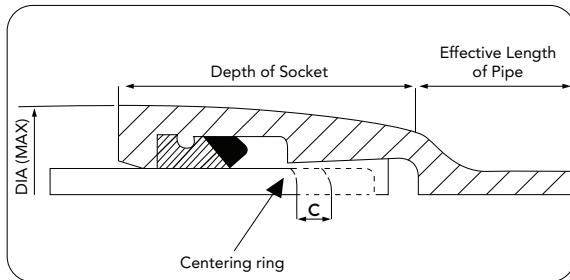
Picture showing angular deflection



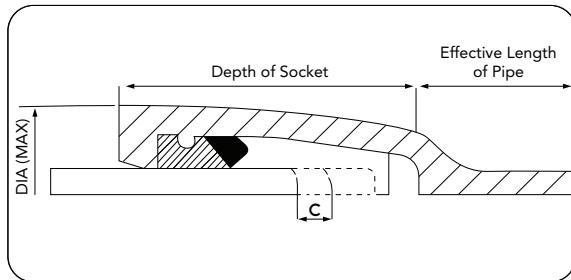
Actual pipeline with angular deflection

DN (Nominal Diameter)	Max. Deflection as laid ($\Delta\theta$)	Approx. Offset as laid at the end of 5.5m pipe (a)	Approx. Offset as laid at the end of 6m pipe (a)
100 - 300	4°	38.4 cm	41.9 cm
350 - 600	3°	28.8 cm	31.5 cm
700 - 800	2°	19.2 cm	21.0 cm
900 - 1000	1°30'	14.3 cm	15.7 cm

Push-on Socket Dimensions & Detail



Socket design from 80 mm – 500 mm
(with centering ring)



Socket design from 600 mm – 1000 mm
(Without centering ring)

Ref. Para 6.1 of IS 9523 : 2000
Which excludes the requirement of centering ring in
fittings of 600 mm and above.

Centering Ring

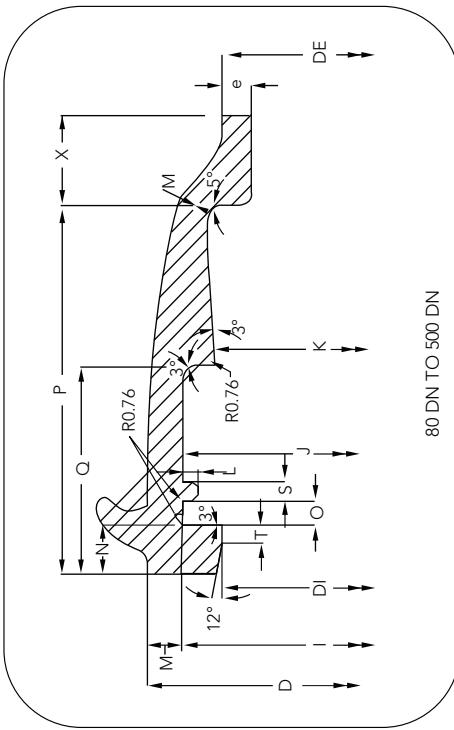
Centering rings up to 500 mm dia are incorporated in Rashmi Metaliks's DI socket fittings, which aid in aligning the pipe during laying and jointing. Nonetheless, it has been discovered that at sizes 600 mm and larger, the centering ring's presence reduces the likelihood of rubber gasket sliding under higher pressure. The centering ring is typically omitted in sizes 600 mm and above all throughout the world. Rashmi Metaliks has elected to dispense with the centering ring for fittings larger than 600 mm in order to increase reliability.

Note: Para 6.1 of IS 9523: 2000 also suggests that in sizes 600 mm & above, the socket may be without the centering ring.

Nominal Size (DN)	Socket Outside Dia.(mm)	Depth of Socket (mm)	Angular Deflection (Degree)	Withdrawal		C	
				No Deflection mm	Full Deflection mm	Spigot Insertion Depth min.	Spigot Insertion Depth max.
80	138	92	4	48	42	40	88
100	158	92	4	47	40	41	88
150	212	95	4	49	38	42	91
200	268	103	4	51	34	48	99
250	321	105	4	44	23	57	101
300	378	110	4	42	15	64	108
350	431	101	3	43	11	63	106
400	487	110	3	33	5	73	106
450	540	120	3	77	4	59	106
500	596	120	3	39	2	77	116
600	704	150	3	66	1	80	146
700	815	160	2	53	0	103	156
800	923	175	2	63	0	108	171
900	1029	185	2	65	0	116	181
1000	1135	215	2	88	0	123	211

*Dimensions in Millimeters.

Pushon Socket Dimensions & Detail

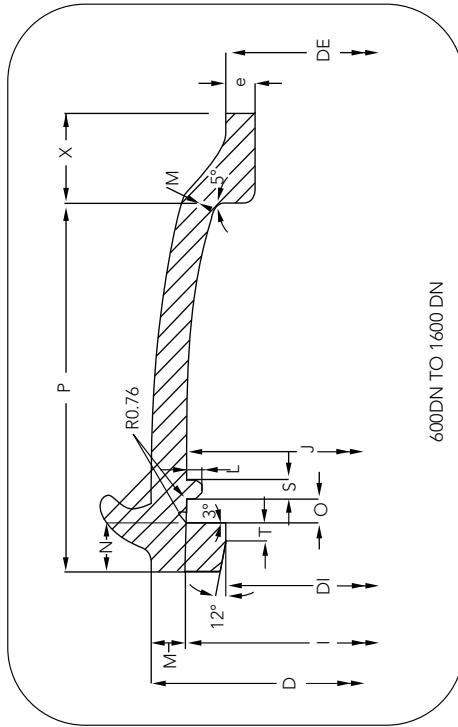


Dimension Chart for Push-on Socket

DN	DE	Tol.	DI	Tol.	P	Tol.	Q	Tol.	I	Tol.	J	Tol.	K	Tol.	N	Tol.	O	Tol.	S	Tol.	L	M	Tol.	D	Tol.	e	Tol.	X
80	98	+1 -2.2	103.0	+1.0 0.5	92	+1.0 -1.0	52	+3.0 -3.0	121.0	+2.0 -1.0	118.9	-1 +1.0	103.0	-2.0 2.0	12	+1.0 -1.0	6.0	5	4	3.5	8.4	+0.0 -1.0	137.8	+0.0 -2.0	7.0	-2.38	23	
100	118	+1	123.0		92		52		141.0		138.9		123.0		12		6.0		5	4	3.5	8.6		158.3		7.2	-2.40	23
125	144	+1 -2.8	149		92		52		169.0		164.8		149.5		12		6.0		5	4	3.5	9.0		187.0		7.5	-2.42	23
150	170	+1 -2.9	175.0		95		52		193.0		190.5		175.0		12		6.0	±0.5	5	4	3.5	9.4		211.7		7.8	-2.45	25
200	222	+1 -3	227.0		103		60		248.0		245.2		228.0		15		7.0		6	5	4.0	10.1		268.2		8.4	-2.50	26
250	274	+1 -3.1	279.0		105		62		299.0		296.9	-1.5	280.0	-2.5 +2.5	15		7.0		6	5	4.0	10.8	+0.0 -1.5	320.6		9.0	-2.55	28
300	326	+1 -3.3	333.0	+2.5 -0.5	110		67		355.0		351.7		332.0		17		8.5		7	5	4.5	11.5		378.0		9.6	-2.60	29
350	378	+1 -3.4	385.0		110		67		407.0		403.4		389.0		17		8.5		7	5	4.5	12.2		431.5		10.2	-2.65	30
400	429	+1 -3.5	436.0		110		74		461.0		457.0		440.0		19		9.0	±0.5	8	5	5.0	13.0		486.9		10.8	-2.70	32
450	480	+1 -3.6	478.0		120		74		512.0		508.0		490.0		19		9.0		8	5	5.0	13.7		539.4		11.4	-2.75	34
500	532	+1 -3.8	539.0		120		81		567.5		562.6		543.5		21		10.0		9	5	5.5	14.4		596.3		12.0	-2.80	36

* Dimensions in millimeters

Pushon Socket Dimensions & Detail



Dimension Chart for Push-on Socket

DN	DE	Tol.	DI	Tol.	P	Tol.	Q	Tol.	I	Tol.	J	Tol.	K	Tol.	N	Tol.	O	Tol.	S	Tol.	L	M	Tol.	D	Tol.	e	Tol.	X
600	635	+1 -4	642.0	+1.0 0.5	150		673.0	668.0		21	10.0		10	5.0	5.5	15.8		704.7		13.20	-2.90	40						
700	738	+1 -4.3	747.0	160			780.0	775.0		21	11.0		10	5.0	5.5	17.3		814.6		14.40	-3.00	41						
750	790	+1 -4.5	799.0	170			834.0	834.5		21	11.0		10	5.0	5.5	18.0		870.0		15.00	-3.05	42						
800	842	+1 -4.5	851.0	175			886.0	880.0		22	11.0		10	6.0	5.5	18.7		923.4		15.60	-3.10	44						
900	945	+1 -4.8	954.0	185			989.0	983.0		22	12.0		11	6.0	6.0	20.1		1029.3		16.80	-3.20	46						
1000	1048	+1 -5	1057.0	215			1092.0	1086.0		22	12.0		11	6.0	6.0	21.6		1135.2		18.00	-3.30	48						
1100	1152	+1 -5.2	1161.0	+2.5 -0.5	225		1209.0	+2.0 -1.0	1203.0	25	19.5		16	6.5	9.0	32.0		1273.0		19.20	-3.40	52						
1200	1255	+1 -5.4	1264.0	240			1315.0	1309.0		25	22.5		18	6.5	9.0	34.0		1383.0		20.40	-3.50	54						
1400	1462	+1 -5.6	1471.0	260			1531.0	1521.0		28	22.5		18	6.5	10.0	36.0		1603.0		22.80	-3.70	56						
1600	1668	+1 -5.8	1677.0	280			1742.0	1732.0		28	22.5		18	6.5	10.0	38.0		1818.0		25.2	-3.90	58						

* Dimensions in millimeters

Push-on Fitting Gaskets

Rubber gaskets are available from EPDM Rubber (Ethylene Propylene Diene Monomer):

EPDM Rubber is a special grade of synthetic rubber for

1. Heat resistance (from -40°C to 130°C)
2. Oxidation and Ozone resistance
3. Saline water resistance
4. Dilute acid and alkali resistance
5. Capable of maintaining hygienic quality (drinking water supply)
6. No risk of bacterial or fungal attack

It is well suited for drinking water supply as well as sewage disposal applications.

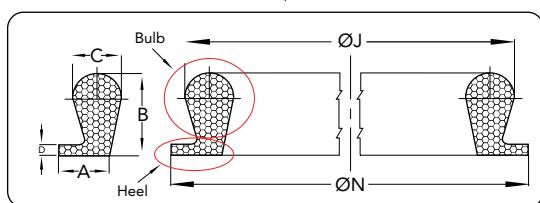
Hence EPDM is considered the most suitable polymer for rubber gasket material for water pipe lines all over the world



Rubber Gasket For Push-on Joints							
Nominal Diameter	Bulb		Heel		Height	App Wt.	
DN	C	ØJ	A	D	ØN	B	kg
80	16	122.0	10.0	5.0	124.0	26.0	0.130
100	16	142.0	10.0	5.0	144.0	26.0	0.145
125	16	169.0	10.0	5.0	171.0	26.0	0.175
150	16	196.0	10.0	5.0	198.0	26.0	0.215
200	18	252.5	11.0	6.0	254.6	30.0	0.340
250	18	305.0	11.0	6.0	308.0	32.0	0.490
200	20	362.5	12.0	7.0	364.5	34.0	0.635
350	20	416.0	12.0	7.0	418.0	34.0	0.740
400	22	472.0	13.0	8.0	474.0	36.0	1.020
450	22	525.0	13.0	8.0	527.0	38.0	1.080
500	24	580.0	14.0	9.0	582.0	43.0	1.480
600	26	689.0	15.0	10.0	601.0	46.0	2.200
700	29	799.0	17.5	10.0	801.5	51.0	3.050
750	30	854.0	18.5	10.3	856.5	52.3	3.450
800	30	906.0	18.5	10.3	908.5	52.5	3.550
900	30	1009.0	18.5	10.3	1012.0	52.9	5.385
1000	30	1118.0	18.5	10.3	1120.0	52.9	6.800

Tolerance on weight $\pm 5\%$

Other Gasket Dimensions are available on request. Dimensions in millimeters



*Ref. IS 12820 : 2004, Table 3

Tolerances on dimensions of Rubber gaskets for Push-on Joint

Dimension (mm)	Nominal Diameter (mm)	Tolerance (mm)
Bulb		
C	80 to 600	± 0.5
	700 to 1050	± 1.0
ØJ	80 to 125	± 1.0
	150 to 300	± 1.5
	350 to 400	± 2.0
	450 to 500	± 3.0
	700 to 800	± 4.0
	900 to 1050	± 5.0
Heel		
A	80 to 250	± 0.3
	300 to 450	± 0.4
	500 to 1050	± 0.5
	80 to 250	± 0.3
	300 to 700	± 0.4
	750 to 1050	± 0.5
ØN		
	80 to 125	± 1.0
	150 to 200	± 1.3
	350 to 400	± 2.0
	430 to 600	± 3.0
	700 to 800	± 4.0
	900 to 1050	± 5.0
B		
	80 to 150	± 0.5
	200 to 500	± 0.8
	700 to 1050	± 1.0

Comparison on Properties

Properties	NR (Natural Rubber)	SBR (Styrene Butadiene Rubber)	EPDM rubber (ethylene propylene diene Monomer rubber)
Density	0.93 gm/cc	0.96 gm/cc	0.86 gm/cc
Tear Strength	30-90 BHN	35-100 BHN	40-90 BHN
Abrasion Resistance	excellent	good	very good
Compression set Resistance	good	good	excellent
Oxidation Resistance	good	good	excellent
Resistance to low temp.	good	moderate	good
Resistance to maximum fluid temp. (°C)	+100°	+120°	+150°
Safety fluid temp. (°C)	+50°	+70°	+70°
Life	moderate	good	very good

Rashmi Metaliks favours EPDM rubber for its superior properties. EPDM gaskets are not attacked by white ants, whereas natural rubber and BR gaskets are prone to attacks by insects.

Physical Properties of Rubber Gasket

Tests to check conformity to IS 5382: 1985

Hardness: Hardness can be checked by using standard equipment for the, entire ring. Hardness values shall be in a maximum range of 4 IRHD / shore 'A' see the Table-Ion pg 63.

Tensile Strength & Elongation at Break: Standard test piece from rubber batch should be tested in universal testing machine. The tensile strength and elongation at break shall comply with the requirements given in Table- Ion Pg 63.

Compression Set: A test piece is compressed in a standard test jig and the compression set reading are noted. Tear strength, Oxidation Resistance, Resistance to low temperature shall be within the requirements in table 1 on pg 63.

Accelerated Ageing in Air: This test is done in an oven with heating and temperature control arrangement. A test piece is heated for a scheduled time temperature cycle and tested for tensile strength and elongation at break. The changes in hardness, tensile strength and elongation at break after ageing shall comply with the requirements given in table- Ion pg 63.

Water Immersion: The test piece shall be immersed upto 7 days in neutral water having a pH value of 7 and a temperature of 70°C. The resultant change in volume of the test piece shall comply with the requirement given in table 1 on pg 63.

Simple tests for checking EPDM gasket:

1. **Flexibility:** On bending, the rubber gasket should not exhibit any cracks.
2. **Heat Resistance:** Put the gasket in an air ageing oven (70°C) for 7 days. Check the flexibility, changed hardness & bond crack. If the gasket is hard & exhibits any crack then the gasket should be rejected. Maximum hardness change should not be more than + 5° Shore 'A'.
3. **Cold Resistance:** Put the gasket in a cold chamber (-0°C) for 72 hours. Check change of hardness & bond strength. Maximum hardness change should not be more than + 5° Shore 'A'.
4. **Weight:** Standard weights for EPDM rubber gaskets are shown on pg 60. However if the filler content is high, the weight will be more. The presence of extra filler is undesirable for the quality of the rubber gasket. Substandard gaskets weight would be more due to excess filler loading resulting in poor quality. However the weight of the gasket would vary due to dimensional difference (within specified tolerance as per pg 60 limit I S: 12820) the upper limit and the lower limit in the diameter of the Finish Product and the diameter at Bulb/Heel zones would also be taken into consideration. Thus the weight of the gasket may vary due to above changes (within specified limits).

Jointing Procedure for Push-on Socket Joints

The method described below is given as an example. The method of making the joint and the equipment used may vary, provided of course that the principles of assembling and recommendations specified will be strictly observed.

Joint Preparation

- Ensure that the spigot is properly chamfered. If it is a cut pipe it is essential to remake the chamfer by using a file or grinder (See fig 1) and ensure that there is a radius to prevent the spigot from displacing the gasket (See fig 2, table 1) with regard to chamfer details.

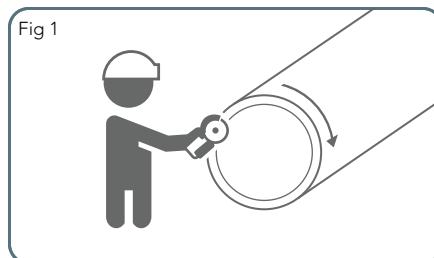
Table 1

Chamfer Details					
Nominal Size DN	m		n		
	Min mm	Max mm	Min mm	Max mm	
80	80	80	80	80	
100	100	100	100	100	
150	150	150	150	150	
200	200	200	200	200	
250	250	250	250	250	
300	300	300	300	300	
350	350	350	350	350	
400	400	400	400	400	
450	450	450	450	450	
500	500	500	500	500	
600	600	600	600	600	
700	700	700	700	700	
800	800	800	800	800	
900	900	900	900	900	
1000	1000	1000	1000	1000	

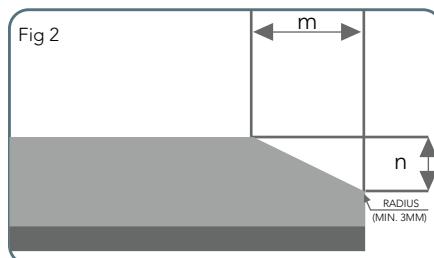
Joint must be deflected only when fully assembled

Thoroughly clean spigot and interior of socket to join. A layer of lubrication is to be applied on the exposed surface of the Gasket, on the chamfer and the spigot end up to the mark. The lubricant should be applied with a brush. (See fig 3 & 4)

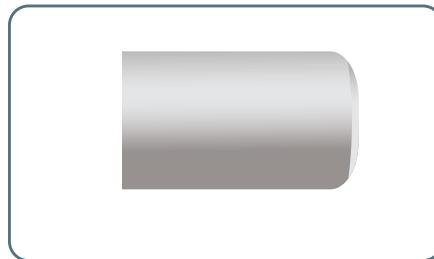
No petroleum lubricant should be used as it deteriorates the rubber gasket.



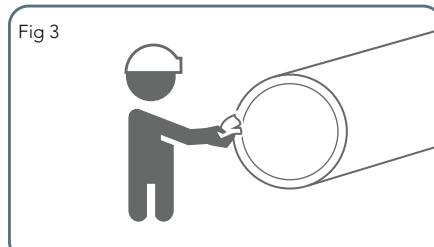
Chamfering the spigot end



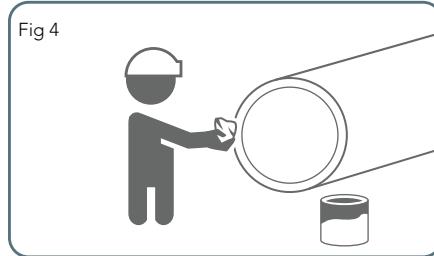
Dimensional detail of spigot end



Section view of spigot end



Clean the outside of spigot with a rag



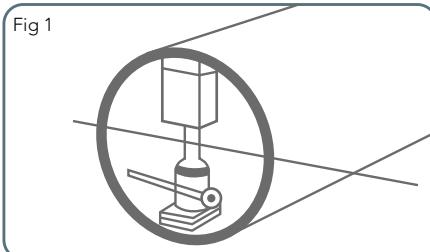
Apply lubricant to the outside of the spigot and surface of gasket

Ovality Correction

Transport and handling can cause sufficient pipe ovality to impede correct assembly of the components. The methods given below cover DN \geq 400 pipes. Before cutting ensure that the diameter is within tolerance at the cut position by outside caliper or circumferential tape. In case of ovality, perform end correction (See fig 1 & 2)

This method is recommended where it is possible to remove the tackle after ovality Correction and subsequent jointing :

- Position the timber street and jack (approximately 5 tones capacity) 100 mm - 200 mm inside the spigot end and at 90° to the major axis. Rubber pads should be placed in position to prevent possible damage to the pipe lining. Extend the jack until the major axis has been reduced to the appropriate limit.

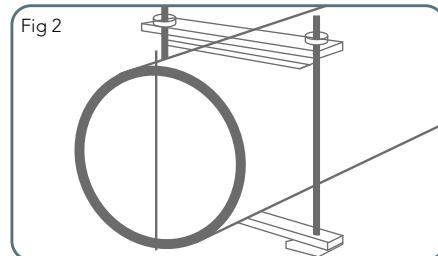


Method A, Ovality Correction

Complete the jointing operation with the major axis of spigot vertical. After jointing remove the tackle.

The use of this method is recommended where it is not possible to remove the tackle described in Method A, after ovality Correction and subsequent jointing.

- Place the tackle around the spigot end of the pipe at a position approximately 450 mm from the pipe end with major axis of the spigot vertical. Where pipes are sleeved or tape wrapped, rubber pads or similar padding should be placed between the re-rounding tackle and the protection system to prevent damage.
- Tighten the two nuts evenly until the major axis has been reduced to the approximate limits specified in table above. Complete the jointing operation with the major axis of the spigot vertical. After joining remove the tackle.

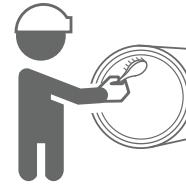


Method B, Ovality Correction

Procedure for Insertion of Rubber Gasket for Push-on Joints

- Clean the inside of socket groove where gasket heel is to be inserted using a wire brush and a rag. Carefully clean the inside of the socket particularly the gasket recesses. In particular, remove any deposits of earth, sand, etc. (See fig 1)

Fig 1



Chamfering the Inside of socket by waste cloth brush or driver

- Clean gasket and insert into socket with the square section gasket heel in the retaining groove. (See fig 2)

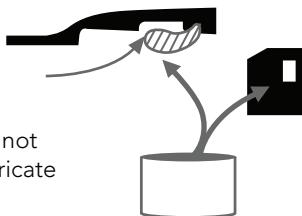
Fig 2



Clean the rubber gasket with a rag

- Coat with lubricating paste on the spigot end of the pipe and the exposed surface of the gasket. The gasket recess must not be coated with lubricating paste, except for small diameter pipes or fitting when problems arise on fitting the gasket. (See fig 3)

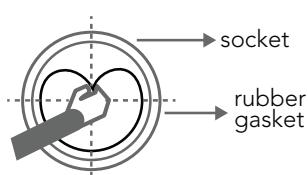
Fig 3



Apply lubricating paste

- The insertion of DN 80 and DN 150 gaskets may be facilitated by turning the gasket inside out, gripping one end with retaining heel uppermost and folding the free end down. (See fig 4)

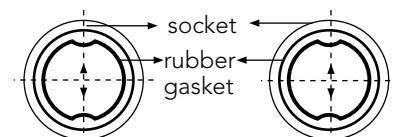
Fig 4



Properly insert the rubber gasket
(DN 80 - DN 150)

- The insertion of DN 200 and larger gaskets is facilitated by folding the gasket as shown by looping it into a heart shape with the gasket bulb towards the back of the socket (See fig 5). For DN 800 - DN 1600 it is preferable to loop the gasket into shape of a cross for insertion.

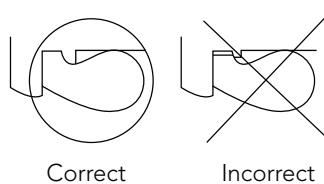
Fig 5



Properly insert the rubber gasket
(DN 200 - DN 700)

- After insertion of the gasket, confirm that the Heel position is properly seated in socket groove. (See fig 6)

Fig 6



Confirm that the gasket is seated properly
(DN 80 - DN 1200)

Joint Assembly

a) DN 80 - DN 150

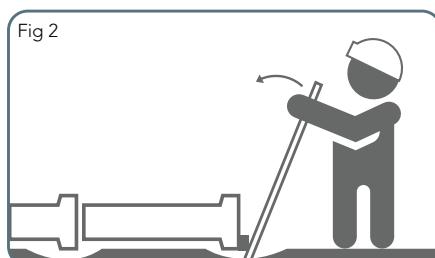
- Prepare & Lubricate the joint area & place pipe / fitting in position, ready for jointing.
- Hold the socket end of the fitting with crowbars slightly dug into the ground and anchored at the ears provided in the socket. Push the crowbar in a jerk simultaneously. (See fig 1 & 2). Pipe socket face must be protected with a piece of hard wood.



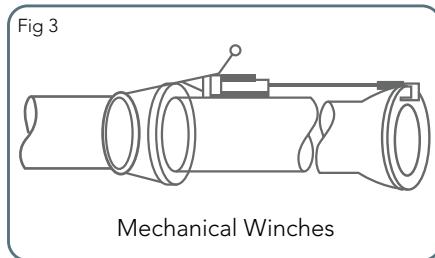
Assembly using Crowbar

b) DN 200 - DN 350

- Prepare & Lubricate the joint area & place pipe / fitting in position ready for jointing.
- In Tirfor type winches take 1.6 ton capacity wire rope and rubber protected hooks.
- Enter the spigot into the socket until the gasket is in contact.
- Place the fork over and behind the socket of the last pipe and attach the eye of the wire rope to the hook on the fork tool.
- Thread the plain end of the rope through the rope grip on the socket hook and place the hook into the socket of the pipe to be jointed.
- Take up the slack in the rope and pull on the fork to complete the jointing. (See fig 3 & 4.)
For fittings of size DN 200 - DN 350, rack and lever can also been used.



Assembly using Crowbar



Mechanical Winches

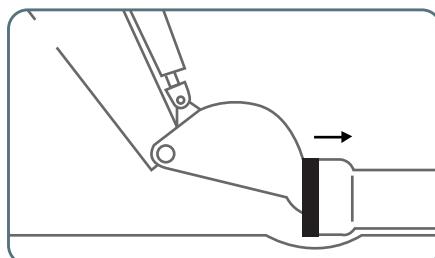
Assembly using tirfor winches

c) DN 350 - DN 1200

- Prepare & lubricate the joint area & lift the fitting with help of the lifting lugs provided. Since the lugs are self aligning the fitting is aligned by its own.
- Place the fittings in the pit and adjust the level.
- Place a wooden batten between the pipe and digger bucket.
- Push the pipe/fitting with the help of a digger till the correct insertion depth is achieved. (See fig 5.)



Assembly using rack & lever



Assembly using rack & lever

Cement Lining Repair

The cement mortar lining may get damaged accidentally or by rough handling. Given below are few simple procedures to restore the lining to its original condition.

Repairable Damage

Any cement mortar damage caused accidentally by rough handling can be repaired on site, provided it is not too severe:

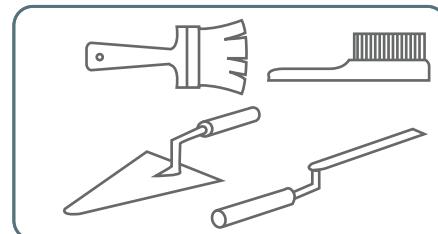
- Area less than 0.10 m².
- Length less than a quarter of the pipe circumference.
- No localized pipe deformation.

Otherwise, cut off the damaged section.

Repair Materials

Material needed for mortar application:

- Brush
- Trowel
- Palette knife or sleeker



Tools and Tackles

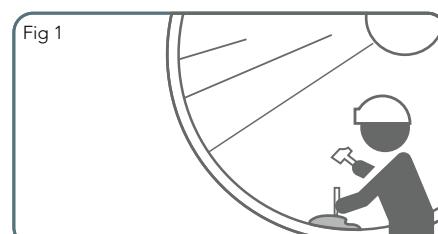


Fig 1

Area preparation

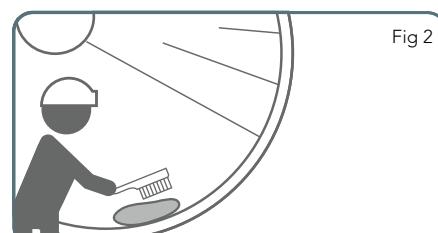


Fig 2

Clean with a wire brush

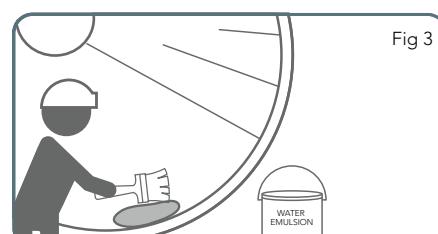


Fig 3

Apply the water emulsion mixture

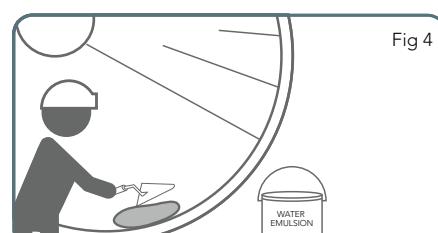


Fig 4

Mortar application adequately to restore the thickness

Patching Material Preparation

The emulsion must be the same as that used for the original coat.

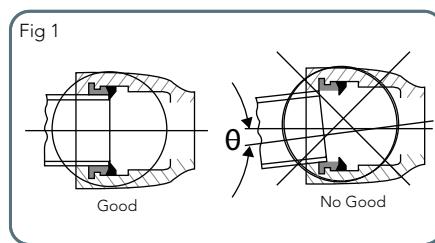
- Mix the components, to give a thick consistent mortar; adjust the amount of water if necessary.

Mortar Application

- Trowel the mortar on, compacting it adequately to restore the thickness.
- Smoothen the repaired surface with a palette knife (or sleeker).
- Check that there are no gaps between the fresh mortar and the original material. (See fig 4)
- Apply a protective coat of water + emulsion, not more than 30 minutes after final smoothening to prevent the patch from drying too quickly. To give it good strength cover with a damp cloth until set.

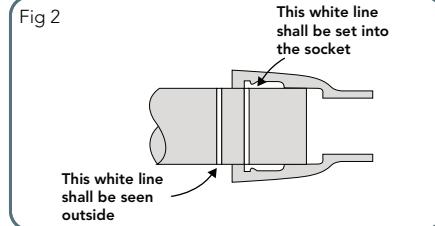
Joint Correction

- Apply radial pressure to the gasket at the heart shaped loop (or cross loops) to force it into place. Check that gasket is located correctly around its whole circumference with its groove on the retaining bead in the socket and retaining heel firmly bedded in its seat. At time of insertion of the spigot end check alignment of the pipes and fittings. (See fig 1)



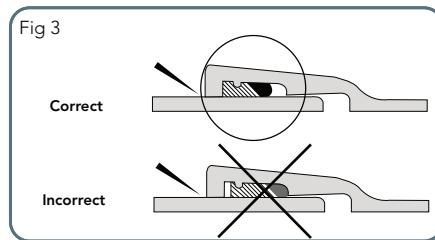
Push the spigot-end on the socket properly (keeping the pipe in straight alignment.)

- Support pipe or fitting just clear of the trench bottom and insert spigot into socket until contact is made. Push the spigot end until the first mark disappears inside the socket. The second mark must still be visible after assembly. (See fig 2)



Properly insert the spigot end into socket upto whiteline

- Ensure that the gasket is correctly in position by inserting the end of a metal ruler through the annular spigot and socket gap until it touches the gasket. The ruler must penetrate to the same depth around the whole circumference. If a difference is found, the gasket may have been displaced and the joint should be dismantled and attempted again (See fig 3)



Confirm by the scale (130-200 mm L) that the gasket is set properly

Joint Dismantling

Socketed joints can usually be separated by using lifting equipment appropriate to the size of the pipe. Secure a webbing sling, of suitable size and strength, around the pipe near the end farthest from the joint to be dismantled. This is then attached to the lifting equipment and the pipe is raised and lowered, within the specified deflection limitations, whilst at the same time exerting slight pulling force, so that the spigot is "walked" out of the socket.

Flanged Fittings

Flanged joint is a bolted joint and a special flat gasket is inserted between the mating flanges and compressed by tightening the bolts holding the flanges together. These joints are mainly used for above the ground installations and other specialized applications. The seal is obtained by compression of a flat elastomer gasket between two flanges.

Name	Flanged
Range	DN 80 - DN 1600
Gasket for water	EPDM/SBR
Angular Deflection	None, Rigid Joint
Standard	PN 10
	PN 16
Available	PN 25
	PN 40



Flanged Fittings

Range & Application

Flanged joints are both rigid and self anchoring, and are primarily used in above ground applications:

- Pumping stations
- Water & Sewerage Treatment Plants
- Industrial pipe works & fire fighting pipelines
- Overhead tanks
- Reservoirs

They may also be used to install valves or hydrants in under the ground pipelines.

Where flanges are buried directly in the ground, the bolts must be adequately protected from corrosion.

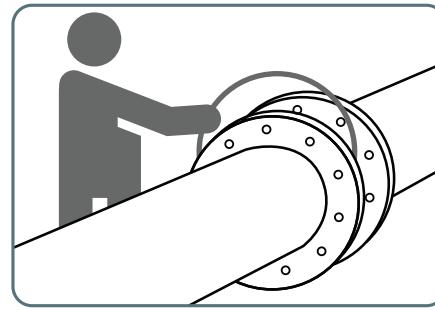
For example: by coating or with a wrapping and protective tape.

It is recommended that flanged pipe work is not buried due to the risk of excessive bending moments being imposed.

Procedure for Jointing

Flange Cleaning and Alignment

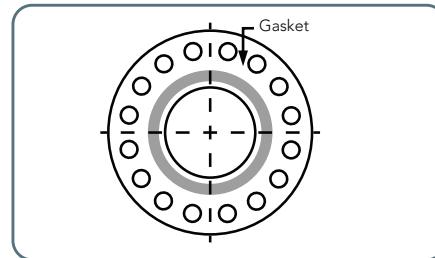
- Check the appearance and cleanliness of the flange faces and the gasket.
- Align the items being assembled.
- Leave a small gap between the two flanges being joined for gasket insertion.



Placing Gasket between Flanges

Gasket Insertion

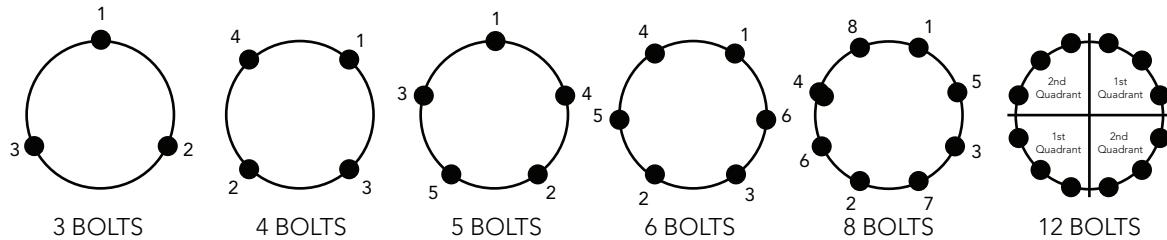
- Place the gasket between the flanges and insert the bolts. Above DN 300, partial adhesion of the correctly positioned gasket to its seat is an aid to assembly (use a Neoprene adhesive).
- Centre the gasket between the raised face on both flanges.



Placing Gasket between Flanges

Bolt Tightening

- Fit the bolts, washers and nuts.
- Tighten the bolts in the order shown in the diagram below, observing the bolt torques prescribed.
- Avoid any tension on the main during bolt tightening.



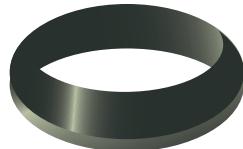
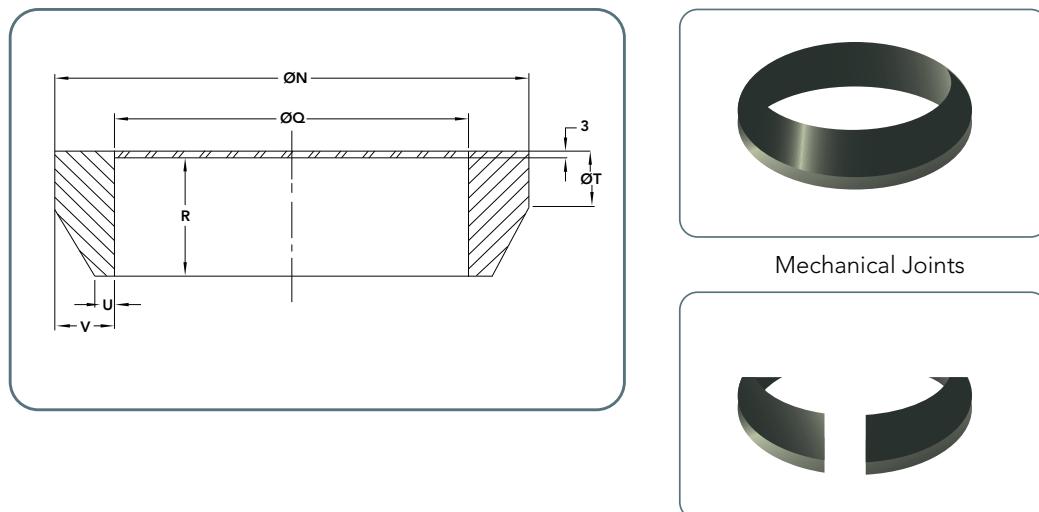
Bolting Torques

The torques recommended below are for lubricated bolt threads.

PN 10 Flanged Joints Approx Bolting Torque (Nm)			PN 16 Flanged Joints Approx Bolting Torque (Nm)			PN 25 Flanged Joints Approx Bolting Torque (Nm)		
Nominal Size DN	To seal at 5 bar	To seal at 10 bar	Nominal Size DN	To seal at 10 bar	To seal at 16 bar	Nominal Size DN	To seal at 20 bar	To seal at 25 bar
80	70	70	80	70	70	80	80	85
100	70	75	100	75	80	100	120	125
150	110	115	150	115	120	150	180	185
200	120	130	200	110	115	200	170	180
250	110	120	250	155	165	250	230	250
300	120	130	300	165	180	300	220	235
350	115	125	350	160	175	350	290	330
400	155	170	400	200	220	400	380	435
450	150	165	450	195	215	450	355	410
500	155	170	500	240	270	500	415	485
600	200	225	600	305	365	600	595	700
700	200	230	700	350	465	700	675	795
800	250	300	800	470	630	800	965	1150
900	250	300	900	475	645	900	990	1185
1000	300	390	1000	605	835	1000	1355	1620
1100	300	395	1100	610	850	1100	1380	1655
1200	360	495	1200	810	1140	1200	1610	1940
1400	420	590	1400	915	1300	1400	1980	2395
1600	530	765	1600	1180	1690	1600	2265	2745

Bolt Size	M16	M20	M24	M27	M30	M33	M36	M39	M30	M45	M56
Spanner Size (mm across flats)	24	30	36	41	46	50	55	60	46	70	85

Mechanical Joint Rubber Gasket Detail



Mechanical Joints



Mechanical Joints Cross Section

Dimensional detail of ML Rubber Gasket

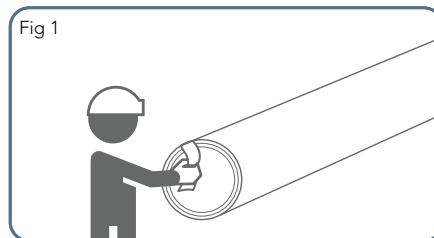
Dimension Chart

DN	N	Q	R	T	U	V
80	130	96	32	10	16	6
100	150	118	32	10	16	6
125	176	144	32	10	16	6
150	202	170	35	10	16	6
200	254	222	35	10	16	6
250	303	274	35	10	17	6
300	360	326	35	10	17	6
350	416	378	40	10	19	8
400	460	429	40	10	19	8
450	516	480	40	10	19	8
500	570	532	45	10	20	8
600	675	635	45	10	20	8
700	788	738	45	10	25	8
750	840	790	45	10	25	8
800	892	842	45	15	25	8
900	995	945	45	15	25	8
1000	1098	1048	45	15	25	8
1100	1220	1152	55	20	34	10
1200	1334	1256	55	20	34	10

Dimensions in millimeters
 Ref. IS 12820 : 2004 Table 2
 MJ gaskets are of EPDM quality

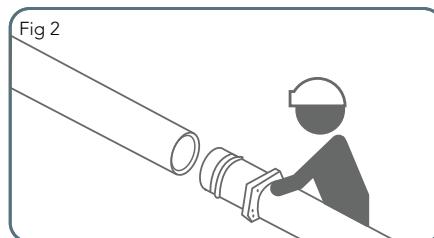
Jointing Procedure

- Clean spigot end and socket jointing surfaces and lubricate the gasket and spigot. (See fig 1)



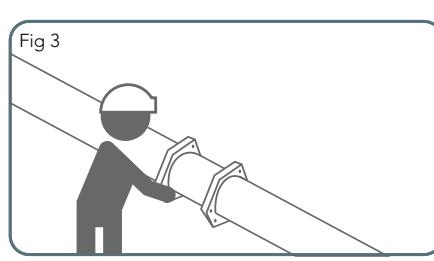
Cleaning of spigot end

- Place gland over spigot with its flat face away from the joint and position about 300 mm from spigot end followed by the gasket with the flat face away from the joint end. Repeat this for the other spigot end. (See fig 2)

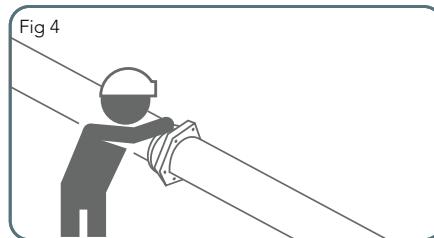


Placing of Gland

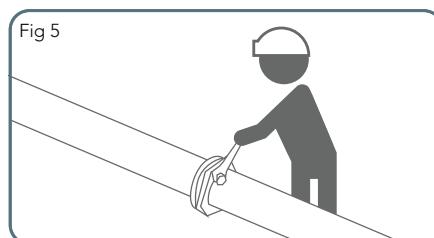
- Insert the body of the coupling in the fixed end of the joint (cut pipe).
- Support pipe and balance just clear of trench bottom.
- Enter spigot of cut pipe into MJ socket.
- Align the other spigot end and glide the body of the coupling into it so that the joint is located between the two sockets. Press gasket into its seat in the socket. Ensure that gasket is centralised.
- Tap gasket home with wide-faced caulking tool. (See fig 3)
- Alternatively use the gland to perform this operation.
- Place gland up against gasket. Centralise gland by using wedge. (See fig 4)
- Lubricate threads and insert sufficient bolts to secure gasket and gland in position by hand tightening the nut. Remove lifting tackle and the centralising wedge.
- Progressively tighten nuts in the sequence recommended. (See fig 5)



Placing rubber Gasket



Placing another gland against Gasket



Tightening of Bolts

Assembly - Repair Pieces

Preventive, curative, and system improvement maintenance are all part of pipeline operation. They frequently necessitate the replacement of key portions.

Rashmi Metaliks provides a variety of repair parts, including flange adapters, disassembly joints, MJ collar couplings, split collars, and leak repair clamps, to address the varied situations faced in Ductile Iron pipelines. The catalogue includes illustrations of these goods.

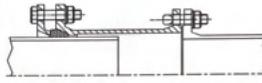
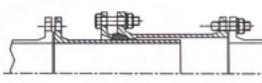
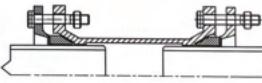
The Choice Depends on:

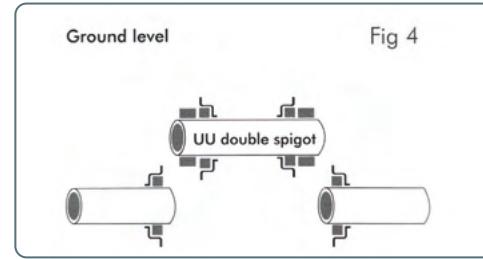
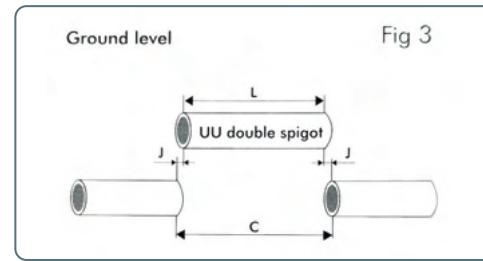
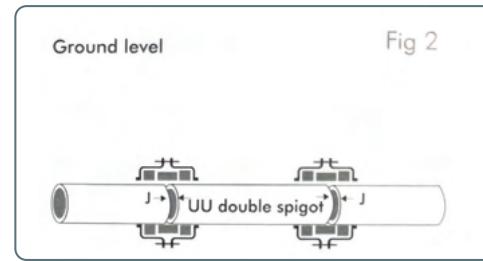
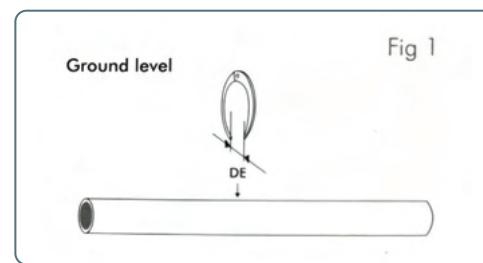
- The connection to be made,
- The external diameter of the main.
- The clearance J (gap to be covered) as shown in figures.

Procedure

The procedures are identical for installation of couplings, flange adapters and Mechanical Joint collars.

- After correctly dimensioning the excavation, carefully clear access to the existing pipe section. Check the diameter of the pipes with a circumference tape or compass caliper.
- Choose the most suitable piece for making the repair, according to the pipe diameter.
- Cut the existing pipe: The length of the pipe to be cut should be greater than the length of the connection being installed.
- Remove the cut section. Check its length before cutting the replacement double spigot piece UU with an acceptable allowance.
- Make the joints as per the Mechanical joint coupling procedure.

METHODS	
Type and Range	Sketch
Flange adapter DN 80 to DN 600	
Dismantling Joint DN 80 to DN 600	
Mechanical Joint coupling DN 80 to DN 600	



L (Length of double spigot piece UU) = C - (2xJ).

Notes:

1. Check the seal after pressurization.
2. The parts must be sterilized before assembly in potable water mains.
3. To protect the connection, use polyethylene sleeving, enveloped in polyethylene sleeving, or a heat shrinkable sleeve.

Ductile Iron Fittings

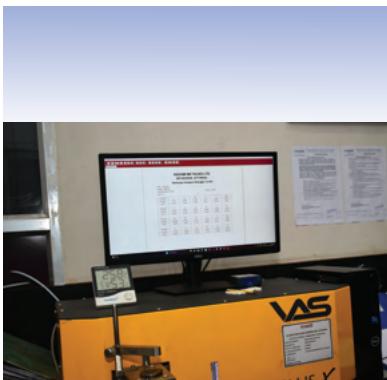
Rashmi Metaliks is a leading manufacturer of Ductile Iron Fittings in India. Our fittings are crafted using advanced casting methods like VLFP and High-Pressure Moulding. They provide durability and strength for water, sewage, wastewater, and slurry applications. Our facilities boast top-notch machinery, finishing units, and testing labs.

We offer fittings in diameters DN 80 to DN 1600 mm, with various jointing options, coatings, and linings. To ensure high performance in harsh environments, our fittings are Fusion Bonded Epoxy coated (internally and externally) with a minimum thickness of 250 μm . Options include WRAS-approved Black & Blue (Potable water) or Red (Sewerage) in line with EN 545 / EN 598 and EN 14901. Alternative coatings are also available upon request.

Benefits of DI Fittings :

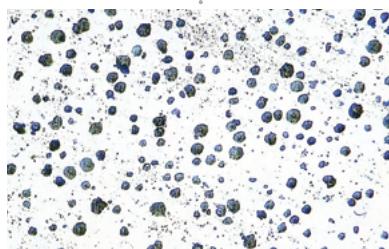
- ▶ Ability to effectively handle consistent alterations in pressure, temperature, and environment.
- ▶ Greater strength and resistance than the other material.
- ▶ Offers high-quality performance for well over 100 years.
- ▶ Much lighter, which makes them easier to lay out in sewer lines than most other Fittings.
- ▶ No additional encasements or treatments are needed for their installation.

Quality Testing :



Assessment of Mechanical Testing: Tensile and hardness tests are conducted.

Final Inspection: Fittings are inspected carefully before shipping.



Examination of Spheroidal Graphite: The spheroidal graphite microstructure is scrutinized through microscopic testing.



Hydrostatic Pressure Test: Every fitting undergoes a hydrostatic test to verify its water leak tightness.

FLOW CHART OF VLFP PROCESS

EPS EXPANSION



SEGMENT MAKING



ASSEMBLY



COATING & DRYING



SHOT BLASTING



POURING



MOLDING



CLUSTERING



FETTLING



ZINC COATING



HYDROSTATIC TESTING



CEMENT LINING



PACKAGING & DISPATCH

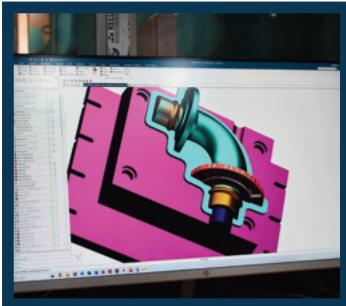


BITUMEN COATING



FLOW CHART OF HIGH PRESSURE MOULDING PROCESS

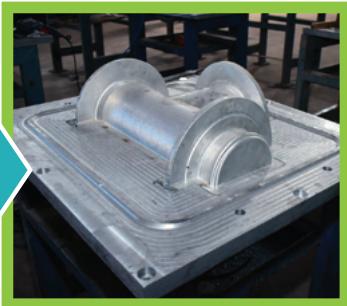
PATTERN DEVELOPMENT



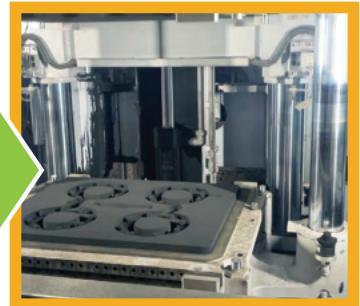
PATTERN MACHINING



PATTERN MOUNTING ON MATCH PLATE



MOLDING & CORE FIXING



SHOT BLASTING



KNOCKOUT



POURING



MOLDING



FETTLING



HYDROTESTING POST ZINC COATING



CEMENT LINING



BITUMEN COATING



FUSION-BONDED EPOXY



PACKAGING & DISPATCH



Range of Fittings



Push-On Joint Fittings: Push-On joints offer the most straightforward assembly method for underground purposes. These joints consist of a rubber gasket, which is placed into a groove within the socket positioned at the bell end of the fittings. Subsequently, by applying lubricant, the beveled end of the fittings is pushed through the gasket, resulting in its compression and the formation of a resilient, pressure-sealed connection.



Flanged Fittings: A flanged joint is a type of connection achieved through bolts, where two equal flanges are joined and held together by tightening the bolts. In this arrangement, a unique flat gasket is placed between the flanges, and as the bolts are tightened, the gasket is compressed. The sealing action is accomplished through the compression of a flat elastomer gasket positioned between the two flange



Mechanical Joint Fittings: The mechanical connection relies on the concept of a stuffing box and comprises a bell featuring an integrated flange, a gland made of cast or ductile iron, a rubber seal, and the required bolts and nuts. This design allows for substantial flexing and accommodates both longitudinal expansion and contraction within the pipeline.

Range of Fittings



Welded Flanged Pipes: Flanges are welded on either or both ends of the barrel. As per customer requirement, flanges are sometimes welded on the barrel at a point other than the ends which are called Puddle flanges.



Screwed Flanged Pipes: Flanges are tapped and drilled to be threaded onto ductile iron pipe. The DI pipe is cut to the exact length needed and put into a chaser machine where the threads are cut into the pipe where the flange is attached and tightened.



"As Cast" Flanged Pipes: "As Cast" Flanged Pipes are casted as a single unit advanced Lost Foam Casting technique based on the specific requirements.



Our Ductile Iron Fittings are manufactured following ISO: 2531: 2009, BS EN: 545: 2006, BS EN: 598: 2006, IS: 9523: 2000 and their associated standards.

Ductile Iron Fittings				
Fittings	DN Range	Bends Range	Fitting	External Coating
Push-On Joint Fittings	80 to 1600	90°, 45°, 22.5°, 11.25°	Double Socket Bends, Double Socket Duck Foot Bends, All Socket Tees, Concentric Reducers, Double Socket Flanged Branch Tee, Wash Out Tee, All Socket Y-Tee, All Socket Cross, Push On Collar, Push-on Flanged Socket, Cap, Plug	Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating
			Double Flanged Bends, Double Flanged Duck Foot Bends, All Flanged Tees, Flanged Concentric & Eccentric Reducer, All Flanged Cross, Double Flanged Semi Circular Bend, All Flanged Scour Tee, Blank Flange, Flanged Bell Mouth, Screwed & Welded Flange, Push-on Flanged Socket, Flanged Spigot	Fusion Bonded Epoxy (FBE)
Flanged Fittings	80 to 1600	90°, 45°, 22.5°, 11.25°		Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating
			MJ Collar, MJ Bend, MJ Flange Socket, MJ All Socket Tee, MJ Double Socket Flange Branch Tee etc.	Fusion Bonded Epoxy (FBE)
Mechanical Join Fittings	80 to 1600	90°, 45°, 22.5°, 11.25°	—	Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating
DI Special Fittings	80 to 1600	—	Flanged Adaptor & Dismantling Joint	Cement Lining
Restrained Joint Fittings (RASHMI-LOCK)	80 to 1600	—	—	Zinc Coating followed by Blue Epoxy Coating Cement Lining
Ductile Iron Flanged Pipes				
Fittings	DN Range	Bends Range	Fitting	External Coating
Welded Flanged Pipes	80 to 1200	—	—	Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating
Screwed Flanged Pipes	80 to 450	—	—	Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating
“As Cast” Flanged Pipes	80 to 1200	—	Length (Under 2 meter)	Zinc Coating followed by Black Bitumen Coating Zinc Coating followed by Blue Epoxy Coating (FBE) FBE

Technical Data

ISO 2531

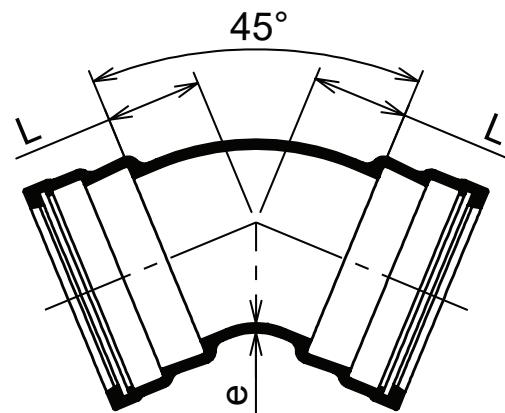
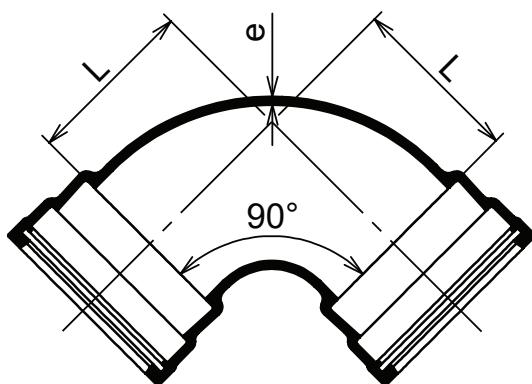
ISO 7186

IS 9523

EN 598

EN 545

RASHMI
GROUP



Dimensions in millimeters

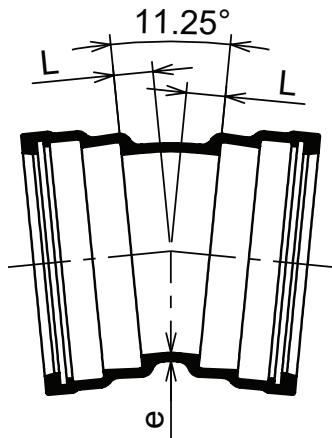
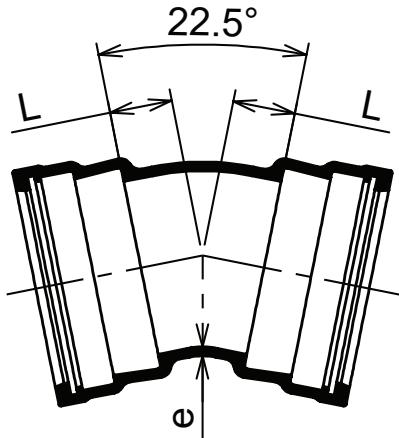
Double Socket Bend 90°

Size/DN	e	L
80	7.0	100
100	7.2	120
125	7.5	145
150	7.8	170
200	8.4	220
250	9.0	270
300	9.6	320
350	10.2	370
400	10.8	420
450	11.4	470
500	12.0	520
600	13.2	620
700	14.4	720
750	15.0	770
800	15.6	820
900	16.8	920
1000	18.0	1020
1100	19.2	1130
1200	20.4	1230
1400	22.8	1430
1500	24.0	1530
1600	25.2	1630

Double Socket Bend 45°

Size/DN	e	L
80	7.0	55
100	7.2	65
125	7.5	75
150	7.8	85
200	8.4	110
250	9.0	130
300	9.6	150
350	10.2	175
400	10.8	195
450	11.4	220
500	12.0	240
600	13.2	285
700	14.4	330
750	15.0	350
800	15.6	370
900	16.8	415
1000	18.0	460
1100	19.2	505
1200	20.4	550
1400	22.8	515
1500	24.0	540
1600	25.2	565

Note: The nominal size is designated DN.



Dimensions in millimeters

Double Socket Bend 22.5°

Size/DN	e	L
80	7.0	40
100	7.2	40
125	7.5	50
150	7.8	55
200	8.4	65
250	9.0	75
300	9.6	85
350	10.2	95
400	10.8	110
450	11.4	120
500	12.0	130
600	13.2	150
700	14.4	175
750	15.0	185
800	15.6	195
900	16.8	205
1000	18.0	210
1100	19.2	220
1200	20.4	240
1400	22.8	260
1500	24.0	270
1600	25.2	280

Double Socket Bend 11.25°

Size/DN	e	L
80	7.0	30
100	7.2	30
125	7.5	35
150	7.8	35
200	8.4	40
250	9.0	50
300	9.6	55
250	10.2	60
400	10.8	65
450	11.4	70
500	12.0	75
600	13.2	85
700	14.4	95
750	15.0	100
800	15.6	110
900	16.8	115
1000	18.0	120
1100	19.2	120
1200	20.4	130
1400	22.8	130
1500	24.0	135
1600	25.2	140

Note: The nominal size is designated DN.

Technical Data

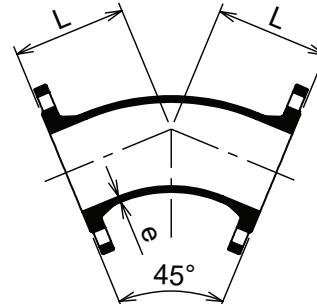
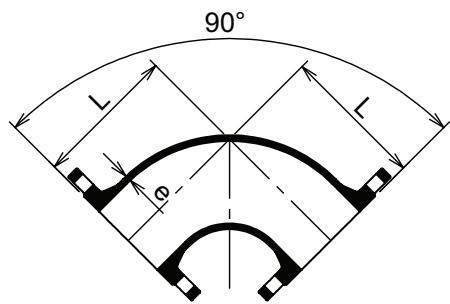
ISO 2531

ISO 7186

IS 9523

EN 598

EN 545



Dimensions in millimeters

Double Flanged Bend 90°

Size/DN	e	L
80	7.0	165
100	7.2	180
125	7.5	200
150	7.8	220
200	8.4	260
250	9.0	350
300	9.6	400
350	10.2	450
400	10.8	500
450	11.4	550
500	12.0	600
600	13.2	700
700	14.4	800
750	15.0	850
800	15.6	900
900	16.8	1000
1000	18.0	1100
1100	19.2	1235
1200	20.4	1340
1400	22.8	1550
1500	24.0	1660
1600	25.2	1765

Double Flanged Bend 45°

Size/DN	e	L
80	7.0	130
100	7.2	140
125	7.5	150
150	7.8	160
200	8.4	180
250	9.0	350
300	9.6	400
350	10.2	300
400	10.8	325
450	11.4	350
500	12.0	375
600	13.2	425
700	14.4	480
750	15.0	504
800	15.6	530
900	16.8	580
1000	18.0	630
1100	19.2	695
1200	20.4	750
1400	22.8	775
1500	24.0	810
1600	25.2	845

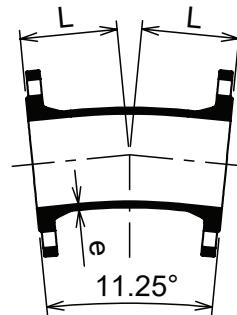
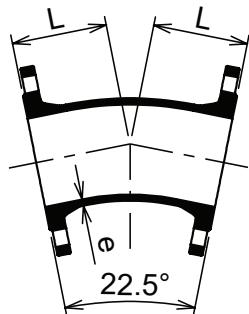
ISO 2531

ISO 7186

IS 9523

EN 598

EN 545



Dimensions in millimeters

Double Flanged Bend 22.5°

Size/DN	e	L
80	7.0	105
100	7.2	110
125	7.5	105
150	7.8	109
200	8.4	131
250	9.0	190
300	9.6	210
350	10.2	210
400	10.8	239
450	11.4	-
500	12.0	-
600	13.2	-
700	14.4	-
750	15.0	-
800	15.6	-
900	16.8	-
1000	18.0	-
1100	19.2	-
1200	20.4	-
1400	22.8	-
1500	24.0	-
1600	25.2	-

Double Flanged Bend 11.25°

Size/DN	e	L
80	7.0	113
100	7.2	115
125	7.5	111
150	7.8	113
200	8.4	132
250	9.0	165
300	9.6	175
350	10.2	191
400	10.8	205
450	11.4	-
500	12.0	-
600	13.2	-
700	14.4	-
750	15.0	-
800	15.6	-
900	16.8	-
1000	18.0	-
1100	19.2	-
1200	20.4	-
1400	22.8	-
1500	24.0	-
1600	25.2	-

Technical Data

ISO 2531

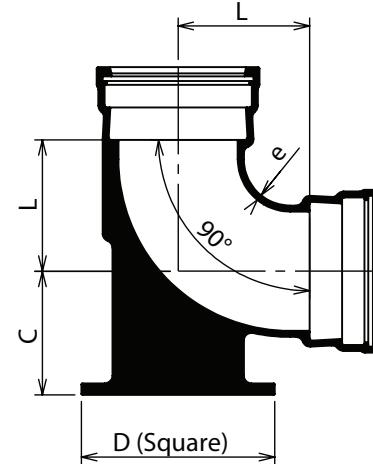
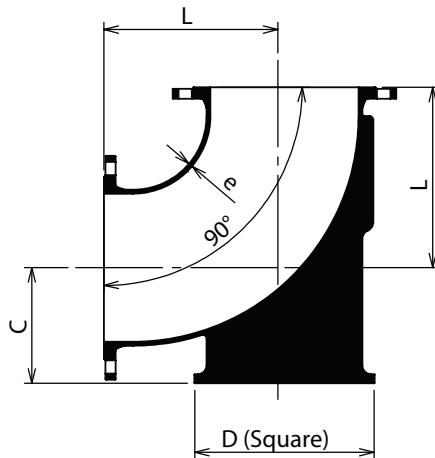
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Dimensions in millimeters

Duckfoot Double Flanged Bend 90°

Size/DN	e	L
80	7.0	165
100	7.2	180
125	7.5	200
150	7.8	220
200	8.4	260
250	9.0	350
300	9.6	400
350	10.2	450
400	10.8	500
450	11.4	550
500	12.0	600
600	13.2	700
700	14.4	-
750	15.0	-
800	15.6	-
900	16.8	-
1000	18.0	-
1100	19.2	-
1200	20.4	-
1400	22.8	-
1500	24.0	-
1600	25.2	-

Duckfoot Double Socket Bend 90°

Size/DN	e	L
80	7.0	110
100	7.2	130
125	7.5	155
150	7.8	180
200	8.4	230
250	9.0	280
300	9.6	325
350	10.2	380
400	10.8	430
450	11.4	480
500	12.0	530
600	13.2	630
700	14.4	735
750	15.0	790
800	15.6	830
900	16.8	930
1000	18.0	1035
1100	19.2	1130
1200	20.4	1230
1400	22.8	1430
1500	24.0	1530
1600	25.2	1630

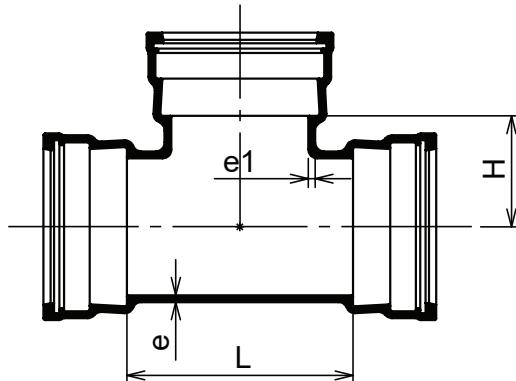
ISO 2531

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IS 9523

EN 598

EN 545



Dimensions in millimeters

All Socket Tee

Size/DN		e	e1	L	H
Body	Branch				
80	80	7.0	7.0	170	85
100	80	7.2	7.0	170	95
100	100	7.2	7.2	190	95
125	80	7.5	7.0	170	105
125	100	7.5	7.2	195	100
125	125	7.5	7.5	225	110
150	80	7.8	7.0	170	120
150	100	7.8	7.2	195	120
150	150	7.8	7.8	255	125
200	80	8.4	7.0	175	145
200	100	8.4	7.2	200	145
200	150	8.4	7.8	255	150
200	200	8.4	8.4	315	155
250	80	9.0	7.0	180	170
250	100	9.0	7.2	200	170
250	150	9.0	7.8	260	175
250	200	9.0	8.4	315	180
250	250	9.0	9.0	375	190
300	80	9.6	7.0	180	235
300	100	9.6	7.2	205	220
300	150	9.6	7.8	260	240
300	200	9.6	8.4	320	220
300	250	9.6	9.0	375	255
300	300	9.6	9.6	435	220
350	80	10.0	7.0	185	260
350	100	10.2	7.2	205	260
350	150	10.2	7.8	265	265
350	200	10.2	8.4	325	270
350	250	10.2	9.0	380	280
350	300	10.2	9.6	440	285
350	350	10.2	10.2	495	290

All Socket Tee

Size/DN		e	e1	L	H
Body	Branch				
400	80	10.8	7.0	185	285
400	100	10.8	7.2	210	285
400	150	10.8	7.8	270	290
400	200	10.8	8.4	325	295
400	250	10.8	9.0	385	305
400	300	10.8	9.6	440	310
400	400	108	10.8	560	320
450	80	11.4	7.0	190	310
450	100	11.4	7.2	215	310
450	150	11.4	7.8	270	315
450	200	11.4	8.4	330	320
450	250	11.4	9.0	390	330
450	300	11.4	9.6	445	335
450	400	11.4	10.8	560	345
450	450	11.4	11.4	620	350
500	80	12	7.0	195	335
500	100	12	7.2	215	335
500	150	12	7.8	275	340
500	200	12	8.4	330	345
500	250	12	9.0	390	355
500	300	12	9.6	450	360
500	350	12	10.2	505	365
500	400	12	10.8	565	370
500	500	12	10.12	680	380
600	80	13.2	7.0	200	385
600	100	13.2	7.2	220	385
600	150	13.2	7.8	280	390
600	200	13.2	8.4	340	395
600	300	13.2	9.6	455	410
600	400	13.2	10.8	570	420
600	500	13.2	12.0	685	430
600	600	13.2	13.2	800	440

Technical Data

ISO 2531

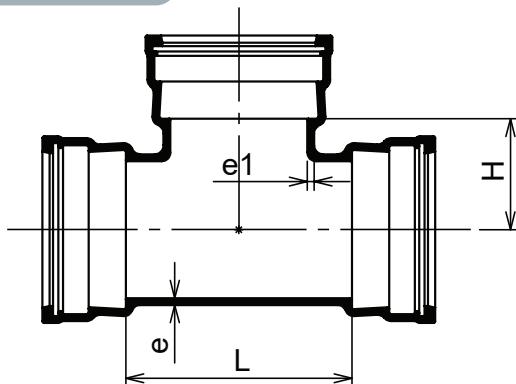
ISO 7186

IS 9523

EN 598

EN 545

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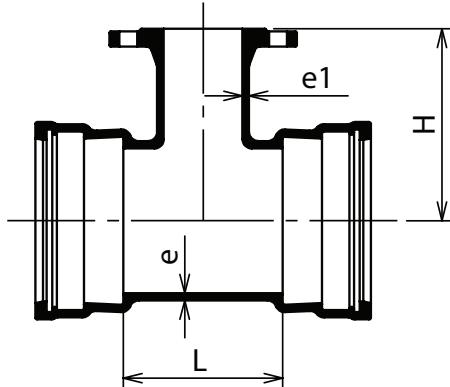
Dimensions in millimeters

All Socket Tee

Size/DN		e	e1	L	H
Body	Branch				
700	100	14.4	7.2	230	435
700	150	14.4	7.8	285	440
700	200	14.4	8.4	345	445
700	300	14.4	9.6	460	460
700	400	14.4	10.8	575	470
700	500	14.4	12.0	690	480
700	600	14.4	13.2	810	490
700	700	14.4	14.4	925	500
750	100	15.0	7.2	230	460
750	150	15.0	7.8	290	465
750	200	15.0	8.4	345	470
750	300	15.0	9.6	465	485
750	400	15.0	10.8	580	495
750	500	15.0	12.0	695	505
750	600	15.0	13.2	810	515
750	700	15.0	14.4	925	525
750	750	15.0	15.0	985	535
800	100	15.6	7.2	235	485
800	150	15.6	7.8	290	490
800	200	15.6	8.4	350	495
800	300	15.6	9.6	465	510
800	400	15.6	10.8	580	520
800	500	15.6	12.0	700	530
800	600	15.6	13.2	815	540
800	700	15.6	14.4	930	550
800	800	15.6	15.6	1045	565
900	100	16.8	7.2	360	540
900	150	16.8	7.8	300	540
900	200	16.8	8.4	355	545
900	400	16.8	10.8	590	570
900	600	16.8	13.2	820	590
900	800	16.8	15.6	1050	615
900	900	16.8	16.8	1170	625
1000	100	18.0	7.2	370	580
1000	150	18.0	7.8	305	590

All Socket Tee

Size/DN		e	e1	L	H
Body	Branch				
1000	200	18.0	7.8	360	595
1000	400	18.0	8.4	595	620
1000	600	18.0	10.8	1290	640
1000	800	18.0	13.2	1290	665
1000	1000	18.0	15.6	1290	685
1100	200	19.2	7.8	370	645
1100	400	19.2	10.8	600	670
1100	600	19.2	13.2	830	690
1100	800	19.2	15.6	1065	715
1100	1000	19.2	18.0	1295	735
1100	1100	19.2	19.2	1410	745
1200	200	20.4	8.4	375	695
1200	400	20.4	10.8	605	720
1200	600	20.4	13.2	840	740
1200	800	20.4	15.6	1070	765
1200	1000	20.4	18.0	1300	785
1200	1200	20.4	20.4	1535	805
1400	400	22.8	10.8	800	950
1400	600	22.8	13.2	1030	980
1400	800	22.8	15.6	1260	1010
1400	1000	22.8	18.0	1495	1040
1400	1200	22.8	20.4	1725	1070
1400	1400	22.8	22.8	1960	1100
1500	400	24.0	10.8	805	1005
1500	600	24.0	13.2	1035	1035
1500	800	24.0	15.6	1270	1065
1500	1000	24.0	18.0	1500	1095
1500	1200	24.0	20.4	1730	1125
1500	1400	24.0	22.8	1965	1155
1500	1500	24.0	24.0	2080	1170
1600	400	25.2	10.8	810	1060
1600	600	25.2	13.2	1040	1090
1600	800	25.2	15.6	1275	1120
1600	1000	25.2	18.0	1505	1150
1600	1200	25.2	20.4	1740	1180
1600	1400	25.2	22.8	1970	1210
1600	1600	25.2	25.2	2200	1240



Dimensions in millimeters

Double Socket Flanged Branch Tee

Size/DN		e	e1	L	H
Body	Branch				
80	80	7.0	7.0	170	165
100	80	7.2	7.0	170	175
100	100	7.2	7.2	190	180
125	80	7.5	7.0	170	190
125	100	7.5	7.2	195	195
125	125	7.5	7.5	225	200
150	80	7.8	7.0	170	205
150	100	7.8	7.2	195	210
150	150	7.8	7.8	255	220
200	80	8.4	7.0	175	235
200	100	8.4	7.2	200	240
200	150	8.4	7.8	255	250
200	200	8.4	8.4	315	260
250	80	9.0	7.0	180	265
250	100	9.0	7.2	200	270
250	150	9.0	7.8	260	280
250	200	9.0	8.4	315	290
250	250	9.0	9.0	375	300
300	80	9.6	7.0	180	295
300	100	9.6	7.2	210	300
300	150	9.6	7.8	260	310
300	200	9.6	8.4	325	320
300	250	9.6	9.0	380	330
300	300	9.6	9.6	440	340
350	80	10.0	7.0	185	325
350	100	10.2	7.2	205	330
350	150	10.2	7.8	265	340
350	200	10.2	8.4	325	350
350	250	10.2	9.0	380	360
350	300	10.2	9.6	440	370
350	350	10.2	10.2	495	380

Double Socket Flanged Branch Tee

Size/DN		e	e1	L	H
Body	Branch				
400	80	10.8	7.0	185	355
400	100	10.8	7.2	210	360
400	150	10.8	7.8	270	370
400	200	10.8	8.4	325	380
400	250	10.8	9.0	385	390
400	300	10.8	9.6	440	400
400	400	10.8	10.8	560	420
450	80	11.4	7.0	190	385
450	100	11.4	7.2	215	390
450	150	11.4	7.8	270	400
450	200	11.4	8.4	330	410
450	250	11.4	9.0	390	420
450	300	11.4	9.6	445	430
450	400	11.4	10.8	560	450
450	450	11.4	11.4	620	460
500	80	12.0	7.0	195	415
500	100	12.0	7.2	215	420
500	150	12.0	7.8	275	430
500	200	12.0	8.4	330	440
500	250	12.0	9.0	390	450
500	300	12.0	9.6	450	460
500	350	12.0	10.2	505	470
500	400	12.0	10.8	565	480
500	500	12.0	12.0	680	500
600	80	13.2	7.0	200	475
600	100	13.2	7.2	220	480
600	150	13.2	7.8	280	490
600	200	13.2	8.4	340	500
600	300	13.2	9.6	455	520
600	400	13.2	10.8	570	540
600	500	13.2	12.0	685	560
600	600	13.2	13.2	800	580

Technical Data

ISO 2531

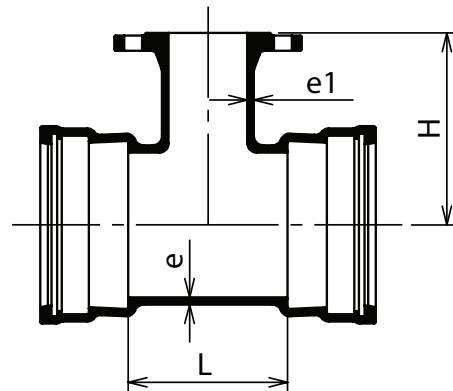
ISO 7186

IS 9523

EN 598

EN 545

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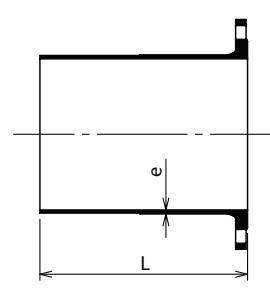
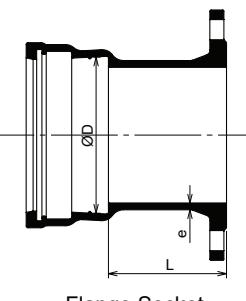
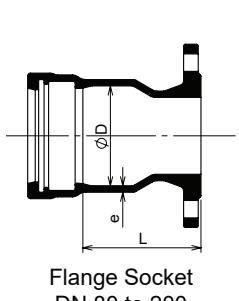
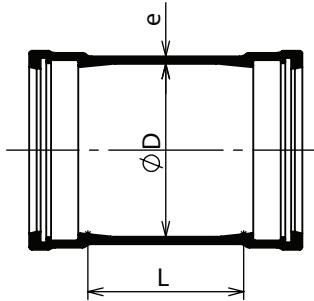
Dimensions in millimeters

Double Socket Flanged Branch Tee

Size/DN		e	e1	L	H
Body	Branch				
700	100	14.4	7.2	230	510
700	150	14.4	7.8	285	520
700	200	14.4	8.4	345	525
700	300	14.4	9.6	460	540
700	400	14.4	10.8	575	555
700	500	14.4	12	690	570
700	600	14.4	13.2	810	585
700	700	14.4	14.4	925	600
750	100	15.0	7.2	230	540
750	150	15.0	7.8	290	550
750	200	15.0	8.4	345	555
750	300	15.0	9.6	465	570
750	400	15.0	10.8	580	585
750	500	15.0	12	695	600
750	600	15.0	13.2	810	615
750	700	15.0	14.4	925	630
750	750	15.0	15	985	640
800	100	15.6	7.2	235	570
800	150	15.6	7.8	290	580
800	200	15.6	8.4	350	585
800	300	15.6	9.6	465	600
800	400	15.6	12	580	615
800	500	15.6	14.4	700	630
800	600	15.6	15.6	815	645
800	700	15.6	17.8	930	660
800	800	15.6	10.8	1045	675
900	150	16.8	7.8	300	640
900	200	16.8	8.4	355	645
900	400	16.8	10.8	590	675
900	600	16.8	13.2	820	705
900	800	16.8	15.6	1050	735
900	900	16.8	16.8	1170	750
1000	150	18	7.8	305	700

Double Socket Flanged Branch Tee

Size/DN		e	e1	L	H
Body	Branch				
1000	200	18.0	8.4	360	705
1000	400	18.0	10.8	595	735
1000	600	18.0	13.2	1290	765
1000	800	18.0	15.6	1290	795
1000	1000	18.0	18.0	1290	825
1100	200	19.2	8.4	370	765
1100	400	19.2	10.8	600	795
1100	600	19.2	13.2	830	825
1100	800	19.2	15.6	1065	855
1100	1000	19.2	18.0	1295	885
1100	1100	19.2	19.2	1410	900
1200	200	20.4	8.4	375	825
1200	400	20.4	10.8	605	855
1200	600	20.4	13.2	840	885
1200	800	20.4	15.6	1070	915
1200	1000	20.4	18.0	1300	945
1200	1200	20.4	20.4	1535	975
1400	400	22.8	10.8	800	950
1400	600	22.8	13.2	1030	980
1400	800	22.8	15.6	1260	1010
1400	1000	22.8	18.0	1495	1040
1400	1200	22.8	20.4	1725	1070
1400	1400	22.8	22.8	1960	1100
1500	400	24.0	10.8	805	1005
1500	600	24.0	13.2	1035	1035
1500	800	24.0	15.6	1270	1065
1500	1000	24.0	18.0	1500	1095
1500	1200	24.0	20.4	1730	1125
1500	1400	24.0	22.8	1965	1155
1500	1500	24.0	24.0	2080	1170
1600	400	25.2	10.8	810	1060
1600	600	25.2	13.2	1040	1090
1600	800	25.2	15.6	1275	1120
1600	1000	25.2	18.0	1505	1150
1600	1200	25.2	20.4	1740	1180
1600	1400	25.2	22.8	1970	1210
1600	1600	25.2	25.2	2200	1240



Dimensions in millimeters

Double Socket Collar

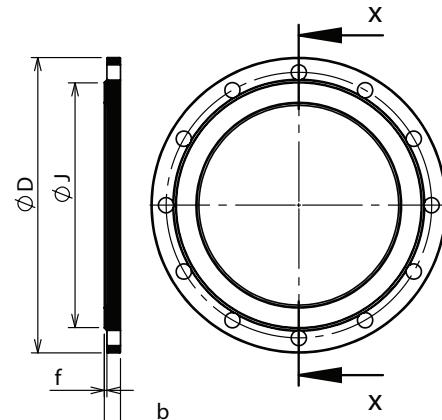
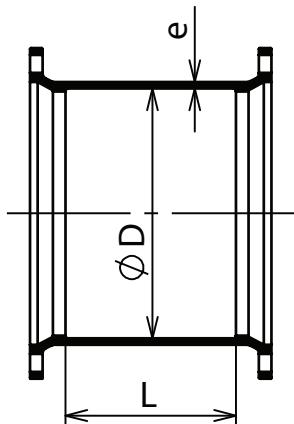
Size/DN	e	L	D
80	7.0	160	109
100	7.2	160	130
125	7.5	165	156
150	7.8	165	183
200	8.4	170	235
250	9.0	175	288
300	9.6	180	340
350	10.2	185	393
400	10.8	190	445
450	11.4	195	498
500	12.0	200	550
600	13.2	210	655
700	14.4	220	760
750	15.0	225	810
800	15.6	230	865
900	16.8	240	970
1000	18.0	250	1075
1100	19.2	260	1180
1200	20.4	270	1285
1400	22.8	340	1477
1500	24.0	350	1580
1600	25.2	360	1683

Flanged Socket

Size/DN	e	L
80	7.0	130
100	7.2	130
125	7.5	135
150	7.8	135
200	8.4	140
250	9.0	145
300	9.6	150
350	10.2	155
400	10.8	160
450	11.4	165
500	12.0	170
600	13.2	180
700	14.4	190
750	15.0	195
800	15.6	200
900	16.8	210
1000	18.0	220
1100	19.2	230
1200	20.4	240
1400	22.8	310
1500	24.0	330
1600	25.2	330

Flanged Spigot

Size/DN	e	L
80	7.0	350
100	7.2	360
125	7.5	370
150	7.8	380
200	8.4	400
250	9.0	420
300	9.6	440
350	10.2	460
400	10.8	480
450	11.4	500
500	12.0	520
600	13.2	560
700	14.4	600
750	15.0	600
800	15.6	600
900	16.8	600
1000	18.0	600
1100	19.2	600
1200	20.4	600
1400	22.8	710
1500	24.0	750
1600	25.2	780



SECTION X-X

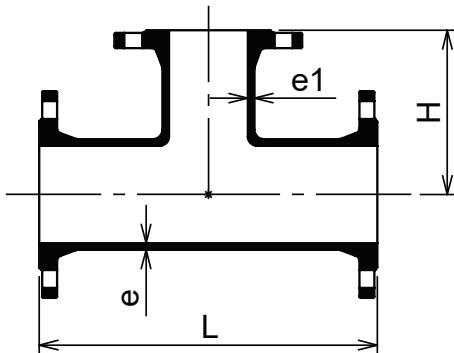
Dimensions in millimeters

Mechanical Joint Collar

Size/DN	e	L	D
80	7.0	160	109
100	7.2	160	130
125	7.5	165	156
150	7.8	165	183
200	8.4	170	235
250	9.0	175	288
300	9.6	180	340
350	10.2	185	393
400	10.8	190	445
450	11.4	195	498
500	12.0	200	550
600	13.2	210	655
700	14.4	220	760
750	15.0	225	810
800	15.6	230	865
900	16.8	240	970
1000	18.0	250	1075
1100	19.2	260	1180
1200	20.4	270	1285
1400	22.8	340	1477
1500	24.0	350	1580
1600	25.2	360	1683

Blank Flange

Size/DN	a		b		D	
	PN 10	PN 16	PN 10	PN 16	PN 10	PN 16
80	19.0	19.0	16.0	16.0	200	200
100	19.0	19.0	16.0	16.0	220	220
125	19.0	19.0	16.0	16.0	250	250
150	19.0	19.0	16.0	16.0	285	285
200	20.0	20.0	17.0	17.0	340	340
250	22.0	22.0	19.0	19.0	400	400
300	24.5	24.5	20.5	20.5	455	455
350	24.5	26.5	20.5	22.5	505	520
400	24.5	28.0	20.5	24.0	565	580
450	25.5	30.0	21.5	26.0	615	640
500	26.5	31.5	22.5	27.5	670	715
600	30.0	36.0	25.0	31.0	780	840
700	32.5	39.5	27.5	34.5	895	910
750	33.0	41.0	28.0	36.0	960	970
800	35.0	43.0	30.0	38.0	1015	1025
900	37.5	46.5	32.5	41.5	1115	1125
1000	40.0	50.0	35.0	45.0	1230	1255
1100	42.5	53.5	37.5	48.5	1340	1355
1200	45.0	57.0	40.0	52.0	1455	1485
1400	46.0	60.0	41.0	55.0	1675	1685
1500	47.5	62.5	42.5	57.5	1785	1820
1600	49.0	65.0	44.0	60.0	1915	1930



Dimensions in millimeters

All Flanged Tee

Size/DN		e	e_1	L	H
Body	Branch				
80	80	7.0	7.0	330	165
100	80	7.2	7.0	360	175
100	100	7.2	7.2	360	180
125	80	7.5	7.0	400	190
125	100	7.5	7.2	400	195
125	125	7.5	7.5	400	200
150	80	7.8	7.0	440	205
150	100	7.8	7.2	440	210
150	150	7.8	7.8	440	220
200	80	8.4	7.0	520	235
200	100	8.4	7.2	520	240
200	150	8.4	7.8	520	250
200	200	8.4	8.4	520	260
250	80	9.0	7.0	700	235
250	100	9.0	7.2	700	275
250	150	9.0	7.8	700	325
250	200	9.0	8.4	700	325
250	250	9.0	9.0	700	350
300	80	9.6	7.0	800	265
300	100	9.6	7.2	800	300
300	150	9.6	7.8	800	350
300	200	9.6	8.4	800	350
300	250	9.6	9.0	800	350
300	300	9.6	9.6	800	400
350	80	10	7.0	850	295
350	100	10.2	7.2	850	325
350	150	10.2	7.8	850	325
350	200	10.2	8.4	850	325
350	250	10.2	9.0	850	325
350	300	10.2	9.6	850	425
350	350	10.2	10.2	850	425

All Flanged Tee

Size/DN		e	e_1	L	H
Body	Branch				
400	80	10.8	7.0	900	325
400	100	10.8	7.2	900	350
400	150	10.8	7.8	900	350
400	200	10.8	8.4	900	350
400	250	10.8	9.0	900	350
400	300	10.8	9.6	900	450
400	400	10.8	10.8	900	450
450	80	11.4	7.0	950	355
450	100	11.4	7.2	950	375
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	375
450	400	11.4	10.8	950	475
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	375
450	450	11.4	11.4	950	475
500	80	12.0	7.0	1000	385
500	100	12.0	7.2	1000	400
500	150	12.0	7.8	1000	400
500	200	12.0	8.4	1000	400
500	250	12.0	9.0	1000	400
500	300	12.0	9.6	1000	500
500	350	12.0	10.2	1000	500
500	400	12.0	10.8	1000	500
500	500	12.0	12.0	1000	500
600	80	13.2	7.0	1100	445
600	100	13.2	7.2	1100	450
600	150	13.2	7.8	1100	450
600	200	13.2	8.4	1100	450
600	300	13.2	9.6	1100	550
600	400	13.2	10.8	1100	550
600	500	13.2	12.0	1100	550
600	600	13.2	13.2	1100	550

Technical Data

ISO 2531

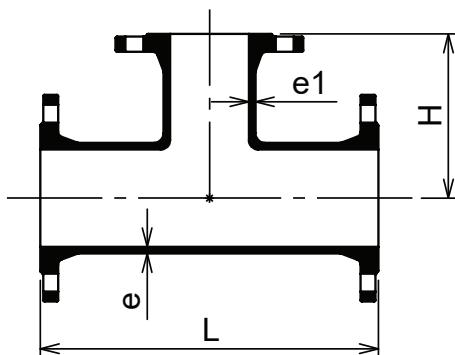
ISO 7186

IS 9523

EN 598

EN 545

RASHMI
GROUP



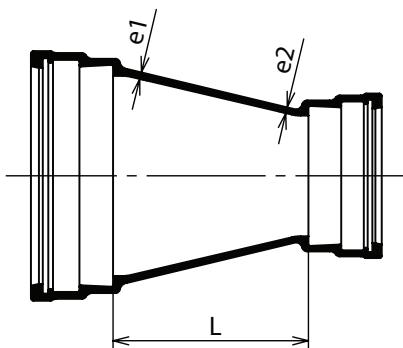
Dimensions in millimeters

All Flanged Tee

Size/DN		e	e1	L	H
Body	Branch				
700	100	14.4	7.2	540	510
700	150	14.4	7.8	600	520
700	200	14.4	8.4	650	525
700	250	14.4	9.0	700	530
700	300	14.4	9.6	760	540
700	350	14.4	10.2	750	550
700	400	14.4	10.8	870	555
700	500	14.4	12.0	1000	570
700	600	14.4	13.2	1200	585
700	700	14.4	14.4	1200	600
750	100	15.0	7.2	550	540
750	150	15.0	7.8	610	550
750	200	15.0	8.4	670	555
750	300	15.0	9.6	780	570
750	400	15.0	10.8	890	585
750	500	15.0	12.0	1020	600
750	600	15.0	13.2	1130	615
750	700	15.0	14.4	1250	630
750	750	15.0	15.0	1275	640
800	100	15.6	7.2	560	570
800	150	15.6	7.8	620	580
800	200	15.6	8.4	690	585
800	300	15.6	9.6	800	600
800	350	15.6	10.2	810	605
800	400	15.6	10.8	910	615
800	500	15.6	12.0	1030	630
800	600	15.6	13.2	1350	645
800	700	15.6	14.4	1350	660
800	800	15.6	15.6	1350	675
900	150	16.8	7.8	650	640
900	200	16.8	8.4	730	645
900	400	16.8	10.8	950	675
900	600	16.8	13.2	1500	705
900	800	16.8	15.6	1500	735
900	900	16.8	16.8	1500	750

All Flanged Tee

Size/DN		e	e1	L	H
Body	Branch				
1000	150	18.0	7.8	720	700
1000	200	18.0	8.4	770	705
1000	400	18.0	10.8	990	735
1000	600	18.0	13.2	1650	765
1000	800	18.0	15.6	1650	795
1000	1000	18.0	18.0	1650	825
1100	200	19.2	8.4	760	765
1100	400	19.2	10.8	980	795
1100	600	19.2	13.2	1210	825
1100	800	19.2	15.6	1470	855
1100	1000	19.2	18.0	1690	885
1100	1100	19.2	19.2	1800	900
1200	200	20.4	8.4	780	825
1200	400	20.4	10.8	1070	855
1200	600	20.4	13.2	1240	885
1200	800	20.4	15.6	1470	915
1200	1000	20.4	18.0	1700	945
1200	1200	20.4	20.4	1950	975
1400	400	22.8	10.8	1050	950
1400	600	22.8	13.2	1550	980
1400	800	22.8	15.6	1760	1010
1400	1000	22.8	18.0	2015	1040
1400	1200	22.8	20.4	2015	1070
1400	1400	22.8	22.8	2200	1100
1500	400	24.0	10.8	1070	1005
1500	600	24.0	13.2	1350	1035
1500	800	24.0	15.6	1570	1065
1500	1000	24.0	18.0	1790	1095
1500	1200	24.0	20.4	2010	1025
1500	1400	24.0	22.8	2230	1155
1500	1500	24.0	24.0	2340	1170
1600	400	25.2	10.8	1100	1060
1600	600	25.2	13.2	1600	1090
1600	800	25.2	15.6	1835	1120
1600	1000	25.2	18.0	2065	1150
1600	1200	25.2	20.4	2300	1180
1600	1400	25.2	22.8	2300	1210
1600	1600	25.2	25.2	2480	1240



ISO 2531

ISO 7186

IS 9523

EN 598

EN 545

Dimensions in millimeters

Double Socket Reducer

Size/DN		e1	e2	L
Larger	Smaller			
100	80	7.2	7.0	90
125	80	7.5	7.0	140
125	100	7.5	7.2	120
150	80	7.8	7.0	190
150	100	7.8	7.2	150
150	125	7.8	7.5	100
200	80	8.4	7.0	270
200	100	8.4	7.2	250
200	125	8.4	7.5	180
200	150	8.4	7.8	150
250	125	9.0	7.5	300
250	150	9.0	7.8	250
250	200	9.0	8.4	150
300	150	9.6	7.8	350
300	200	9.6	8.4	250
300	250	9.6	9.0	150
350	200	10.2	8.4	360
350	250	10.2	9.0	260
350	300	10.2	9.6	160
400	200	10.8	8.4	410
400	250	10.8	9.0	360
400	300	10.8	9.6	260
400	350	10.8	10.2	160
450	250	11.4	9.0	410
450	300	11.4	9.6	330
450	350	11.4	10.2	260
450	400	11.4	10.8	160
500	300	12.0	9.6	410
500	350	12.0	10.2	360
500	400	12.0	10.8	260
500	450	12.0	11.4	180
600	350	13.2	10.2	490
600	400	13.2	10.8	460
600	450	13.2	11.4	330
600	500	13.2	12.0	260

Double Socket Reducer

Size/DN		e1	e2	L
Larger	Smaller			
700	400	14.4	10.8	600
700	450	14.4	11.4	520
700	500	14.4	12.0	480
700	600	14.4	13.2	280
750	450	15.0	11.4	600
750	500	15.0	12.0	480
750	600	15.0	13.2	280
750	700	15.0	14.4	220
800	450	15.6	11.4	690
800	500	15.6	12.0	600
800	600	15.6	13.2	480
800	700	15.6	14.4	280
900	500	16.8	12.0	780
900	600	16.8	13.2	600
900	700	16.8	14.4	480
900	800	16.8	15.6	280
1000	600	18.0	13.2	770
1000	700	18.0	14.4	605
1000	800	18.0	15.6	480
1100	700	19.2	14.4	690
1100	800	19.2	15.6	520
1100	900	19.2	16.8	330
1100	1000	19.2	18.0	280
1200	700	20.4	14.4	800
1200	800	20.4	15.6	630
1200	900	20.4	16.8	520
1200	1000	20.4	18.0	480
1200	1100	20.4	19.2	280
1600	1400	25.2	22.8	360

Technical Data

ISO 2531

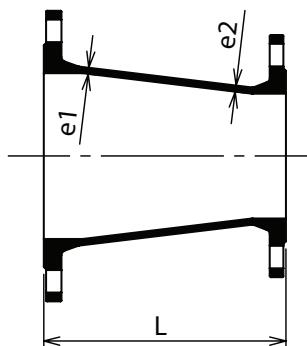
IS 9523

EN 545

ISO 7186

EN 598

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GROUP



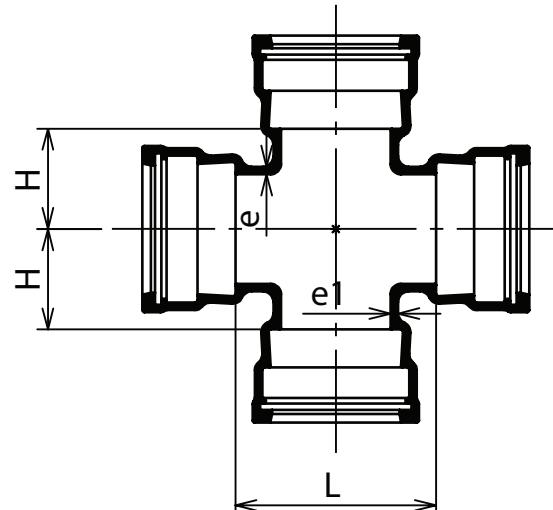
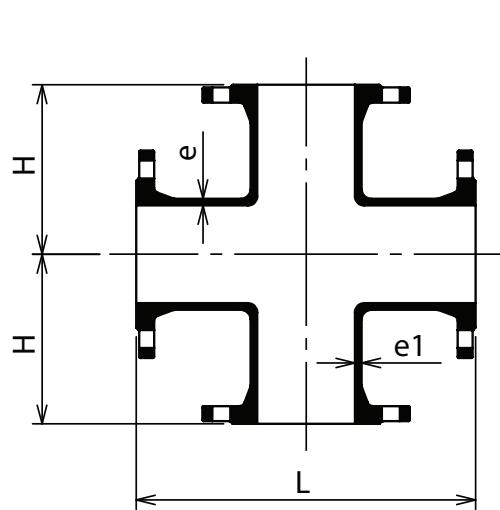
Dimensions in millimeters

Double Flanged Reducer

Size/DN		e1	e2	L
Larger	Smaller			
100	80	7.2	7.0	200
125	80	7.5	7.0	200
125	100	7.5	7.2	200
150	80	7.8	7.0	200
150	100	7.8	7.2	200
150	125	7.8	7.5	200
200	100	8.4	7.2	300
200	125	8.4	7.5	300
200	150	8.4	7.8	300
250	125	9.0	7.5	300
250	150	9.0	7.8	300
250	200	9.0	8.4	300
300	150	9.6	7.8	300
300	200	9.6	8.4	300
300	250	9.6	9.0	300
350	200	10.2	8.4	300
350	250	10.2	9.0	300
350	300	10.2	9.6	300
400	200	10.8	8.4	300
400	250	10.8	9.0	300
400	300	10.8	9.6	300
400	350	10.8	10.2	300
450	250	11.4	9.0	300
450	300	11.4	9.6	300
450	350	11.4	10.2	300
450	400	11.4	10.8	300
500	300	12.0	9.6	600
500	350	12.0	10.2	600
500	400	12.0	10.8	600
500	450	12.0	11.4	600
600	350	13.2	10.2	600
600	400	13.2	10.8	600
600	450	13.2	11.4	600
600	500	13.2	12.0	600
700	400	14.4	10.8	600
700	450	14.4	11.4	600
700	500	14.4	12.0	600

Double Flanged Reducer

Size/DN		e1	e2	L
Larger	Smaller			
700	600	14.4	13.2	600
750	450	15.0	11.4	600
750	600	15.0	13.2	600
750	700	15.0	14.4	600
800	450	15.6	11.4	600
800	500	15.6	12.0	600
800	600	15.6	13.2	600
800	700	15.6	14.4	600
900	500	16.8	12.0	600
900	600	16.8	13.2	600
900	700	16.8	14.4	600
900	800	16.8	15.6	600
1000	600	18.0	13.2	600
1000	700	18.0	14.4	600
1000	800	18.0	15.6	600
1000	900	18.0	16.8	600
1100	700	19.2	14.4	600
1100	800	19.2	15.6	600
1100	900	19.2	16.8	600
1100	1000	19.2	18.0	600
1200	700	20.4	14.4	790
1200	800	20.4	15.6	790
1200	900	20.4	16.8	790
1200	1000	20.4	18.0	790
1200	1100	20.4	19.2	790
1400	800	22.8	15.6	850
1400	900	22.8	16.8	850
1400	1100	22.8	19.2	850
1400	1200	22.8	20.4	850
1500	900	24.0	22.8	695
1500	1000	24.0	18.0	910
1500	1100	24.0	19.2	910
1500	1200	24.0	20.4	910
1500	1400	24.0	22.8	695
1600	1000	25.2	18.0	910
1600	1100	25.2	19.2	910
1600	1200	25.2	20.4	910
1600	1400	25.2	22.8	910
1600	1500	25.2	24.0	910



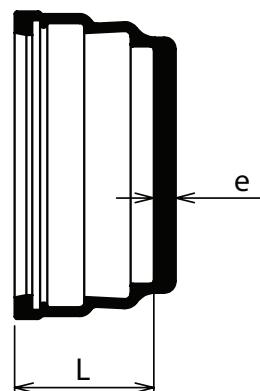
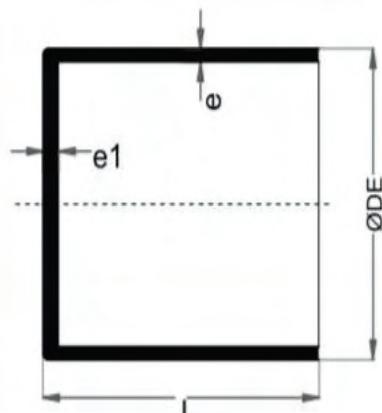
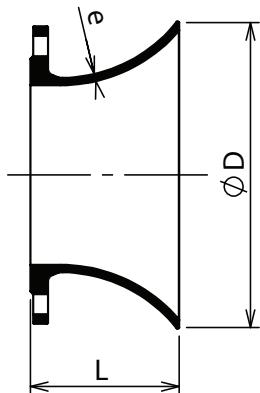
Dimensions in millimeters

All Flanged Cross

Size/DN		e	L	H
DN	dn			
80	80	7.0	330	165
100	100	7.2	360	180
150	150	7.8	440	220
200	200	8.4	520	260
250	250	9.0	700	350
300	300	9.6	800	400
350	350	10.2	850	425
400	400	10.8	900	450
450	450	11.4	950	475
500	500	12.0	1000	500
600	600	13.2	1100	550
700	700	14.4	1200	600
750	750	15.0	1275	640
800	800	15.6	1350	675
900	900	16.8	1500	750
1000	1000	18.0	1650	825

All Socket Cross

Size/DN		e	L	H
DN	dn			
80	80	7.0	170	85
100	100	7.2	190	95
150	150	7.8	255	125
200	200	8.4	315	155
250	250	9.0	375	190
300	300	9.6	440	220
350	350	10.2	500	250
400	400	10.8	560	280
450	450	11.4	620	310
500	500	12.0	680	340
600	600	13.2	800	400
700	700	14.4	925	460
750	750	15.0	985	490
800	800	15.6	1045	520
900	900	16.8	1170	585
1000	1000	18.0	1290	645



Dimensions in millimeters

Flanged Bell Mouth

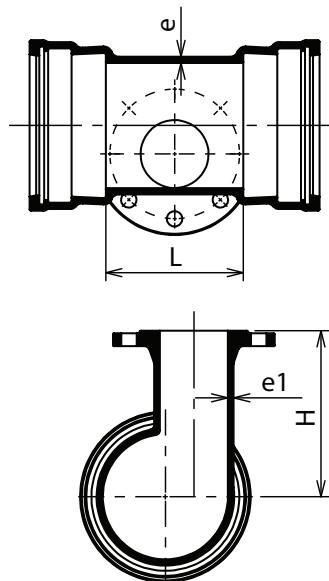
Size/DN	ϕD	L
80	150	135
100	175	140
125	230	150
150	290	155
200	345	170
250	405	180
300	460	200
350	520	220
400	575	240
450	635	260
500	7560	275
600	865	300
700	925	360
750	980	380
800	1095	415
900	1210	450
1000	1325	485
1100	1140	520
1200	1670	590
1400	1785	625
1500	1900	660
1600	2130	730

Plug

Size/DN	e	e1	L
80	7.0	9.5	113
100	7.2	10.5	120
125	7.5	11.0	120
150	7.8	12.5	130
200	8.4	13.5	146
250	9.0	14.5	152
300	9.6	15.5	159
350	10.2	16.5	176
400	10.8	17.5	178
450	11.4	19.0	180
500	12.0	20.0	187
600	13.2	21.0	194
700	14.4	23.0	200
750	15.0	24.0	225
800	15.6	25.0	250
900	16.8	27.0	300
1000	18.0	28.0	325
1100	19.2	30.0	350
1200	20.4	32.0	375
1400	22.8	34.0	400
1500	24.0	36.0	425
1600	25.2	36.0	450

End Cap

Size/DN	e	L
80	16.0	105
100	16.0	105
125	16.0	110
150	17.0	120
200	19.0	120
250	21.5	125
300	23.5	130
350	26.0	130
400	28.0	130
450	30.0	140
500	32.5	140
600	37.0	140
700	34.5	175
800	38.0	185
900	39.0	200
1000	41.0	210
1100	44.5	225
1200	48.0	245



Dimensions in millimeters

**Double Socket Invert Tee
With Flanged Branch**

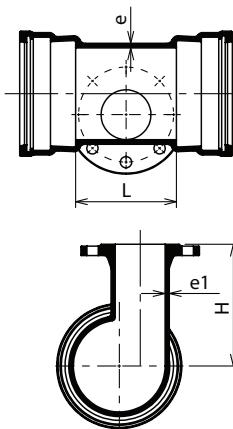
Size/DN		e	e1	L	H
Body	Branch				
80	80	7.0	7.0	170	165
100	80	7.2	7.0	170	175
100	100	7.2	7.2	190	180
125	80	7.5	7.0	170	190
125	100	7.5	7.2	195	195
125	125	7.5	7.5	225	200
150	80	7.8	7.0	170	205
150	100	7.8	7.2	195	210
150	150	7.8	7.8	255	220
200	80	8.4	7.0	175	235
200	100	8.4	7.2	200	240
200	150	8.4	7.8	255	250
200	200	8.4	8.4	315	260
250	80	9.0	7.0	180	265
250	100	9.0	7.2	200	270
250	150	9.0	7.8	260	280
250	200	9.0	8.4	315	290
250	250	9.0	9.0	375	300
300	80	9.6	7.0	180	295
300	100	9.6	7.2	210	300
300	150	9.6	7.8	260	310
300	200	9.6	8.4	325	320
300	250	9.6	9.0	380	330
300	300	9.6	9.6	440	340
350	80	10.2	7.0	185	325
350	100	10.2	7.2	205	330
350	150	10.2	7.8	265	340
350	200	10.2	8.4	325	350
350	250	10.2	9.0	380	360
350	300	10.2	9.6	440	370
350	350	10.2	10.2	495	380

**Double Socket Invert Tee
With Flanged Branch**

Size/DN		e	e1	L	H
Body	Branch				
400	80	10.8	7.0	185	355
400	100	10.8	7.2	210	360
400	150	10.8	7.8	270	370
400	200	10.8	8.4	325	380
400	250	10.8	9.0	385	390
400	300	10.8	9.6	440	400
400	400	10.8	10.8	560	420
450	80	11.4	7.0	190	385
450	100	11.4	7.2	215	390
450	150	11.4	7.8	270	400
450	200	11.4	8.4	330	410
450	250	11.4	9.0	390	420
450	300	11.4	9.6	445	430
450	400	11.4	10.8	560	450
450	450	11.4	11.4	620	460
500	80	12.0	7.0	195	415
500	100	12.0	7.2	215	420
500	150	12.0	7.8	275	430
500	200	12.0	8.4	330	440
500	250	12.0	9.0	390	450
500	300	12.0	9.6	450	460
500	350	12.0	10.2	505	470
500	400	12.0	10.8	565	480
500	500	12.0	10.12	680	500
600	80	13.2	7.0	200	475
600	100	13.2	7.2	220	480
600	150	13.2	7.8	280	490
600	200	13.2	8.4	340	500
600	300	13.2	9.6	455	520
600	400	13.2	10.8	570	540
600	500	13.2	12.0	685	560
600	600	13.2	13.2	800	580

Note: Special Fittings are available as per customer requirements.

Special Fittings



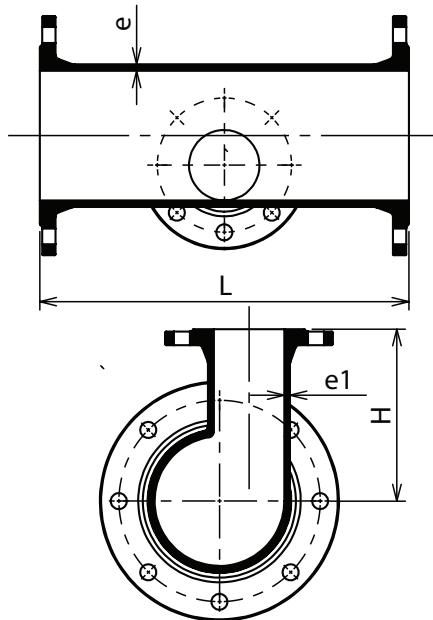
Dimensions in millimeters

**Double Socket Invert Tee
With Flanged Branch**

Size/DN		e	e1	L	H
Body	Branch				
700	100	14.4	7.2	230	510
700	150	14.4	7.8	285	520
700	200	14.4	8.4	345	525
700	300	14.4	9.6	460	540
700	400	14.4	10.8	557	555
700	500	14.4	12.0	690	570
700	600	14.4	13.2	810	585
700	700	14.4	14.4	925	600
750	100	15.0	7.2	230	540
750	150	15.0	7.8	290	550
750	200	15.0	8.4	345	555
750	300	15.0	9.6	465	570
750	400	15.0	10.8	580	585
750	500	15.0	12.0	695	600
750	600	15.0	13.2	810	615
750	700	15.0	14.4	925	630
750	750	15.0	15.0	985	640
800	100	15.6	7.2	235	570
800	150	15.6	7.8	290	580
800	200	15.6	8.4	350	585
800	300	15.6	9.6	465	600
800	400	15.6	12.0	580	615
800	500	15.6	14.4	700	630
800	600	15.6	15.6	815	645
800	700	15.6	7.8	930	660
800	800	15.6	10.8	1045	675
900	150	16.8	7.8	300	640
900	200	16.8	8.4	355	645
900	400	16.8	10.8	590	675
900	600	16.8	13.2	820	705
900	800	16.8	15.6	1050	735
900	900	16.8	16.8	1170	750
1000	150	18.0	7.8	305	700

**Double Socket Invert Tee
With Flanged Branch**

Size/DN		e	e1	L	H
Body	Branch				
1000	200	18.0	8.4	360	705
1000	400	18.0	10.8	595	735
1000	600	18.0	13.2	1290	765
1000	800	18.0	15.6	1290	795
1000	1000	18.0	18.0	1290	825
1100	200	19.2	8.4	370	765
1100	400	19.2	10.8	600	795
1100	600	19.2	13.2	830	825
1100	800	19.2	15.6	1065	855
1100	1000	19.2	18.0	1295	885
1100	1100	19.2	19.2	1410	900
1200	200	20.4	8.4	375	825
1200	400	20.4	10.8	605	855
1200	600	20.4	13.2	840	885
1200	800	20.4	15.6	1070	915
1200	1000	20.4	18.0	1300	945
1200	1200	20.4	20.4	1535	957
1400	400	22.8	10.8	800	950
1400	600	22.8	13.2	1030	980
1400	800	22.8	15.6	1260	1010
1400	1000	22.8	18.0	1495	1040
1400	1200	22.8	20.4	1725	1070
1400	1400	22.8	22.8	1960	1100
1500	400	24.0	10.8	805	1005
1500	600	24.0	13.2	1035	1035
1500	800	24.0	15.6	1270	1065
1500	1000	24.0	18.0	1500	1095
1500	1200	24.0	20.4	1730	1125
1500	1400	24.0	22.8	1965	1155
1500	1500	24.0	24.0	2080	1170
1600	400	25.2	10.8	810	1060
1600	600	25.2	13.2	1040	1090
1600	800	25.2	15.6	1275	1120
1600	1000	25.2	18.0	1505	1150
1600	1200	25.2	20.4	1740	1180
1600	1400	25.2	22.8	1970	1210
1600	1600	25.2	25.2	2200	1240



Dimensions in millimeters

All Flanged Invert Tee

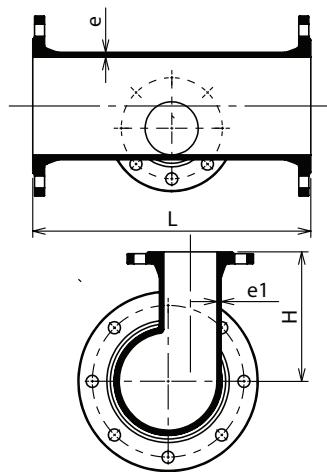
Size/DN		e	e1	L	H
Body	Branch				
80	80	7.0	7.0	330	165
100	80	7.2	7.0	360	175
100	100	7.2	7.2	360	180
125	80	7.5	7.0	400	190
125	100	7.5	7.2	400	195
125	125	7.5	7.5	400	200
150	80	7.8	7.0	440	205
150	100	7.8	7.2	440	210
150	150	7.8	7.8	440	220
200	80	8.4	7.0	520	235
200	100	8.4	7.2	520	240
200	150	8.4	7.8	520	250
200	200	8.4	8.4	520	260
250	80	9.0	7.0	700	235
250	100	9.0	7.2	700	275
250	150	9.0	7.8	700	325
250	200	9.0	8.4	700	325
250	250	9.0	9.0	700	350
300	80	9.6	7.0	800	265
300	100	9.6	7.2	800	300
300	150	9.6	7.8	800	350
300	200	9.6	8.4	800	350
300	250	9.6	9.0	800	350
300	300	9.6	9.6	800	400
350	80	10.2	7.0	850	295
350	100	10.2	7.2	850	325
350	150	10.2	7.8	850	325
350	200	10.2	8.4	850	325
350	250	10.2	9.0	850	325
350	300	10.2	9.6	850	425
350	350	10.2	10.2	850	425

All Flanged Invert Tee

Size/DN		e	e1	L	H
Body	Branch				
400	80	10.8	7.0	900	325
400	100	10.8	7.2	900	350
400	150	10.8	7.8	900	350
400	200	10.8	8.4	900	350
400	250	10.8	9.0	900	350
400	300	10.8	9.6	900	450
400	400	10.8	10.8	900	450
450	80	11.4	7.0	950	355
450	100	11.4	7.2	950	375
450	150	11.4	7.8	950	375
450	200	11.4	8.4	950	375
450	250	11.4	9.0	950	375
450	300	11.4	9.6	950	475
450	400	11.4	10.8	950	475
450	500	11.4	11.4	950	475
500	80	12.0	7.0	1000	385
500	100	12.0	7.2	1000	400
500	150	12.0	7.8	1000	400
500	200	12.0	8.4	1000	400
500	300	12.0	9.6	1000	500
500	350	12.0	10.2	1000	500
500	400	12.0	10.8	1000	500
500	500	12.0	12.0	1000	500
600	80	13.2	7.0	1100	445
600	100	13.2	7.2	1100	450
600	150	13.2	7.8	1100	450
600	200	13.2	8.4	1100	450
600	300	13.2	9.6	1100	550
600	400	13.2	10.8	1100	550
600	500	13.2	12.0	1100	550
600	600	13.2	13.2	1100	550

Note: Special Fittings are available as per customer requirements.

Special Fittings



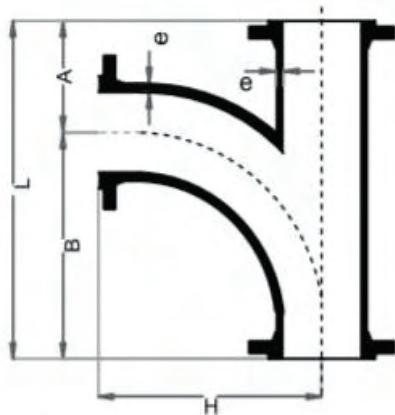
Dimensions in millimeters

All Flanged Invert Tee					
Size/DN		e	e1	L	H
Body	Branch				
700	100	14.4	7.2	540	510
700	150	14.4	7.8	600	520
700	200	14.4	8.4	650	525
700	300	14.4	9.6	760	540
700	400	14.4	10.8	870	55
700	500	14.4	12.0	1000	570
700	600	14.4	13.2	1200	585
700	700	14.4	14.4	1200	600
750	100	15.0	7.2	550	540
750	150	15.0	7.8	610	550
750	200	15.0	8.4	670	555
750	300	15.0	9.6	780	570
750	400	15.0	10.8	890	585
750	500	15.0	12.0	1020	600
750	600	15.0	12	1130	615
750	700	15.0	14.4	1250	630
750	750	15.0	15.0	1275	640
800	100	15.6	7.2	560	570
800	150	15.6	7.8	620	580
800	200	15.6	8.4	690	585
800	300	15.6	9.6	800	600
800	400	15.6	10.8	910	615
800	500	15.6	12.0	1030	630
800	600	15.6	13.2	1350	645
800	700	15.6	14.4	1350	660
800	800	15.6	15.6	1350	675
900	150	16.8	7.8	650	640
900	200	16.8	8.4	730	645
900	400	16.8	10.8	950	675
900	600	16.8	13.2	1500	705
900	800	16.8	15.6	1500	735
900	900	16.8	16.8	1500	750

All Flanged Invert Tee					
Size/DN		e	e1	L	H
Body	Branch				
1000	150	18.0	7.8	720	700
1000	200	18.0	8.4	770	705
1000	400	18.0	10.8	990	735
1000	600	18.0	13.2	1650	765
1000	800	18.0	15.6	1650	795
1000	1000	18.0	18.0	1650	825
1100	200	19.2	8.4	760	765
1100	400	19.2	10.8	980	795
1100	600	19.2	13.2	1210	825
1100	800	19.2	15.6	1470	855
1100	1000	19.2	18.0	1690	885
1100	1100	19.2	19.2	1900	900
1200	200	20.4	8.4	780	825
1200	400	20.4	10.8	1070	855
1200	600	20.4	13.2	1240	885
1200	800	20.4	15.6	1470	915
1200	1000	20.4	18.0	1700	945
1200	1200	20.4	20.4	1950	975
1400	400	22.8	10.8	1050	950
1400	600	22.8	13.2	1550	980
1400	800	22.8	15.6	1760	1010
1400	1000	22.8	18.0	2015	1040
1400	1200	22.8	20.4	2015	1070
1400	1400	22.8	22.8	2200	1100
1500	400	24.0	10.8	1070	1005
1500	600	24.0	13.2	1350	1035
1500	800	24.0	15.6	1570	1065
1500	1000	24.0	18.0	1790	1095
1500	1200	24.0	20.4	2010	1125
1500	1400	24.0	22.8	2230	1155
1500	1500	24.0	24.0	2340	1170
1600	400	25.2	10.8	1100	1060
1600	600	25.2	13.2	1600	1090
1600	800	25.2	15.6	1835	1120
1600	1000	25.2	18.0	2065	1150
1600	1200	25.2	20.4	2300	1180
1600	1400	25.2	22.8	2300	1210
1600	1600	25.2	25.2	2480	1240

Note: Special Fittings are available as per customer requirements.

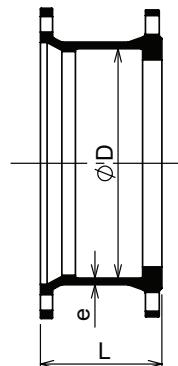
Dimensions in millimeters



Body		All Flanged Radial Tee				
Size/DN	Branch	e	A	B	H	L
80	80	7.0	165	380	380	545
100	100	7.2	180	400	400	580
150	150	7.8	220	450	450	670
200	200	8.4	260	500	500	760
250	250	9.0	350	550	550	900
300	300	9.6	400	600	600	1000
350	350	10.2	450	650	650	1100
400	400	10.8	500	700	700	1200
450	450	11.4	550	750	750	1300
500	500	12.0	600	800	800	1400
600	600	13.2	700	900	900	1600
700	700	14.4	800	1000	1000	1800
800	800	15.6	900	1100	1100	2000
900	900	16.8	1000	1200	1200	2200
1000	1000	18.0	1100	1300	1300	2400
1100	1100	19.2	1200	1400	1400	2600
1200	1200	20.4	1300	1500	1500	2800

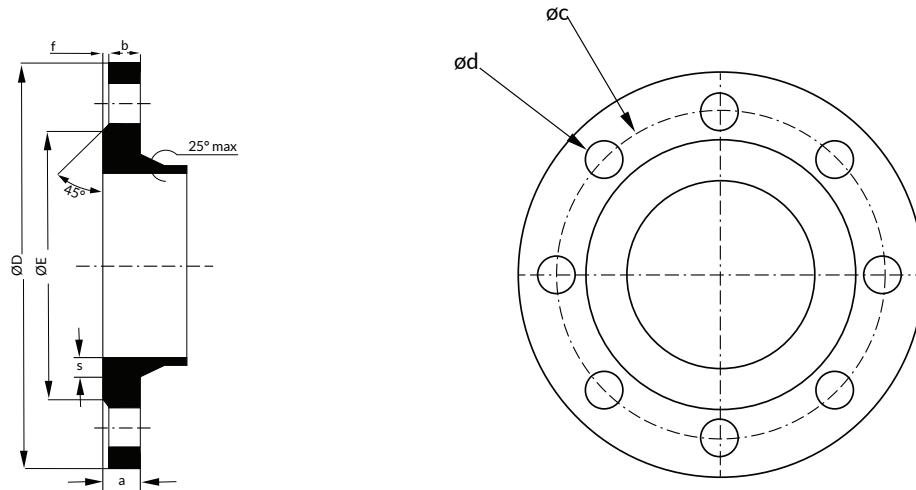
Dismantling Joints	Double Flanged Pipe	Flanged Spigot Pipe With Puddle	Double Flanged Pipe With Puddle	Socket Flanged Pipe
Size/DN	Size/DN	Size/DN	Size/DN	Size/DN
80	80	80	80	80
100	100	100	100	100
125	125	125	125	125
150	150	150	150	150
200	200	200	200	200
250	250	250	250	250
300	300	300	300	300
350	350	350	350	350
400	400	400	400	400
450	450	450	450	450
500	500	500	500	500
600	600	600	600	600
700	700	700	700	700
750	750	750	750	750
800	800	800	800	800
900	900	900	900	900
1000	1000	1000	1000	1000
1100	1100	1100	1100	1100
1200	1200	1200	1200	1200
1400	1400	1400	1400	1400
1500	1500	1500	1500	1500
1600	1600	1600	1600	1600

Note: Special Fittings are available as per customer requirements.



Dimensions in millimeters

Mechanical Joint Gland	Flanged Adaptor
Size/DN	Size/DN
80	80
100	100
125	125
150	150
200	200
250	250
300	300
350	350
400	400
450	450
500	500
600	600
700	700
750	750
800	800
900	900
1000	1000
1100	1100
1200	1200
1400	1400
1500	1500
1600	1600



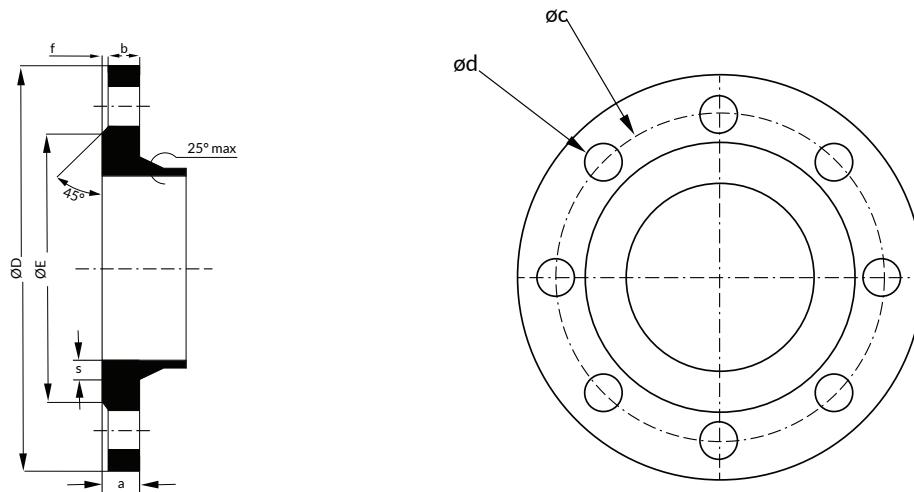
Dimensions in millimeters

Dimension Chart as per PN 10

Nominal DIA DN	D	E	C	b	f	a	s	No of Holes	Hole DIA (Ød)	Bolt Size in Metric
80	200	132	160	16.0	3	19.0	15.0	*4/8	19	M16
100	220	156	180	16.0	3	19.0	15.0	8	19	M16
125	250	184	210	16.0	3	19.0	15.0	8	19	M16
150	285	211	240	16.0	3	19.0	15.0	8	23	M20
200	340	266	295	17.0	3	20.0	15.0	8	23	M20
250	*395/400	319	350	19.0	3	22.0	16.0	12	23	M20
300	*445/455	370	400	20.5	4	24.5	17.5	12	23	M20
350	505	429	460	20.5	4	24.5	19.5	16	23	M20
400	565	480	515	20.5	4	24.5	19.5	16	28	M24
450	615	530	565	*21.0/21.5	4	25.5	20.0	20	28	M24
500	670	582	620	22.5	4	26.5	21.0	20	28	M24
600	780	682	725	25.0	5	30.0	24.0	20	31	M27
700	895	794	840	27.5	5	32.5	24.0	24	31	M27
750	960	857	900	29.0	5	34.0	24.0	24	31	M27
800	1015	901	950	30.0	5	35.0	24.5	24	34	M30
900	1115	1001	1050	32.5	5	37.5	26.5	28	34	M30
1000	1230	1112	1160	35.0	5	40.0	28.0	28	37	M33
1100	1340	1231	1270	*38.0/38.5	5	43.0	30.0	*28/32	37	M33
1200	1455	1328	1380	40.0	5	45.0	31.5	32	*40/41	M36
1400	1675	1530	1590	41.0	5	46.0	32.0	36	*43/44	M39
1600	1915	1750	1820	44.0	5	49.0	34.5	40	*49/50	M45

*IS 8329:2000/EN 1092-2:1997

Note: Tolerances as per IS 8329:2000 and EN 1092-2:1997



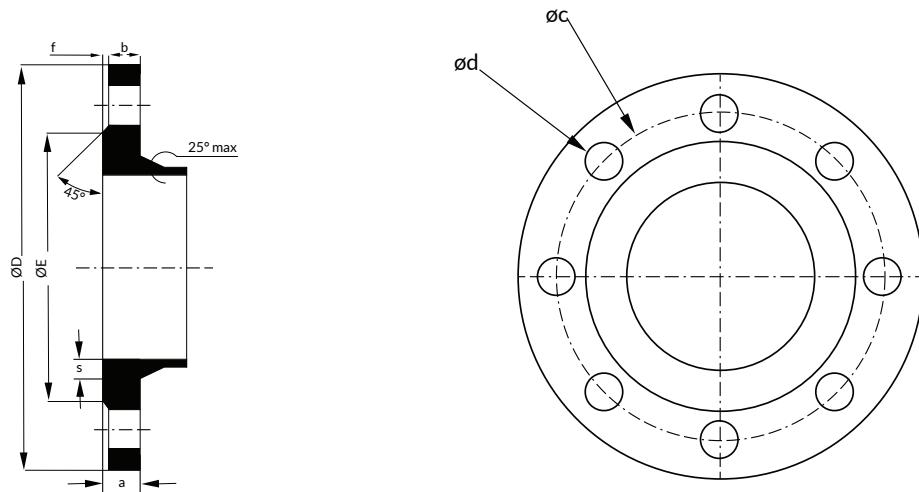
Dimensions in millimeters

Dimension Chart as per PN 16

Nominal DIA DN	D	E	C	b	f	a	s	No of Holes	Hole DIA (Od)	Bolt Size in Metric
80	200	132	160	16.0	3	19.0	15.0	8	19	M16
100	220	156	180	16.0	3	19.0	15.0	8	19	M16
125	250	184	210	16.0	3	19.0	15.0	8	19	M16
150	285	211	240	16.0	3	19.0	15.0	8	23	M20
200	340	266	295	17.0	3	20.0	16.0	12	23	M20
250	400	319	355	19.0	3	22.0	17.5	12	28	M24
300	455	370	410	20.5	4	24.5	19.5	12	28	M24
350	520	429	470	22.5	4	26.5	21.0	16	28	M24
400	580	480	525	24.0	4	28.0	22.5	16	31	M27
450	640	548	585	26.0	4	30.0	24.0	20	31	M27
500	715	609	650	27.5	4	31.5	25.0	20	34	M30
600	840	720	770	31.0	5	36.0	27.0	20	37	M33
700	910	794	840	34.5	5	39.5	27.5	24	37	M33
750	970	857	900	36.0	5	41.0	28.0	24	37	M33
800	1025	901	950	38.0	5	43.0	30.0	24	*40/41	M36
900	1125	1001	1050	*41.0/41.5	5	46.0	32.5	28	*40/41	M36
1000	1255	1112	1170	45.0	5	50.0	35.0	28	*43/44	M39
1100	1355	1218	1270	48.5	5	53.5	37.5	32	*43/44	M39
1200	1485	1328	1390	52.0	5	57.0	40.0	32	*49/50	M45
1400	1685	1530	1590	55.0	5	60.0	42.0	36	*49/50	M45
1600	1930	1750	*1620/1820	60.0	5	65.0	45.5	40	*56/57	M52

*IS 8329:2000/EN 1092-2:1997

Note: Tolerances as per IS 8329:2000 and EN 1092-2:1997



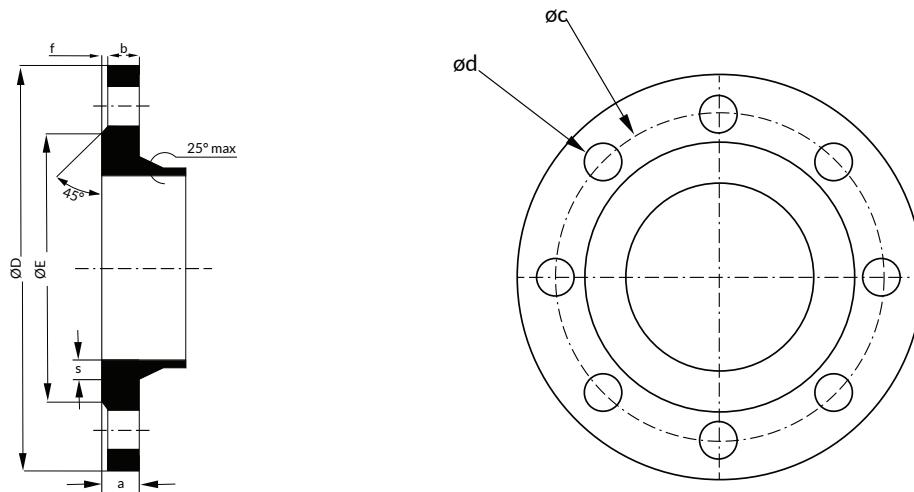
Dimensions in millimeters

Dimension Chart as per PN 25

Nominal DIA DN	D	E	C	b	f	a	s	No of Holes	Hole DIA (Φd)	Bolt Size in Metric
80	200	132	160	16.0	3	19.0	15.0	8	19	M16
100	235	156	190	16.0	3	19.0	15.0	8	23	M20
125	270	184	220	16.0	3	19.0	15.0	8	28	M24
150	300	211	250	17.0	3	20.0	16.0	8	28	M24
200	360	274	310	19.0	3	22.0	17.5	12	28	M24
250	425	330	370	21.5	3	24.5	19.5	12	31	M27
300	485	389	430	23.5	4	27.5	22.0	16	31	M27
350	555	448	490	26.0	4	30.0	24.0	16	34	M30
400	620	503	550	28.0	4	32.0	25.5	16	37	M33
450	670	548	600	30.5	4	34.5	27.5	20	37	M33
500	730	609	660	32.5	4	36.5	29.0	20	37	M33
600	845	720	770	37.0	5	42.0	33.5	20	*40/41	M36
700	960	820	875	41.5	5	46.5	33.5	24	*43/44	M39
750	1020	883	940	45.0	5	50.0	34.0	24	43	M39
800	1085	928	990	46.0	5	51.0	35.5	24	*49/50	M45
900	1185	1028	1090	50.5	5	55.5	39.0	28	*49/50	M45
1000	1320	1140	1210	55.0	5	60.0	42.0	28	*56/57	M52
1100	1420	1240	1310	*60.5/59.5	5	65.5	45.0	32	*56/57	M52
1200	1530	1350	1420	64.0	5	69.0	48.5	32	*56/57	M52
1400	1755	1560	1640	69.0	5	74.0	52.0	36	62	M56
1600	1975	1780	1860	76.0	5	81.0	56.5	40	62	M56

*IS 8329:2000/EN 1092-2:1997

Note: Tolerances as per IS 8329:2000 and EN 1092-2:1997



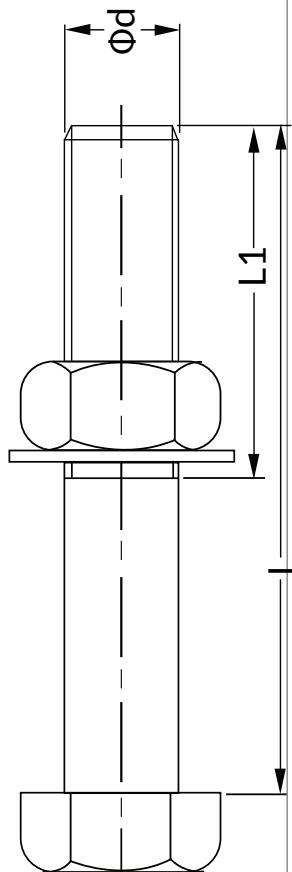
Dimensions in millimeters

Dimension Chart as per PN 40

Nominal DIA DN	D	E	C	b	f	a	s	No of Holes	Hole DIA (Φx)	Bolt Size in Metric
80	200	132	160	16.0	3	19.0	15.0	8	19	M16
100	235	166	190	16.0	3	19.0	15.0	8	23	M20
125	270	184	220	20.5	3	23.5	16.5	8	28	M24
150	300	211	250	23.0	3	26.0	18.0	8	28	M24
200	375	284	320	27.0	3	30.0	21.0	12	31	M27
250	450	345	385	31.5	3	34.5	24.0	12	34	M30
300	515	409	450	35.5	4	39.5	27.5	16	34	M30
350	580	465	510	40.0	4	44.0	31.0	16	37	M33
400	660	535	585	44.0	4	48.0	33.5	16	*40/41	M36
450	685	560	610	*46.0/45.0	4	50.0	35.0	20	*40/41	M36
500	755	615	670	48.0	4	52.0	36.5	20	*43/44	M39
600	890	735	795	53.0	5	58.0	40.5	20	*49/50	M45

*IS 8329:2000/EN 1092-2:1997

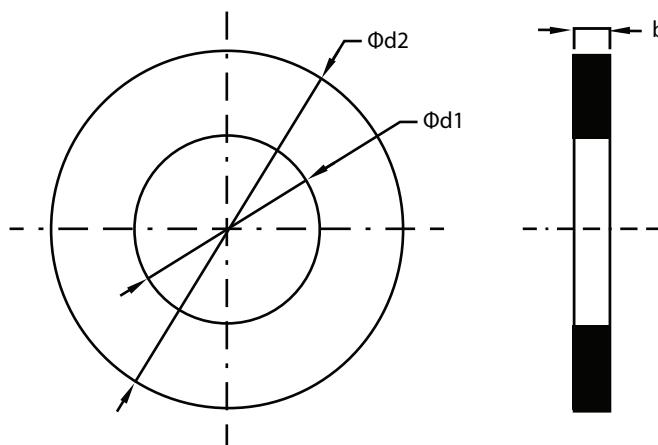
Note: Tolerances as per IS 8329:2000 and EN 1092-2:1997



Dimensions in millimeters

Bolts and Nuts for Flanges

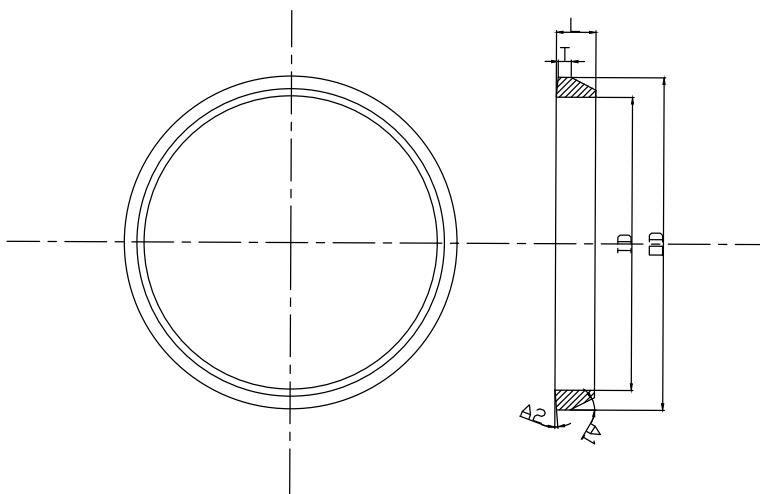
Nominal DIA DN	Bolt Size	PN - 10				PN - 16				PN - 25				PN - 40			
		No. of nuts & bolts set	(L)	App. Wt.	Bolt Size	No. of nuts & bolts set	(L)	App. Wt.	Bolt Size	No. of nuts & bolts set	(L)	App. Wt.	Bolt Size	No. of nuts & bolts set	(L)	App. Wt.	
80	M16	4	85.00	57.00	0.23	M16	8	85.00	57	0.23	M16	8	85.00	57.00	0.23	37.60	0.23
100	M16	8	90.00	62.00	0.24	M16	8	90.00	62.00	0.24	M20	8	100.00	72.00	0.41	100.00	0.41
125	M16	8	90.00	62.00	0.24	M16	8	90	62.00	0.24	M24	8	110.00	82.00	0.71	110.00	0.71
150	M20	8	100.00	72.00	0.41	M20	8	100.00	72.00	0.41	M24	8	110.00	82.00	0.71	110.00	0.71
200	M20	8	100.00	72.00	0.41	M20	12	100.00	82.00	0.41	M24	12	110.00	82.00	0.71	130.00	1.01
250	M20	12	110.00	76.00	0.56	M24	12	110.00	93.00	0.56	M27	12	130.00	90.00	1.01	140.00	1.35
300	M20	12	120.00	83.00	0.58	M24	12	130.00	93	0.58	M27	16	1130.00	90.00	1.01	140.00	1.35
350	M20	16	130.00	93.00	0.58	M24	16	130.00	105.00	0.58	M30	16	140.00	93.00	1.35	--	--
400	M24	16	140.00	103.00	0.91	M27	16	150.00	90.00	0.91	M33	16	1150.00	93.00	1.75	--	--
450	M24	20	130.00	93.00	0.83	M27	20	130.00	110.00	0.83	M33	20	150.00	100.00	1.75	--	--
500	M24	20	150.00	110.00	0.99	M30	20	160	117	0.99	M33	20	160.00	100.00	1.85	--	--
600	M27	20	170.00	122.00	1.37	M33	20	180.00	100.00	1.37	M36	20	180.00	110.00	2.46	--	--
700	M27	24	150.00	105.00	1.24	M33	24	150.00	92.00	1.24	M39	24	1180.00	105.00	2.91	--	--
750	M27	24	160.00	110.00	1.28	M33	24	160.00	92.00	1.28	M39	24	190.00	110.00	3.01	--	--
800	M30	24	160.00	110.00	1.66	M36	24	160.00	105.00	1.66	M45	24	1190.00	110.00	4.71	--	--
900	M30	28	180.00	117.00	1.76	M36	28	180.00	105.00	1.76	M45	28	230.00	130.00	4.71	--	--
1000	M33	28	160.00	100.00	2.14	M39	28	180.00	115	2.14	M52	28	230.00	130.00	7.44	--	--
1100	M33	28	180.00	110.00	2.35	M39	32	210.00	115.00	2.35	M52	32	230.00	130.00	7.54	--	--
1200	M36	32	1180.00	105.00	3.61	M45	32	210.00	130	3.61	M52	32	1260.00	133.00	8.04	--	--
1400	M39	36	180.00	105.00	4.37	M45	36	230.00	130.00	4.37	M56	36	260.00	133.00	9.30	--	--
1600	M45	40	190.00	110.00	4.87	M52	40	230.00	130	5.94	M56	40	260.00	133.00	9.30	--	--



Dimensions in millimeters

Dimension detail of Rubber Gasket for Flange Joints

Nominal DIA DN	d1	b	PN10	PN16	PN25	PN40
			d2	d2	d2	d2
80	84.0	3	132	132	132	132
100	103.6	3	156	156	156	156
125	129.0	3	184	184	184	184
150	154.4	3	211	211	211	211
200	205.2	3	266	266	274	284
250	256.0	3	319	319	330	345
300	306.8	3	370	370	389	389
350	357.6	3	429	429	448	448
400	407.4	3	480	480	503	535
450	457.2	3	527	548	548	560
500	508.0	3	582	609	609	615
600	608.6	3	682	720	720	735
700	709.2	5	794	794	820	--
750	760.0	5	857	857	883	--
800	810.8	5	901	901	928	--
900	911.4	5	1001	1001	1028	--
1000	1012.0	5	1112	1112	1140	--
1100	1113.6	5	1231	1218	1240	--
1200	1214.2	5	1328	1328	1350	--
1400	1416.4	5	1530	1530	1560	--
1600	1617.6	5	1750	1750	1780	--



Rubber Gasket for Mechanical Joint

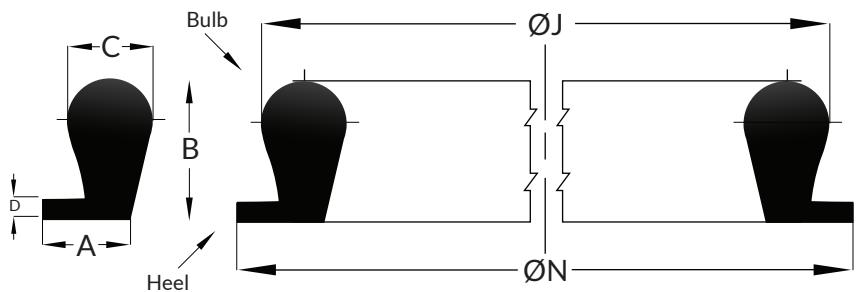
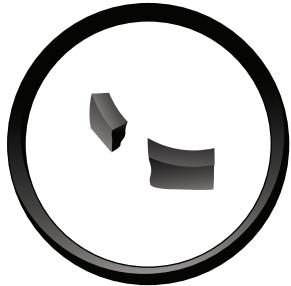


Rubber Gasket Cross Section

Dimensions in millimeters

Dimension Detail for MJ Rubber Gasket

Nominal DIA DN	OD	ID	L	T	A1	A2
80	126	98	27	8	27°	5°
100	148	118	27	8	27°	5°
150	200	170	27	8	27°	5°
200	252	222	29	10	27°	5°
250	306	274	31	10	27°	5°
300	358	326	32	10	27°	5°
350	413	378	36	12	27°	5°
400	464	429	36	12	27°	5°
450	520	480	40	12	27°	5°
500	573	532	44	14	27°	5°
600	678	635	47	15	27°	5°
700	788	738	50	16	27°	5°
750	840	790	50	16	27°	5°
800	892	842	53	17	27°	5°
900	995	945	55	19	27°	5°
1000	1098	1048	57	21	27°	5°
1100	1220	1152	60	24	27°	5°
1200	1324	1255	60	24	27°	5°
1400	--	--	--	--	--	--
1600	--	--	--	--	--	--



Dimensions in millimeters

Rubber Gasket For Push-on Joints

Nominal Diameter	Bulb		Heel		Height	Appx. Wt.		
	DN	C	ØJ	A	D	ØN	B	Kg
80	16	122.0	122.0	10.0	5.0	124.0	26.0	0.130
100	16	142.0	142.0	10.0	5.0	144.0	26.0	0.145
125	16	169.0	169.0	10.0	5.0	171.0	26.0	0.175
150	16	196.0	196.0	10.0	5.0	198.0	26.0	0.215
200	18	252.5	252.5	10.0	6.0	254.6	30.0	0.340
250	18	305.0	305.0	11.0	6.0	308.0	32.0	0.490
300	20	362.5	362.5	12.0	7.0	364.5	34.0	0.635
350	20	416.0	416.0	12.0	7.0	418.0	34.0	0.740
400	22	472.0	472.0	13.0	8.0	474.0	36.0	1.020
450	22	525.0	525.0	13.0	8.0	527.0	38.0	1.080
500	24	580.0	580.0	14.0	9.0	582.0	43.0	1.480
600	26	689.0	689.0	15.0	10.0	601.0	46.0	2.200
700	29	799.0	799.0	17.5	10.0	801.5	51.0	3.050
750	30	854.0	854.0	18.5	10.3	856.5	52.3	3.450
800	30	906.0	906.0	18.5	10.3	908.5	52.5	3.650
900	30	1009.0	1009.0	18.5	10.3	1012.0	52.9	5.385
1000	30	1118.0	1118.0	18.5	10.3	11120.0	52.9	6.800
1200	-	-	-	-	-	-	-	-
1400	-	-	-	-	-	-	-	-
1600	-	-	-	-	-	-	-	-

Tolerances on dimensions of Rubber Gaskets for Push-on Joint

Dimension (mm)	Nominal Diameter (mm)	Tolerance (mm)
C	Bulb	
	80 to 600	±0.5
	700 to 1050	±1.0
	80 to 125	±1.0
	150 to 300	±1.5
	350 to 400	±2.0
	450 to 500	±3.0
	700 to 800	±4.0
	900 to 1050	±5.0
	Heel	
A	80 to 250	±0.3
	300 to 450	±0.4
	500 to 1050	±0.5
	80 to 250	±0.3
	300 to 700	±0.4
	750 to 1050	±0.5
	ØN	
ØN	80 to 125	±1.0
	150 to 200	±1.3
	350 to 400	±2.0
	430 to 600	±3.0
	700 to 800	±4.0
	900 to 1050	±5.0
	B	
B	80 to 150	±0.5
	200 to 500	±0.8
	700 to 1050	±1.0

Restrained Joint

The RASHMI-LOCK Restrained Jointing system offers a restrained, semi-flexible push-in jointing for Ductile Iron Pipes. It's a self-restrained socket and spigot joint that allows deflection within the designed range. The system transfers internal pressure from fluid flow to the adjacent pipe. This is achieved through weld beads on the spigot and lock segments.

This jointing system eliminates the need for thrust blocks, enabling trenchless laying of pipes. It's suitable for seismic zones, fault crossings, liquefaction zones, connections to structures, floating pipelines, Hydro Power plants, steep slopes, firefighting mains, and dewatering pipelines. Complies with EN545/ISO 2531/ISO10804-1 standards and is available in sizes DN 40-DN 600.

Technical Specifications

Product Name	RASHMI -LOCK suitable for restrained semi flexible Push-on-Jointing
Size Range	DN 40mm to DN 600mm
Standard Length	5.5 m or customized length *
Internal Linings	<ul style="list-style-type: none">• Sulphate resisting cement• Blast furnace slag cement• Ordinary Portland cement• High Alumina cement• Poly urethane coating• Seal coat
Outside Coatings	<ul style="list-style-type: none">• Zinc or Zinc-Aluminium deposition of 130 gm/m² / 200 gm/m² / 400 gm/m² with finishing layer of Blue or Red Epoxy, Bitumen
Coating of Joint Area	Blue or Red Epoxy / Bituminous coating
Conforming Specifications	Design : ISO 10803 Product : ISO 2531; BS EN 545 Joint : ISO 10804 Rubber Gasket : ISO 4633, BS EN 681-1

*Options available only with prior arrangement

Advantages

- Provides a robust pipe system with a simple locking mechanism.
- Ranges from DN 40 to DN 600 respectively.
- Can withstand pressure surges.
- Saves a great deal of installation time.
- Polyurethane coating and lining provide extraordinarily high C-value.
- The deflection in the jointing system provides flexibility during operation.
- Can be used in regions with elevated earthquake or earth settlement risks.
- Suitable even for laying in complicated and demanding intersections.

RASHMI-LOCK Pipe Dimensions

Size	Dimensions (mm)			P1	WL
	DN	DE	Water / Sewerage		
100	118	A	A	123	85
150	170	170	246	130	85
200	222	290	290	142	95
250	274	354	354	163	100
300	326	410	410	174	105
350	378	460	460	171	110
400	429	540	**	183	117
500	532	670	**	200	117
600	635	786	**	216	128

**Details available on request

RASHMI-LOCK Allowable Pressure

Size	PFA *(Allowable operating Pressure), bar		Allowable angular deflection	No. of locks
	DN	Water / Sewerage	High Pressure application	
100	40	100	5	5
150	40	100	5	5
200	40	64	4	8
250	40	64	4	8
300	40	45	4	8
350	30	38	3	8
400	30	35	3	8
500	30	35	3	9
600	35	*	2	10

Applications

- Trenchless laying of Ductile Iron pipelines
- Laying of Ductile iron pipelines without thrust blocks – for Water Application
- Laying of pipelines on steep slopes
- Hydro-power applications
- Mining applications such as dewatering and temporary water distributions
- Bridge pipelines
- Laying by Horizontal Directional Drilling -Trenchless Application
- Snow-making pipelines
- Firefighting Mains
- District Cooling/Heating Pipelines
- Floating pipelines in water



DI Pipes & Fittings

Linings & Coatings



DI Pipes & Fittings

Internal Protection

Cement Mortar Lining

Rashmi Metaliks' DI Pipes & Fittings are supplied with manually applied cement mortar lining. The lining is composed of cement, sand and water.

Thickness of the Lining

DN (mm)	Thickness (mm)	
	Normal value	Tolerance
100-300	For IS 9523 - 3.0 For BSEN 545 - 4.0 For ISO 2531 - 3.5	For IS 9523 : -1.5 For BSEN 545 : -1.5 For ISO 2531 : -1.0
350-600	5.0	-2.0
700-1200	6.0	-2.5

Seal coat of asphaltic material on Cement Mortar Lining is also done on request.



Bitumen Coating

To protect Pipes & Fittings from external conditions an external layer of min. 70 microns thick bituminous coating, that comply with ISO 2531 / EN 545, is applied to ensure weatherproofing and corrosion resistance.

General Specifications

Property	Value	Unit
Coating Thickness	Min. 70	microns
Operating Temperature Range	-10 to 60	°C
Adhesion Strength	500 - 1000	psi
Impact Resistance	10 - 20	inch-lbs
Abrasion Resistance	50 - 100	mg loss
Chemical Resistance	Moderate	
Salt Spray Resistance	500 - 1000	hours
UV Resistance	Yes	
Application Method	Hot-Applied or Cold-Applied	
Coating Color	As per requirement	

DI Pipes & Fittings

Internal Protection

Fusion-Bonded Epoxy (FBE) Coating

Fusion-Bonded Epoxy (FBE) Coating involves application of thermosetting epoxy resin layers to Ductile Iron (DI) Fittings through an electrostatic process. This protective coating serves as an effective corrosion barrier, renowned for its ability to withstand corrosion across a broad temperature spectrum. Additionally, it exhibits exceptional adhesion to the surface of ductile iron.

Specifications of Internal FBE Coating

Property	Value	Unit
Coating Thickness	min. 250	microns
Operating Temperature Range	-30 to 120	°C
Adhesion Strength	3500 - 4500	psi
Impact Resistance	20 - 30	inch-lbs
Abrasion Resistance	50 - 100	mg loss
Chemical Resistance	Excellent	
Salt Spray Resistance	1500 - 2000	hours
Dielectric Strength	1000 - 1500	volts/mil
Flexibility	Yes	
UV Resistance	Yes	
Application Method	Powder Coating	
Cure Temperature	180 - 220	°C
Coating Color	As per requirement	



DI Pipes & Fittings

External Protection

FBE Coating

External Fusion-Bonded Epoxy (FBE) coating on Ductile Iron Fitting increases the fitting's longevity and ensures sustained structural integrity in demanding industrial environments. Its application creates a seamless, resilient shield, safeguarding against chemical and mechanical wear, ensuring top-tier pipeline protection.

Surface Preparation

Parameter	Description
Surface Cleaning	Shotblasting to achieve SA 2.5 or SSPC-SP 10 standard
Surface Profile	40-70 microns (1.5-2.7 mils) roughness (anchor pattern)
Surface Condition	Clean, dry, and free of contaminants
Preheating	Optional, based on substrate and coating thickness

Advantages of Fusion Bond Epoxy Coating

Excellent Chemical Resistance

Better Resistance to External Corrosion

High abrasion and scratch resistance

Perfect for transporting various liquids

Excellent adhesion with a glossy and smooth coating

Different colour options are available based on usage



FBE Coating

External Coating Application and Testing

Parameter	Description
Coating Thickness	Min. 250 microns on the body. Over jointing portion min 150 microns.
Application Method	Electrostatic spray
Application Temperature	200-220°C
Dwell Time	5-10 minutes (may vary with thickness)
Curing Temperature	170-190°C
Inspection	Visual inspection for uniformity, adhesion, and defects
Adhesion Testing	ASTM D4541 or equivalent pull-off test
Holiday Detection	High-voltage spark testing (ASTM G62) or equivalent method
Hardener	ASTM D2517-99, Type I, Grade 2, Class C
Filler Powder	Conforms to manufacturer's recommendations
Preheating Oven	Temperature Range: 270°C - 290°C
Fusion Bond Gun	Conforms to manufacturer's specifications
Blast Equipment	Complies with SA 2.5 or SSPC-SP 10 standard
Operating Temperature	-20°C to +110°C (Ambient temperature 60°C)
Thickness Testing	ASTM D4138-82 (Dry Film Thickness)
Cure Schedule	Follow manufacturer's recommended cure schedule

Note: All fittings coated with Fusion Bonded Epoxy coating are compliant with European Standard EN 14901



Polyurethane (PU) Coating

A polyurethane coating is applied to the surface of DI Pipes & Fittings to protect it from the inflowing fluids. This coating helps protect fittings from various types of defects such as corrosion, weathering, abrasion, and other deteriorating processes.

Our PU Coated DI Pipes conforms to the international standards EN15655 and EN 15189.

Specifications of PU Coating

Property	Value	Unit
Coating Thickness	800 - 2000	microns
Operating Temperature Range	Upto 45/50	°C
Adhesion Strength	>1450	psi
Impact Resistance	>75	inch-lbs
Abrasion Resistance	<100	mg loss
Chemical Resistance	Yes	
Flexibility	Yes	
Application Method	Spray Coating	
Cure Time	24 - 48 hours	
Coating Color	As per requirement	

PU Coating - Quality Testing

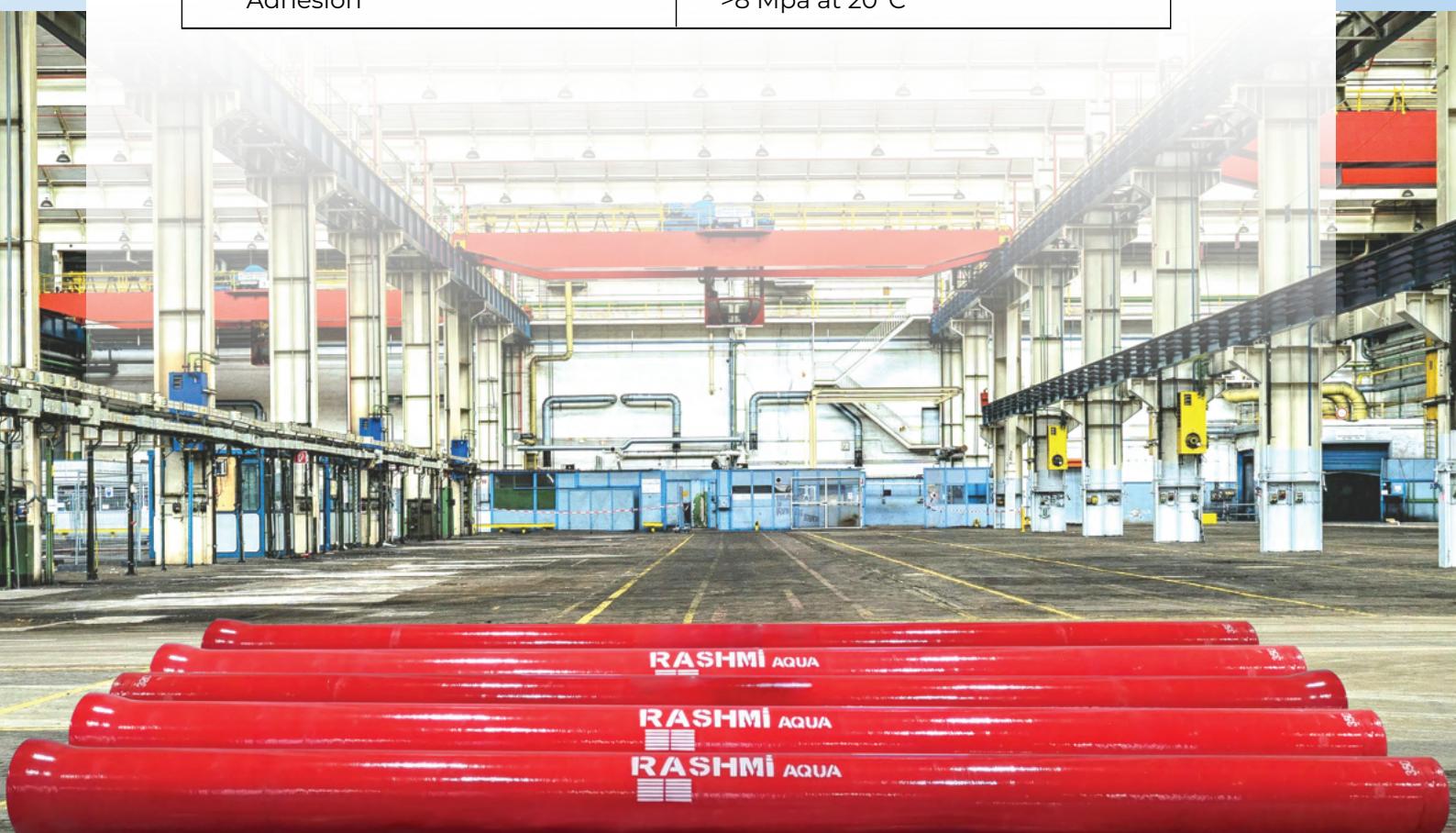
Parameter	Requirement	Clause	Test method	Clause
Chemical Resistance	Less than 15% weight increase after immersion Less than 2% weight loss after drying	6.1	Immersion in deionised water EN ISO 62 method 2	7.2.1.1
	Less than 10% weight increase after immersion Less than 4% weight loss after drying		Immersion in diluted sulphuric acid 10% EN ISO 62 method 2	7.2.1.2
Impact Strength	8 J/mm PU-coated pipe barrel 5 J/mm EP-coated spigot end (see EN 14901)	6.2	Dropping weight High voltage test	7.2.2
Indentation Resistance	< 10% at 10 MPa	6.3	Indentation test	7.2.3
Elongation at Break	>2.5%	6.4	Tensile test	7.2.4
Specific Coating Resistance in 0.1 M NaCl	>108 Ωm ²	6.5	Resistovotu test towel method or vessel method	7.2.5
Ratio of Coating Resistance	>0.8	6.5	Res.d/res. 70d	7.2.5

DI Pipes & Fittings External Protection

PU Coating

External polyurethane (PU) coating on DI Pipes & Fittings enhances corrosion resistance. It extends the fittings' service life, providing a durable barrier against harsh environmental conditions while maintaining the integrity of the fluid conveyance system.

Property	Specification
Chemical Structure	Polyurethane
Coating Thickness	800 - 2000 microns
Hardness	>70 Shore D
Density	Typically 1.0 - 1.2 g/cm ³
Elongation at Break	>2.5%
UV Resistance	Yes
Abrasion Resistance	Yes
Curing Time	1 - 48 hours
Dry Film Thickness (microns)	800 - 2000
Adhesion	>8 Mpa at 20°C



PU Coating

Polyurethane Coatings Thickness by Application

Property	Specification (Unit - microns)
Water Distribution Systems	800 - 2000
Sewage and Wastewater Systems	800 - 2000

Advantages of Polyurethane Coating

- Highly resistant to abrasion
- Strong impact resistance
- Chemical resistance
- Suitable for handling heavy flows of fluids
- Provides UV resistance
- Aggressive fluid conveyance
- Protection from corrosion and weathering





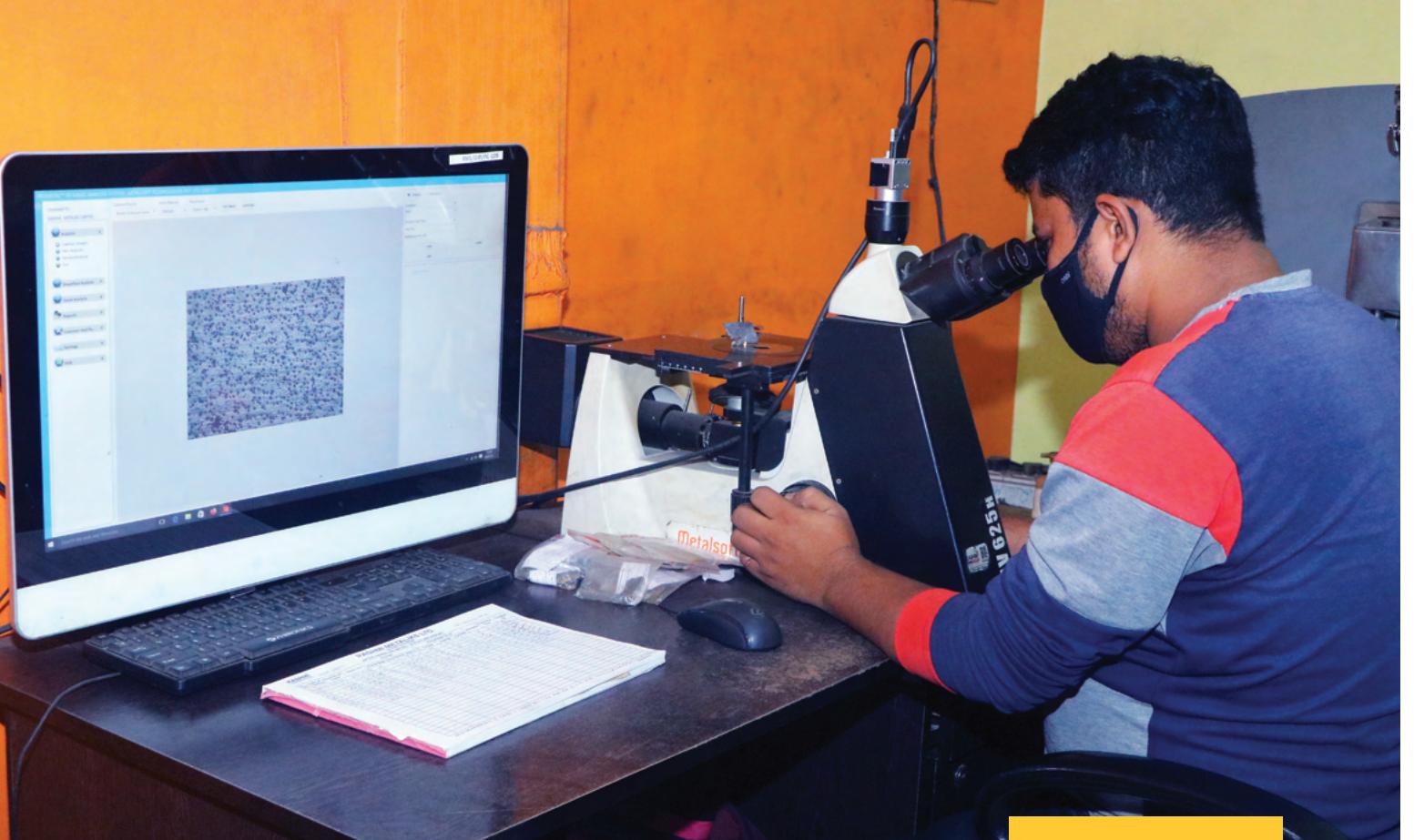
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Mechanical Properties of DI Pipes by Rashmi Metaliks Limited

Mechanical Properties	Values
Tensile Strength	Min. 4,200 Kg/cm ² or 420 MPa
Yield Strength	3,000 Kg/cm ² or 300 MPa
Minimum Elongation	10% (upto DN 1000 mm)
Modulus of Elasticity	"1.62 x 10 ⁶ - 1.70 x 10 ⁶ Kg/cm ² or 162,000 - 170,000 MPa"
Hardness	Max. 230 BHN
Density	7,050 Kg per cubic meter
Coefficient of Thermal Expansion	11.5 x 10 ⁻⁶ per degree celsius (°C) (for temperature range 200°C - 1000°C)
Impact Strength	At Normal Temperature - 7 ft-lb (minimum) & At Low temperature - 3 ft-lb (minimum)

Angular Deflection of DI Pipes by Rashmi Metaliks Limited

Diameter Range (DN)	Angular Deflection
DN 80 - DN 150	5°
DN 200 - DN 300	5°
DN 300 - DN 600	3°
DN 700 - DN 800	2°
DN 900 - DN 1000	1.5°
DN 1100 - DN 1200	1°



HIGH-TECH IN-HOUSE PERFORMANCE TEST FACILITY



Rashmi Metaliks

Quality Assurance

Rashmi Metaliks holds the belief that Quality Control plays a pivotal role in ensuring the creation of flawless Ductile Iron Pipes and Fittings. This commitment to quality control is integrated into every phase of production, beginning with the scrutiny of Raw Materials and culminating in the thorough examination of the Finished Product.

We diligently uphold a regime of in-process inspection and quality control throughout the entirety of the production process. These practices are meticulously recorded and managed according to international standards within our documented Management System.

Design



Design Department

Sand Testing



Permeability Meter Universal Strength Machine



Pattern Shop



Sieve Shaker

Compactability Tester

Rashmi Metaliks

Quality Assurance

Physical Testing



Spectrometer



Metalsoft microscope



Universal Testing Machine

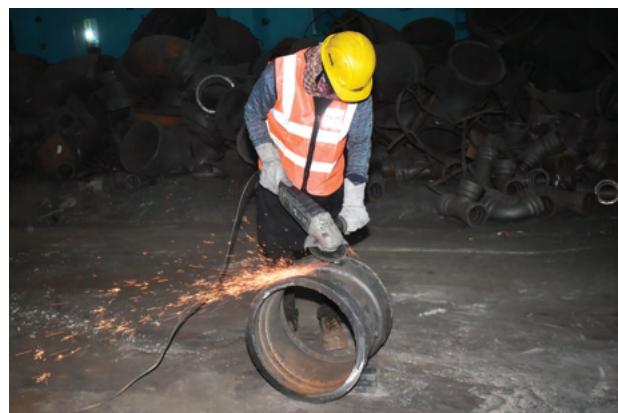


Hardness Testing Machine

Finishing Facility



Shot Blasting Facility



Fettling

QUALITY INSPECTION



Carbon Equivalent



Chemical Analysis



Microstructure Analysis



Temperature Control



Thickness Control



Ring Test



Zinc Coating Mass



Hydraulic Testing Machine



Cement Lining Thickness



Bitumen Coating Thickness



Spigot Outer Diameter



Socket Inner Diameter



Tensile And Elongation



Hardness Testing



Impact Resistance



Rashmi Metaliks

Quality Assurance

Dimension Inspection



Dimensional checking



Inspection with Go, No-Go gauge

Machining Facility



Maching being done



Drilling being done

Multi Drilling



Hydrostatic Pressure Testing of Fittings



Machine Shop

Rashmi Metaliks

Quality Certificates



Kitemark™ Certificate



This is to certify that:
Rashmi Metaliks Limited (DIP Division)
VII-Gopinathpur
PO-Changual,Kharagpur,
Paschim Medinipur
West Bengal
721301
India

Holds Certificate Number: KM 793698

In respect of:

BS ISO 2531
Ductile iron pipes, fittings, accessories and their joints for water applications

This issues the right and licence to use the Kitemark in accordance with the Kitemark Terms and Conditions governing the use of the Kitemark, as may be updated from time to time by BSI Assurance UK Ltd (the "Conditions"). All defined terms in this Certificate shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Certificate provided at or from the above address.

For and on behalf of BSI: Shahm Barham, Group Product Certification Director

First Issued: 2023-09-28

Effective Date: 2023-09-28

Latest Issue: 2023-09-28

Expiry Date: 2026-08-23

Page: 1 of 7

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Rashmi Metaliks Limited (DIP Division)
VII-Gopinathpur
PO-Changual,Kharagpur,
Paschim Medinipur
West Bengal
721301
India

Holds Certificate Number: KM 793696

In respect of:

BS EN 545
Ductile iron pipes, fittings, accessories and their joints for water pipelines

This issues the right and licence to use the Kitemark in accordance with the Kitemark Terms and Conditions governing the use of the Kitemark, as may be updated from time to time by BSI Assurance UK Ltd (the "Conditions"). All defined terms in this Certificate shall have the same meaning as in the Conditions.

The use of the Kitemark is authorized in respect of the Product(s) detailed on this Certificate provided at or from the above address.

For and on behalf of BSI: Shahm Barham, Group Product Certification Director

First Issued: 2023-09-28

Effective Date: 2023-09-28

Latest Issue: 2023-09-28

Expiry Date: 2026-08-23

Page: 1 of 7

This certificate has been issued by and remains the property of BSI Assurance UK Ltd, Kitemark Court, Davy Avenue, Knowle, Milton Keynes MK5 8PF, United Kingdom and should be returned immediately upon request.
BSI Assurance UK Ltd Tel: +44 113 245 0000. An electronic certificate can be authenticated online.

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A member of BSI Group of Companies.

National Accreditation Board for Testing and Calibration Laboratories

bsi NABL

CERTIFICATE OF ACCREDITATION

RASHMI METALIKS LIMITED (DI PIPE DIVISION)
QUALITY CONTROL LABORATORY

has been assessed and accredited in accordance with the standard
ISO/IEC 17025:2017

"General Requirements for the Competence of Testing & Calibration Laboratories"

for its facilities at
NH-06,VILL-GOKULPUR P.O SHYAMRAJPUR, KHARAGPUR, MEDINIPUR WEST, WEST BENGAL, INDIA
in the field of
TESTING

Certificate Number: TC-6688
Issue Date: 16/12/2022
Valid Until: 15/12/2024

This certificate remains valid for the Scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the relevant requirements of NABL.
(To see the scope of accreditation of this laboratory, you may also visit NABL website www.nabl-india.org)

Name of Legal Identity : Rashmi Metaliks Limited
Signed for and on behalf of NABL

N. Venkateswaran
Chief Executive Officer



Certificate of Registration



ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

Rashmi Metaliks Limited
Premila Building, 6th Floor
39, Shakespeare Sarani
Kolkata 700 017
West Bengal
India

Holds Certificate No: EMS 620622

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The Manufacture of Various Grades and Sizes of Ductile Iron Pipes for Different Application.

For and on behalf of BSI:

Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2015-01-05

Effective Date: 2023-12-31

Latest Revision Date: 2023-11-27

Expiry Date: 2026-12-30

Page: 1 of 2

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online.

An electronic certificate can be authenticated online.

Printed copies can be validated at www.bsi-global.com/ClientOnline or telephone +91 11 2602 9000.

Further certifications regarding the scope of this certificate and the applicability of ISO 14001:2015 requirements may be obtained by consulting the organization.

This certificate is valid only if provided original copies are in complete set.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowle, Milton Keynes MK5 8PF, Tel: +44 115 880 9000.

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.

A member of the BSI Group of Companies.



Certificate of Registration



OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - ISO 45001:2018

This is to certify that:

Rashmi Metaliks Limited
Premila Building, 6th Floor
39, Shakespeare Sarani
Kolkata 700 017
West Bengal
India

Holds Certificate No: OHS 620627

and operates an Occupational Health and Safety Management System which complies with the requirements of ISO 45001:2018 for the following scope:

The Manufacture and Supply of Various Grades and Sizes of Ductile Iron Pipes for Different Application.

[Previously certified to BS OHSAS 18001:2007 since 06-04-2015]

For and on behalf of BSI:

Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2020-12-07

Effective Date: 2024-02-05

Latest Revision Date: 2024-02-05

Expiry Date: 2027-02-04

Page: 1 of 2

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online.

An electronic certificate can be authenticated online.

Printed copies can be validated at www.bsi-global.com/ClientOnline or telephone +91 11 2602 9000.

Further certifications regarding the scope of this certificate and the applicability of ISO 45001:2018 requirements may be obtained by consulting the organization.

This certificate is valid only if provided original copies are in complete set.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowle, Milton Keynes MK5 8PF, Tel: +44 115 880 9000.

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.

A member of the BSI Group of Companies.



Certificate of Registration



QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

Rashmi Metaliks Limited
Premila Building, 6th Floor
39, Shakespeare Sarani
Kolkata 700 017
West Bengal
India

Holds Certificate No: FM 578917

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

The Design & Development, Manufacture and Supply of Various Grades and Sizes of Ductile Iron Pipes for Different Applications.

For and on behalf of BSI:

Theuns Kotze, Managing Director Assurance - IMETA

Original Registration Date: 2011-09-07

Effective Date: 2023-08-23

Latest Revision Date: 2023-07-14

Expiry Date: 2026-08-23

Page: 1 of 2

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
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An electronic certificate can be authenticated online.

Printed copies can be validated at www.bsi-global.com/ClientOnline or telephone +91 11 2602 9000.

Further certifications regarding the scope of this certificate and the applicability of ISO 9001:2015 requirements may be obtained by consulting the organization.

This certificate is valid only if provided original copies are in complete set.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowle, Milton Keynes MK5 8PF, Tel: +44 115 880 9000.

BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.

A member of the BSI Group of Companies.

Theuns Kotze, Managing Director Assurance - IMETA

...making excellence a habit."

Rashmi Metaliks

Quality Certificates



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LIMITED

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Gokulpur, P.O. Shyamnagar, Kharagpur, West Medinipur, West Bengal – 721304 INDIA

Bureau Veritas Italia S.p.A. certify that the following products:
Ductile iron pipes for water and sewerage applications
from DN 80 to DN 1200 Push-On
from DN 40 to DN 600 Restrained Flexible Joint
from DN 80 to DN 1000 Flanged Joint
(welding flanged operation is carried out at Gopinathpur, Meusa Changua plant)
Commercial Brand
RASHMI AQUA

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirements of the following standard:
EN 545:2010
ISO 2531:2009
Ductile iron pipes, fittings, accessories and their joints for water application

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

This certificate has not to be intended as related to Notify Body activity according to UE Construction Products Regulation CPR 305/2011 neither can be used for the CE marking

Original Emission Date: 20/04/2018
Last Emission Date: 31/08/2023
Expiration Date: 17/04/2025

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 31/08/2023
Certificate N°: 975/001 Rev.6
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LIMITED

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Gokulpur, P.O. Shyamnagar, Kharagpur, West Medinipur, West Bengal – 721304 INDIA

Bureau Veritas Italia S.p.A. certify that the following products:
Ductile iron pipes for water and sewerage applications
from DN 80 to DN 1200 Push-On
from DN 40 to DN 600 Restrained Flexible Joint
from DN 80 to DN 1000 Flanged Joint
(welding flanged operation is carried out at Gopinathpur, Meusa Changua plant)
Commercial Brand
RASHMI AQUA

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirements of the following standard:
EN 545:2008
ISO 2531:1998
Ductile iron pipes, fittings, accessories and their joints for sewerage application

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

This certificate has not to be intended as related to Notify Body activity according to UE Construction Products Regulation CPR 305/2011 neither can be used for the CE marking

Original Emission Date: 20/04/2016
Last Emission Date: 31/08/2023
Expiration Date: 17/04/2025

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 31/08/2023
Certificate N°: 975/002 Rev.6
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LIMITED

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Gokulpur, P.O. Shyamnagar, Kharagpur, West Medinipur, West Bengal – 721304 INDIA

Bureau Veritas Italia S.p.A. certify that the process of application of coatings for the following products:
Ductile iron pipes
for water and sewerage applications
from DN 80 to DN 1200 Push-On
from DN 40 to DN 600 Restrained Flexible Joint
from DN 80 to DN 1000 Flanged Joint
(welding flanged operation is carried out at Gopinathpur, Meusa Changua plant)
Commercial Brand
RASHMI AQUA

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirement listed in Annex 1/1 of this certificate.

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 31/08/2023
Certificate N°: 1053/001 Rev.4
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LTD (DIP Division)

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Mousa-Changua, Jethia, Gopinathpur, JL n° 359, 360 & 361, NH-16 Kharagpur, Paschim Medinipur, West Bengal – 721301 INDIA

Bureau Veritas Italia S.p.A. certify that the following products:
Ductile iron fittings for pipes for water and sewerage applications
from DN 80 to DN 1200
Commercial Brand
RASHMI

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirements of the following standard:
EN 545:2010
ISO 2531:2009
Ductile iron pipes, fittings, accessories and their joints for water application

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

This certificate has not to be intended as related to Notify Body activity according to UE Construction Products Regulation CPR 305/2011 neither can be used for the CE marking

Original Emission Date: 07/11/2017
Last Emission Date: 08/06/2023
Expiration Date: 05/06/2028

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 06/06/2023
Certificate N°: 1318/001 Rev.0
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LIMITED

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Gokulpur, P.O. Shyamnagar, Kharagpur, West Medinipur, West Bengal – 721304 INDIA

Bureau Veritas Italia S.p.A. certify that the following products:
Ductile iron pipes
for water and sewerage applications
from DN 80 to DN 1200 Push-On
from DN 40 to DN 600 Restrained Flexible Joint

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirement listed in Annex 1/2 and 2/2 of this certificate.

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 20/10/2023
Certificate N°: 1053/001 Rev.5
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY



BUREAU VERITAS
Certification

Certificate of Conformity
Awarded to:

RASHMI METALIKS LIMITED

HEAD OFFICE:
Premtala Building, 39, Shakespeare Sarani, Kolkata, West Bengal, PIN – 700017 INDIA
PRODUCTION PLANT:
Gokulpur, P.O. Shyamnagar, Kharagpur, West Medinipur, West Bengal – 721304 INDIA

Bureau Veritas Italia S.p.A. certify that the process of application of coatings for the following products:
Ductile iron pipes
for water and sewerage applications
from DN 80 to DN 1200 Push-On
from DN 40 to DN 600 Restrained Flexible Joint

Designed and produced by Rashmi Metaliks Limited have been evaluated and found in conformity against the requirement listed in Annex 1/1 of this certificate.

Certification according requirements stated in:
QHSE-REG-02-TQR Bureau Veritas
IND-REP-48-CP Bureau Veritas

Subject to the continued satisfactory operation, to check this certificate validity please refer to website www.bureauveritas.it. Further clarifications regarding the scope of this certificate and the applicability of standard's requirements may be obtained by consulting the organization.

Scheme Technical Manager
Date: 03/04/2023
Certificate N°: 1053/001 Rev.3
Bureau Veritas Italia S.p.A.–Viale Monza, 347 – 20126 MILAN – ITALY

www.rashmimetaliks.com

Rashmi Metaliks

Quality Certificates



WRAS APPROVED MATERIAL

Approval Number 210952
Test Report: J-00392059 & J-00392059

29th October 2021
Wangong Rubber Manufacturing Co., (P) Ltd
732-A, Delhi Road
Post Office - Bellary(BH),
Distt. Bangalore
Karnataka
West Bengal - 712233,
India

WATER REGULATIONS APPROVAL 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 requirement of BS6920-1:2014 "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.

RUBBERS- ETHYLENE PROPYLENE DIENE MONOMER (EPDM) - MATERIAL ONLY. 5365

• EP-40, S/EPA0, S/EPA70 & S/EPA90.
• Grey coloured, compression moulded EPDM materials with a shore hardness of between 50A & 90A, Tested in-situ size 1.05mm.
For use with water up to 65°C.

APPROVAL NUMBER: 210952
APPROVAL HOLDER: WAHEGURU RUBBER MANUFACTURING CO.(P) LTD

The Scheme reserves the right to review approval.
Approval 210952 is valid until 29th October 2021 and September 2026

An entry, as above, will accordingly be made 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.wrasscheme.co.uk/waterdirectory

Yours faithfully,

Ian Hughes
WRAS Approved Manager

WRAS APPROVED MATERIAL

Approval Number 2104522
Test Report: M-7254-E

29th April 2021
Rashmi Metaliks Ltd,
Gokhur,
PO Shyamnagar,
Kharagpur,
Dist. West Midnapore,
West Bengal,
India 721301.

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 requirement of BS6920-1:2000 and/or 2011 "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.

COATINGS, PAINTS & LININGS- FACTORY APPLIED PIPE & FITTINGS COATINGS. 6030

• Paraffin Sulphate Resisting Portland Cement.

Factory applied, grey coloured Sulphate Resistant cement mortar,
Mix cement, sand and water in 1.5-1.5 ratio, Cure for 28 days@50°C.
For use with water up to 65°C.

This material is only approved for the mixing and curing conditions that appear on the approval. If the mixing and/or curing conditions are varied from those specified on the approval then the material are not covered by the scope of the approval.

APPROVAL NUMBER: 2104522
APPROVAL HOLDER: RASHMI METALIKS LTD.

The Scheme reserves the right to review approval.
Approval 2104522 is valid between April 2021 and April 2026

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".

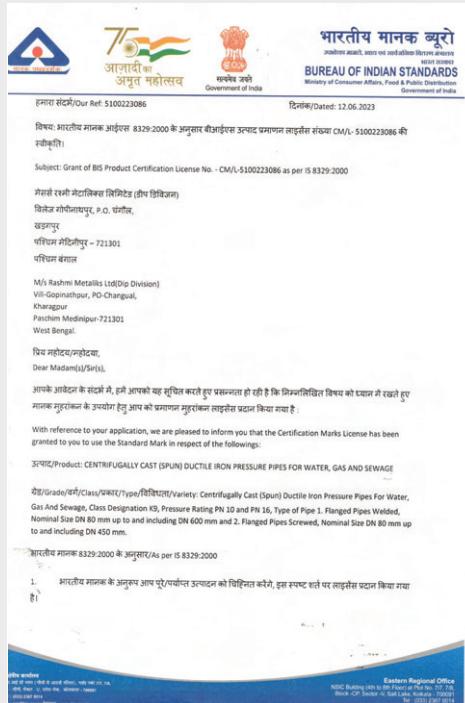
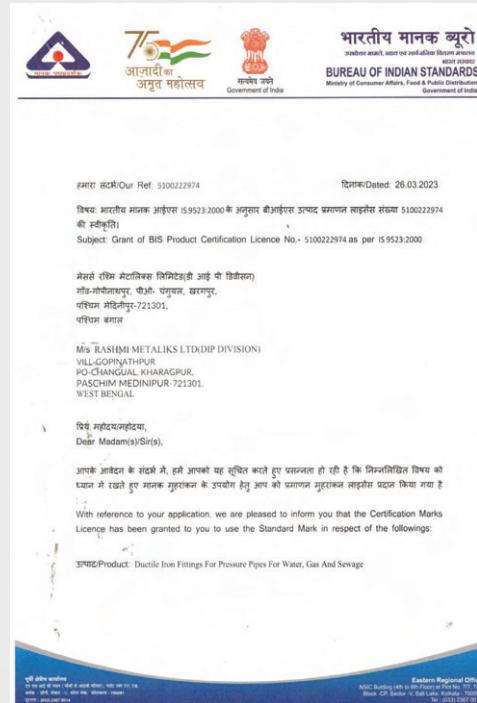
The Directory may be found at: www.wrasscheme.co.uk/waterdirectory

Yours faithfully,

Jason Funnell
Approved & Enquiries Manager
Water Regulations Advisory Scheme

Rashmi Metaliks

Quality Certificates



BUREAU OF INDIAN STANDARDS		
Attachment to Licence No. CM/L- 5533060		
C/I/L-No	Name of the Licensee with the Factory Address	Name of the Product
5533060	Rashmi Metaliks Ltd - Vill.Gokulpur,P.O.Shamrajpur, P.Kharagpur ,Kharagpur : 721304 West Bengal.	CENTRIFUGALLY CAST "SPUN" DUCTILE IRON PRESSURE PIPES FOR WATER, GAS AND SEWAGE

Endorsement No. 15 Dated 07-March-2023

Whereas, the licence was valid upto Fifth April Two Thousand Twenty Three.
Now, consequent upon renewal, the validity of the licence given in schedule of the Licence Dated 07-March-2023 has been extended from Fifth April Two Thousand Twenty Three to Fourth April Two Thousand Twenty Four
Other terms and conditions of licence remain same.

Branch Head (Kolkata Branch Office-I)

Manak Bhawan, 9 Bahadur Shah Zafar Marg, New Delhi 110002, 9 Bahadur Shah Zafar Marg, DELHI, 110002

Contact No: +91 11 23230131, Fax: +91 11 23234062, 232 Email: info@bis.gov.in



Rashmi Metaliks

Global Presence

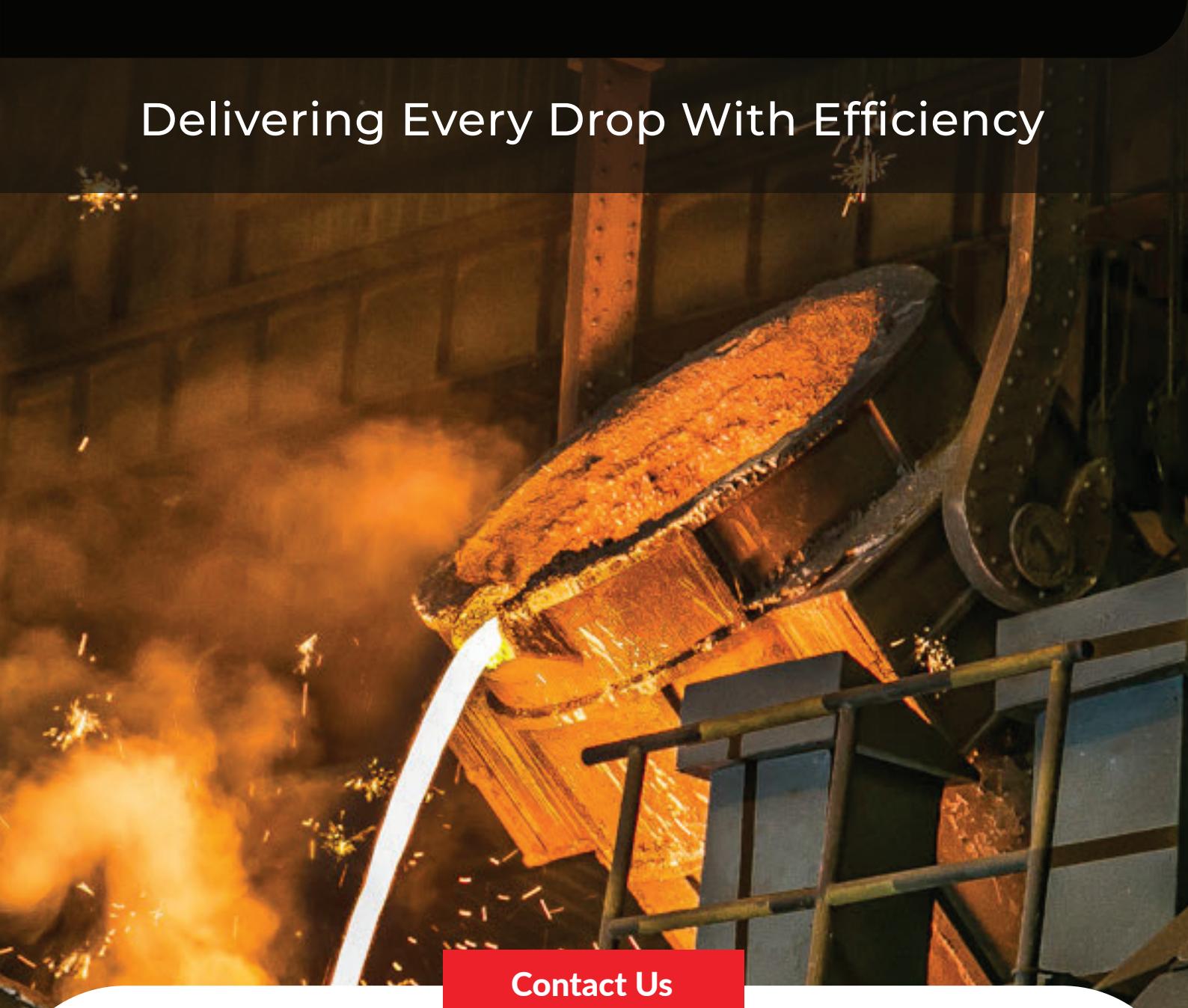


We recognize the significance of embracing a global outlook in an interconnected world. This has driven Rashmi Metaliks to bolster its global footprint through strategic ventures across the world.



Operating in 25 countries and comprising a diverse team representing many nationalities, our global footprint is expanding, particularly in established regions such as India, and more recently, in China and Vietnam.

Delivering Every Drop With Efficiency



Contact Us

Offices

Registered Office

Premlata Building, 39, Shakespeare Sarani, 6th Floor,
Kolkata - 700017 West Bengal, India.

Corporate Office

9, AJC Bose Road, Ideal Center, First Floor, Kolkata - 700017
West Bengal, India.

Factory

Plant 1

Gokulpur, P.O.: Shyamraipur,
Dist.: West Midnapur, West Bengal, India.

Plant 2

Gopinathpur and Jethia A.D.S.R., Khatranga,
Changal, NH - 60, Kharagpur, West Bengal, India.

International Sales Offices

UNITED ARAB EMIRATES RASHMI PIPE & FITTING FZCO

Cluster R, Jumeirah Lake
Towers (JLT), Dubai, UAE

UNITED KINGDOM RASHMI METALIKS UK LTD.

3rd Floor, 5 Lloyd's Avenue,
EC3N 3AE London, UK

SINGAPORE RASHMI AQUA PTE LTD.

137 Telok Ayer Street,#05-02
Singapore (068602)



+91 33 40237200



www.rashmimetaliks.com



sales.enquiry@rashmigroup.com