



Total Pipe Line Solution

INTERNATIONAL EDITION 2018

Duclite Iron
Joints
Pipes
Special Fittings **Fittings**
for Upvc PIPES
Coating & Linings

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Quality Standards

ISO:2531

ISO

ISO : 4633 : Rubber Gasket
 ISO : 7005 : Flanged Joints
 or
 EN : 1092
 ISO : 8179 : Metallic Zinc
 ISO : 4179 : Cement Mortar Lining
 ISO : 16132 : Cement Mortar with Seal Coat
 External Coating : Black Bitumen / Fusion Bonded Epoxy (FBE)
 PU Coating

BS EN 545

BSI

EN : 681 : Rubber Gasket
 EN : 196 : Compressive strength of the Cement Mortar Lining
 ISO : 7005 : Flanged Joints
 or
 EN : 1092
 ISO : 8179 : Metallic Zinc
 ISO : 4179 : Cement Mortar Lining
 ISO : 16132 : Cement Mortar with Seal Coat
 External Coating : Black Bitumen / Fusion Bonded Epoxy (FBE)

BS EN 598

BSI

Colour Code
 for Sewage : **BROWN / RED / GREY**
 Internal Coating : Zinc Coating
 High Aluminium Cement (HAC)
 External Coating : Zinc Coating
 Black Bitumen OR
 Red Epoxy OR
 Grey Epoxy
 Joint System : NBR Rubber Gasket

For details information about standard please, check latest standard

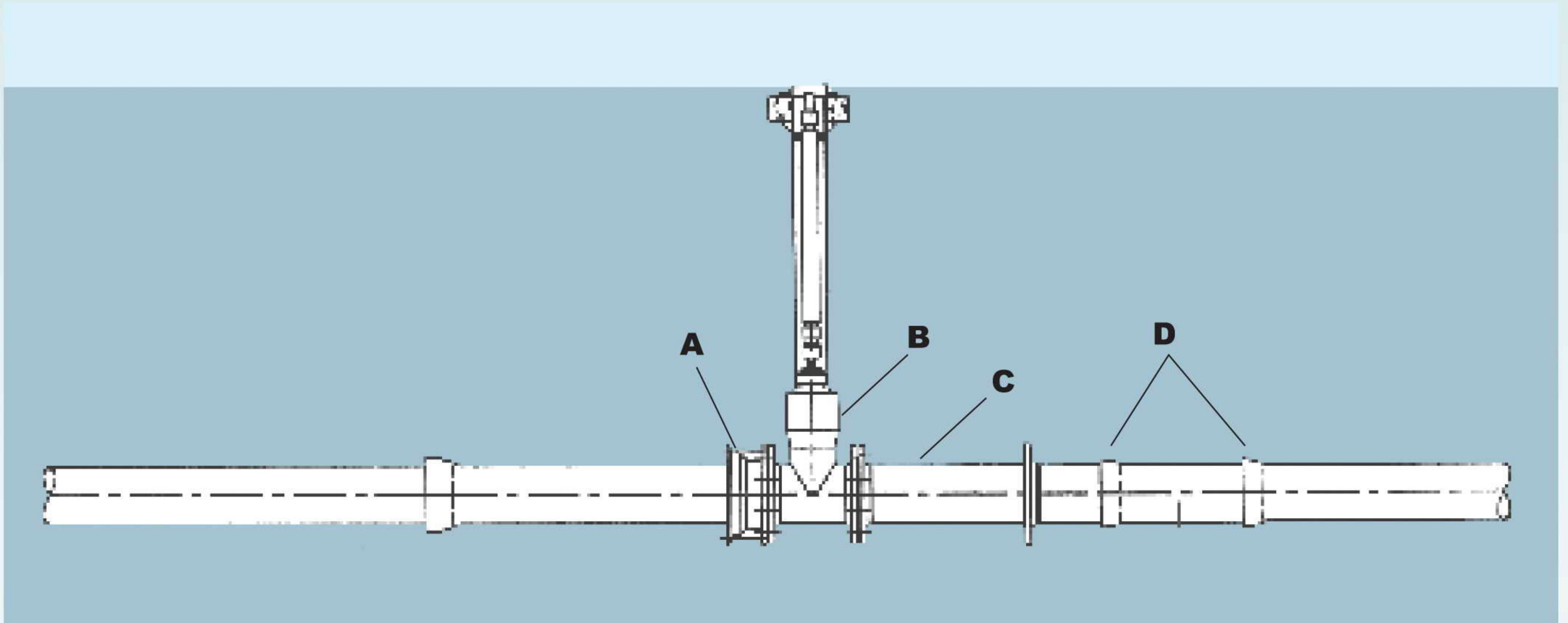


Table : i Approximate Weight of Water Content in Cast Iron Pipes in Kg/metre.			
Nominal Bore	Kg./mtr.	Nominal Bore	Kg./mtr.
80	5.0	450	161
100	8.2	500	199
125	12.7	600	285
150	18.2	700	388
200	32.2	750	445
250	50.6	800	505
300	72.7	900	645
350	98.7	1000	790
400	128.1	1200	1140

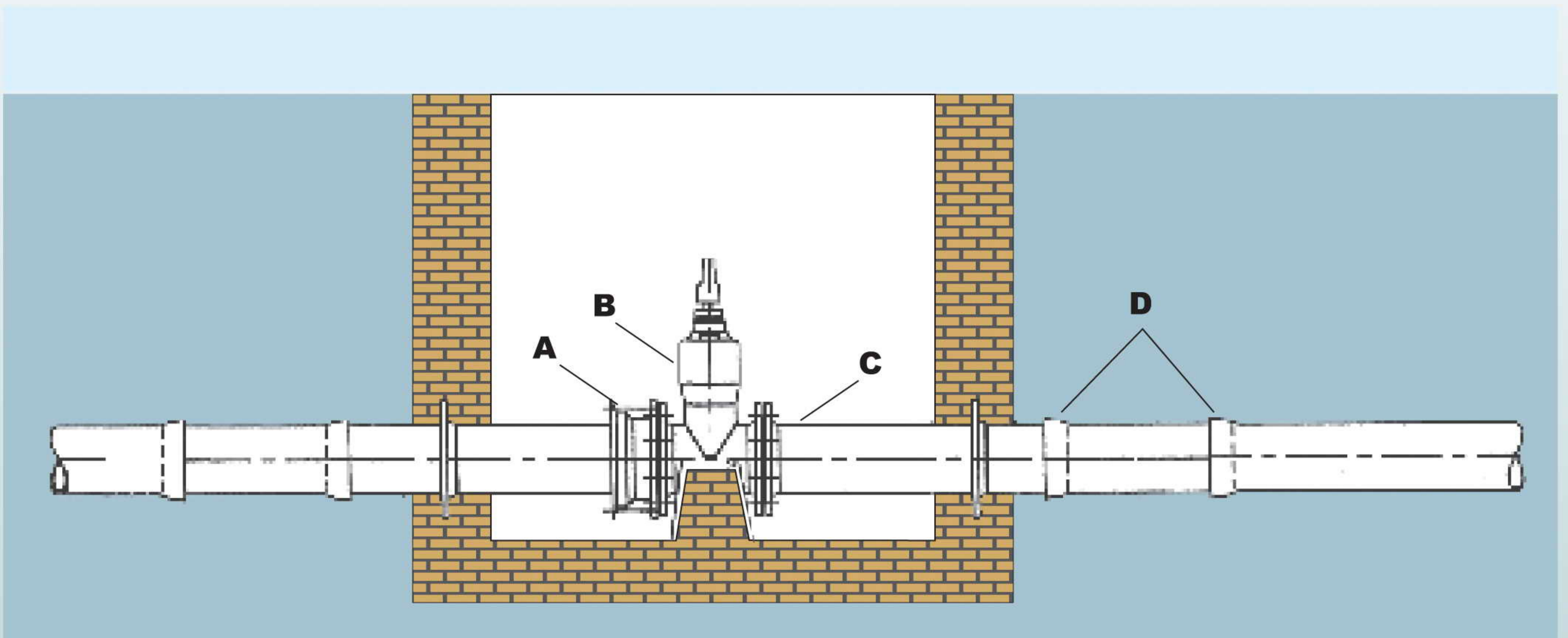
Table : ii Conversion Factors	
Length	
1 Inch	= 25.400 Millimetres (mm)
1 Foot	= 304.800 Millimetres (mm)
1 Yard	= 914.400 Millimetres (mm)
1 Mile	= 1.609 Kilometres (Km)
Weight	
1 Kilogram	= 2.2046 Pound
1 Pound	= 0.4536 Kilogram
Capacity	
1 Gallon (UK)	= 4.546 litres
1 Litre	= 0.219976 gallon (UK)
1 Gallon (US)	= 3.7853 litres
1 Litre	= 0.26418 gallon (US)
Others	
Pipe OD x π (2.14159)	= Circumference
1 liter	= 1000 cm ² (approx.)

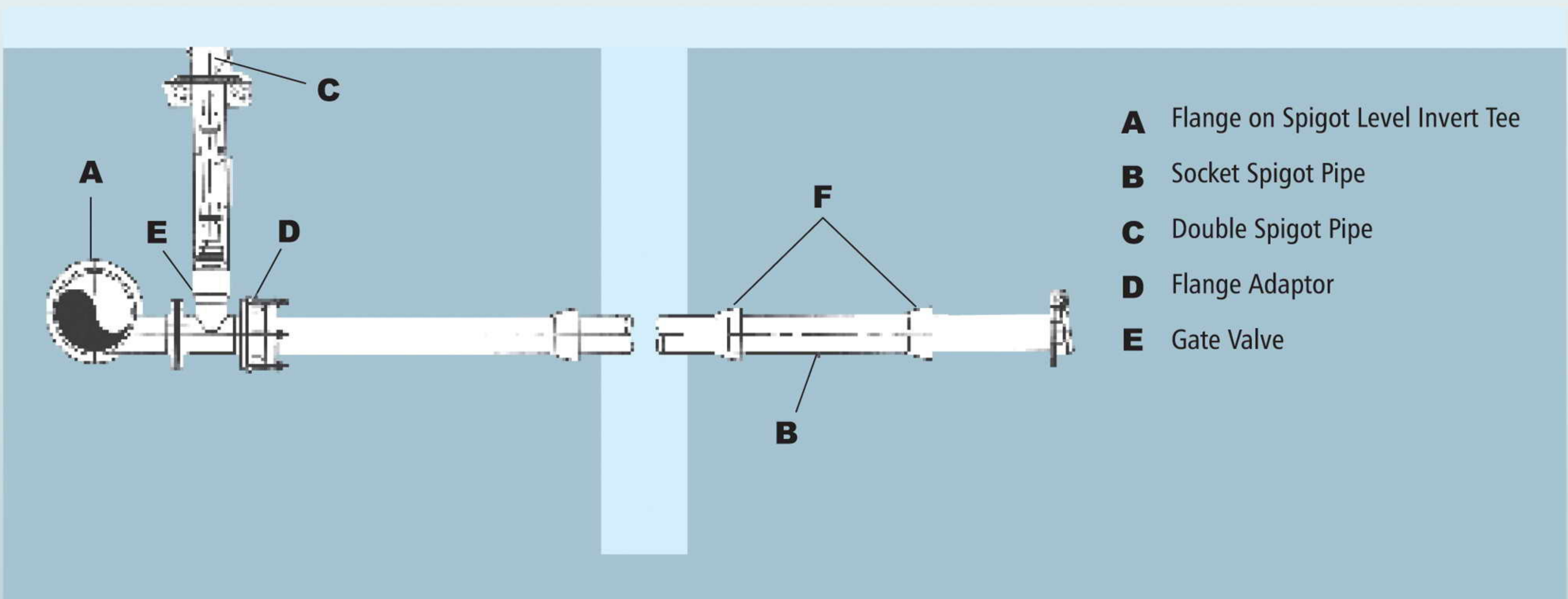
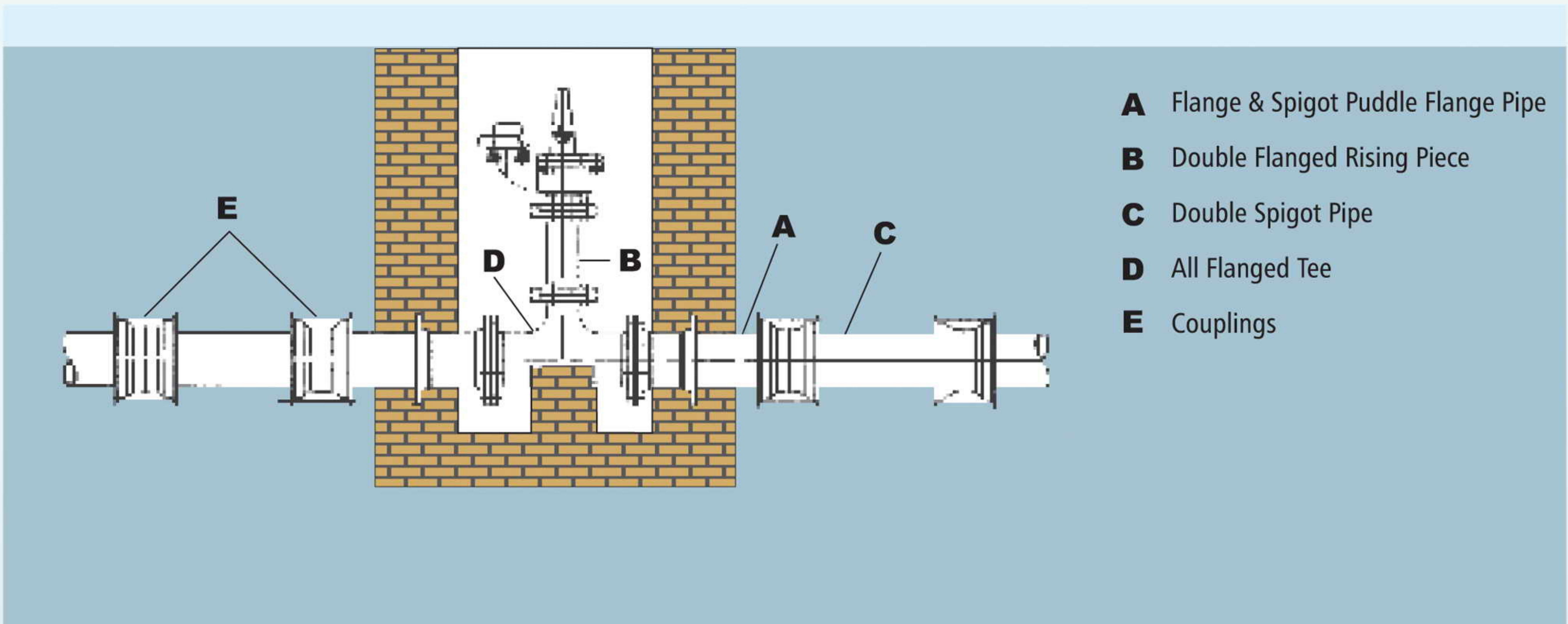
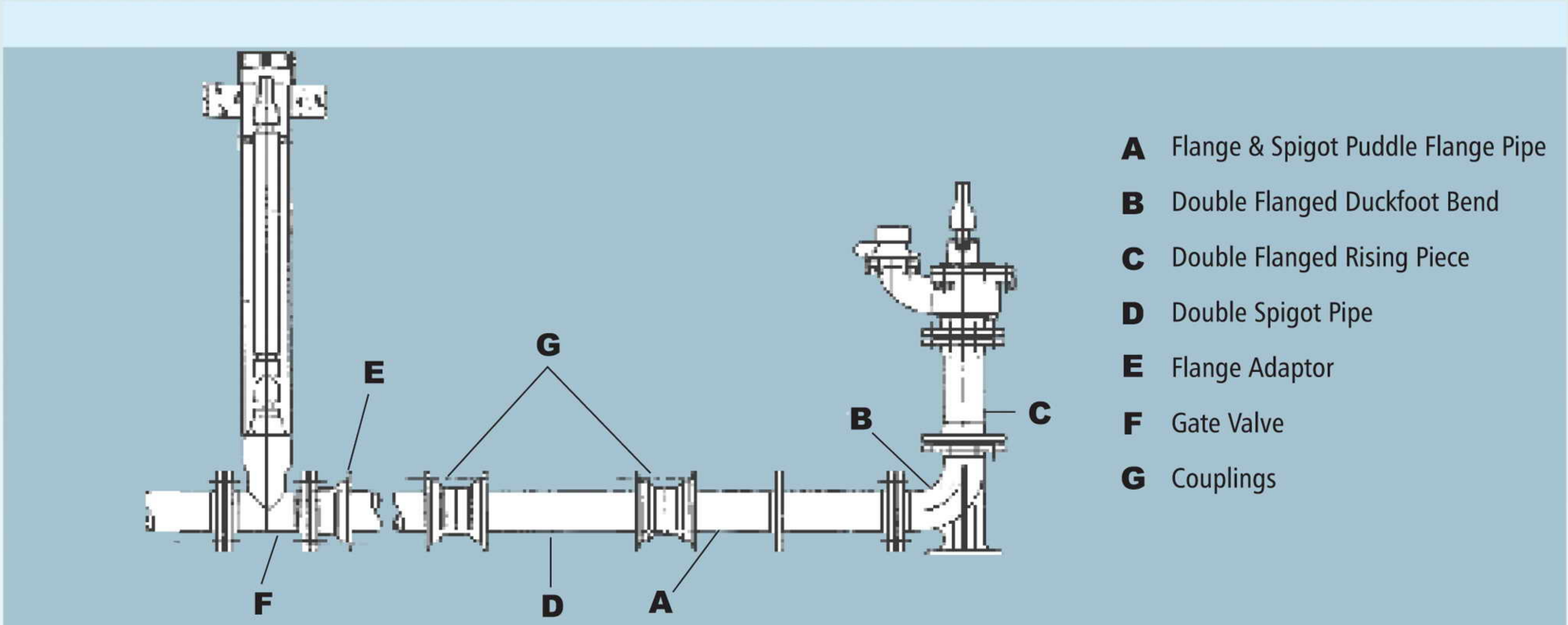
Table : iii Pressure Conversion Table											
Kg/cm ²	lbs/sq.inch	Meter Head	Approx. Feet Head	Kg/cm ²	lbs/sq.inch	Meter Head	Approx. Feet Head	Kg/cm ²	lbs/sq.inch	Meter Head	Approx. Feet Head
1	14.22	10	32.81	13	184.90	130	426.62	25	355.58	250	820.62
2	28.45	20	65.62	14	199.13	140	459.45	26	369.80	260	853.24
3	42.67	30	98.43	15	213.35	150	492.24	27	384.02	270	886.05
4	56.87	40	131.24	16	227.57	160	525.07	28	398.24	280	918.86
5	71.12	50	164.05	17	241.80	170	557.90	29	412.47	290	951.69
6	85.34	60	196.86	18	256.02	180	590.71	30	426.69	300	984.28
7	99.56	70	229.67	19	270.24	190	623.52	31	440.91	310	1017.31
8	113.79	80	262.47	20	284.47	200	656.38	32	455.14	320	1050.15
9	128.01	90	295.38	21	298.69	210	689.17	33	469.36	330	1082.96
10	142.23	100	328.19	22	312.91	220	721.98	34	483.58	340	1115.77
11	156.46	110	361.00	23	327.14	230	754.81	35	497.80	350	1148.33
12	170.68	120	393.81	24	341.36	240	787.62				

Design Your Pipeline with UNITECH

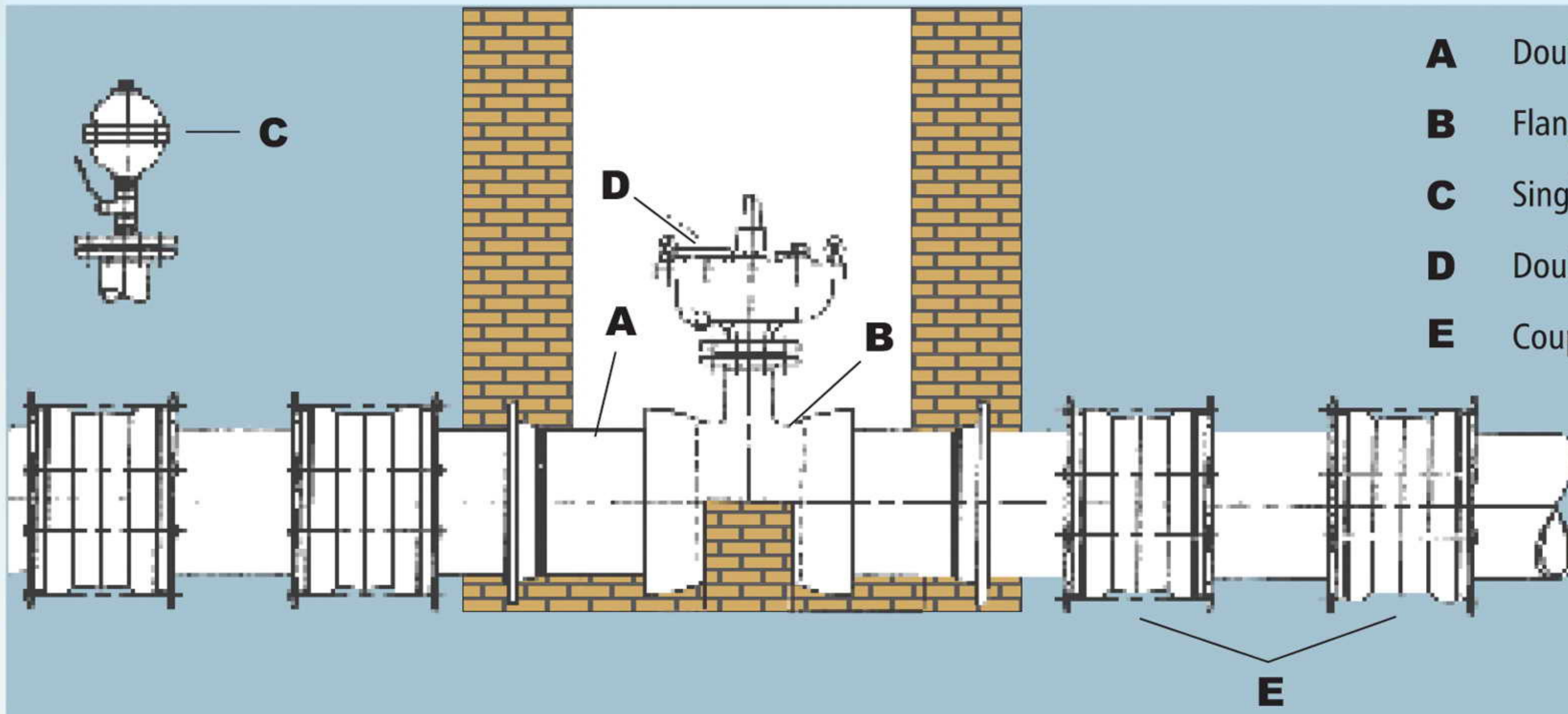


- A** Flange Adaptor
- B** Sluice Gate Valve
- C** Flange Spigot Pipe with Puddle Flange
- D** Socket / Spigot Pipe

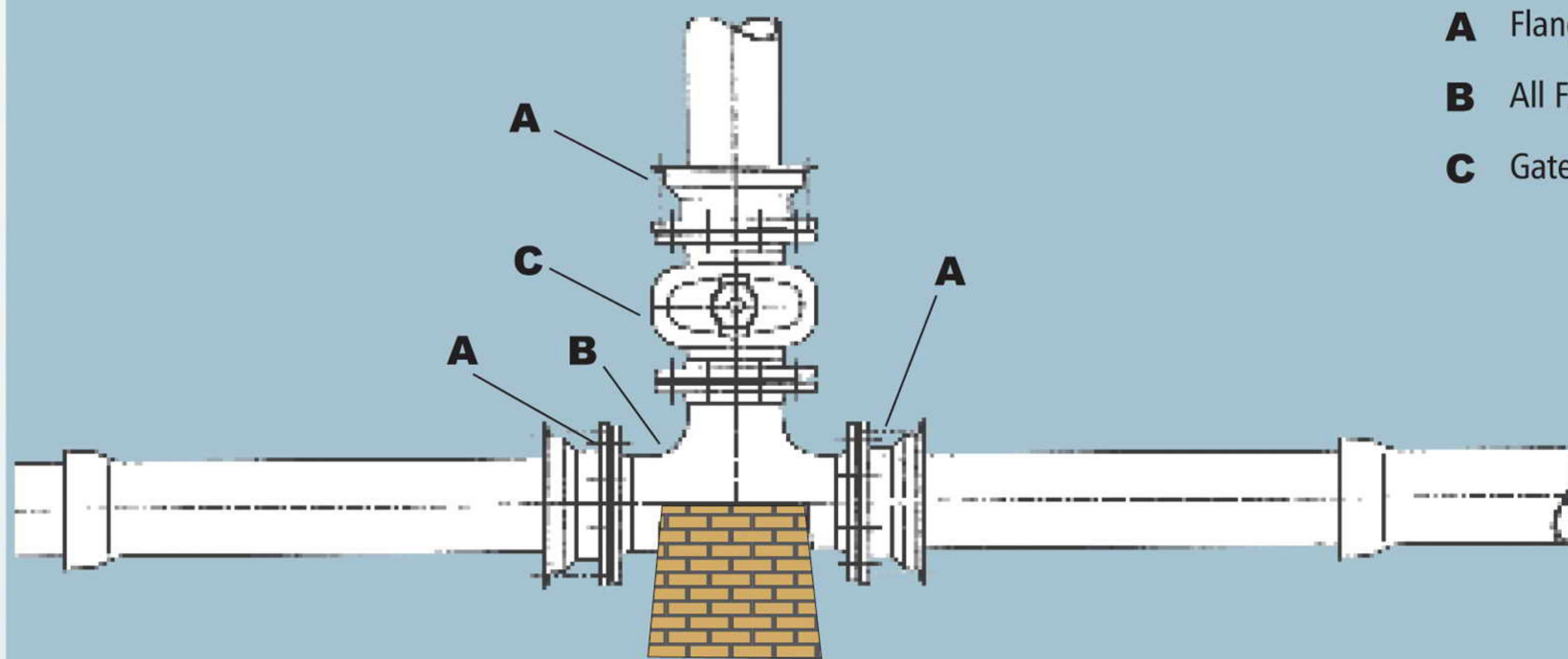




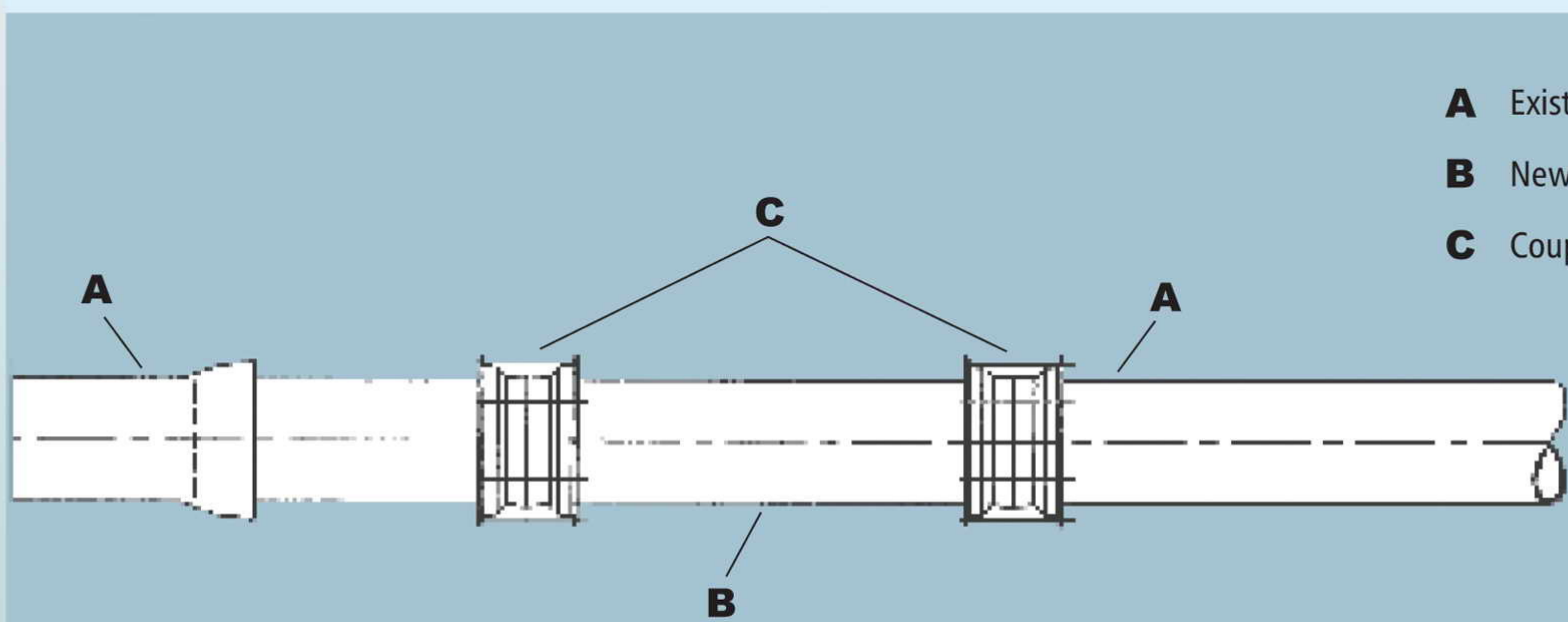
Design Your Pipeline with UNITECH



- A** Double Spigot Puddle Flanged Pipe
- B** Flange on Double Socket Tee
- C** Single Orifice Air Valve
- D** Double Orifice Air Valve
- E** Coupling

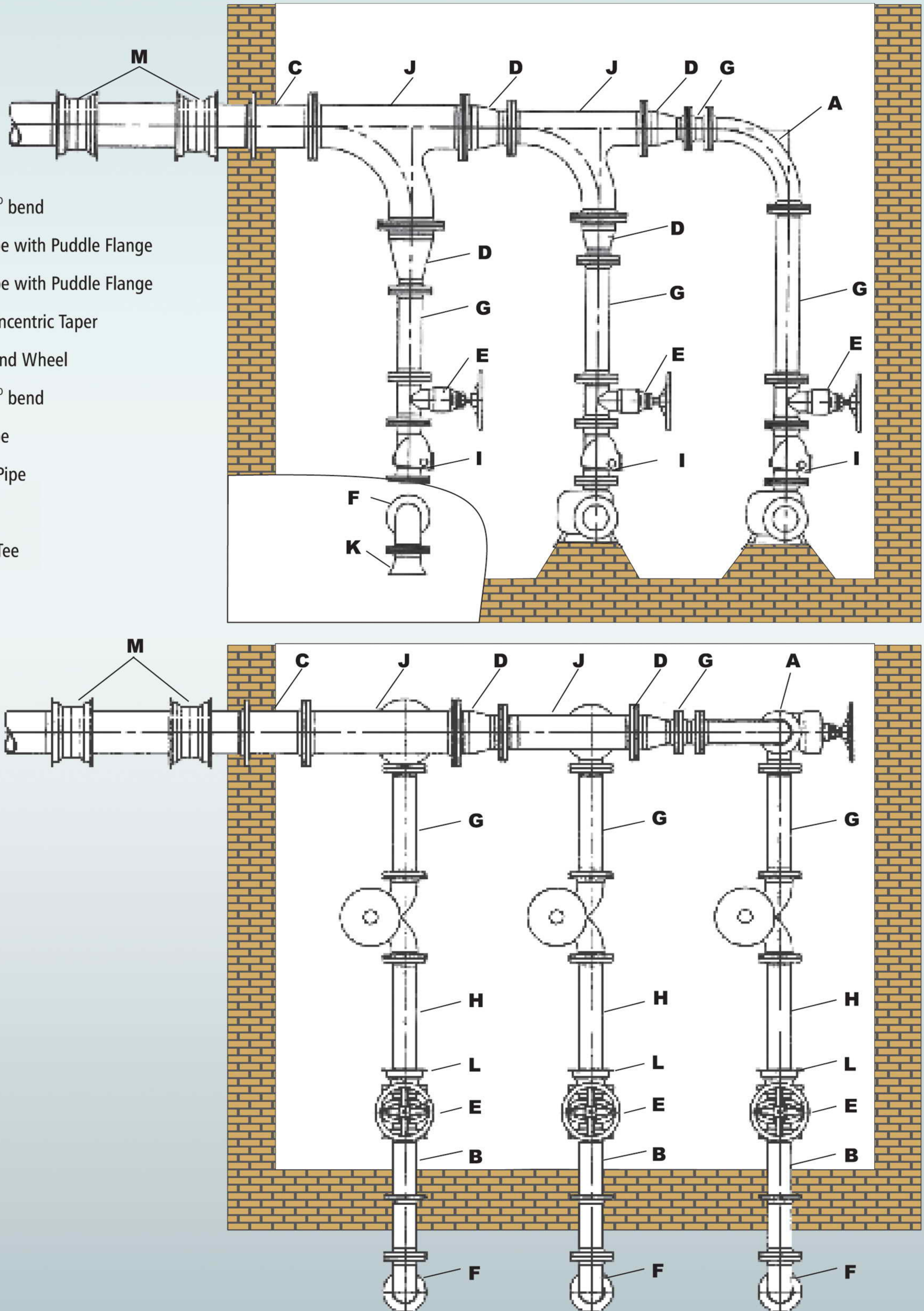


- A** Flange Adapter
- B** All Flanged Tee
- C** Gate Valve

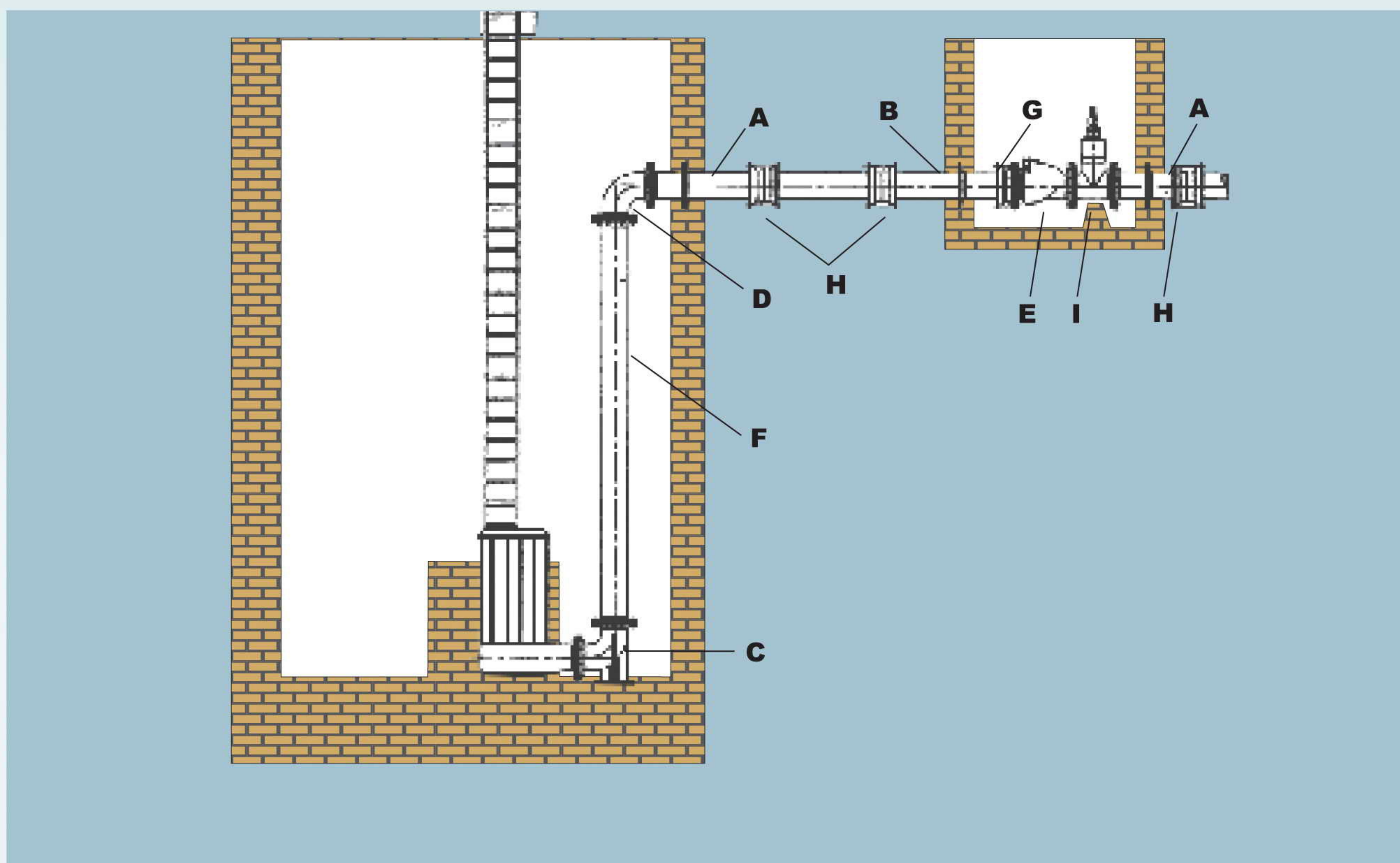


- A** Existing Main
- B** New Pipe Plain Ended
- C** Coupling

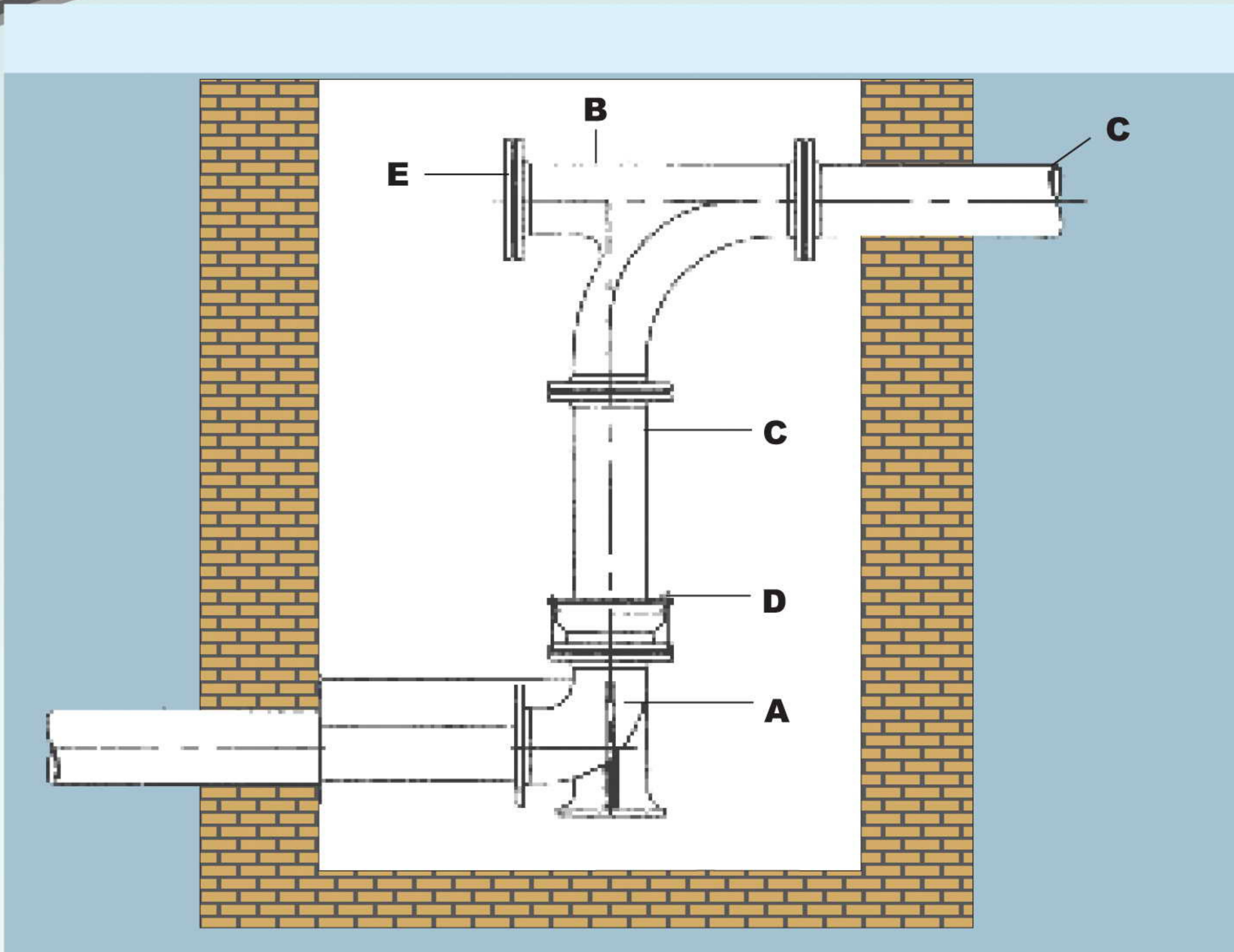
- A** Double Flanged 90° bend
- B** Double Flanged Pipe with Puddle Flange
- C** Flange & Spigot Pipe with Puddle Flange
- D** Double Flanged Concentric Taper
- E** Gate Valve with Hand Wheel
- F** Double Flanged 90° bend
- G** Double Flanged Pipe
- H** Flanged and Sipot Pipe
- I** Non Return Valve
- J** All Flanged Radial Tee
- K** Flanged Bellmouth
- L** Flanged Adapter
- M** Coupling



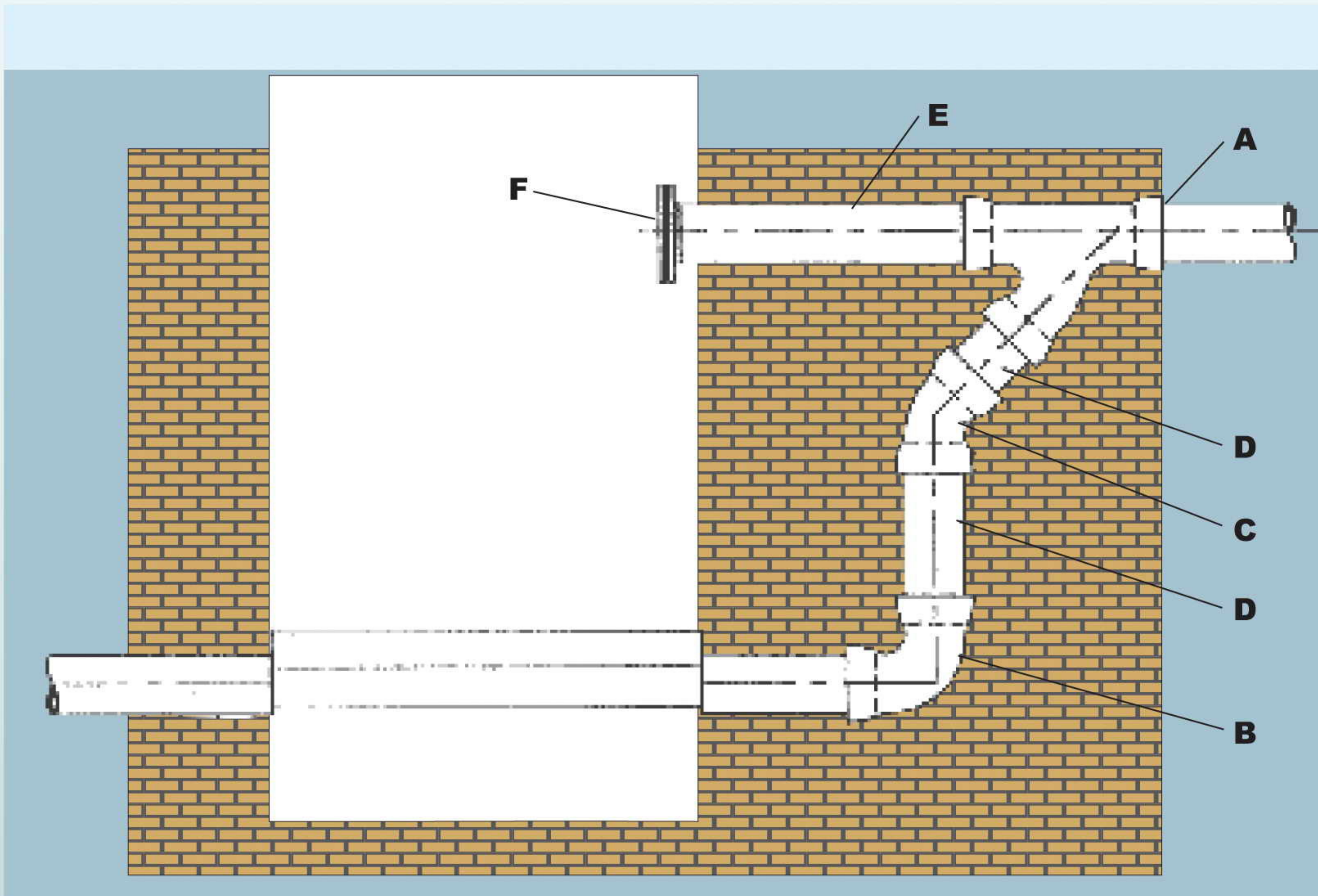
Design Your Pipeline with UNITECH




- A** Flange and Spigot Pipe with Puddle Flange
- B** Double Spigot Pipe with Puddle Flange
- C** Double Flanged 90° Duckfoot Bend
- D** Double Flanged 90° Bend
- E** Non-return Valve
- F** Double Flanged Pipe
- G** Flange Adapter
- H** Coupling
- I** Gate Valve



- A** Double Flanged 90° Duckfoot Bend
- B** All Flanged Radial Tee
- C** Flange & Spigot Pipe
- D** Flange Adapter
- E** Blank Flange



- A** All Socket 45° Angle Branch
- B** Double Socket 45° Bend
- C** Double Socket 90° Bend
- D** Double Spigot Pipe
- E** Flange & Spigot Pipe
- F** Blank Flange



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Jooints

JOINTING PROCEDURE

Joint Preparation

Ensure the spigot is properly chamfered . If it is a cut pipe it is essential to remake the chamfer and ensure that there is a radius to prevent the spigot from displacing the gasket , see Fig. 1 and Table below. Before cutting ensure that the diameter is within tolerance at the cut position.

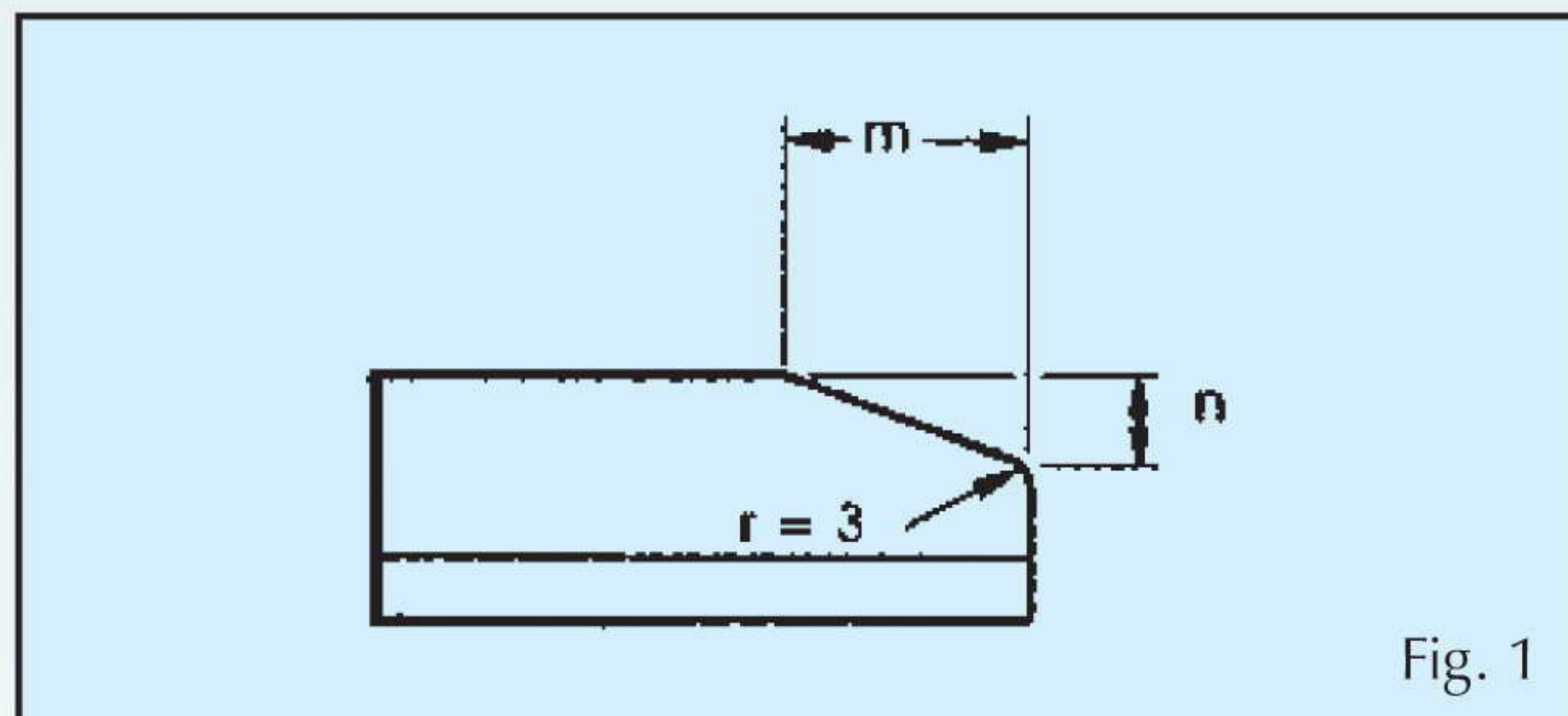


Fig. 1

TABLE - 1

Nominal size	m	n
DN	(mm)	(mm)
80	9 - 12	3 - 4
100	9 - 12	3 - 4
150	9 - 12	3 - 4
200	9 - 12	3 - 4
250	9 - 12	3 - 4
300	9 - 12	3 - 4
350	9 - 12	3 - 4
400	9 - 12	3 - 4
450	9 - 12	3 - 4
500	9 - 12	3 - 4
600	9 - 12	3 - 4
700	15 - 20	5 - 6
800	15 - 20	5 - 6
900	15 - 20	5 - 6
1000	15 - 20	5 - 6
1200	15 - 20	5 - 6
1400	20 - 25	7 - 9
1600	20 - 25	7 - 9
1800	20 - 25	8 - 10

Thoroughly clean the spigot and the interior of the socket.

Clean gasket and insert into socket with the square section gasket heel in the retaining groove and the gasket fish tail towards the back of the socket

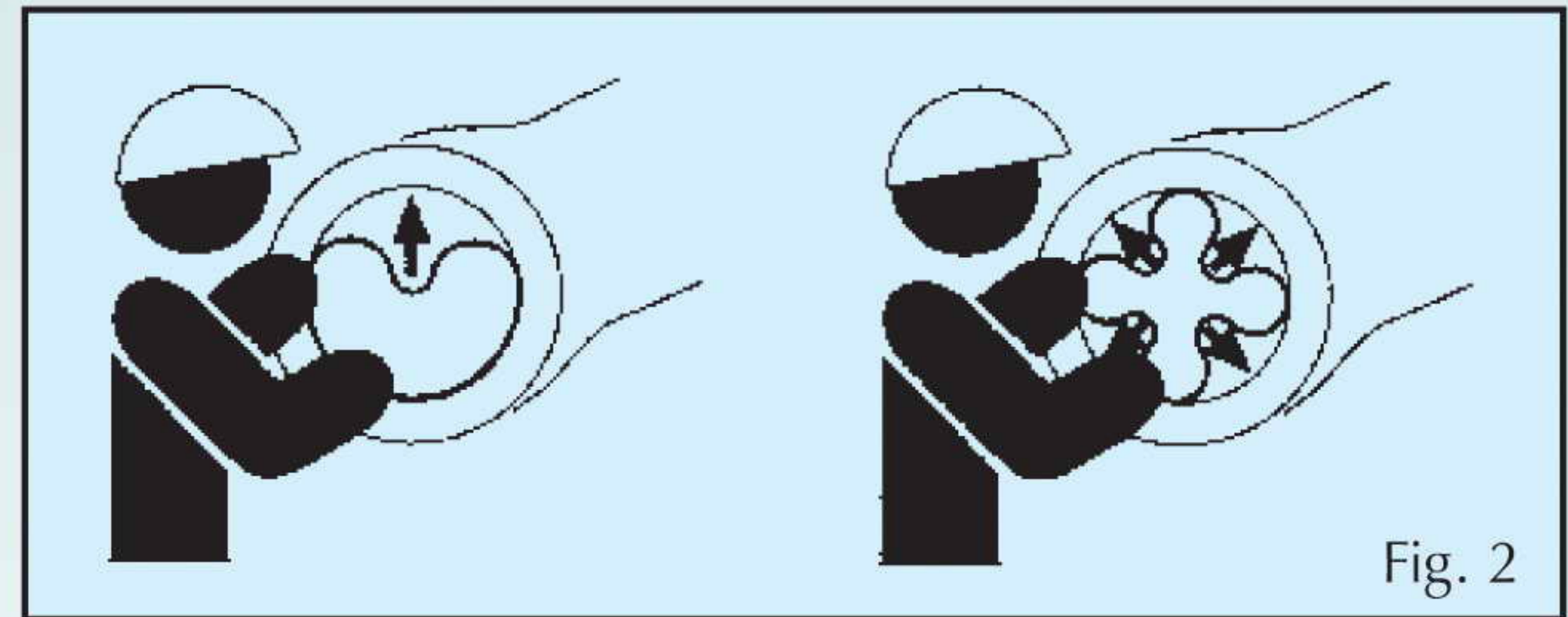


Fig. 2

The insertion of gaskets is facilitated by folding the gasket as shown in Fig. 2 by looping it into a heart shape with the gasket fish tail towards the back of the socket.

For DN 800 DN 1800 it is preferable to loop the gasket into the shape of a cross for insertion, see Fig. 3.

Apply radial pressure to the gasket at the heart shaped loop (or cross loops) to force it into place.

Check that the gasket is located correctly around its entire circumference with the retaining heel firmly embedded in its seating.

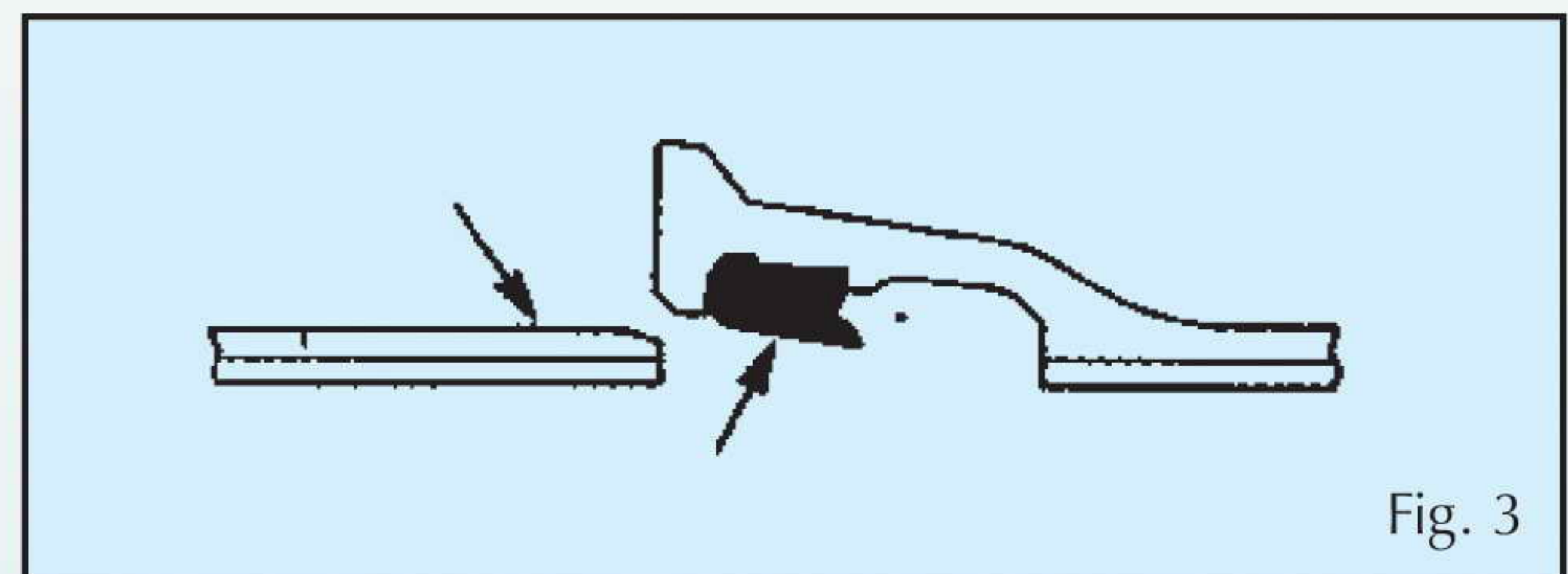


Fig. 3

Where fittings are supplied with pre-fitted gaskets, care should be taken to ensure socket and gasket are clean and free of debris.

Apply a thin film of lubricant to the inside surface of the gasket and to the outside surface of the spigot for a distance of about 50mm for pipe sizes up to and including DN 600 and 120mm for pipe sizes DN 700 and above.

Note : Please follow the Health and Safety guidance specified on the lubricant packaging.

Support the pipe or fitting just clear of the trench bottom and enter spigot into socket until contact is made.

Recommended spigot insertion depths are given in and are also marked on the page.

Complete the joint assembly as described in the following pages for appropriate method being used.

Spigot Insertion Depths

Push-fit joints have the capability of permitting both angular deflection and longitudinal movement within defined limits

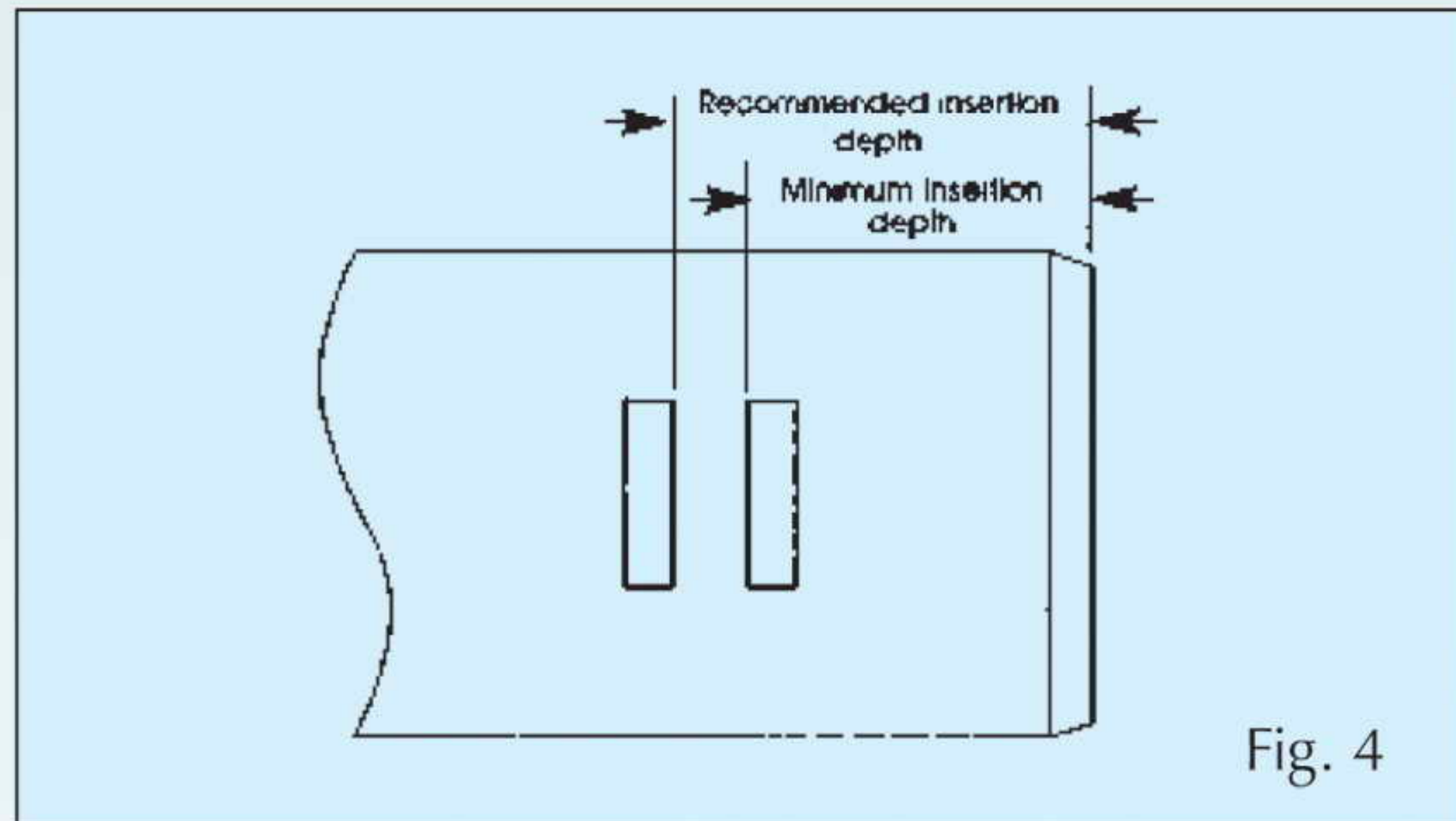


Fig. 4

Two white lines on the spigot indicate the minimum and recommended insertion depths.

On non-standard lengths or where the pipes are cut to length on site, a mark indicating the desired insertion depth should be made on the spigot end prior to jointing and the pipe entered into the socket by this amount. Should any laid pipe or fitting be subsequently disturbed this mark will also indicate if the joint has withdrawn to any serious degree.

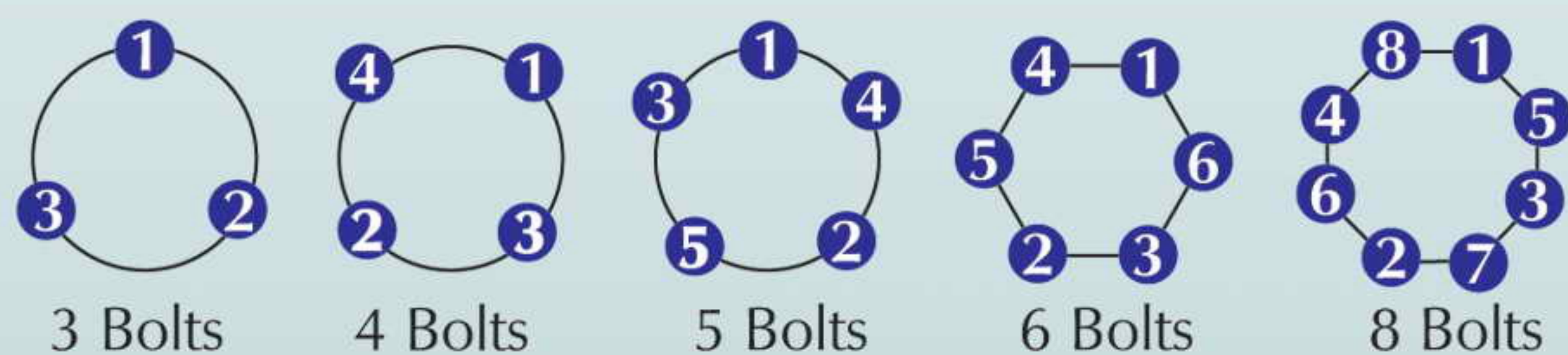
In the event that site requirements necessitate that a joint be deflected after jointing, the minimum insertion depth should also be marked on the spigot end to help ensure that the pipe is not withdrawn beyond its safe limit when this deflection is undertaken.

Note : Insertion of the spigot beyond the maximum recommended insertion depth may result in damage to cement mortar linings. Additionally, the allowable angular deflection will be reduced.

FLANGED JOINTS - Bolt Tightening Sequence

Bolt should be tightened in the correct sequence and a sufficient number of circuits undertaken to ensure that the specified bolt torques are achieved.

Bolt Tightening Sequence 3 to 8 Bolts



It is recommended that sufficient complete tightening circuits are carried out in sequence to ensure all bolts have attended the specified torque.

Joint Assembly

a) Crowbar DN80 and DN100

Push against the end of the pipe socket face with a crowbar or lever to complete the joint Fig. 5.

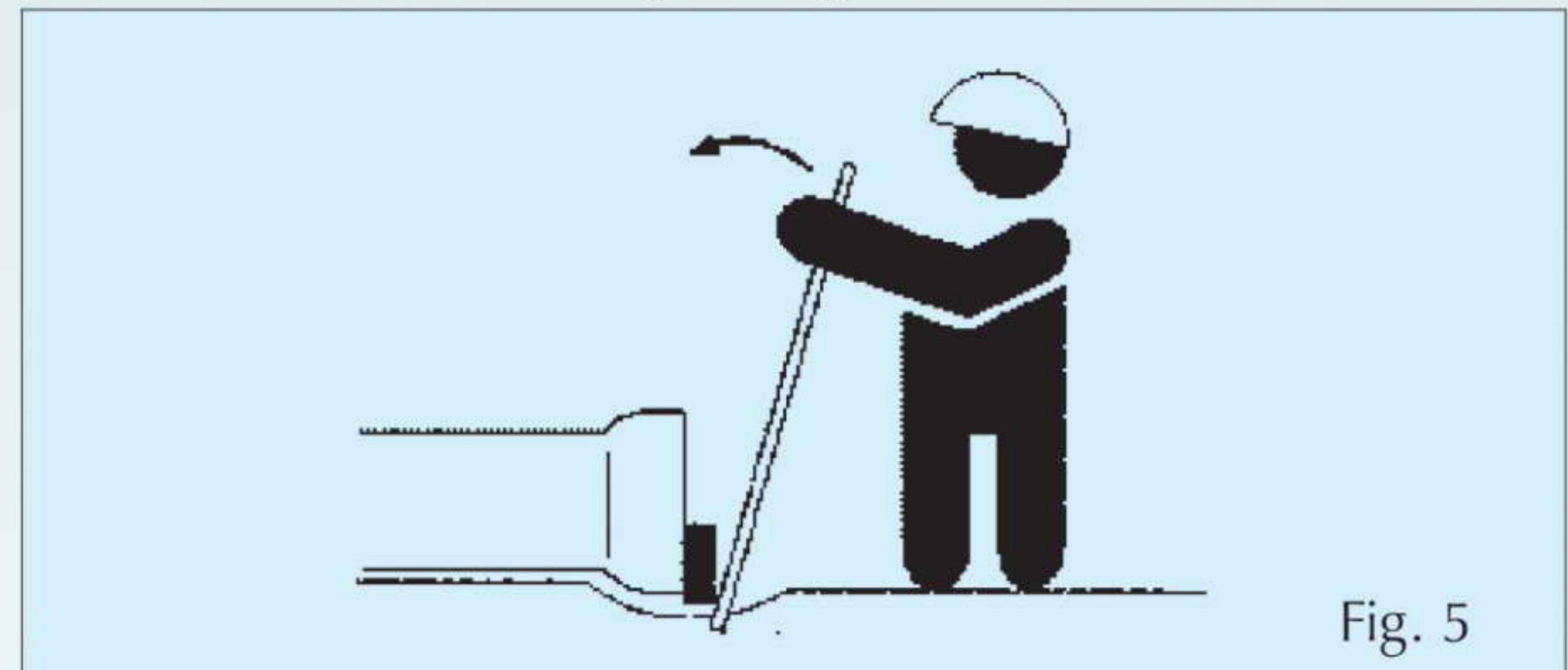


Fig. 5

b) Digger Bucket DN 80 to DN 1800

Where suitable equipment is available on site joints can be made using the trench digger. This method minimizes the time required to make a joint and is widely used.

Place a wooden batten between the pipe and digger bucket.

Push slowly and steadily until the joint is made to the correct insertion depth, Fig. 6.

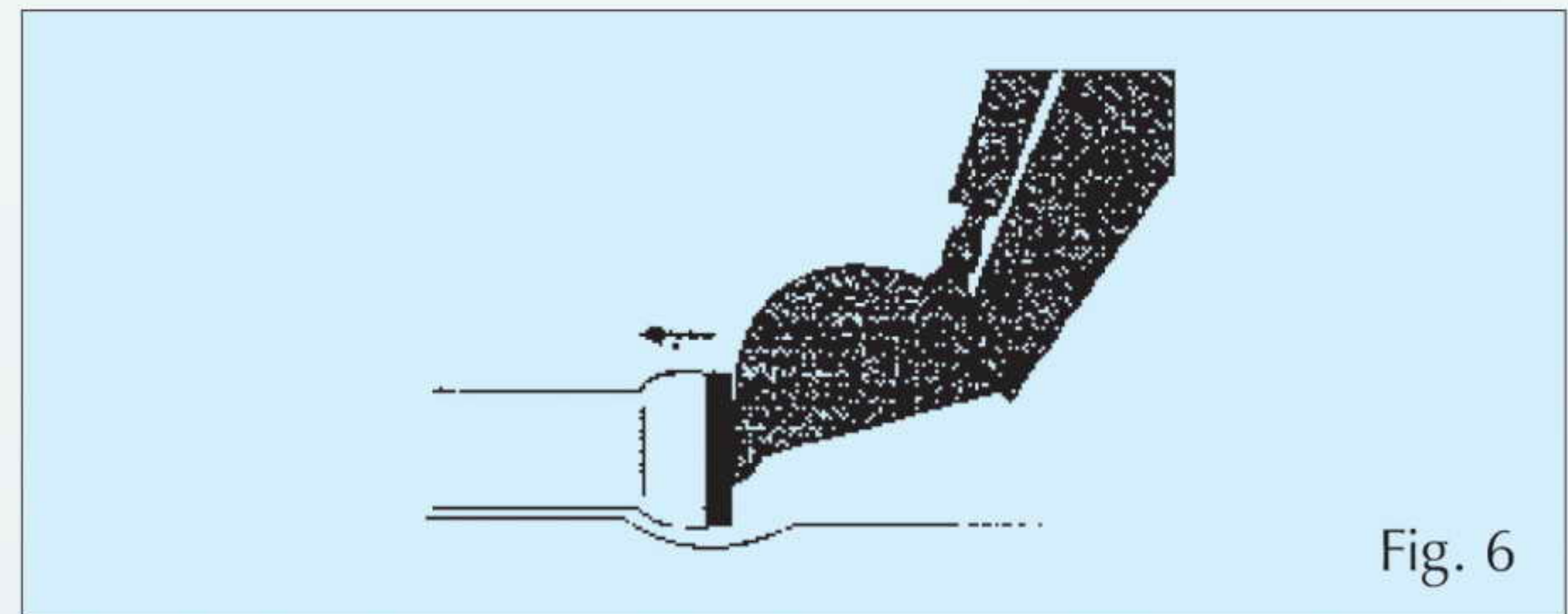
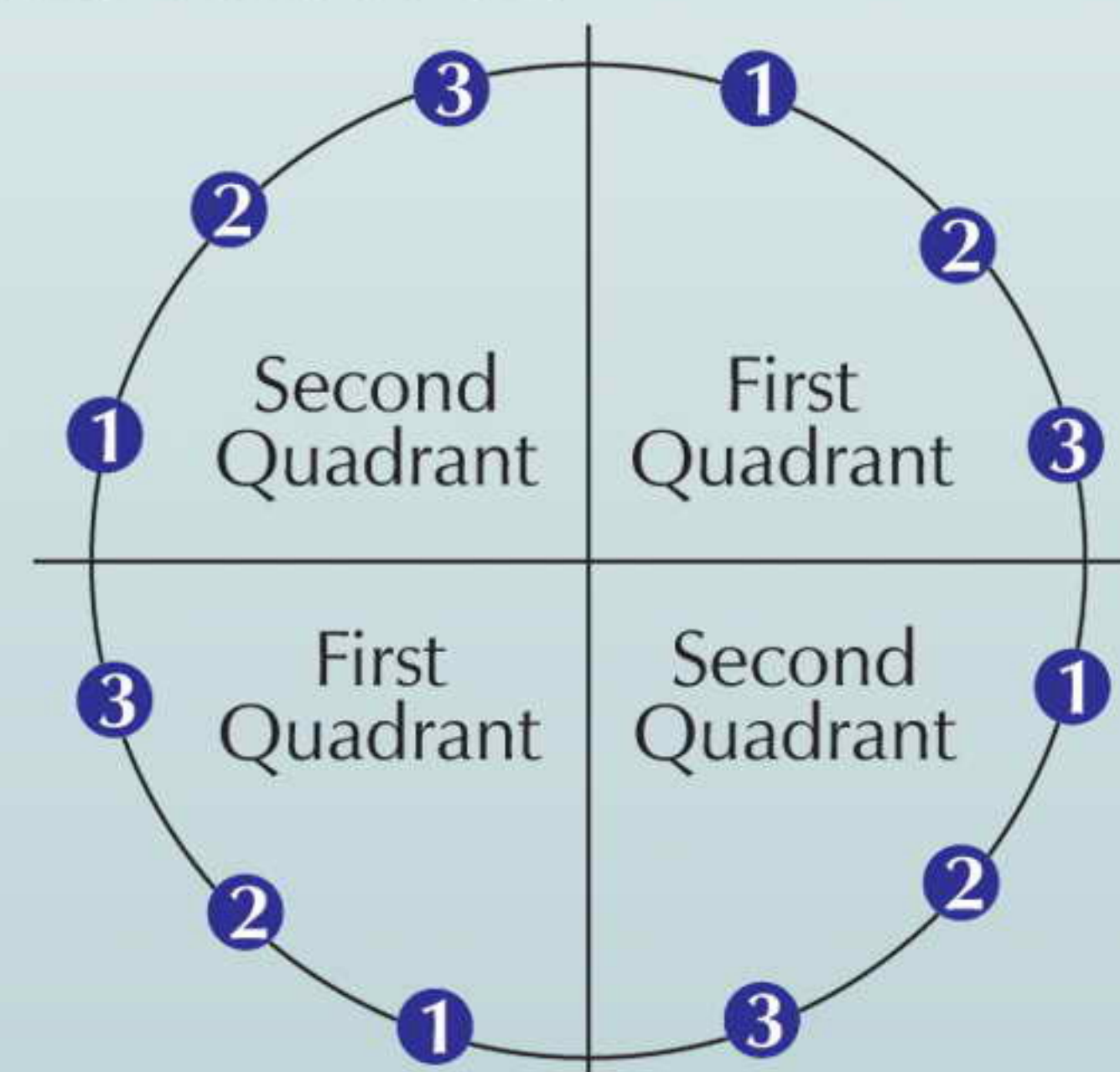


Fig. 6

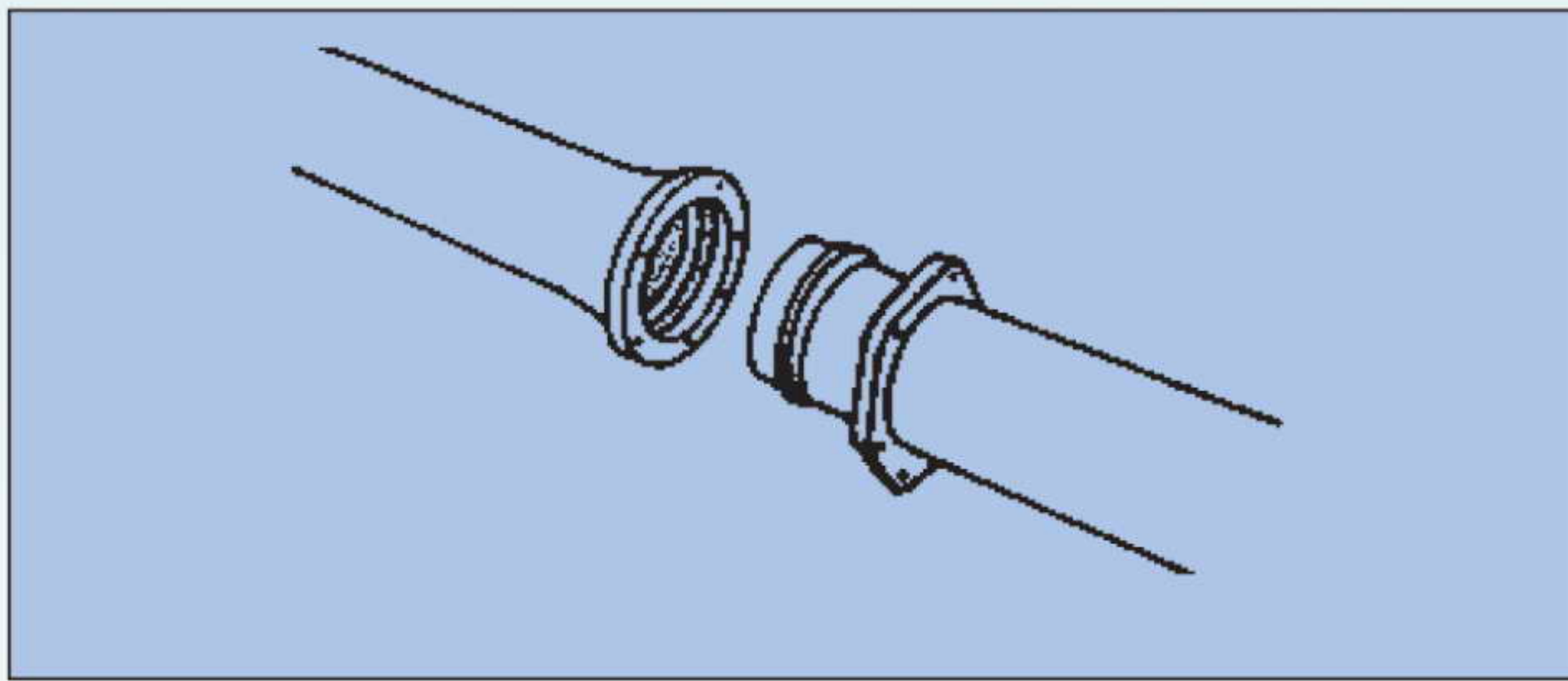
c) Other methods

Rack and lever, Sidelink tackle, Tifors and Hydraulic tackle can also be used to joint Integral pipes.

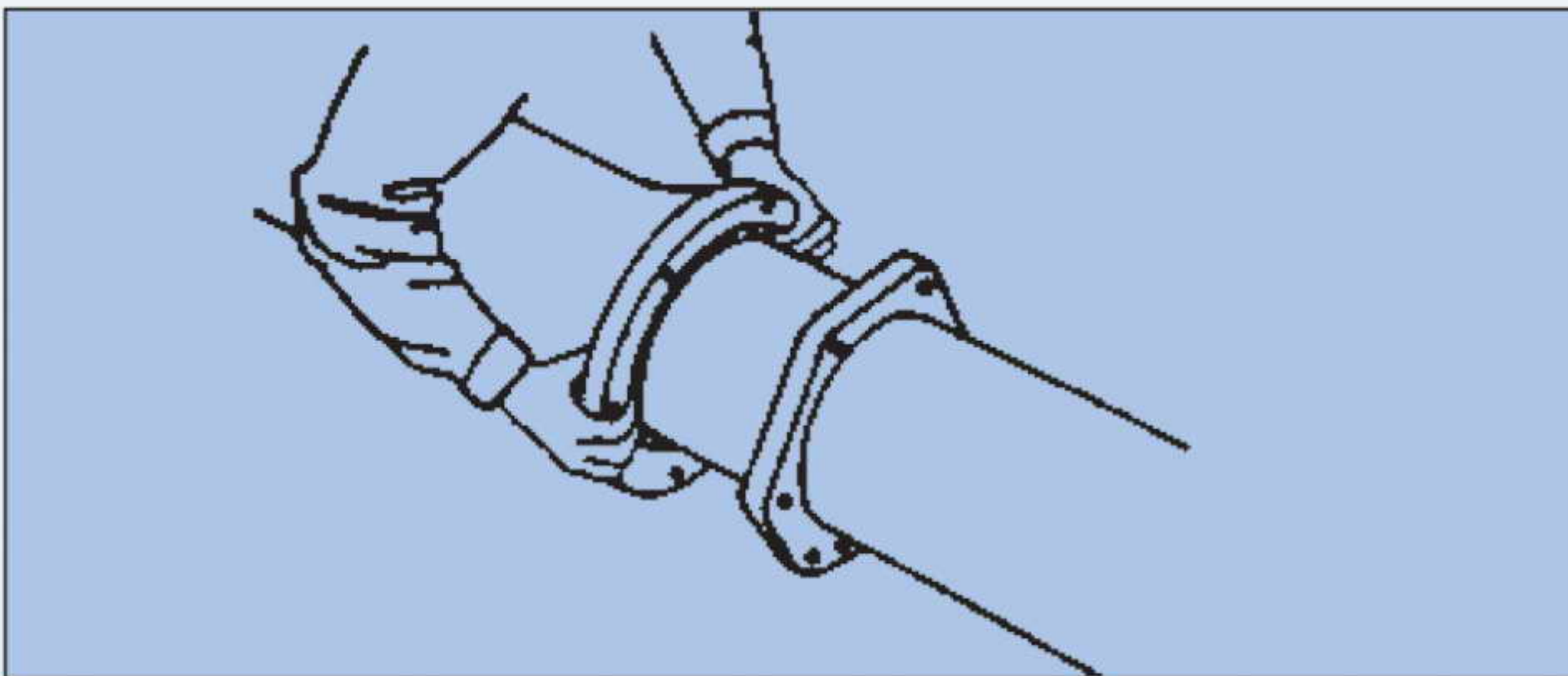
For sizes having 12 or more it is recommended that two jointers work simultaneously on diametrically opposite bolts. Each jointer tightens the first nut in the first quadrant, then the first nut in the second quadrant, returns to the second nut in the first quadrant and so on.



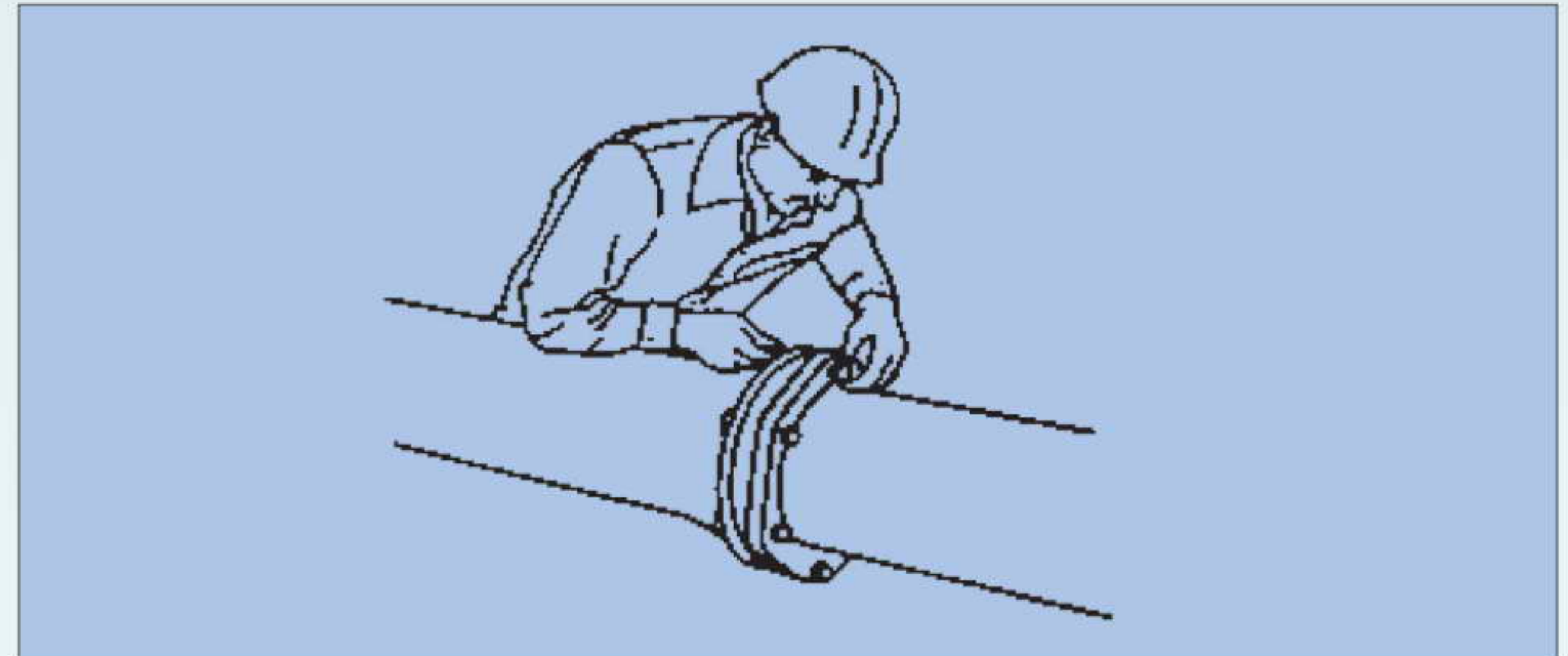
Clean the socket and the plain end. Lubrication and additional cleaning should be provided by brushing both the gasket and plain end with soapy water or an approved pipe lubricant, just prior to slipping the gasket on to the plain end for joint assembly. Place the gland on the plain end with the lip extension toward the plain end, followed by the gasket with the narrow edge of the gasket toward the plain end.



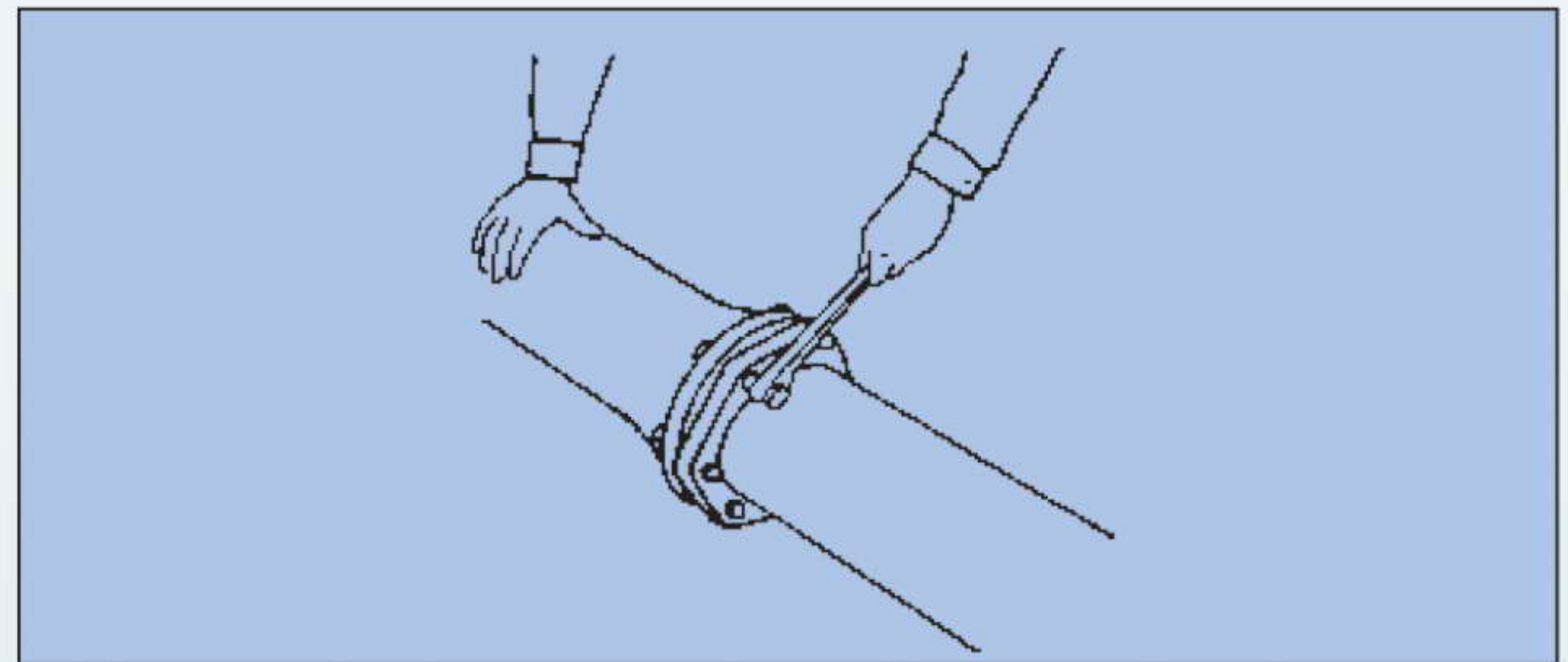
Insert the pipe into the socket and press the gasket firmly and evenly into the gasket recess. Keep the joint straight during the assembly



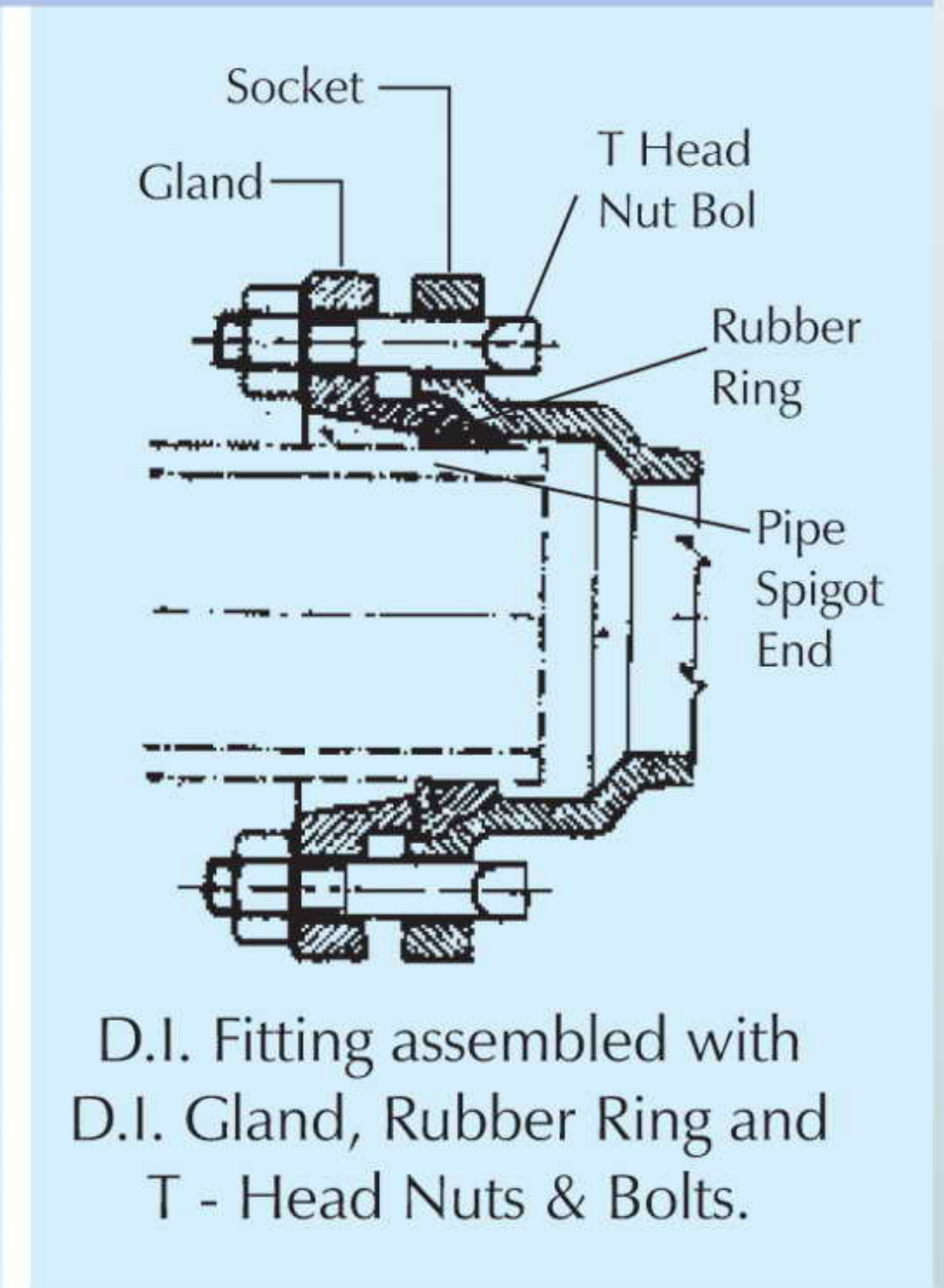
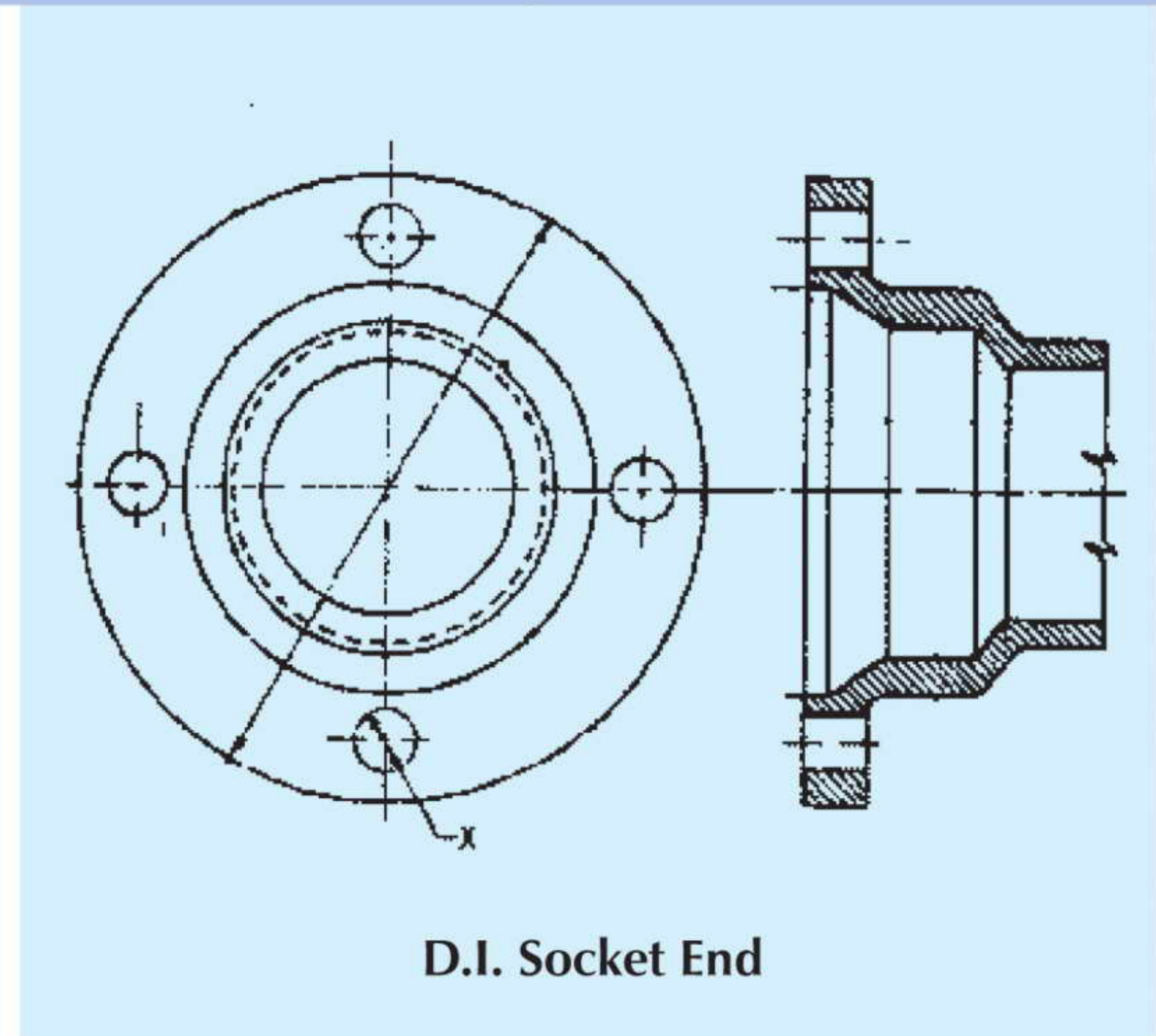
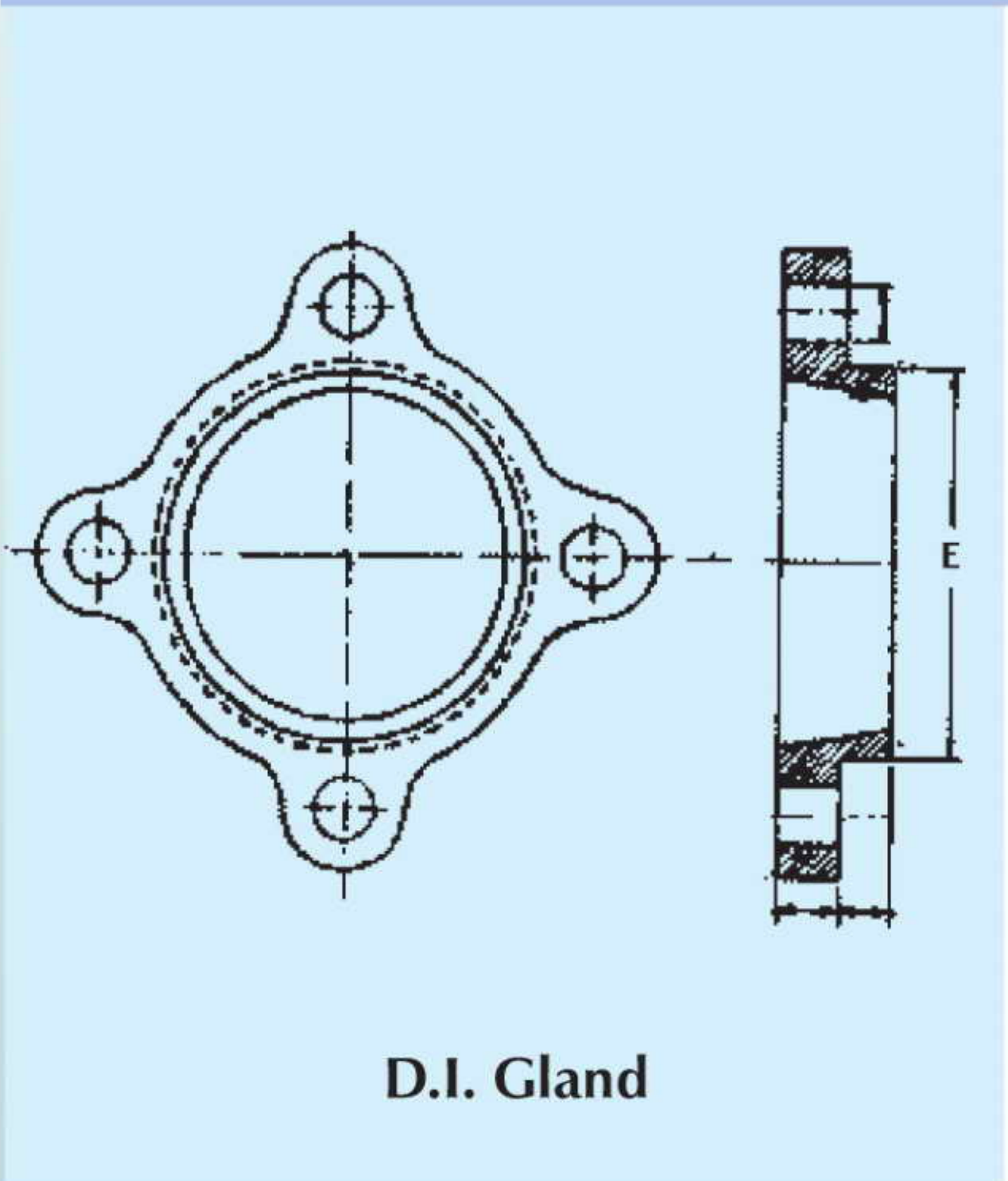
Push the gland toward the socket and center it around the pipe with the gland lip against the gasket. Insert bolts and hand tighten nuts. Make deflection after joint assembly but before tightening bolts.




Tighten the bolts to the normal range of bolt torque as indicated on page 9, while at all times maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This can be accomplished by partially tightening the bottom bolts first, then the top bolt, next the bolts at other side, finally the remaining bolts. The use of a torque - indicating wrench will facilitate this procedure. Repeat the process until all bolts are within the appropriate range of torque.



Details of Mechanical Joint - Socket Fitment





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Pipes

CLASSIFICATION

Pipes have been classified in this standard as K7, K8, K9 and K10 according to their thickness. K7 pipes have minimum wall thickness where K10 has maximum. The Ductile Iron Spun Pipes having screwed on flanges are sealed at the threaded Joints between the pipes and the flange by a suitable sealing compound. The flanges are never removed after screwing on the barrels of the pipes.

TOLERANCE ON LENGTH

- a. Socket & Spigot and Plain end Pipes = ± 100 mm
- b. Flanged Pipes = ± 10 mm

COATINGS

- (1) Pipes are normally externally coated with Black Bituminous paint after zinc primer.
- (2) Suitable cement mortar lining is normally done internally.

S/S Pipes = Socket/Spigot Pipes
D/F Pipes = Double Flanged Pipes

TABLE - 2 Minimum Class for Ductile Iron Flanged Pipes

Nominal Bore	Screwed on Flange minimum			
	PN-10	PN-16	PN-25	PN-40
80-450	K-9	K-9	K-9	K-9
500-600	K-10	K-10	K-10	K-10
700-1000	K-10	K-10	K-10	x

TABLE - 3 Hydrostatic Works Test Pressures (kgf/cm²)

Nominal Bore	S/S Pipes			D/F Pipes			
				Welded / Screwed Flanged			
	K-7	K-8	K-9, K-10	PN-10	PN-16	PN-25	PN-40
80-300	32	40	50	16	25	32	40
350-600	25	32	40	16	25	32	40
700-1000	18	25	32	16	25	32	x

Pipes

Dimensions of
Socket spigot pipes, Classes K7, K8, K9 and K10



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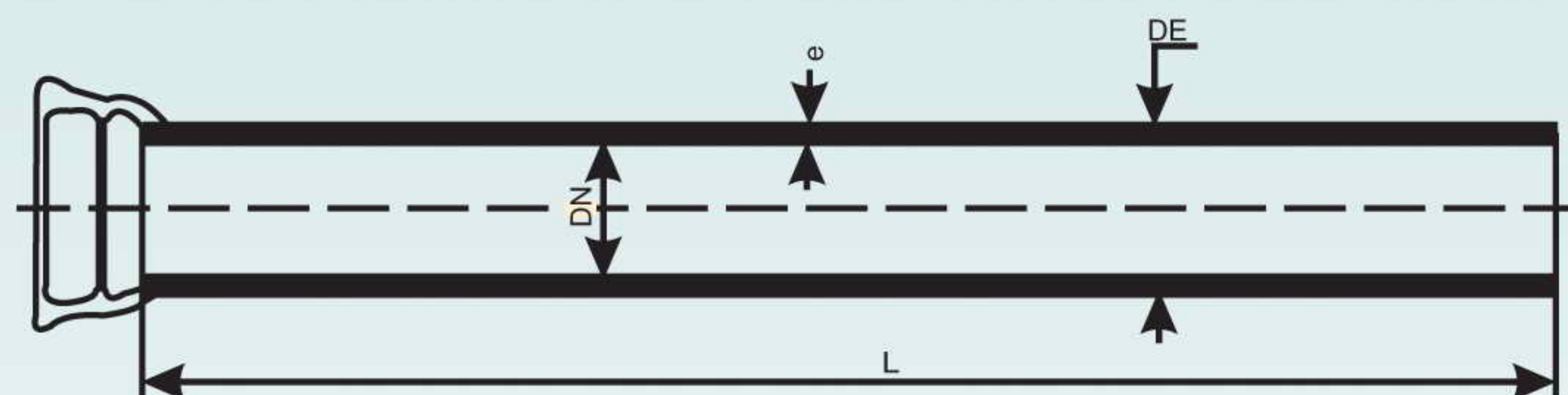


TABLE - 4

Nominal Diameter	External Diameter	Socket Mass	Barrel Wall Thickness 'e'				Approx Mass Per mtr. including socket			
			K7	K8	K9	K10	Tar Coated		Cement Lined	
DN	DE					K-7	K-9	K-7	K-9	
80	98	3.4	5	6	6	6	10.91	12.84	12.61	14.54
100	118	4.3	5	6	6	6.1	13.29	15.66	15.39	17.76
125	144	6	5	6	6	6.3	16.43	20	20.50	24.27
150	170	7.1	5	6	6	6.5	19.55	23.07	22.75	26.27
200	222	10.3	5	6	6.3	7	25.89	31.95	30.09	36.15
250	274	14.2	5.3	6	6.8	7.5	34.11	42.80	39.31	48.00
300	326	18.6	5.6	6.4	7.2	8	43.10	54.19	49.40	60.49
350	378	23.8	6	6.8	7.7	8.5	53.72	67.43	66.02	79.73
400	429	29.3	6.3	7.2	8.1	9	64.28	80.80	78.28	94.80
450	480	36	6.6	7.6	8.6	9.5	75.71	95.27	91.41	110.97
500	532	42.8	7	8	9	10	89.14	111.98	106.64	129.48
600	635	59.3	7.7	8.8	9.9	11	117.71	147.78	138.61	168.63
700	738	79.1	8.4	9.6	10.8	12	159.62	188.24	188.92	217.54
750	790	90	8.7	10	11.3	12.5	184.06	211.30	215.36	242.60
800	842	103	9.1	10.4	11.7	13	210.11	233.70	243.51	267.10
900	945	130	9.8	11.2	12.6	14	255.14	283.69	292.74	321.29
1000	1048	162	10.5	12	13.5	15	304.53	338.49	346.23	380.19
1100	1152	200	11.2	12.8	14.4	16	--	405.00	--	--
1200	1255	238	11.9	13.9	15.3	17	--	460.00	--	--
1400	1462	280	--	--	17.1	--	--	600.00	--	--
1600	1668	380	--	--	18.9	--	--	760.00	--	--
1800	1875	490	--	--	20.7	--	--	930.00	--	--
2000	2082	626	--	--	22.5	--	--	1120.00	--	--
2200	2288	784	--	--	24.3	--	--	1350.00	--	--
2400	2458	966	--	--	26.1	--	--	1610.00	--	--
2600	2684	1174	--	--	27.9	--	--	1900.00	--	--

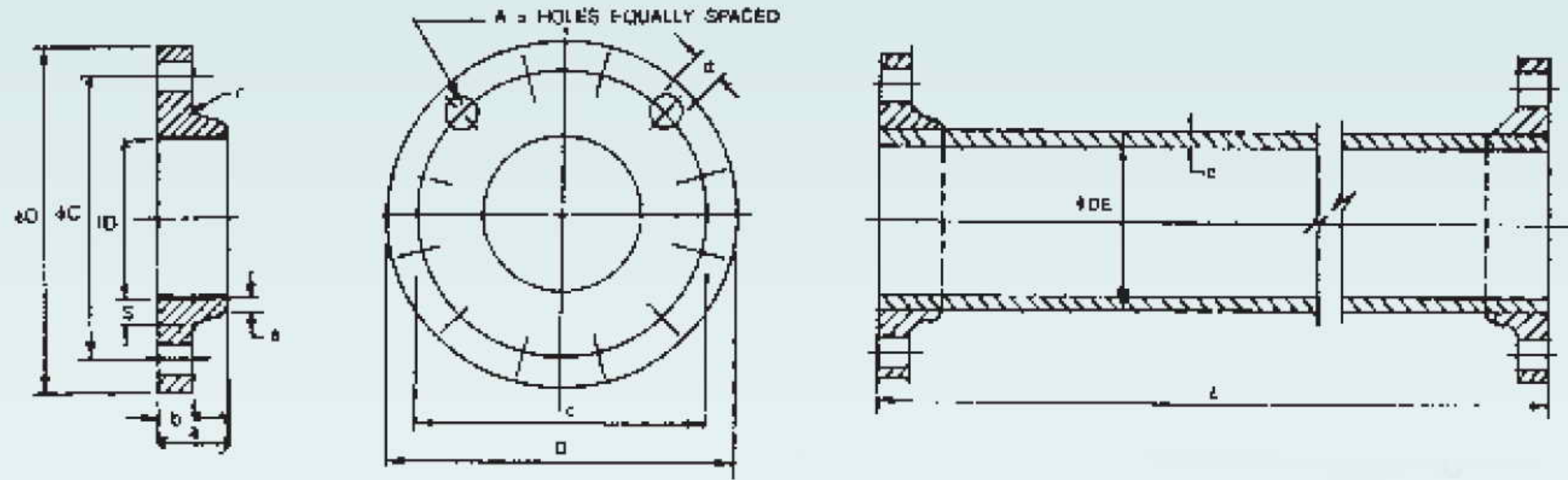
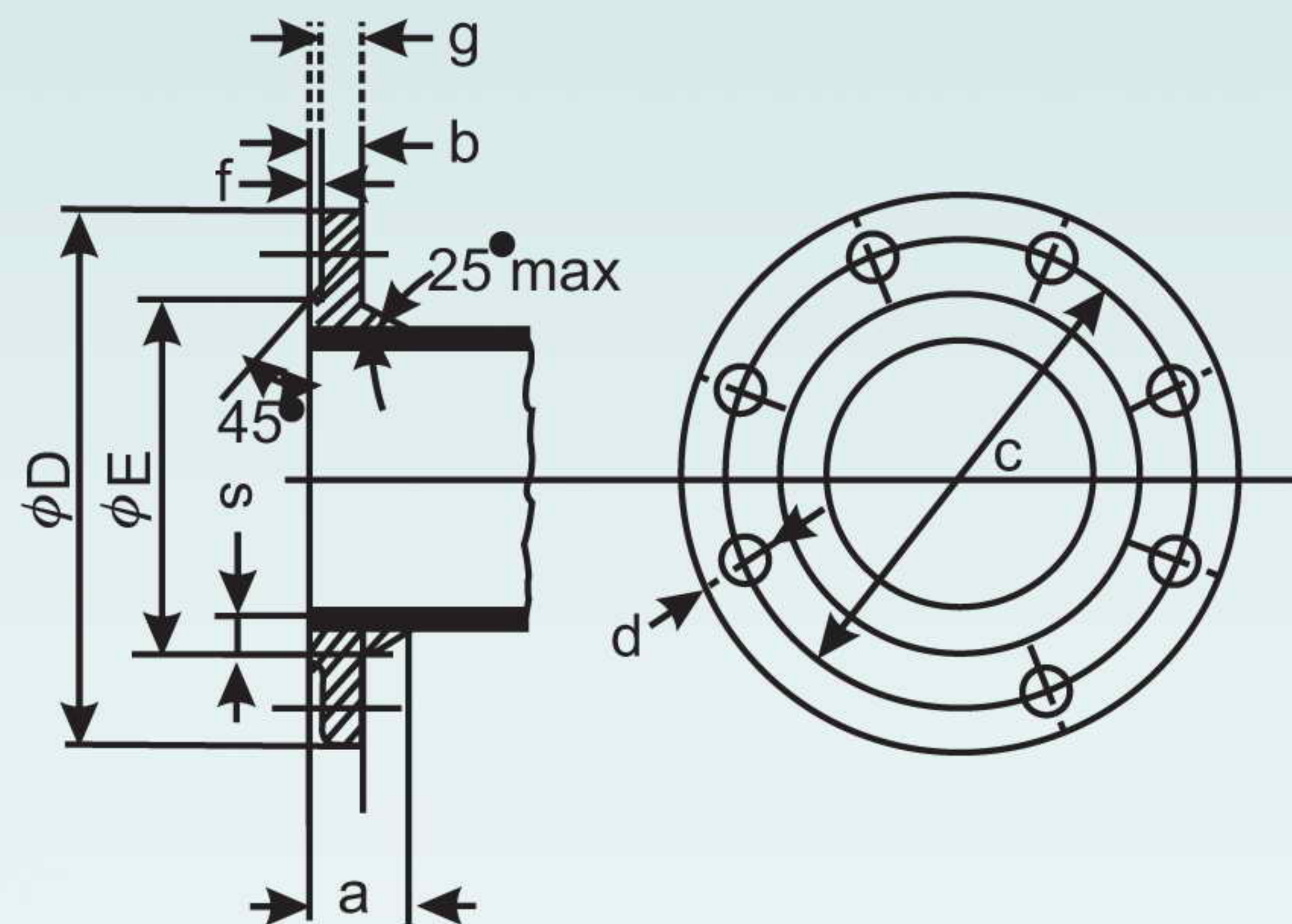


TABLE - 5

DN	DE	e	App. Mass of One Flange		App. Mass of Barrel/mtr. Non-CML	Approx Mass of One working Length "L" including two flanges					
			PN-10	PN-16		PN - 10			PN - 16		
						2.75M	5.0M	5.4M	2.75M	5.0M	5.4M
80	98	6.0	3.5	3.5	12.84	42	71	78	42	71	78
100	118	6.0	3.8	3.8	15.66	51	86	94	51	86	94
125	144	6.0	4.7	4.7	20.00	64	109	119	64	109	119
150	170	6.0	5.8	5.8	23.07	75	127	138	75	127	138
200	222	6.3	7.8	8.0	31.95	104	176	191	104	176	191
250	274	6.8	12.0	11.0	42.80	140	236	256	142	238	258
300	326	7.2	15.2	15.0	54.19	179	301	327	181	303	329
350	378	7.7	18.6	18.0	67.43	221	373	406	231	383	416
400	429	8.1	23.4	19.0	80.80	260	442	480	274	456	494
450	480	8.6	26.6	22.0	95.27	306	520	566	330	544	590
500	532	9.0	32.6	28.0	111.98	364	616	670	400	652	706
600	635	9.9	45.5	45.0	147.78	496	829	900	552	885	956
700	738	10.8	61.3	62.0	188.24	642	1065	1155	684	1107	1196
750	790	11.3	74.2	74.0	211.30	729	1205	1306	773	1249	1350
800	842	11.7	82.2	82.0	233.70	807	1333	1445	859	1385	1495
900	945	12.6	99.8	92.0	283.69	964	1602	1740	1030	1668	1805
1000	1048	13.5	126.0	126.0	338.49	1183	1944	2103	1287	2048	2215
1100	1152	14.4	158.0	158.0	367.80	1327	2155	2332	1431	2259	2435
1200	1255	15.3	188.5	190.0	425.80	1551	2509	2715	1711	2669	2875

NOTE :

1. The method of screwing and the exact form of thread are as per our own discretion as the flanges are never removed after screwing on to the barrel of the pipes.
2. If so required the flanges may be spot welded on the back side after screwing.
3. Alternatively the flanges may be completely welded on to the barrel pipes.
4. Pipes = K 9
5. ONLY WELDABLE FLANGES MAY ALSO BE SUPPLIED TO BE WELDED ON TO THE PIPES AS PER SITE REQUIREMENTS
6. PUDDLE flanges (for wall casting) may be welded on pipes as per Customer's requirements.



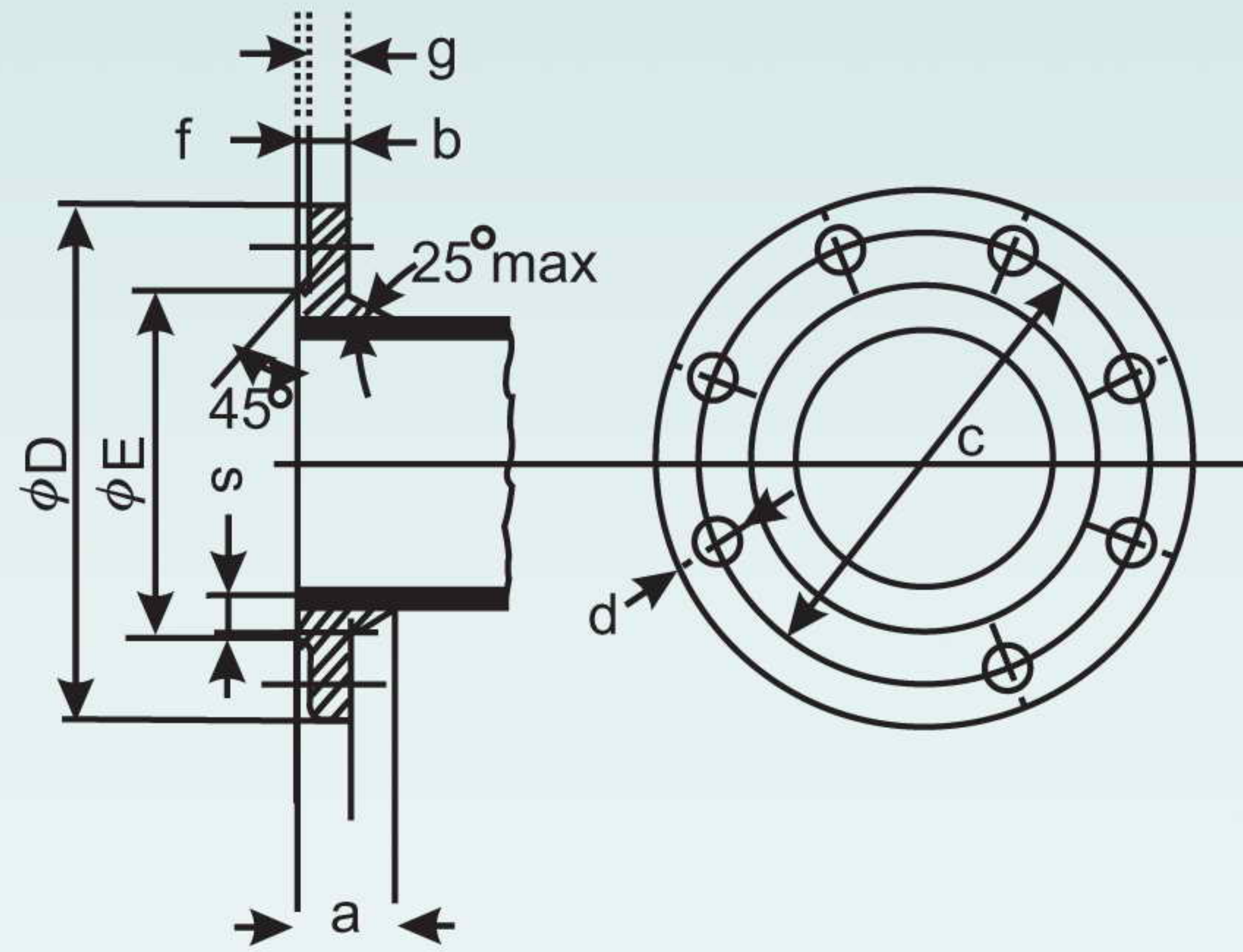
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TABLE - 6

Nominal Diameter	Dimensions								Holes		Bolt Size Metric	Bolt length mm
	DN	D	E	C	b	f	g	a	S	Number		
80	200	132	160	19	3	16	32	15	4	19	M16	100
100	220	156	180	19	3	16	32	15	8	19	M16	100
125	250	184	210	19	3	16	32	15	8	19	M16	100
150	285	211	240	19	3	16	32	15	8	23	M20	100
200	340	266	295	20	3	17	34	15	8	23	M20	100
250	395	319	350	22	3	19	48	16	12	23	M20	120
300	445	370	400	24.5	4	20.5	52	17.5	12	23	M20	120
350	505	429	460	24.5	4	20.5	52	19.5	16	23	M20	120
400	565	480	515	24.5	4	20.5	60	19.5	16	28	M24	130
450	615	530	565	25.5	4	21.5	63	20	20	28	M24	130
500	670	582	620	26.5	4	22.5	68	21	20	28	M24	130
600	780	682	725	30	5	25	75	24	20	31	M27	150
700	895	794	840	32.5	5	27.5	82	24	24	31	M27	150
750	960	857	900	34	5	29	87	24	24	31	M27	150
800	1015	901	950	35	5	30	90	24.5	24	34	M30	170
900	1115	1001	1050	37.5	5	32.5	98	26.5	28	34	M30	170
1000	1230	1112	1160	40	5	35	105	28	32	37	M33	180
1100	1340	1231	1270	43	5	38	114	30	32	37	M33	180
1200	1455	1328	1380	45	5	40	120	31.5	32	40	M36	200

NOTE :

1. The method of screwing and the exact form of thread shall be left to the discretion of the manufacturer as the flanges are never removed after screwing on the barrels of the pipes.
2. If so required the screwed flanges may be spot welded on the back side after screwing.
3. Dimensions 'a' and 'S' are for guidance only.
4. Unless otherwise specified, flanges shall be of ductile iron.



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TABLE - 7

DN	Dimensions								Holes		Bolt Size Metric	Bolt Length mm
	D	E	C	b	f	g	a	S	Number	Dia(d)		
80	200	132	160	19	3	16	32	15	8	19	M16	100
100	220	156	180	19	3	16	32	15	8	19	M16	100
125	250	184	210	19	3	16	32	15	8	19	M16	100
150	285	211	240	19	3	16	32	15	8	23	M20	100
200	340	266	295	20	3	17	34	16	12	23	M20	100
250	400	319	355	22	3	19	48	17.5	12	28	M24	120
300	455	370	410	24.5	4	20.5	52	19.5	12	28	M24	120
350	520	429	470	26.5	4	22.5	68	21	16	28	M24	120
400	580	480	525	28	4	24	72	22.5	16	31	M27	140
450	640	548	585	30	4	26	78	24	20	31	M27	140
500	715	609	650	31.5	4	27.5	82	25	20	34	M30	160
600	840	720	770	36	5	31	93	27.5	20	37	M33	180
700	910	794	840	39.5	5	34.5	103	27.5	24	37	M33	180
750	970	857	900	41	5	36	108	28	24	37	M33	180
800	1025	901	950	43	5	38	114	30	24	40	M36	200
900	1125	1001	1050	46	5	41	124	32.5	28	40	M36	200
1000	1255	1112	1170	50	5	45	135	35	28	43	M39	220
1100	1355	1218	1270	53.5	5	48.5	144	37.5	32	43	M39	220
1200	1485	1328	1390	57	5	52	156	40	32	49	M45	240

NOTE :

1. The method of screwing and the exact form of thread shall be left to the discretion of the manufacturer as the flanges are never removed after screwing on the barrels of the pipes.
2. If so required the screwed flanges may be spot welded on the back side after screwing.
3. Dimensions 'a' and 'S' are for guidance only.
4. Unless otherwise specified, flanges shall be of ductile iron.