

## PIPE FITTINGS & FLANGES





## Galvanised Malleable Fittings

### MATERIALS

Blackheart Malleable Iron castings.

### DIMENSIONS

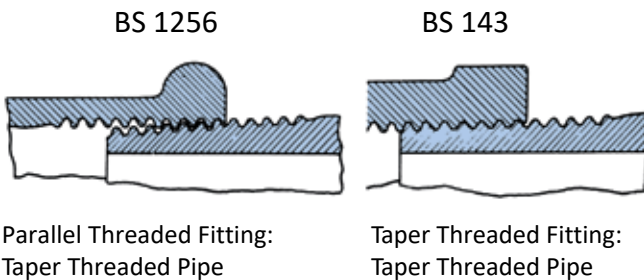
generally to ASME B16.3 or JIS B2301, depending on manufacturing source. JIS B2301 dimensions are generally considered to be corresponding values to BS143 and BS1256, although some sizes are not exact equivalents.

### THREADING

is BSP pipe thread, to BS.21 (AS 1722, Part 1).

The specification for BS 143 fittings is:  
Taper External (Series R) Taper Internal (Series RC)

The specification for BS 1256 fittings is:  
Taper External (Series R) Parallel Internal (Series RP)



### ALTERNATIVE THREADING to special order.

NPT (API linepipe threads) Taper Internal/Taper External can be supplied for fittings to American specification ANSI B16.3.

NOTE: Locknuts and Plain Sockets without ribs, are supplied with parallel threads.

### FINISH

Hot Dip Galvanised is the standard finish for stock.

### TESTING

Fittings shall be subject to an internal hydraulic pressure of 2068 kPa without showing any sign of leakage or abnormality.

### WORKING PRESSURES

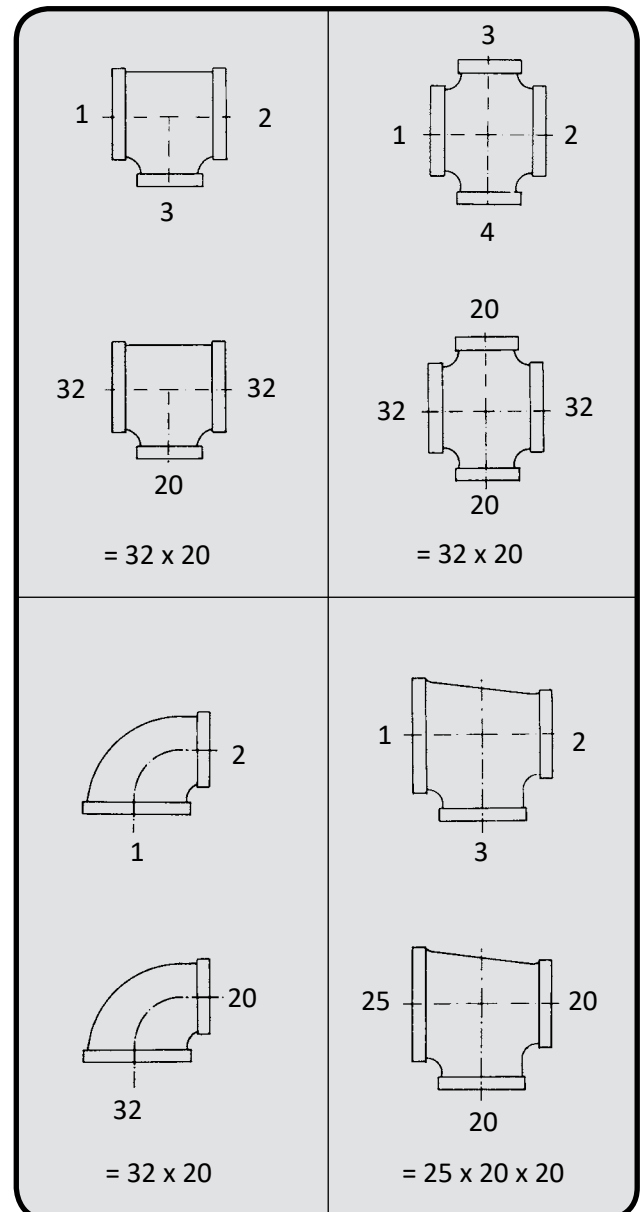
(except flanges) Recommended maximum working pressures are 1379 kPa for water and 1034 kPa for steam, air, gas and oil.

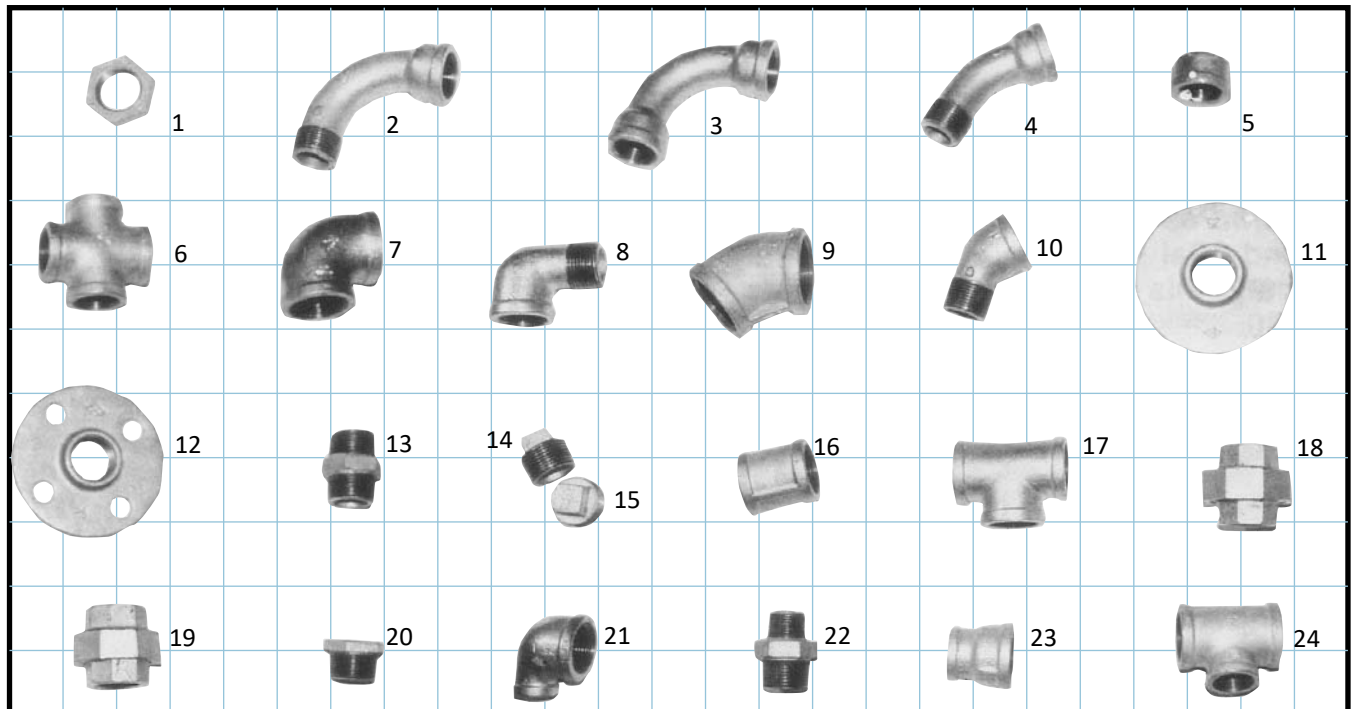
NOTE: Working pressures may also be limited by relevant Pressure Piping Codes or Industry regulations.

### UNEQUAL SIZES

When ordering Reducing Sockets, Nipples, Bushes and Elbows, always state largest size first — e.g. 80 x 40 bush.

When ordering 3- or 4- way fittings, the sizing sequence illustrated below should be adopted.





Nominal Range - Equal & Reducing Fittings (all sizes shown in mm)			
Number	Item	Minimum Size	Maximum Size
	Adaptor (not illustrated)	15	50
1	Backnut	8	150
2	Bend 90° M&F	8	150
3	Bend 90° F&F	8	100
4	Bend 45° M&F	15	50
5	Cap	8	150
6	Cross	10	100
7	Elbow 90° F&F	8	150
8	Elbow 90° M&F	8	100
9	Elbow 45° F&F	15	100
10	Elbow 45° M&F	15	50
11	Flange — Undrilled	15	150
12	Flange — Drilled	15	150
13	Hex Nipple	8	150
14	Plug — Hollow.	8	150
15	Plug — Solid	15	50
16	Socket	8	150
17	Tee	8	150
18	Union — Flat Seat	8	150
19	Union — Brass Seat F&F	8	100
20	Bush — Reducing	10 x 6	150 x 125
21	Elbow — Reducing F&F	15 x 8	50 x 40
22	Hex Nipple — Reducing	10 x 8	100 x 80
23	Sockets — Reducing	10 x 8	100 x 80
24	Tees — Reducing	15 x 8	100 x 80
24	Tees — Reducing Special	20 x 15	80 x 50



## Black & Galvanised Steel Fittings

Screwed Steel Pipe fittings are designed for use with “Medium” and “Heavy” pipes to AS 1074. These BS EN 10241 fittings are the recognised Standard for Medium Pressure Screwed Pipework. Tubular items in this range conform to AS 1074.

### SPECIFICATION

BS EN 10241 “Steel Threaded Pipe Fittings, Screwed BSP Thread”.

Australian Standard 1074 “Steel Tubes and Tubulars Threaded or suitable for Threading with Pipe Threads of Whitworth Form”.

Australian Standard 1650 “Galvanised Coatings on Ferrous Articles”.

### MATERIAL

**Tubulars:** These are manufactured from tubing made in accordance with AS 1074 from steel with 0.06 max sulphur and 0.06 max phosphorus.

**Machined Fittings:** These are manufactured to dimensions in BS EN 10241:2000 and generally made from “Free Cutting Steel”.

### FINISH

#### Surface Condition

1. **Black Steel:** These fittings are generally degreased and protected with a coating of light oil.
2. **Zinc Protective Coating:** Fittings may be supplied zinc plated using the Electrolytic Zinc Coating process on finished Black Fittings.
3. **Hot Dip Zinc Galvanising:** Galvanising of fittings shall be performed before the thread cutting operation, by means of the hot dip method.
4. **Zinc Flake:** Fittings may be supplied Zinc Flake Coated. This process being performed on Finished Black Fittings.

### THREADING

Threads for the screwed ends of fittings comply to the appropriate requirements of AS 1722

Part 1: Sealing pipe threads and also ISO 7-1.

Female Ends: Normally supplied with parallel thread.

Male Ends: Normally supplied with taper threads.

### PERMISSIBLE WORKING PRESSURES

TABLE 1 TAPER/PARALLEL THREAD — NON-GAS APPLICATIONS

Nominal Bore of Pipe	Type of Service										
	Water & Inert Oil Med. Hvy.			Fuel Oil				Other Applications (Inc. Steam & Compressed Air)			
				Medium Press. Temp.		Heavy Press. Temp.		Medium Press. Temp.		Heavy Press. Temp.	
mm	kPa	kPa	kPa	kPa	°C	kPa	°C	kPa	°C	kPa	°C
*25	2070	2410	140	1030	100	1210	192	1210	100	1210	192
32	1720	2070	140	1030	100	1030	192	1030	100	1030	192
40	1720	2070	140	1030	100	1030	192	1030	100	1030	192
50	1380	1720	140	860	100	860	192	860	100	860	192
65	1380	1720		860	100	860	192	860	100	860	192
80	1380	1720		860	100	860	192	860	100	860	192
100	1030	1380		690	100	860	192	690	100	690	192
125	1030	1380									
150	860	1030									

\*Up to and including

TABLE 2 TAPER/TAPER THREAD — NON-GAS APPLICATIONS

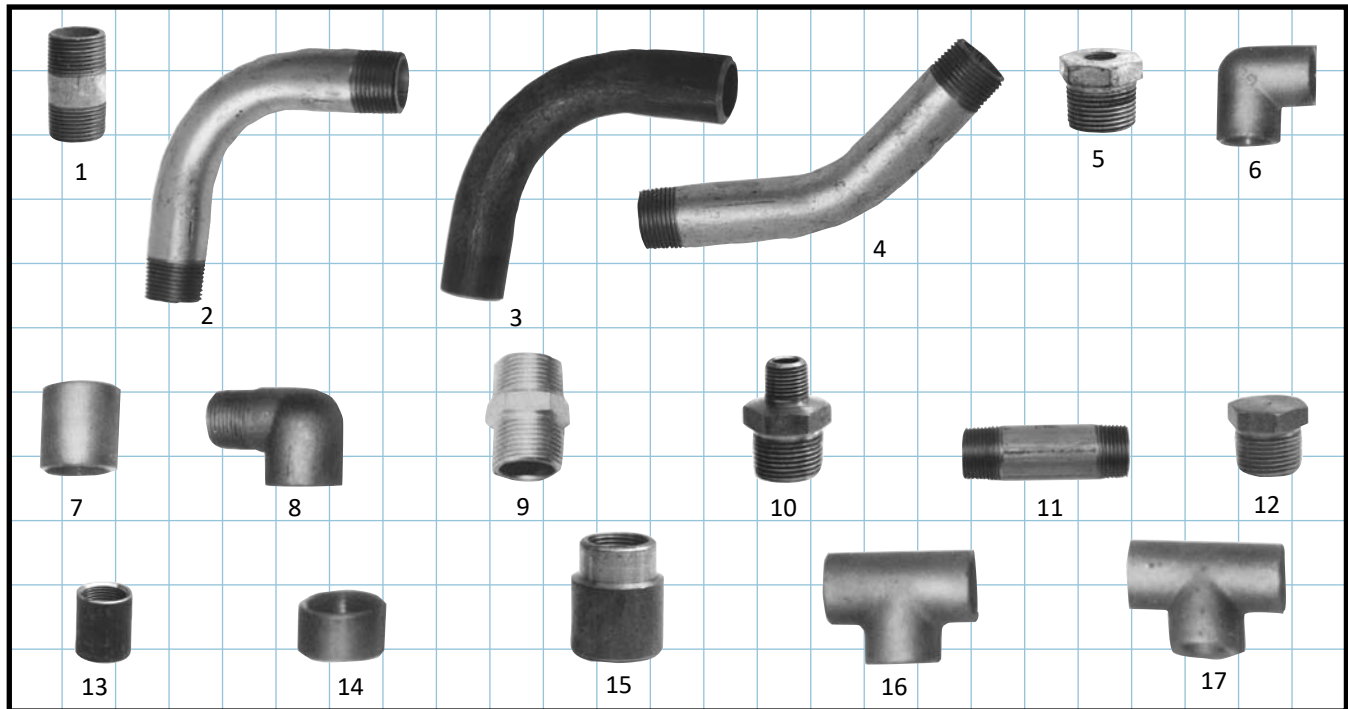
Nominal Bore of Pipe	Type of Service										
	Water & Inert Oil Med. Hvy.			Fuel Oil				Other Applications (Inc. Steam & Compressed Air)			
				Medium Press. Temp.		Heavy Press. Temp.		Medium Press. Temp.		Heavy Press. Temp.	
mm	kPa	kPa	kPa	kPa	°C	kPa	°C	kPa	°C	kPa	°C
*25	3450	4140	340	1030	100	1210	192	1210	100	1210	192
32	2760	3450	340	1030	100	1210	192	1210	100	1210	192
40	2760	3450	340	1030	100	1210	192	1210	100	1210	192
50	2410	3100	340	1030	100	1210	192	1210	100	1210	192
65	2410	3100		1030	100	1210	192	1210	100	1210	192
80	2070	2760		1030	100	1210	192	1210	100	1210	192
100	1720	2070		1030	100	1030	192	1030	100	1210	192
125	1720	2070									
150	1380	1720									

\*Up to and including

TABLE 3 TAPER/TAPER THREAD — GAS APPLICATIONS TO AS 1697

Nominal Bore of Pipe	Med & Hvy.
mm	kPa
*25	1030
32	1030
40	1030
50	1030
65	1030
80	1030
100	1030

\*Up to and including



Nominal Stock Ranges (all sizes shown in mm)			
Number	Item	Minimum Size	Maximum Size
1	Barrel Nipple (Manufactured from heavy pipe)	8	80
2	90° Bend (M&M)	8	150
3	90° Bend (B/E) (Available black only)	8	150
4	45° Bend (M&M)	15	100
5	Reducing Bush	8 x 6	100 x 80
6	Elbow F&F	6	150
7	Cap	8	100
8	Elbow (M&F)	8	100
9	Hex Nipple (Equal)	6	100
10	Hex Nipple (Reducing)	8 x 6	100 x 80
11	Pipe Piece (Manufactured from medium pipe).	Dia. 15 Length 100	Dia. 50 Length 600 in 50mm increments
12	Plug (Hexagon)	6	100
13	Socket (Equal) (To AS 1074)	6	150
14	Half Socket	6	150
15	Socket (Reducing)	8 x 6	150 x 100
16	Tee (Equal)	6	150
17	Tee (Reducing)	10 x 8	150 x 100

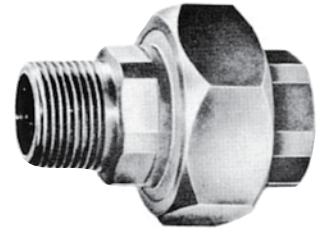
\*Larger sizes available to order.

## Black & Galvanised Steel Unions

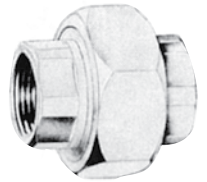
BLACK STEEL UNIONS are used in a wide range of make-and-break joints requiring periodic disconnection. Available in Steel-Steel, Steel-Bronze and Bronze-Bronze seats in Female-Female and Male-Female types.

Black Steel Unions are all-purpose unions coated in black oxide to give protection to the fitting until assembled to piping.

ZINC-COATED UNIONS are Electro Zinc Plated. This process gives a complete coating both externally and internally which protects the Union at thread and vital seat areas.



Black



Zinc Coated

### WORKING PRESSURES

- For standard screwed unions  
8 to 25mm up to 21000 kPa Cold Working Pressure 32 to 100mm up to 14000 kPa Cold Working Pressure  
For Steam Pressures and Temperatures refer to SAA Boiler Code

### RANGE

- 6mm to 100mm nominal pipe size

### SEATINGS

Steel-Steel. A general purpose combination recommended where vibration is present, the most economically priced.

Steel-Bronze. A good combination where corrosion is present and when periodic disconnection is required.

Bronze-Bronze. Should corrosion be a major factor, and where consistent disconnection is required.

### THREADING

- BSP Taper M and F Threads to AS 1722 Part 1.

## Stainless Steel Screwed Fittings - BSP



### RANGE

Caps, Elbows 90°, Elbows 45°, Hex Nipples (equal and reducing), Plugs, Sockets (equal and reducing), Tees (equal and reducing), Bushes, Unions, Barrel Nipples and Flanges.

### MATERIAL

ASTM A351 Grade 316 (CF8M).

### THREAD

BSP (Male — taper, female — parallel).

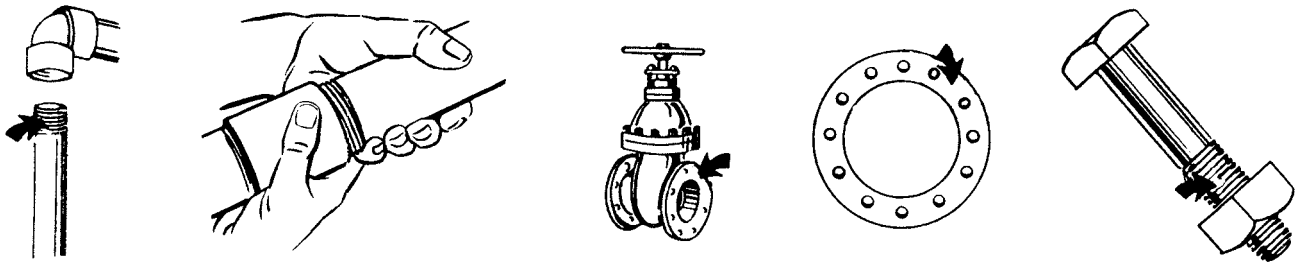
### PRESSURE

Nominal 1000 kPa working pressure, 2000 kPa test.

### SIZE RANGE

Generally 6-50mm, with larger sizes available to order.





Our comprehensive piping package includes a variety of accessory products for use with pipes and fittings. These include flange bolts, as well as a range of sealing materials for threaded and flanged joints. For threaded joints the most popular materials are shown below.

### PTFE ("TEFLON") TAPE

For high or low temperature sealing. Ideal for gas or liquid lines, it is one of the cleanest and easiest ways to connect threaded pipes, fittings and valves.

A 50% overlap should be allowed when applying PTFE Tape.

A variety of tapes are available to suit specific needs including:

WHITE GENERAL PURPOSE	10m roll x 12, 19 or 25mm wide (19mm and 25mm comply with BS4375)
YELLOW GAS TAPE	10m roll x 12mm wide AGA Approval No. 5582
PINK PLUMBERS TAPE	10m roll x 12mm wide



### PLUMBERS HEMP

26m rolls, for use with soap or any jointing paste which is compatible with the line fluid.



### PLUMBERS SOAP

Principally for water use, available in 500gm bars.





## Flanges to Australian Standards

Specification AS 2129 covers plain face, raised face, plain face with "O"-ring flanges in plate or forged as specified. Types available are slip-on weld or blank in plate and threaded, slip-on or weldneck in forged material. Standard flanges are flat faced.

### THREADING

Boss Flanges not exceeding 150mm may be supplied threaded with a parallel or taper thread in accordance with AS 1722.

### MATERIAL

This section covers flanges made from steel forgings and plates, but AS 2129 also applies to Stainless Steel. Forged steel flanges conform to BS 10.



### RANGE

FORGED	NOM SIZE
Table D (Galv) Threaded	15-150mm
Table D (Black) Slip-on weld	15-200mm
Table E (Black) Slip-on weld & Threaded	15-200mm
Table H (Black) Slip-on weld & Threaded	15-200mm

PLATE	NOM SIZE
Table D & E Slip-on weld	15-600mm
Table D & E Blank	15-600mm
Table H Slip-on weld	15-600mm
Table H Blank	15-600mm

### TEMPERATURE-PRESSURE RATINGS FOR CARBON STEEL FLANGES

Flange Table	Pressure, kPa*												Max hydro- static test pressure kPa
	Temperature, °C												
	-18 to 120	-50 to 232	250	275	300	325	350	375	400	425	450	475	
D		700	650	600	570	550	500	450	400	350			1 050
C	1 200												1 800
E		1 400	1 300	1 200	1 100	1 000	950	900	800	700			2 100
F		2 100	2 000	1 800	1 700	1 600	1 400	1 300	1 200	1 100			3 150
H		3 500	3 300	3 100	2 900	2 600	2 400	2 200	2 000	1 700	1 300	900	5 250
J		4 800	4 600	4 300	4 000	3 700	3 400	3 100	2 700	2 400	1 900	1 300	7 200
K		6 200	5 900	5 500	5 100	4 700	4 300	3 900	3 500	3 100	2 400	1 600	9 300
R		8 300	7 900	7 400	6 800	6 300	5 800	5 200	4 700	4 200	3 200	2 200	12 450
S		12 400	11 800	11 100	10 300	9 500	8 700	7 900	7 100	6 300	4 800	3 300	18 600
T		19 300	18 400	17 200	16 000	14 700	13 500	12 200	11 000	9 800	7 500	5 100	28 950

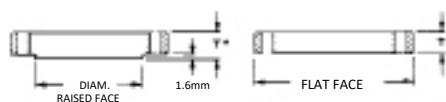
### TEMPERATURE-PRESSURE RATINGS FOR ALLOY STEEL FLANGES

Flange Table	Pressure, kPa*														Max hydro- static test pressure kPa
	Temperature, °C														
	-100 to 232	250	275	300	325	350	375	400	425	450	475	482	500	525	
H	3500	3300	3 200	3 000	2 800	2600	2500	2 300	2 100	2 000	1 800	1 700	1 200	500	5 250
J	4800	4700	4 400	4 200	3 900	3700	3500	3 200	3 000	2 700	2 500	2 400	1 700	700	7 200
K	6200	6000	5 700	5 400	5 100	4700	4400	4 100	3 800	3 500	3 200	3 100	2 200	940	9 300
R	8300	8000	7 600	7 200	6 700	6300	5900	5 500	5 100	4 700	4 300	4 100	3 000	1 300	12 450
S	12 400	12 000	11 400	10 700	10 100	9500	8900	8 300	7 600	7 000	6 400	6 200	4 400	1 900	18 600
T	19 300	18 600	17 600	16 700	15 700	14 800	13 800	12 800	11 900	10 900	9 900	9 700	6 900	3 000	28 950

\*Intermediate values are to be obtained by linear interpolation.

Note: Carbon steel standard material stocked. Alloy steel available to special order.





BLANK OR BLIND FLANGE

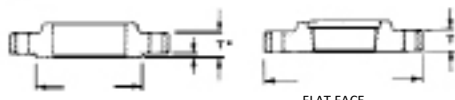
COPPER ALLOY

T.3 – Plate or Boss or Blank

T.10 – Plate or Boss

T.11 – Blank

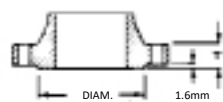
## DIMENSIONS FOR LOOSE FLANGES



BOSS FLANGE – SLIP ON WELD OR SCR. B.S.P.



PLATE FLANGE  
SLIP ON WELD



WELD NECK FLANGE

FORGED OR PLATE STEEL

T.6 – Plate or Boss or Blank, or Weldneck (except for valves) T.18 – Plate or Blank or Weldneck (except for valves)

Nominal Size DN	Table D						Table E						Table F						Nominal Size DN		
	Flange			Drilling			Flange				Drilling		Flange				Drilling				
	OD mm	Thickness		Bolt Circle Dia. mm	No. of Bolts	Dia. of Bolts mm	OD mm	Thickness			Bolt Circle Dia. mm	No. of Bolts	Dia. of Bolts mm	OD mm	Thickness			Bolt Circle Dia. mm		No. of Bolts	Dia. of Bolts mm
		T3 mm	** T6 mm					T10 mm	T11 mm	** T6 mm					T10 mm	T11 mm	** T6 mm				
15	95	6	5	67	4	M12	95	6	6	6	67	4	M12	95	8	8	10	67	4	M12	15
20	100	6	5	73	4	M12	100	6	6	6	73	4	M12	100	8	8	10	73	4	M12	20
25	115	8	5	83	4	M12	115	8	8	7	83	4	M12	120	10	10	10	87	4	M16	25
32	120	8	6	87	4	M12	120	8	8	8	87	4	M12	135	10	10	13	98	4	M16	32
40	135	10	6	98	4	M12	135	10	10	9	98	4	M12	140	11	11	13	105	4	M16	40
50	150	10	8	114	4	M16	150	10	10	10	114	4	M16	165	11	12	16	127	4	M16	50
65	165	11	8	127	4	M16	165	11	11	10	127	4	M16	185	13	13	16	146	8	M16	65
80	185	13	10	146	4	M16	185	13	13	11	146	4	M16	205	14	15	16	165	8	M16	80
100	215	16	10	178	4	M16	215	16	16	13	178	8	M16	230	17	17	19	191	8	M16	100
125	255	17	13	210	8	M16	255	17	17	14	210	8	M16	280	19	20	22	235	8	M20	125
150	280	17	13	235	8	M16	280	17	17	17	235	8	M20	305	22	23	22	260	12	M20	150
200	335	19	13	292	8	M16	335	19	20	19	292	8	M20	370	25	28	25	324	12	M20	200
250	405	19	16	356	8	M20	405	22	25	22	356	12	M20	430	25	32	29	381	12	M24	250
300	455	22	19	406	12	M20	455	25	28	25	406	12	M24	490	29	37	32	438	16	M24	300
350	525	25	22	470	12	M24	525	25	32	29	470	12	M24	550	32	42	35	495	16	M27	350
400	580	25	22	521	12	M24	580	25	36	32	521	12	M24	610	32	47	41	552	20	M27	400
450	640	29	25	584	12	M24	640	29	41	35	584	16	M24	675	35	52	44	610	20	M30	450
500	705	32	29	641	16	M24	705	32	46	38	641	16	M24	735	38	57	51	673	24	M30	500
600	825	35	32	756	16	M27	825	38	–	48	756	16	M30	850	41	68	57	781	24	M33	600
700	910	–	35	845	20	M27	910	–	–	51	845	20	M30	935	–	–	60	857	24	M33	700
750	995	–	41	927	20	M30	995	–	–	54	927	20	M33	1015	–	–	67	940	28	M33	750
800	1060	–	41	984	20	M33	1060	–	–	54	984	20	M33	1060	–	–	68	984	28	M33	800
900	1175	–	48	1092	24	M33	1175	–	–	64	1092	24	M33	1185	–	–	76	1105	32	M36	900
1000	1255	–	51	1175	24	M33	1255	–	–	67	1175	24	M36	1275	–	–	83	1194	36	M36	1000
1200	1490	–	60	1410	32	M33	1490	–	–	79	1410	32	M36	1530	–	–	95	1441	40	M39	1200

Nominal Size DN	Table H								Table J						Table R						Nominal Size DN
	Flange				Drilling				Flange		Drilling				Flange		Drilling				
	OD mm	Thickness			† Dia. R/F mm	Bolt Circle Dia. mm	No. of Bolts	Dia. of Bolts mm	OD mm	Thickness * T6 mm	Dia. R/F mm	Bolt Circle Dia. mm	No. of Bolts	Dia. of Bolts mm	OD mm	Thickness * T18 mm	Dia. R/F mm	Bolt Circle Dia. mm	No. of Bolts	Dia. of Bolts mm	
		T10 mm	T11 mm	* T6 mm																	
15	115	10	11	13	57	83	4	M16	115	16	57	83	4	M16	115	19	64	83	4	M16	15
20	115	10	11	13	57	83	4	M16	115	16	57	83	4	M16	115	19	64	83	4	M16	20
25	120	11	12	14	64	87	4	M16	120	19	64	87	4	M16	125	22	76	95	4	M16	25
32	135	11	13	17	76	98	4	M16	135	19	76	98	4	M16	135	22	76	98	4	M16	32
40	140	13	14	17	83	105	4	M16	140	22	83	105	4	M16	150	25	89	114	4	M20	40
50	165	13	16	19	102	127	4	M16	165	25	102	127	4	M20	165	25	102	127	8	M16	50
65	185	14	17	19	114	146	8	M16	185	25	114	146	8	M20	185	29	114	146	8	M20	65
80	205	16	19	22	127	165	8	M16	205	32	127	165	8	M20	205	32	127	165	8	M20	80
100	230	19	23	25	152	191	8	M16	230	35	152	191	8	M20	240	35	152	197	8	M24	100
125	280	22	27	29	178	235	8	M20	280	38	178	235	8	M24	280	41	178	235	12	M24	125
150	305	25	30	29	210	260	12	M20	305	38	210	260	12	M24	305	44	210	260	12	M24	150
200	370	32	39	32	260	324	12	M20	370	41	260	324	12	M24	370	51	260	324	12	M27	200
250	430	35	45	35	311	381	12	M24	430	48	311	381	12	M27	430	60	311	387	16	M27	250
300	490	38	52	41	362	438	16	M24	490	51	362	438	16	M27	510	70	362	457	16	M30	300
350	550	41	58	48	419	495	16	M27	550	57	419	495	16	M30	585	79	419	527	16	M33	350
400	610	44	64	54	483	552	20	M27	610	64	483	552	20	M30	640	89	483	584	20	M33	400
450	675	48	71	60	533	610	20	M30	675	70	533	610	20	M33	735	98	572	673	20	M36	450
500	735	51	78	67	597	673	24	M30	735	79	597	673	24	M33	805	105	622	730	20	M39	500
600	850	57	92	76	699	781	24	M33	850	92	699	781	24	M36	–	–	–	–	–	–	–

- NOTES:
- (1) All dimensions are in millimetres (mm).
  - (2) Only metric preferred sizes listed, except for DN 750 which is a non-preferred size.
  - (3) It is impractical to use flange thickness less than 12mm for Steel Plate Flanges.
  - (4) Thickness includes 1.6mm height for the Raised Face.
  - (5) The Raised Face is non-preferred for Table "H".
  - (6) It is normal practice to supply Steel Flanges to Tables A, D, C, E, F and H. — Flat Faced.

IMPORTANT: For DN 65, DN 125 and DN 150 Flanges, the O.D. of pipe being used must be specified.

## I.S.O. METRIC HEXAGON STEEL BOLTS FOR USE WITH AS. 2129 FLANGES

Steel Hexagon Bolts and Nuts (XOX) are typically used within a temperature range of -50°C to +300°C. Outside of this temperature range, Stud Bolts may be selected based on AS. 2528.

A quick reference chart for sizing bolts and nuts for a range of regularly used standard flanges is given below.

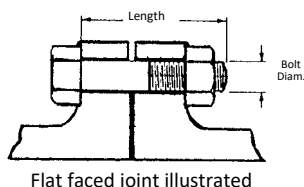
### APPLICABLE TO PLATE AND FORGED STEEL LOOSE FLANGES ONLY

NOTE: Integral valve flanges quite often differ in thickness to equivalent loose flanges.

When integral flanges are involved due allowance should be made to bolt lengths.

Nominal Flange Size DN	Table D		Table E		Table F		Table H	
	No. Bolts Per Flange	XOX Bolt & Nut dia. x lgth.	No. Bolts Per Flange	XOX Bolt & Nut dia. x lgth.	No. Bolts Per Flange	XOX Bolt & Nut dia. x lgth.	No. Bolts Per Flange	XOX Bolt & Nut dia. x lgth.
15	4	M12 X 40 mm*	4	M12 X 40 mm*	4	M12 x 40 mm*	4	M16 x 45 mm*
20	4	M12 x 40 mm*	4	M12 x 40 mm*	4	M12 x 40 mm*	4	M16 x 45 mm*
25	4	M12 x 40 mm*	4	M12 x 40 mm*	4	M16 x 45 mm*	4	M16 x 50 mm*
32	4	M12 x 40 mm*	4	M12 x 40 mm*	4	M16 x 45 mm*	4	M16 x 55 mm*
40	4	M12 x 40 mm*	4	M12 x 40 mm*	4	M16 x 45 mm*	4	M16 x 55 mm*
50	4	M16 x 45 mm*	4	M16 x 45 mm*	4	M16 x 50 mm*	4	M16 x 60 mm*
65	4	M16 x 45 mm*	4	M16 x 45 mm*	8	M16 x 50 mm*	8	M16 x 60 mm*
80	4	M16 x 45 mm*	4	M16 x 45 mm*	8	M16 x 50 mm*	8	M16 x 65 mm*
100	4	M16 x 45 mm*	8	M16 x 45 mm*	8	M16 x 60 mm*	8	M16 x 70 mm*
125	8	M16 x 45 mm*	8	M16 x 50 mm*	8	M20 x 70 mm*	8	M20 x 80 mm*
150	8	M16 x 45 mm*	8	M20 x 60 mm*	12	M20 x 70 mm*	12	M20 x 80 mm*
200	8	M16 x 45 mm*	8	M20 x 60 mm*	12	M20 x 75 mm*	12	M20 x 90 mm*
250	8	M20 x 55 mm*	12	M20 x 70 mm*	12	M24 x 85 mm*	12	M24 x 100 mm*
300	12	M20 x 60 mm*	12	M24 x 80 mm*	16	M24 x 100 mm*	16	M24 x 110 mm*
350	12	M24 x 75 mm*	12	M24 x 85 mm*	16	M27 x 100 mm*	16	M27 x 130 mm*
400	12	M24 x 75 mm*	12	M24 x 100 mm*	20	M27 x 120 mm*	20	M27 x 140 mm*
450	12	M24 x 80 mm*	16	M24 x 100 mm*	20	M30 x 130 mm*	20	M30 x 160 mm*
500	16	M24 x 85 mm*	16	M24 x 110 mm*	24	M30 x 140 mm*	24	M30 x 170 mm*
600	16	M27 x 100 mm*	16	M30 x 130 mm*	24	M33 x 150 mm*	24	M33 x 190 mm*
700	20	M27 x 100 mm*	20	M30 x 140 mm*	24	M33 x 160 mm*		
750	20	M30 x 120 mm*	20	M33 x 150 mm*	28	M33 x 170 mm*		
800	20	M33 x 120 mm*	20	M33 x 150 mm*	28	M33 x 180 mm*		
900	24	M33 x 140 mm*	24	M33 x 170 mm*	32	M36 x 200 mm*		
1000	24	M33 x 140 mm*	24	M36 x 180 mm*	36	M36 x 220 mm*		
1200	32	M33 x 160 mm*	32	M36 x 200 mm*	40	M39 x 240 mm*		

All dimensions are in millimetres — (mm)



Bolt lengths listed apply to flat-faced or 1.6mm raised face flanges with allowance for 1.6mm gasket thickness.

\* For approximate Stud Bolt Lengths take the XOX Bolt Length and add the metric diameter in mm rounded to the nearest 5mm increment up.

NOTE: This does not include length of point.

Inch series bolts interchangeable as follows:

FOR	USE	FOR	USE
1/4"	M6	7/8"	M24
5/16"	M8	1"	M27
3/8"	M10	1-1/8"	M30
1/2"	M12	1-1/4"	M33
5/8"	M16	1-3/8"	M36
3/4"	M20	1-1/2"	M39

## BOLT HOLE DIAMETERS

For bolts to M24, clearance hole 2mm larger. Above M24, clearance hole 3mm larger.

## XOX BOLTS & NUTS

XOX is the trade term used for H.R.H. commercial steel bolts and nuts.

H.R.H. denotes Hexagon Head x Round Shank x Hexagon Nut.



A Quality Commitment

Backed by over 80 years of practical experience in protecting metal substrates against corrosion both above and below ground, and under immersed conditions, Denso Long Life Anti-corrosion Systems have been specifically formulated to enable cold application and do not require elaborate surface preparation or equipment. Denso Systems readily conform to suit most irregular contours and profiles.

Technical advice, specifications and problem solving together with on site instructions in the correct application of the Denso Systems are all part of the service offered by Denso.

### SYSTEM SELECTION GUIDE

STRUCTURE	ENVIRONMENT	RECOMMENDED SYSTEM	TEMP.
Pipe lengths Bends, Joints	Above ground No mechanical impact or abrasion	Densyl KF ColourTape (Self-extinguishes in 60 s)	(To 60°C)
Pipe lengths Bends, Joints	Above ground Infrequent mechanical impact or abrasion	<b>Steelcoat 400 System</b> Penetrating Primer Ultraseal tape Acrylic Topcoat	(To 65°C)
Pipe lengths Bends, Joints	Above ground Frequent mechanical impact Heavy abrasion	<b>Steelcoat 400 System</b> Penetrating Primer Ultraseal tape Urethane Topcoat	(To 65°C)
Pipe lengths Bends, Joints	Below ground Selected Backfill	<b>Denso or Densyl Petrolatum System</b> MP Primer Denso or Densyl Tape PVC Self-Adhesive Tape	Denso (To 55°C) Densyl (To 75°C)
Pipe lengths Bends, Joints	Below ground Original Backfill	Primer D Denso Ultraflex 1500 or Densopol 60HT Tape	(To 75°C)
Pipe lengths Bends, Joints	Below ground Rock Backfill	Primer D Denso Ultraflex 1500 or Densopol 60HT Tape Denso Rockmesh	(To 75°C)
Valves, fittings and other irregular profiles	Below ground	<b>Denso or Densyl Petrolatum System MP</b> Primer Denso Mastic or Densyl Supersoft Mastic Denso or Densyl Tape PVC Self-Adhesive Tape	Denso (To 55°C) Densyl (To 75°C)
Valves, fittings and other irregular profiles	Above ground No mechanical impact or abrasion	Densyl Supersoft Mastic Densyl KF ColourTape	(To 60°C)
Valves, fittings and other irregular profiles	Above ground Infrequent mechanical impact or abrasion	<b>Steelcoat 400 System</b> Penetrating Primer Densyl Supersoft Mastic Ultraseal Tape Acrylic Topcoat	(To 65°C)
Valves, fittings and other irregular profiles	Above ground Frequent mechanical impact Heavy abrasion	<b>Steelcoat 400 System</b> Penetrating Primer Densyl Supersoft Mastic Ultraseal tape Urethane Topcoat	(To 65°C)

Note: In colder climates, it is suggested that Densopol 60HT is substituted for Densopol 60.



## Denso Corrosion Protection Systems



### DENSO PETROLATUM SYSTEM

The Denso Multi-purpose long life corrosion protection system is a multi-component system which remains permanently plastic and flexible and offers excellent conformability and shelf life. Based upon blended Petrolatum and selected inhibitors the system provides unrivalled corrosion protection in terms of surface preparation requirements and ease of application. It is typically used for in-situ and shop application alike.



### STEELCOAT 400 SYSTEM

Denso Steelcoat 400 System comprising of penetrating primer (Denso Penetrating Primer), an easily applied layer of semi-coated acrylic backed bitumen tape (Denso Ultraseal Tape) and a choice of final topcoats (Denso Acrylic or Urethane Topcoat). The final topcoat can be reinforced with a selected reinforcing scrim (Denso D5 or D10 Scrim) for sections of steelwork or pipework which require additional impact resistance. After priming, Denso Supersoft Mastic is first utilised to seal and profile back to back angles, voids, flanges or fittings, before application of Denso Ultraseal Tape and selected topcoat.



### ULTRAFLEX 1500 SYSTEM

The Ultraflex 1500 System comprises Denso Primer 'D' and Ultraflex 1500 Tape. The Ultraflex 1500 System presents one of the most rugged pipewraps ever developed, combining both durability and hi-conformability. This combined with a specially callendered hi-impact PVC backing, results in impact resistance values, unrivalled by other pipe coating products.

The Ultraflex 1500 System is characterised by superb adhesion to self, to steel and shop coatings and when applied with a 55% overlap results in a 3000 microns finished coating thickness.



## Denso Corrosion Protection Systems

PRODUCT DESCRIPTION & CARTON QUANTITIES	
Product Description	Units / Carton
Denso MP Primer - 4kg tin (Also available in 1kg tin and 20kg drum)	4
Denso Mastic - 3kg block	8
Densyl Supersoft Mastic - 3kg	8
Denso Tape	
50mm x 10m roll	36
75mm x 10m roll	24
100mm x 10m roll	18
150mm x 10m roll	12
200mm x 10m roll	9
300mm x 10m roll	6
Densyl Tape	
50mm x 10m roll	36
75mm x 10m roll	24
100mm x 10m roll	18
150mm x 10m roll	12
Densyl KF ColourTape	
50mm x 10m roll	36
75mm x 10m roll	24
100mm x 10m roll	18
150mm x 10m roll	12
Denso PVC Self-Adhesive Tape	
50mm x 30m roll	40
100mm x 30m roll	20
150mm x 30m roll	15
Denso Primer 'D' 4lt Tin	4
Denso Ultraflex 1500 – 100mm x 10m roll	12
Denso Ultraflex 1500 – 150mm x 10m roll	8
Densopol 60 HT – 50mm x 10m roll	18
Densopol 60 HT – 100mm x 10m roll	9
Densopol 60 HT – 150mm x 10m roll	6
Denso Penetrating Primer - 4lt Tin	4
Denso Acrylic Top Coat - 4lt Tin (Available in White & Lt. Aircraft Grey)	4
Denso Ultraseal Tape – 50mm x 15m roll	20
Denso Ultraseal Tape – 100mm x 15m roll	12
Denso Ultraseal Tape – 150mm x 15m roll	8
Denso Ultraseal Tape – 225mm x 15m roll	6
Denso Ultraseal Tape – 475mm x 15m roll	2



Buttweld Pipe Fittings are the recognised standard for leak-proof pipe fabrication in medium and high pressure systems and in pipelines handling corrosive and hazardous fluids.

OneSteel carries premium quality buttweld fittings covered by major international oil and petrochemical company approvals, and an alternative low-cost range of OneSteel approved fittings for other applications.

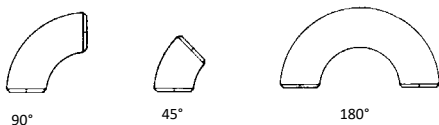
All stock carbon steel buttweld fittings comply fully with the material and manufacturing standards detailed here, with the added advantage of .23% maximum carbon content for optimum weld-joint integrity.

### DIMENSIONAL SPECIFICATIONS

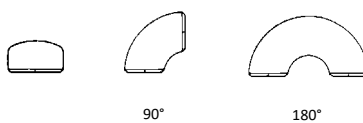
**ASME B16.9:** Steel buttweld fittings. Covers dimensions and tolerance of buttweld fittings 15 to 600mm.

#### B16.9

LONG RADIUS WELDING ELBOWS, RETURN BENDS & CAPS



SHORT RADIUS WELDING ELBOWS & RETURN BENDS



STRAIGHT TEES



REDUCING TEES



CONCENTRIC & ECCENTRIC REDUCERS



**ASME B16.25:** Buttweld ends. Covers the preparation and design details of buttweld ends for all components of buttwelded pipe systems.

**MSS SP-48:** Steel buttweld fittings 650mm and larger. Covers dimensions and tolerance of long radius elbows, tees and reducers in sizes 650 to 900mm.



### MATERIAL SPECIFICATIONS

**SEAMLESS CARBON STEEL:** Buttweld fittings are made to the material specifications of ASTM A234, grades WPA, WPB or WPC; which correspond exactly to the material specifications of seamless carbon steel pipes to ASTM A106 grades A, B, or C.

**AUSTENITIC STAINLESS STEEL FITTINGS:** OneSteel stocks stainless steel fittings in ASTM grades 304L and 316L. Other grades available to order.

**LOW TEMPERATURE FITTINGS:** For low temperature applications, a wide range of fittings in materials to ASTM A420 can be offered.

**HIGH YIELD FITTINGS:** On an indent basis, we offer a range of fittings having a high yield strength suitable for use with the various grades of API 5LX linepipe.

**FERRITIC ALLOY STEEL FITTINGS:** For high temperatures, OneSteel offers a range of alloy fittings to ASTM specification A335, in the following grades:

P1 - 1/2%Mo  
P5 - 5%Cr1/2%Mo  
P7 - 7%Cr1/2%Mo  
P9 - 9%Cr1%Mo

P11 - 11/4%Cr1/2%Mo  
P12 - 1%Cr1/2%Mo  
P22 - 21/4%Cr1%Mo

### WORKING PRESSURES

Buttweld fittings are designed and manufactured to standards which demand a bursting strength equal to or greater than that of Seamless Pipe of the same material specification, nominal diameter and wall thickness, and their allowable working pressures are equal to those shown for pipe in the OneSteel pipe catalogue. Maximum allowable working pressures for:

**CARBON STEEL FITTINGS:** Equal to seamless pipes to ASTM A106 (Grade B unless otherwise specified).

**STAINLESS STEEL:** Fittings (Grades 304 and 316, also 304L and 316L) are equal to stainless steel pipes to ASTM A312 of equal grade and schedule.

**HIGH TEMPERATURE (Ferritic Alloy):** Fittings (Grades WP5, WP11 etc.), are equal to seamless pipes to ASTM A335 of similar grade (P5, P11, etc.).

**LOW TEMPERATURE:** Fittings (Grade WPL6-ASTM A420) are equal to seamless pipes to Grade 6 - ASTM A333.

**NB:** Stainless Steel Fittings in Schedule 10S and 5S are not designed for applications where pressure is a prime consideration, and the relevant standard, MSS SP43 establishes the working pressures substantially lower than those yielded by the application of the basic formula.

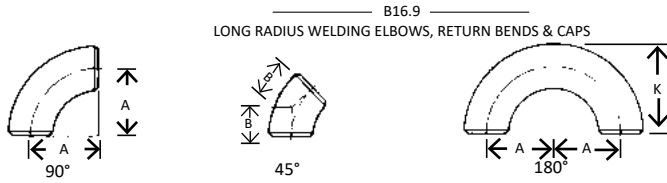
### QUALITY CONTROL

Buttweld fittings from OneSteel are subject to strict quality control. Manufacturers' plants are visited regularly, and the source of mother tube is verified. Test certificates are available as required. OneSteel liaises with major customers to ensure that all fittings are obtained from sources approved by the customer or by specific industry groups.

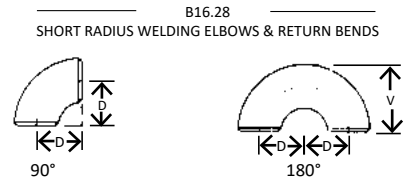


## Butt Weld Fittings

### CARBON STEEL BUTTWELD FITTINGS TO ASME B16.9, B16.28 & BS.1640



B16.9  
LONG RADIUS WELDING ELBOWS, RETURN BENDS & CAPS

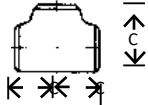


B16.28  
SHORT RADIUS WELDING ELBOWS & RETURN BENDS

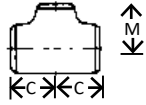
Nominal Sizes shown are |DN: SI Metric Term | NPS: ASME Term

Nom. Size DN		Pipe OD mm	Wall Thickness (mm)													A	B	K	D	V	E. Std. Wt. & Ex. Stg.	Nom. Size DN	
DN	NPS		Sch. 10	Sch. 20	Sch. 30	Std. Wt.	Sch. 40	Sch. 60	X Stg.	Sch. 80	Sch. 100	Sch. 120	Sch. 140	Sch. 160	X.X. Stg.							DN	NPS
15	1/2	21.3	—	—	—	2.77	—	—	3.73	—	—	—	—	4.78	7.47	38	16	47.5	—	—	25.4	15	1/2
20	3/4	26.7	—	—	—	2.87	—	—	3.91	—	—	—	—	5.56	7.82	38	19	43	19	33	25.4	20	3/4
25	1	33.4	—	—	—	3.38	—	—	4.55	—	—	—	—	6.35	9.09	38	22	55.5	25.4	41	38.1	25	1
32	1 1/4	42.2	—	—	—	3.56	—	—	4.85	—	—	—	—	6.35	9.70	47.5	25.4	70	32	52	38.1	32	1 1/4
40	1 1/2	48.3	—	—	—	3.68	—	—	5.08	—	—	—	—	7.14	10.15	57	29	82.5	38	62	38.1	40	1 1/2
50	2	60.3	—	—	—	3.91	—	—	5.54	—	—	—	—	8.74	11.07	76	35	106	51	81	38.1	50	2
65	2 1/2	73	—	—	—	5.16	—	—	7.01	—	—	—	—	9.53	14.02	95	44.5	132	63.5	100	38.1	65	2 1/2
80	3	88.9	—	—	—	5.49	—	—	7.62	—	—	—	—	11.13	15.24	114	51	159	76	121	50.8	80	3
90	3 1/2	101.6	—	—	—	5.74	—	—	8.08	—	—	—	—	—	16.15	133	57	184	89	140	63.5	90	3 1/2
100	4	114.3	—	—	—	6.02	—	—	8.56	—	—	11.13	—	13.49	17.12	152	63.5	210	102	159	63.5	100	4
125	5	141.3	—	—	—	6.55	—	—	9.53	—	—	12.70	—	15.88	19.05	190	79	262	127	197	76.2	125	5
150	6	168.3	—	—	—	7.11	—	—	10.97	—	—	14.27	—	18.26	21.95	229	95	313	152	237	88.9	150	6
200	8	219.1	—	6.35	7.04	8.18	—	10.31	12.70	—	15.09	18.26	20.62	23.01	22.23	305	127	414	203	313	102	200	8
250	10	273.1	—	6.35	7.80	9.27	—	12.70	12.70	5.09	18.26	21.44	25.40	28.58	25.40	381	159	517	254	390	127	250	10
300	12	323.9	—	6.35	8.38	9.53	10.31	14.27	12.70	17.48	21.44	25.4	28.58	33.32	25.40	457	190	619	305	467	152	300	12
350	14	355.6	6.35	7.92	9.53	9.53	11.13	15.09	12.70	19.05	23.83	27.79	31.75	35.71	—	533	222	711	356	533	165	350	14
400	16	406.4	6.35	7.92	9.53	9.53	12.70	16.66	12.70	21.44	26.19	30.96	36.53	40.49	—	610	254	813	406	610	178	400	16
450	18	457	6.35	7.92	11.13	9.53	14.27	19.05	12.70	23.83	29.36	34.93	39.67	45.24	—	686	286	914	457	686	203	450	18
500	20	508	6.35	9.53	12.70	9.53	15.09	20.62	12.70	26.19	32.54	38.10	44.45	50.01	—	762	318	1016	508	762	229	500	20
600	24	610	6.35	9.53	14.27	9.53	17.48	24.61	12.70	30.96	38.89	46.02	52.37	59.54	—	914	381	1219	610	914	267	600	24
750	30	762	7.92	12.70	15.88	9.53	—	—	12.70	—	—	—	—	—	—	1143	470	1524	762	1143	267	750	30
900	36	914	7.92	12.70	15.88	9.53	19.05	—	12.70	—	—	—	—	—	—	1372	565	—	914	1372	267	900	36

STRAIGHT TEES (B16.9)



REDUCING TEES (B16.9)



CONCENTRIC & ECCENTRIC  
REDUCERS (B16.9)

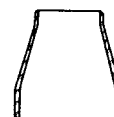


Nominal Sizes shown are |DN: SI Metric Term | NPS: ASME Term

Nominal Size				C	M	H	Nominal Size				C	M	H	Nominal Size				C	M	H
DN ]		NPS I					DN ]		NPS I					DN ]		NPS I				
Large End	Small End	Large End	Small End				Large End	Small End	Large End	Small End				Large End	Small End	Large End	Small End			
20	20 15	3/4	3/4 1/2	28.6	-	-	100	100 90 80	4	4	105	-	-	400	400 350 300	16	16 14 12	305	-	-
25	25 20 15	1	3/4 1/2	38.1 38.1	38.1 50.8	65 50 40		2 1/2 2 1 1/2		105 105 105	98.4 95.3 88.9	102 102 102								
	32		1 1/4	3/4 1/2	47.6 47.6	50.8 50.8		5 4 3 1/2		124 124 124	- - 114	- - 127								
				40	1 1/2	1 1/2 1 1/4		57.2 57.2		- 63.5	3 2 1/2 2	124 124 124	111 108 105		127 127 127					
50		2				1 1/2 2 1 1/2	57.2 63.5 63.5	57.2 60.3 57.2	63.5 76.2 76.2	6 5 4	143 143 143	- 137 130	- 140 140							
	65		2 1/2			2 1 1/2 1 1/4	63.5 63.5 63.5	50.8 44.5 -	76.2 76.2 76.2	6 5 4	178 178 178	- 168 162	- 152 152							
				80	3	3 2 1/2 2	85.7 85.7 85.7	- 82.6 76.2	- 88.9 88.9	8 6 5	216 216 216	- 194 191	- 178 178							
90		3 1/2				3 1/2 3 2 1/2 2 1 1/2	95.3 95.3 95.3 95.3	- 92.1 88.9 82.6 79.4	- 102 102 102 102	10 12 10 8 6	254 254 254 254 279	- - 210 203 270	- - 203 203 330							
	350		14			14 12 10 8 6	279 279 279 279 279	238 238 238 238 238	330 330 330 330 330											

NOTE: All dimensions are in millimetres — (mm)

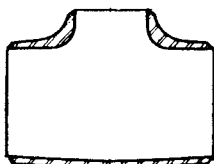
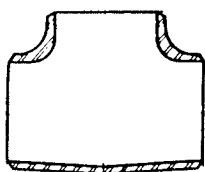
**MASS**  
(weight)



SIZE mm	90° Elbows				45° Elbows		180° Returns				Reducers		Caps	
	LONG RAD		SHORT RAD		LONG RAD		LONG RAD		SHORT RAD		CON & ECC			
	Approx. Weight (kg)				Approx. Wt.		Approx. Weight (kg)				Approx. Weight (kg)			
	STD	XS	STD	XS	STD	XS	STD	XS	STD	XS	STD	XS	STD	XS
15	0.08	0.10	—	—	0.04	0.05	0.16	0.20	—	—	—	—	—	—
20	0.08	0.10	—	—	0.04	0.05	0.16	0.20	—	—	0.07	0.10	—	—
25	0.15	0.20	0.10	—	0.11	0.14	0.31	0.40	0.21	—	0.13	0.16	0.10	0.14
32	0.26	0.34	0.17	—	0.17	0.22	0.53	0.69	0.35	—	0.17	0.23	0.14	0.18
40	0.38	0.48	0.25	0.33	0.23	0.29	0.76	1.00	0.50	0.66	0.26	0.34	0.18	0.23
50	0.68	0.91	0.45	0.60	0.37	0.49	1.36	1.85	0.90	1.22	0.41	0.57	0.27	0.32
65	1.32	1.73	0.88	1.14	0.74	0.95	2.67	3.50	1.78	2.32	0.77	1.01	0.41	0.45
80	2.08	2.78	1.38	1.83	1.10	1.47	4.19	5.62	2.78	3.72	1.00	1.36	0.64	0.82
90	2.92	3.96	1.93	2.61	1.49	2.90	5.90	7.98	3.90	5.31	1.36	1.89	0.95	1.27
100	3.95	5.40	2.62	3.58	1.96	2.66	7.94	10.98	5.26	7.30	1.63	2.27	1.13	1.54
125	6.67	9.34	4.42	6.21	3.31	4.63	13.47	18.96	8.94	12.56	2.77	3.92	1.91	2.59
150	10.39	15.47	6.89	10.25	5.13	7.58	20.91	31.25	13.93	20.73	3.95	5.94	2.95	4.10
200	20.87	31.34	13.83	20.68	10.34	15.42	41.91	63.50	27.94	42.00	6.49	9.84	5.00	7.30
250	36.97	49.44	24.49	32.89	18.33	24.45	74.39	100.25	49.44	66.48	10.70	14.47	9.10	11.80
300	53.98	71.22	36.06	47.17	26.99	35.52	109.32	143.79	72.58	95.26	15.01	19.78	13.60	17.20
350	69.85	91.63	46.27	61.24	34.70	45.36	—	—	—	—	26.85	35.35	15.90	20.80
400	91.17	120.20	61.24	80.29	45.36	59.88	—	—	—	—	33.11	44.00	20.00	26.30
450	116.12	153.32	77.57	102.06	58.06	76.20	—	—	—	—	—	—	26.00	34.00
500	143.79	190.06	96.16	126.10	71.67	94.35	—	—	—	—	—	—	33.00	43.00
550	174.64	230.43	—	—	87.09	114.76	—	—	—	—	—	—	—	—
600	207.75	274.88	138.35	183.25	103.87	141.52	—	—	—	—	—	—	46.00	61.00
650	244.49	323.42	—	—	122.02	161.03	—	—	—	—	—	—	—	—
700	326.59	432.28	217.73	287.58	162.39	215.46	—	—	—	—	—	—	—	—
750	471.74	625.97	313.89	414.14	234.96	311.17	—	—	—	—	—	—	—	—

## TEES — Straight and Reducing

Note: Weights given for reducing Tees are based on branch one size smaller than run size.



RUN	BR	STD	XS	RUN	BR	STD	XS
15	15	0.11	0.16	90	90	4.47	5.72
	16	0.10	0.13		80	4.09	5.31
20	20	0.17	0.21	100	100	5.72	7.44
	15	0.15	0.19		90	5.26	6.94
25	25	0.34	0.42	125	125	8.98	4.98
	20	0.29	0.36		100	8.21	10.98
32	32	0.61	0.74	150	150	13.29	19.05
	25	0.53	0.66		125	21.11	17.15
40	40	0.92	1.12	200	200	24.36	34.66
	32	0.80	1.00		150	22.09	31.93
50	50	1.34	1.69	250	250	41.37	53.52
	40	1.21	1.54		200	37.65	49.44
65	65	2.36	2.92	300	300	59.88	75.75
	50	2.08	2.61		250	54.89	70.31
80	80	3.37	4.29	350	350	76.20	92.08
	55	3.09	3.90		300	65.32	84.37

## WELDOLETS

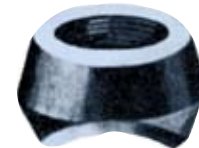
Used to make full size and reducing branch connections from 6 to 750mm from run pipes 10 to 900mm in order to:

- Facilitate header construction.
- Construct the joint to full pipe strength.
- Meet code design requirements for reinforced branch joints.
- Improve flow.
- Assure economical, clean and strong connections.

Weldolet



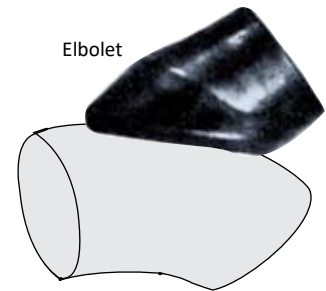
Thredolet



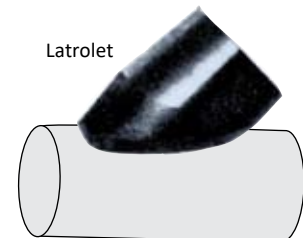
Sockolet



Elbolet



Latrolet



## THREDOLETS AND SOCKOLETS

Used for making relatively small branch outlet connections.

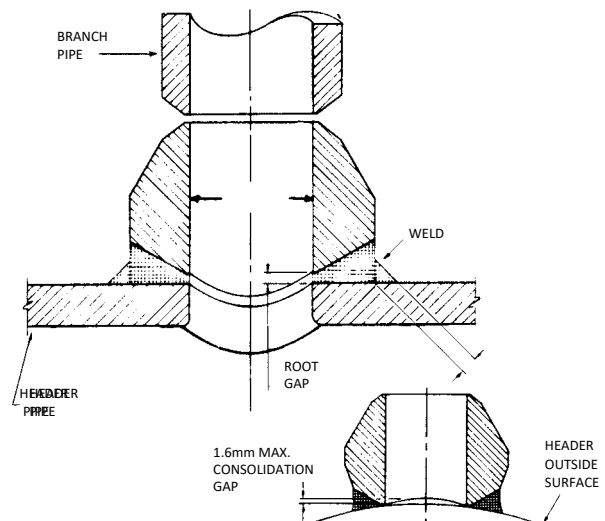
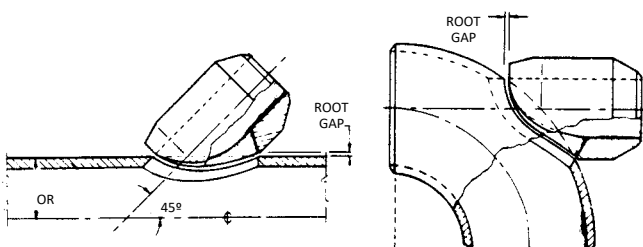
Thredolets and Sockolets are “half couplings” that are bevelled for convenience, tapered for strength, flared for fluid flow and drop forged for the ultimate in strength and ruggedness.

## ELBOLETS AND LATROLETS

Used for making threaded, socket-weld or butt-weld outlets tangentially to elbows or as 45° branch connections on straight pipe. The design provides for a full penetration weld. These fittings provide greatly improved flow conditions compared with 90° connections and are advantageous for many instrument connection applications.

## INSTALLATION GUIDE

Less fit up time is required for Olets than for most other fittings or fabricated connections. When proper welding procedure is followed, the resultant cost is more economical than constructing branch connections by any other method.



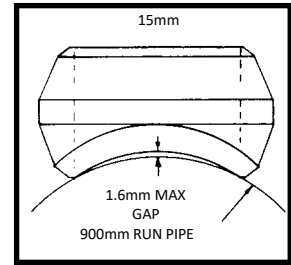
## RANGE OF OLETS

The following range of Olets are available:

• Weldolets • Thredolets • Sockolets • Elbolets • Latrolets • Nipolets • Sweepolets

## HOW IT WORKS

Each outlet size indicated on chart is designed to fit a number of run pipe sizes, e.g. The 15mm fitting marked 900-100x15 will fit all run pipe sizes from 100mm to 900mm. When placed on a 900mm run pipe, there will be a maximum gap of 1.6mm between the top of the run pipe and the base of the fitting at the crotch as shown on sketch. This gap is negligible when welding.



## SIZE SELECTION CHART

Standard Weight and Extra Strong Weldolets, Sockolets and 3000# Thredolets

10 x 6	20 x 20	40 x 40	65 x 65	90 x 90
15 x 6	25 x 20	50 x 40	80 x 65	100 x 90
25 - 20 x 6	40 - 32 x 20	65 x 40	90 x 65	125 x 90
65 - 32 x 6	65 - 50 x 20	80 x 40	100 x 65	150 x 90
900 - 80 x 6	125 - 80 x 20	100 - 90 x 40	125 x 65	200 x 90
10 x 8	300 - 150 x 20	150 - 125 x 40	150 x 65	250 x 90
15 x 8	900 - 350 x 20	300 - 200 x 40	200 x 65	350 - 300 x 90
25 - 20 x 8	25 x 25	600 - 350 x 40	300 - 250 x 65	500 - 400 x 90
65 - 32 x 8	32 x 25	900 - 650 x 40	450 - 350 x 65	900 - 600 x 90
900 - 80 x 8	40 x 25	50 x 50	900 - 500 x 65	100 x 100
15 x 10	50 x 25	65 x 50	80 x 80	125 x 100
25 - 20 x 10	65 x 25	80 x 50	90 x 80	150 x 100
65 - 32 x 10	90 - 80 x 25	90 x 50	100 x 80	200 x 100
900 - 80 x 10	125 - 100 x 25	100 x 50	125 x 80	250 x 100
15 x 15	250 - 150 x 25	125 x 50	150 x 80	350 - 300 x 100
20 x 15	900 - 300 x 25	150 x 50	200 x 80	500 - 400 x 100
25 x 15	32 x 32	250 - 200 x 50	250 x 80	100 900 - 600 x 100
40 - 32 x 15	40 x 32	450 - 300 x 50	350 - 300 x 80	Outlet Sizes: 125, 150, 200, 250, 300, 350, 400, 450, 500, 600, 650, 750 Order to specific size combination.
65 - 50 x 15	50 x 32	900 - 500 x 50	500 - 400 x 80	
200 - 80 x 15	65 x 32		900 - 600 x 80	
900 - 250 x 15	90 - 80 x 32			
	125 - 100 x 32			
	200 - 150 x 32			
	900 - 500 x 32			

6000# Thredolets, Schedule 160 and Double Extra Strong Sockolets

20 x 15	40 - 32 x 25	40 x 32	50 x 40	65 x 50
32 x 15	65 - 50 x 25	65 - 50 x 32	65 x 40	80 x 80
65 x 15	250 - 80 x 25	90 - 80 x 32	90 - 80 x 40	100 x 50
900 - 200 x 15	900 - 300 x 25	200 - 100 x 32	125 - 100 x 40	125 x 50
25 x 20		500 - 250 x 32	200 - 150 x 40	150 x 50
65 - 32 x 20		900 - 600 x 32	450 - 250 x 40	250 - 200 x 50
250 - 80 x 20			900 - 500 x 40	500 - 300 x 50
900 - 300 x 20				900 - 600 x 50

Schedule 160 and Double Extra Strong Weldolets

15 x 15	25 x 25	40 x 40	50 x 50	Outlet Sizes: 65, 80, 100, 125, 150, 200, 250, 300. Order to specific size combination.
32 - 20 x 15	65 - 32 x 25	65 - 50 x 40	65 x 50	
900 - 40 x 15	250 - 80 x 25	90 - 80 x 40	90 - 80 x 50	
20 x 20	900 - 300 x 25	200 - 100 x 40	125 - 100 x 50	
32 x 20	40 - 32 x 32	400 - 250 x 40	200 - 150 x 50	
40 x 20	65 - 50 x 32	900 - 600 x 40	450 - 250 x 50	
200 x 20	250 - 80 x 32		900 - 500 x 50	
	900 - 300 x 32			

## SCREWED & SOCKET-WELD 3000 & 6000 lb

The high pressure pipe fittings illustrated in the following pages are designed for use with American Standard Linepipe and are used extensively in the fabrication of screwed or socket-weld high pressure piping systems.

They are found throughout refinery, petrochemical and industrial plants, on pressure vessels, hydraulic lines, refrigeration plants and wherever high pressures and/or temperatures occur.

Pipe/Fitting combinations are as follows:

Fitting Pressure Class	Corresponding Max. Pipe Schedule
Threaded Fittings	
3000 lbs	Sch. 80
6000 lbs	XXS
Socket-Weld Fittings	
3000 lbs	Sch. 80
6000 lbs	Sch. 160



90° ELBOW



45° ELBOW



TEE



CROSS



COUPLING



UNION



HEXAGON HEAD PLUG



HEXAGON HEAD BUSHING



ROUND HEAD PLUG



SQUARE HEAD PLUG



90° ELBOW



45° ELBOW



TEE



CROSS



COUPLING



CAP



TYPE 2



TYPE 1

SOCKET WELDING REDUCER INSERTS

## DIMENSIONAL SPECIFICATIONS

ASME B16.11 — Forged Steel Fittings, Socket-Weld and Threaded.

BS3799 - Forged Steel Pipe Fittings, screwed and socket-weld for the petroleum industry - based on ASME B16.11.

## MATERIAL SPECIFICATIONS

Carbon Steel — forgings to ASTM A105, or Barstock.

Grade F11 (Chrome-Moly, for high temperatures), Grade F316L (Stainless Steel, for temperature and corrosion resistance).

Stainless and Alloy Steels to ASTM A182 of the appropriate grades, including:—

ASTM A350 Gr-LF1 (Carbon Steel for low temperatures).

## WORKING PRESSURES

### PRESSURE / TEMPERATURE RATINGS

Nominal Pressure Ratings	SERVICE TEMPERATURE °CELSIUS																		
	38	66	93	121	149	177	204	232	260	288	316	343	371	399	427	427*	482*	510†	538†
3000 lb	20670	20359	20084	19808	19602	19360	19119	18706	17948	16949	15915	14813	13504	12229	10507	8612	6373	4409	2445
6000 lb	41340	40754	40168	39617	39232	38756	38239	37412	37412	33933	31831	29627	27008	24459	21014	17225	12780	8853	4926
Non-shock Working Pressures tabulated in kPa																			

Non-shock Working Pressures tabulated in kPa

\*These pressures are in accordance with the ANSI Code for Pressure Piping (ASME B31.1).

† Suggest Alloy Steel above 482°C.

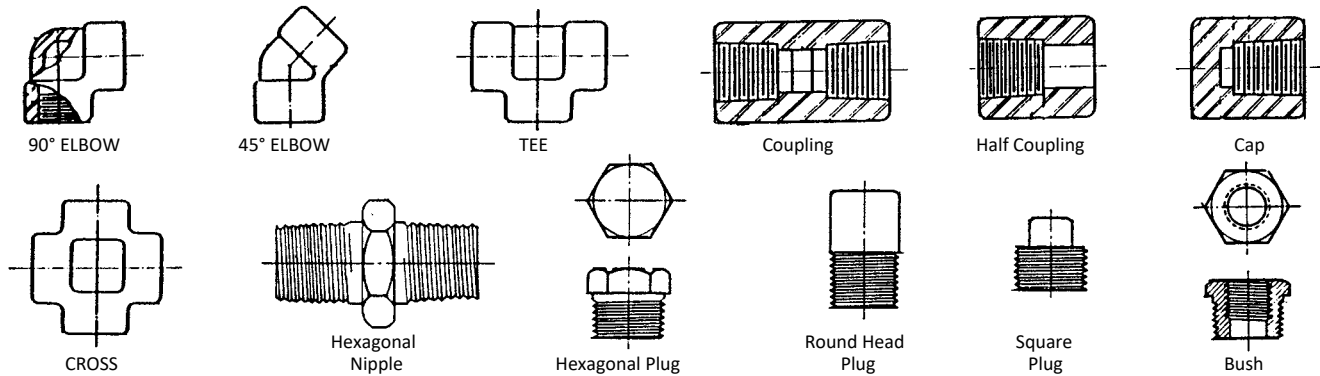
All high pressure fittings must be used within the pressure/temperature limitations of the pipes to which they are attached.

## FINISH

Fittings are normally self-coloured or phosphate-finished. Galvanised or cadmium-plated finish is available at extra cost.

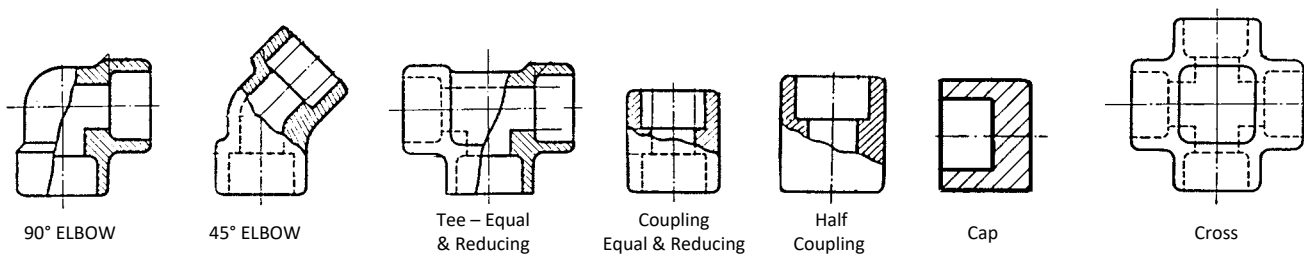


## Standard Range: SCREWED NPT. (BSP available to order).



	3000 lb	6000 lb	Size Range	Normal Manufacture
90° Elbow	✓	✓	6-100mm	Forged
45° Elbow	✓	✓	6-100mm	Forged
Tee	✓	✓	6-100mm	Forged
Coupling	✓	✓	6-100mm	Barstock
Half Coupling	✓	✓	6-100mm	Barstock
Cap	✓	✓	6-100mm	Barstock
Cross	✓	✓	6-100mm	Forged
Hexagonal Nipple	✓	✓		
	All conform to 6000 lb rating		6-100mm	Forged or Barstock
Hexagonal Plug	✓	✓	6-100mm	Forged or Barstock
Round Head Plug	✓	✓	6-100mm	Barstock
Square Plug	✓	✓	6-100mm	Barstock
Bush	✓	✓	6-100mm	Forged or Barstock

## Standard Range: SOCKET-WELD



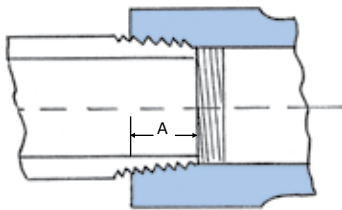
	3000 lb	6000 lb	Size Range	Normal Manufacture
90° Elbow	✓	✓	8-80mm	Forged
45° Elbow	✓	✓	8-80mm	Forged
Tee	✓	✓	8-80mm	Forged
Coupling	✓	✓	8-80mm	Barstock
Half Coupling	✓	✓	8-80mm	Barstock
Cap	✓	✓	8-80mm	Barstock
Cross	✓	✓	8-80mm	Forged

## SCREWED & SOCKET-WELD 2000, 3000 & 6000 lb

Screwed Fittings are taper-threaded in accordance with ASME B1.20.1, having thread lengths in accordance with applicable tables.

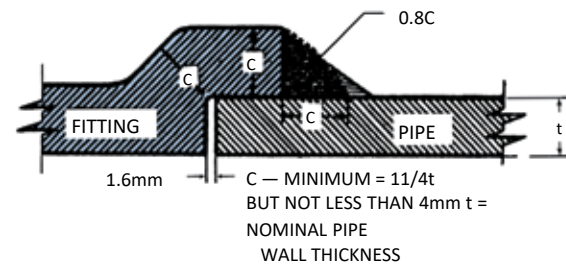
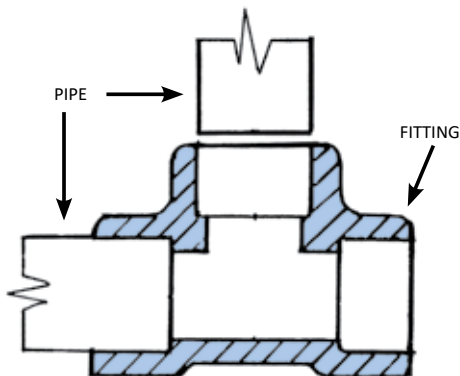
The actual and theoretical axes of the threads may diverge by not more than 1.6 mm in 300 mm.

Fittings can be threaded to British Standard Taper (BS 21) if required. ASME B 1.20.1, the American Standard for pipe threads, determines length of thread engagement as shown below.



Length of Thread Screwed into Valves or Fittings															
SIZE	6	8	10	15	20	25	32	40	50	65	80	90	100	125	150
A mm	7.93	9.52	11.11	12.7	14.28	17.46	17.46	17.46	17.46	23.81	24.6	26.98	28.57	30.16	30.16

Socket-Weld Fittings are designed for welding to American standard pipes (3000 lb. fittings to Sch. 80 pipe and 6000 lb. fittings to Sch. 160 pipe).

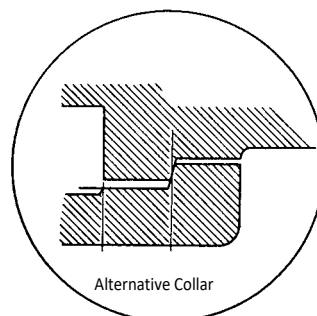
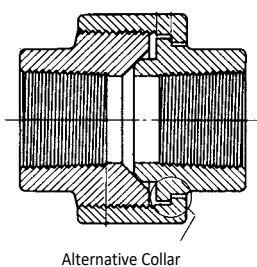


Minimum dimensions required for socket-weld fittings as specified in the American Standard Code for Pressure Piping, ASME B31.1.

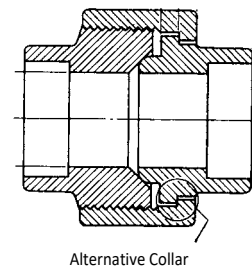
## UNIONS SCREWED & SOCKET-WELD

Dimensions for high pressure unions are listed in BS 3799. Dimensions may vary according to manufacturer's specifications.

### SCREWED UNIONS



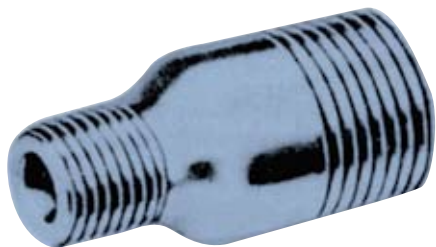
### SOCKET-WELD UNIONS



## TUBULAR FITTINGS

### SWAGE NIPPLES

Ends Screwed, Plain or Bevelled for Welding, Concentric and Eccentric.



Swage Nipples as illustrated are manufactured from Seamless Steel Pipe to ASTM A106, Grade 'B'. They can also be machined from Barstock material.

### PIPE NIPPLES

Seamless Tubular, Ends Screwed, Plain or Bevelled.

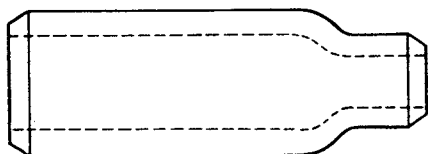


### CLOSE-TAPER NIPPLES

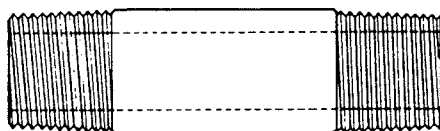
Seamless Tubular, Screwed.



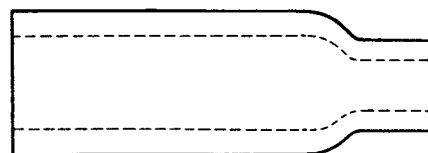
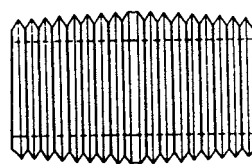
Swage and Pipe Nipples can also be supplied with non-standard end connections — e.g. One End Screwed, One End Bevelled, or One End Sch. 80, One End Sch. 40.



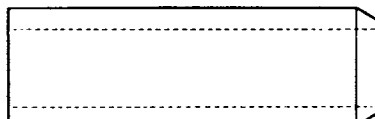
BUTTWELD TYPE



SCREWED TYPE



PLAIN END TYPE



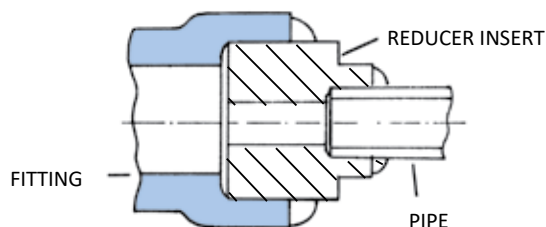
PLAIN END

BEVEL END

OneSteel offers a range of Swage and Pipe Nipples in a wide variety of diameters, lengths, wall thicknesses and materials. Please consult us for your requirements.

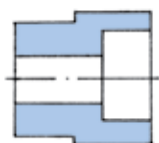
## SOCKET-WELD REDUCER INSERTS ASTM A105 FORGINGS

The purpose of socket-weld reducer inserts is to avoid the delays and extra costs that naturally occur in producing regular socket-weld fittings with reduced outlets. Designed for use with straight size fittings, reducer inserts serve the same purpose as threaded bushings used with screwed fittings. The drawing at right illustrates the simplicity of their application.



### TYPE 1

For use with Schedule 40 & 80 pipe.



### TYPE 2

For use with Schedule 160 pipe.



SIZE RANGE: From 15 x 10mm to 100 x 25mm, in all standard reducing sizes.

## SPECIFICATIONS

Forged Carbon, Alloy and Stainless Steel Flanges to American Standards are designed for use with pipes and fittings to American Standards, but can also be attached, in certain sizes to pipes made to British and Australian Standards.



### SIZES 15 - 600mm

CLASS 150, 300, 400, 600, 900, 1500 & 2500

Dimensions shown are for Flanges made to the dimensional requirements of ASME B16.5 which is the accepted American Standard for all Flanges in sizes to 600mm bore.

### SIZES ABOVE 600mm

Steel Flanges above 600mm bore are made to various standards, as follows:

CLASS 150, 300, 400, 600, 900

Dimensions to MSS-SP44\* or BS 2393. OneSteel stocks slip-on and weld-neck flanges to BS 3293 and blinds to MSS SP44.

\*MSS-SP44

A Standard developed by the Manufacturers Standardisation Society (of the Valves and Fittings Industry) to provide uniform dimensions of flanges for use with high pressure pipelines larger than 600mm diameter. These designs were predicated on flanges being used with API 5LX line-pipe of 52,000 lbs. minimum yield strength, and were proportioned accordingly.

This Standard can be taken as being the extension of ASME B16.5 in sizes above 600mm bore.

## ANSI FLANGES



## ANSI FLANGES

### MATERIAL SPECIFICATIONS

American Standard Pipe Flanges are manufactured in a variety of Carbon, Alloy and Stainless Steels and selection of a particular grade is determined by the usual criteria of pressure/temperature requirements and corrosion resistance.

Since these factors determine pipe and fittings to be used in a piping system, it is then necessary only to select flanges of a similar material.

## LARGE DIAMETER FLANGE STANDARDS

### ASME B16.1b

This Standard establishes dimensions for Class 250 Cast Iron Flanges above 600mm, (as ASME B16.1 gives dimensions for large diameter Class 125 Cast Iron Flanges).

### API 605

American Petroleum Institute Standard intended primarily for use in Oil and Gas production. API 605 dimensions DO NOT match ASME, MSS or BS dimensions of similar pressure class.

### AWWA C207-54T

This is a Standard published by the American Waterworks Association for steel Flanges to be used on waterworks and sewerage pipes. These flanges match Class 125 Cast Iron Flanges (ASME B16.1) in most dimensions.

### CLASSES 125LW, 175 & 350

These are Standards developed over the years by a number of manufacturers, not all using exactly the same dimensions.

### TEMA FLANGES

The Tubular Exchangers Manufacturers Association (TEMA) lays down standards for dimensions and material specifications for Shell Flanges, Cover Flanges, Long Welding Necks for Nozzles and other heat exchanger components.

### BS.3293

This British Standard established dimensions for flanges for petroleum industry use, in Class 150, 300, 400 and 600, in sizes above 600mm, which correspond exactly to those of MSS SP-44 in Class 300, 400 and 600.

Class 900 is not included in the British Standard, but dimensions are given for Class 150, 600-700mm which are similar to those of ASME B16.1, Class 125.

### BS.1560

This British Standard is based on ASME B16.5, and lists Steel Pipe Flanges to the same dimensions, pressure classes and in the same sizes as the American Standard up to 600mm.

The classifications are used to group materials for Flanges Class 150 through Class 2500.

† ASTM Specifications directly covering forged flanges for these general materials specifications do not presently exist. Flanges of these materials shall be specified to conform to the nearest grade in A182, except chemistry to conform to the ASTM specification listed.

‡ Intended primarily for use for subzero service. The ratings at -29° to 38°C given for the materials on page 28 shall also apply at lower temperatures.

### Guide to Material Specifications

General Classification	Applicable ASTM Specification - Forgings
Carbon Steel (Refer Table pg. 28)	A105
Carbon Steel (low temp.)	A350 Grade LFI† other grades also available
Carbon Molv (Refer Table pg. 28)	A182-55T Grade F1
Chrome-Moly Alloy Steels 1/2 Cr 1/2 Mo 1 Cr 1/2 Mo 1 1/4 Cr 1/2 Mo 2 1/4 Cr 1 Mo 3 Cr 1 Mo 5 Cr 1/2 Mo 5 Cr 1/2 Mo-Si 9 Cr 1 Mo	A335 Grade P2† A182 Grade F12 A182 Grade F11 A182 Grade F22 A335 Grade P21† A182 Grade F5a A335 Grade P5b† A182 Grade F9
Chrome-Nickel Stainless Steels Type 304 Type 310 Type 347 Type 321 Type 316 H & L Grades also available	A182 Grade F304 A182 Grade F310 A182 Grade F347 A182 Grade F321 A182 Grade F316
Nickel Steel 3 1/2 Ni.	A350-55T Grade LF3†

## ASTM A105

Chemical Requirements	
Note - For each reduction of 0.01% below the specified carbon maximum (0.35%), an increase of 0.06% manganese above the specified maximum (1.05%) will be permitted up to a maximum of 1.35%.	
Element	Composition, %
Carbon	0.35 max
Manganese	0.60-1.05
Phosphorus	0.040 max
Sulfur	0.050 max
Silicon	0.10-0.35
Copper	0.40 max <sup>A</sup>
Nickel	0.40 max <sup>A</sup>
Chromium	0.30 max <sup>A,B</sup>
Molybdenum	0.12 max <sup>A,B</sup>
Vanadium	0.03 max <sup>C</sup>
Columbium	0.02 max <sup>C</sup>

<sup>A</sup> The sum of copper, nickel, chromium and molybdenum shall not exceed 1.00%.

<sup>B</sup> The sum of chromium and molybdenum shall not exceed 0.32%.

<sup>C</sup> By agreement between the manufacturer and the purchaser, the limits for vanadium and columbium, or both, may be increased to 0.10% and 0.05% respectively.

Mechanical Requirements - nominal *	
Tensile strength, min, MPa	485
Yield strength, min, MPa <sup>C</sup>	250
Elongation in 50mm, min %	30
Reduction of area, min %	30
Hardness, HB, max	187

\*For complete explanation, refer detailed specification, Table 3, ASTM A 105/A105M.

Heat treatment of flange forgings above Class 300 is mandatory under ASTM A105. All A105 flanges stocked by OneSteel including Class 150 and 300 are heat treated (normalised).

TEMPERATURE / PRESSURE RATINGS						
Carbon Steel Pipe Flanges to ASME B16.5 (BS. 1560) Forgings to ASTM A105 - Not recommended for prolonged use above 427°C Forgings to ASTM A350 - LF2 - Not to be used above 343°C						
Temperature in °C	Maximum Working Pressure in kPa by PN					
	PN20	PN50	PN100	PN150	PN250	PN420
	Class 150	Class 300	Class 600	Class 900	Class 1500	Class 2500
-29 to 38	1960	5110	10210	15320	25530	42550
50	1920	5010	10020	15020	25040	41730
100	1770	4640	9280	13910	23190	38650
150	1580	4520	9050	13570	22610	37690
200	1400	4380	8760	13150	21910	36520
250	1210	4170	8340	12520	20860	34770
300	1020	3870	7750	11620	19370	32280
350	840	3700	7390	11090	18480	30800
375	740	3650	7290	10940	18230	30390
400	650	3450	6900	10350	17250	28750
425	560	2880	5750	8630	14380	23960
450	470	2000	4010	6010	10020	16690
475	370	1350	2710	4060	6770	11290
500	280	880	1760	2640	4400	7330
525	190	520	1040	1550	2590	4320
540	130	330	650	980	1630	2720

FLANGES ABOVE DN 600 ARE NOT INCLUDED IN ASME B16.5 AND THE CLASS DESIGNATIONS IN THESE LARGE DIAMETERS DO NOT IMPLY SPECIFIC TEMPERATURE/PRESSURE RATINGS



### METHODS OF ATTACHMENT



#### SLIP - ON FLANGES

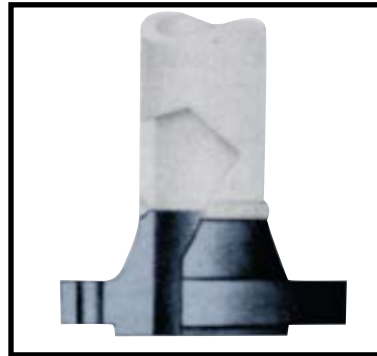
Although recommended practice in attaching Slip-On type flanges is to weld both at the flange hub and the pipe end, for mild service conditions only one is sometimes employed. In this case the weld is normally made at the pipe end.



#### LAP JOINT FLANGES

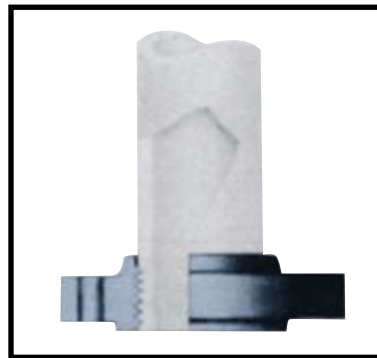
Lap joint flanges are most frequently used with lap joint stub ends, (Type A), although in some cases the lap is formed on the pipe end. Since they are free to rotate or swivel, there is no problem of bolt hole alignment. Such joints may be readily broken for inspection, cleaning, etc. The radius at the ID of the flange face accommodates that at the back of the lap, thus permitting more uniform application of loading.

Lap Joint flanges find their most common application when used with stainless steel stub ends.



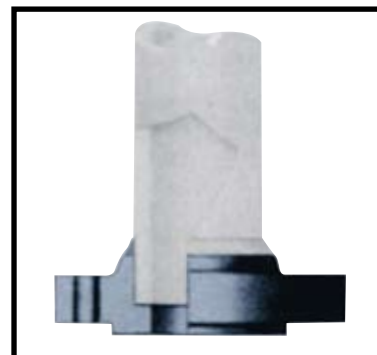
#### WELDING NECK FLANGES

This type of flange is attached by butt welding to the adjoining pipe or shell. The weld may be made either manually or automatically with or without a backing strip. Sound welds are readily obtained with any recognised welding procedure.



#### THREADED FLANGES

Threaded flanges are, of course, attached by screwing to threaded pipe ends.



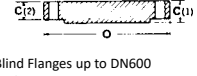
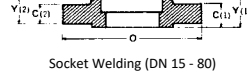
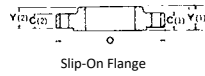
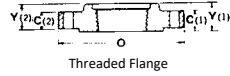
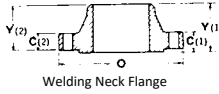
#### SOCKET-WELD FLANGES

In attaching socket-weld flanges, the pipe end is inserted into the socket and then welded at the flange hub. An inside weld at the pipe end is frequently made for greater strength or, with grinding, to provide a smooth bore without pocket.



# Flanges to American Standards

DN 15 to 600 are to ASME B16.5 (BS 1560). DN 750 & 900 are to BS 3293 for Slip-On & Weldneck only.



Blind Flanges up to DN600  
(Above DN600 see notes below†)

NOMINAL SIZES SHOWN ARE | DN : SI METRIC TERM | NPS : ASME TERM

Nominal Flange Size DN		PN20 (Class 150)								PN50 (Class 300)							PN100 (Class 600)							Nominal Flange Size DN	
		Dia. of Fig. O	Thick- ness of Fig. Min. C(1)*	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts	Dia. of Fig. O	Thick- ness of Fig. Min. C(1)*	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts	Dia. of Fig. O	Thick- ness of Fig. Min. C(2)†	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts			
				Thrd. Slip- On Soc/ Weld Y(1)*	Weld Neck Y(1)*						Thrd. Slip-On Soc/ Weld Y(1)*	Weld Neck Y(1)*						Thrd. Slip- On Soc/ Weld Y(2)†	Weld Neck Y(2)†						
J DN	I NPS																						J DN	I NPS	
15	1/2	90	11.5	16	48	60.5	16	4	95	14.5	22	52	66.5	16	4	95	14.5	22	52	66.5	16	4	15	1/2	
20	3/4	100	13.0	16	52	70.0	16	4	120	16.0	25	57	82.5	20	4	120	16.0	25	57	82.5	20	4	20	3/4	
25	1	110	14.5	17	56	79.5	16	4	125	17.5	27	62	89.0	20	4	125	17.5	27	62	89.0	20	4	25	1	
32	1 1/4	120	16.0	21	57	89.0	16	4	135	19.5	27	65	98.5	20	4	135	21.0	29	67	98.5	20	4	32	1	
40	1 1/2	130	17.5	22	62	98.5	16	4	155	21.0	30	68	114.5	22	4	155	22.5	32	70	114.5	22	4	40	1 1/4	
50	2	150	19.5	25	64	120.5	20	4	165	22.5	33	70	127.0	20	8	165	26.5	37	73	127.0	20	8	50	1 1/2	
65	2 1/2	180	22.5	29	70	139.5	20	4	190	25.5	38	76	149.0	22	8	190	29.0	41	79	149.0	22	8	65	2	
80	3	190	24.0	30	70	152.5	20	4	210	29.0	43	79	168.5	22	8	210	32.0	46	83	168.5	22	8	80	1 3/4	
90	3 1/2	215	24.0	32	71	178.0	20	8	230	30.5	44	81	184.0	22	8	230	35.0	49	86	184.0	26	8	90	3	
100	4	230	24.0	33	76	190.5	20	8	255	32.0	48	86	200.0	22	8	275	38.5	54	102	216.0	26	8	100	1 1/2	
125	5	255	24.0	36	89	216.0	22	8	280	35.0	51	98	235.0	22	8	330	44.5	60	114	267.0	30	8	125	5	
150	6	280	25.5	40	89	241.5	22	8	320	37.0	52	98	270.0	22	12	355	48.0	67	117	292.0	30	12	150	6	
200	8	345	29.0	44	102	298.5	22	8	380	41.5	62	111	330.0	26	12	420	55.5	76	133	349.0	33	12	200	8	
250	10	405	30.5	49	102	362.0	26	12	445	48.0	67	117	387.5	30	16	510	63.5	86	152	432.0	36	16	250	10	
300	12	485	32.0	56	114	432.0	26	12	520	51.0	73	130	451.0	33	16	560	66.5	92	156	489.0	36	20	300	12	
350	14	535	35.0	57	127	476.0	30	12	585	54.0	76	143	514.5	33	20	605	70.0	94	165	527.0	39	20	350	14	
400	16	600	37.0	64	127	540.0	30	16	650	57.5	83	146	571.5	36	20	685	76.5	106	178	603.0	42	20	400	16	
450	18	635	40.0	68	140	578.0	33	16	710	60.5	89	159	628.5	36	24	745	83.0	117	184	654.0	45	20	450	18	
500	20	700	43.0	73	145	635.0	33	20	775	63.5	95	162	686.0	36	24	815	89.0	127	190	724.0	45	24	500	20	
600	24	815	48.0	83	152	749.5	36	20	915	70.0	106	168	813.0	42	24	940	102.0	140	203	838.0	52	24	600	24	
750	30	985	54.0 +	89	130.2	914.0	35	28	1090	92.0	210	210	997.0	48	28	1130	114.0	248	248	1022	54	28	750	30	
900	36	1170	60.3 +	95	136.5	1086	41	32	1270	105.0	241	241	1168.0	54	32	1315	124.0	283	283	1194	67	28	900	36	

Nominal Flange Size DN		PN150 (Class 900)							PN250 (Class 1500)							PN420 (Class 2500)							Nominal Flange Size DN		
		Dia. of Fig. O	Thick- ness of Fig. Min. C(2)†	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts	Dia. of Fig. O	Thick- ness of Fig. Min. C(2) †	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts	Dia. of Fig. O	Thick- ness of Fig. Min. C(2)†	Length Thru Hub		Dia. of Bolt Circle	Dia. of Bolt Holes	No. of Bolts			
				Thrd. Slip-On Y(2)†	Weld Neck Y(2)†						Thrd. Slip-On Soc/ Weld Y(2)†	Weld Neck Y(2)†						Thrd. Slip-On Soc/ Weld Y(2)†	Weld Neck Y(2)†						
J DN	I NPS	USE PN250 DIMENSIONS IN THESE SIZES																					J DN	I NPS	
15	1/2								120	22.5	32	60	82.5	22	4	135	30.5	40	73	89.0	22	4	15	1/2	
20	3/4								130	25.5	35	70	89.0	22	4	140	32.0	43	79	95.0	22	4	20	3/4	
25	1								150	29.0	41	73	101.5	26	4	160	35.0	48	89	108.0	26	4	25	1	
32	1 1/4								160	29.0	41	73	111.0	26	4	185	38.5	52	95	130.0	30	4	32	1 1/4	
40	1 1/2								180	32.0	44	83	124.0	30	4	205	44.5	60	111	146.0	33	4	40	1 1/2	
50	2								215	38.5	57	102	165.0	26	8	235	51.0	70	127	171.5	30	8	50	2	
65	2 1/2								245	41.5	64	105	190.5	30	8	270	57.5	79	143	197.0	33	8	65	2 1/2	
80	3	240	38.5	54	102	190.5	26	8	270	48.0	73	118	203.0	33	8	305	67.0	92	168	228.5	36	8	80	3	
100	4	295	44.5	70	114	235.0	32	8	310	54.0	90	124	241.5	36	8	355	76.5	108	190	273.0	42	8	100	4	
125	5	350	51.0	79	127	279.5	35	8	375	73.5	105	155	292.0	42	8	420	92.5	130	229	324.0	48	8	125	5	
150	6	380	56.0	86	140	317.5	32	12	395	83.0	119	171	317.5	39	12	485	108.0	152	273	368.5	56	8	150	6	
200	8	470	63.5	102	162	393.5	39	12	485	92.0	143	213	393.5	45	12	550	127.0	178	318	438.0	56	12	200	8	
250	10	545	70.0	108	184	470.0	39	16	585	108.0	159	254	482.5	52	12	675	165.5	229	419	539.5	68	12	250	10	
300	12	610	79.5	117	200	533.5	39	20	675	124.0	181	283	571.5	56	16	760	184.5	254	464	619.0	76	12	300	12	
350	14	640	86.0	130	213	559.0	42	20	750	133.5		298	635.0	60	16									350	14
400	16	705	89.0	133	216	616.0	45	20	825	146.5		311	705.0	68	16									400	16
450	18	785	102.0	152	229	686.0	52	20	915	162.0		327	774.5	76	16									450	18
500	20	855	108.0	159	248	749.5	54	20	985	178.0		356	832.0	80	16									500	20
600	24	1040	140.0	203	292	901.5	68	20	1170	203.5		406	990.5	94	16									600	24

NOTES:  
All dimensions are shown in millimetres - mm.

\* 1. The 2mm Raised Face is included in thickness C(1) and length through hub Y(1). This applies to PN20 and PN50 Pressure Ratings.

† 2. The 7mm Raised Face is not included in thickness C(2) and length through hub Y(2). PN100, 150, 250 and 420 Pressure Ratings are regularly furnished with 7mm Raised Face which is additional to the flange thickness C(2) and Y(2).

3. Always specify bore when ordering weldneck flanges.  
Bore dimensions shown opposite also provide inside pipe diameters.

## LARGE DIAMETER FLANGES ABOVE DN 600

† For Blind Flanges refer to MSS SP44.  
BS 3293 covers Slip-On and Weldneck but excludes Blind Flanges.  
MSS SP44 covers Blind and Weldneck but excludes Slip-On Flanges.  
BS 3293 Weldneck PN20 flange thickness, C(1), is less than MSS SP44 equivalents.  
API - 605 Dimensions for Large Diameter Flanges vary considerably from both BS 3293 and MSS SP44 — Details on request.

Raised Face Diam.	Nominal Size DN		O.D. of Pipe mm	Approximate Welding Neck Flange Bores - mm															
	All Press. Ratings mm	J DN		I NPS	SCH. 10	SCH. 20	SCH. 30	STD. WT.	SCH. 40	SCH. 60	EXT. STG.	SCH. 80	SCH. 100	SCH. 120	SCH. 140	SCH. 160	X.X STG		
35	15	1/2	21.3				15.8	Same as STD. WT.		13.9	Same as EXT. STG.					11.8	6.4		
43	20	3/4	26.7				20.9			18.9								15.5	11.0
51	25	1	33.4				26.6			24.3								20.7	15.2
64	32	1 1/4	42.2				35.1			32.5								29.5	22.8
73	40	1 1/2	48.3				40.9			38.1								34.0	27.9
92	50	2	60.3				52.5			49.2								42.9	38.2
105	65	2 1/2	73.0				62.7			59.0								54.0	45.0
127	80	3	88.9				77.9			73.7								66.7	58.4
140	90	3 1/2	101.6				90.1			85.4								—	—
157	100	4	114.3				102.3			97.2								87.3	80.1
186	125	5	141.3				128.2			122.3					92.1			109.6	103.2
216	150	6	168.3				154.1			146.3					139.7			131.8	124.4
270	200	8	219.1		206.4	205.0	202.7			198.5		193.7		188.9	182.6	177.8	173.1	174.6	
324	250	10	273.1		260.3	257.5	254.5			247.7		247.7	242.9	236.5	230.2	222.3	215.9	222.3	
381	300	12	323.9		311.1	307.1	304.8		303.2	295.3		298.5	288.9	281.0	273.1	266.7	257.2	273.1	
413	350	14	355.6	342.9	339.8	336.6	336.6	333.3	325.4	330.2	317.5	307.9	300.0	292.1	284.2				
470	400	16	406.4	393.7	390.6	387.4	387.4	381.0	373.1	381.0	363.5	354.0	344.5	333.3	325.4				
533	450	18	457.0	444.5	441.4	434.9	438.2	428.7	419.1	431.8	409.5	398.5	387.4	377.9	366.7				
584	500	20	508.0	495.3	489	482.6	489.0	477.8	466.8	482.6	455.6	442.9	431.8	419.1	408.0				
692	600	24	610.0	596.9	590.6	581.1	590.6	574.6	560.4	584.2	547.7	531.8	517.6	504.9	490.5				
857	750	30	762.0	746.2	736.6	730.2	743.0			736.6									
1022	900	36	914.0	898.6	889.0	882.6	895.4	876.3		889.0									

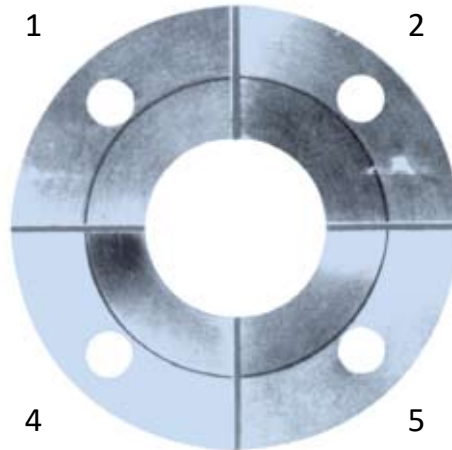
## GASKET SURFACE

Flanges, and other products designed for bolted connection, when furnished with raised face (or flat face) may have any type of gasket surface finish that is required. The more common finishes are described in the following paragraphs.

### 1 STOCK FINISH:

This is a continuous spiral groove. For nominal sizes 300mm and smaller it is generated by a 1.58mm radius round-nosed tool at a feed of 0.79mm per revolution. For sizes above 300mm the tool nose is radiused to 3.17mm and the feed is 1.19mm per revolution.

NB OneSteel stocks flanges with surface finish in the range 3.2-6.3 microns, typically used with both spiral-wound and ring gaskets.



### 2 SPIRAL SERRATED:

This too, is a continuous spiral groove, but it differs from the stock finish in that the groove is generated with a 90° included angle "V" tool. The groove is .39mm deep and the feed is .79mm for all sizes.

### 4 SMOOTH FINISH:

This finish, which can be produced by several shapes of tools, shows no definite tool markings apparent to the naked eye. In the past this finish was sometimes known as "Smooth Plane". This term however, should be avoided because of a tendency to confuse it with "flat faced" which, of course, applies to the flange facing and not to the gasket surface finish.

### 3 CONCENTRIC SERRATED: (Not illustrated)

As the name suggests this surface finish is made up of concentric grooves. A 90° included angle "V" tool is used and the grooves are .39mm deep and .79mm apart.

### 5 COLD WATER FINISH:

Produced by using a wide tool at high speeds, this finish is equivalent to that of a ground surface. It is mirror-like in appearance and surfaces finished in this manner are usually expected to be used without gaskets.

## AMERICAN STANDARD FACINGS — To ASME B.16.5



RAISED FACE



LAPPED JOINT



FLAT FACE



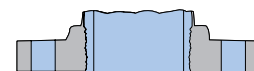
RING JOINT



LARGE TONGUE and GROOVE\*



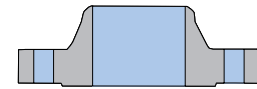
SMALL MALE and FEMALE



SMALL MALE and FEMALE



SMALL TONGUE and GROOVE\*



LARGE MALE - FEMALE

\*It is necessary to modify facing dimensions in order to furnish slip-on flanges 40mm and smaller and welding neck flanges with bores larger than Schedule 40, in sizes 40mm and smaller, for large tongue and groove facing.

## FLANGE GASKETS

Full Face Gaskets: To suit Table D, E and H flanges to AS 2129

Ring Gaskets: To suit Class 150 and 300lb raised face flanges to ANSI B16.5

Gasket materials include:

### INSERTION RUBBER

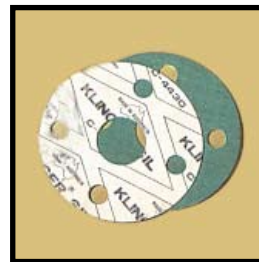
Full face to suit AS 2129 Table D or E. Made from 3mm natural rubber, usually fabric reinforced. Suitable for liquids and gases at ambient temperature, within the rated pressure of the flange.



Full Face Rubber Gasket

### COMPRESSED NON-ASBESTOS FIBRE

Ring or full face. Usually Klingsil C4430. Suitable for most liquids and gases including hydrocarbons and steam. AGA approved (number 5237). Potable water approved to AS 4020.



Full Face Fibre Gasket



Ring Gasket

### SPIRAL WOUND GASKETS

Constructed from a spirally wound "V" section austenitic stainless steel strip, with a non-asbestos filler between each turn. Offering high pressure and temperature resistance and ease of replacement.

There are two popular styles in the Klinger range of spiral gaskets:

### SELF CENTERING, MEDIUM PRESSURE TYPE CR

Type CR gaskets have an outer ring which facilitates accurate centering of the gasket in the joint, provides additional radial strength, helps prevent blow-out and serves as a reference point to determine the amount of compression during bolt pullup. Recommended up to Class 600 flanges or equivalent, general service. Maximum temperature 350°C with graphite filler – check range suitability.

### SELF CENTERING, HIGH PRESSURE TYPE CRIR

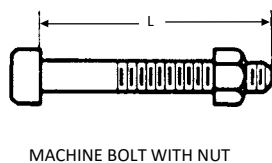
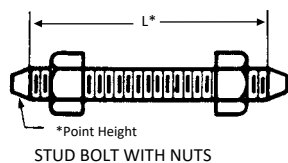
Type CRIR gaskets are the same construction as Type CR but have an additional inner ring. The inner ring provides additional radial strength, acts as a barrier to vacuum and corrosive/abrasive media. Recommended for Class 150 to 2500 flanges or equivalent, and any application requiring advantages of an inner ring. Maximum temperatures 540°C with graphite filler – check flange suitability. Higher temperature rated materials available on request.



Spiral Gasket  
Type CRIR

## BOLTING

To suit R.F. Flange sizes DN 15 to 600 to ASME — B16.5 (BS. 1560) and DN 750 & 900 to BS. 3293



Diameter of Bolts is shown in inches. For nominal diameters 1 inch and smaller, threads are U.N.C.; nominal diameters 1-1/8 inch and larger threads are 8 U.N. (8 T.P.I.).

Length of Bolts (L) is shown in millimetres rounded to the nearest 5 mm. Stud Bolt lengths (L\*) do not include the height of points. Machine Bolt lengths (L) include the height of point. The length shown includes the height of the Raised Face in all cases.

NOMINAL SIZES SHOWN ARE ] DN : SI METRIC TERM | NPS : ASME TERM

Nominal Flange Size DN			PN 20 (Class 150)				PN 50 (Class 300)				PN 100 (Class 600)			PN 150 (Class 900)			PN 250 (Class 1500)			PN 420 (Class 2500)			Nominal Flange Size DN	
			No. Bolts	Dia. Bolts ins.	L		No. Bolts	Dia. Bolts ins.	L		No. Bolts	Dia. Bolts ins.	L	No. Bolts	Dia. Bolts ins.	L	No. Bolts	Dia. Bolts ins.	L	No. Bolts	Dia. Bolts ins.	L		
J DN	I NPS																					J DN	I NPS	
15	1/2	4	1/2	60	45	4	1/2	65	55	4	1/2	80	USE PN250 DIMENSIONS IN THESE SIZES			4	3/4	105	4	3/4	125	15	1/2	
20	3/4	4	1/2	65	50	4	5/8	75	60	4	5/8	90				4	3/4	115	4	3/4	125	20	3/4	
25	1	4	1/2	65	55	4	5/8	80	65	4	5/8	90				4	7/8	125	4	7/8	140	25	1	
32	1 1/4	4	1/2	70	55	4	5/8	80	65	4	5/8	100				4	7/8	125	4	1	150	32	1 1/4	
40	1 1/2	4	1/2	70	60	4	3/4	90	75	4	3/4	105				4	1	140	4	1 - 1/8	170	40	1 1/2	
50	2	4	5/8	80	65	8	5/8	90	75	8	5/8	105				8	7/8	145	8	1	175	50	2	
65	2 1/2	4	5/8	90	75	8	3/4	100	85	8	3/4	120				8	1	160	8	1 - 1/8	195	65	2 1/2	
80	3	4	5/8	90	75	8	3/4	110	90	8	3/4	125	8	7/8	145	8	1 - 1/8	180	8	1 - 1/4	220	80	3	
90	3 1/2	8	5/8	90	75	8	3/4	110	95	8	7/8	140	-	-	-	-	-	-	-	-	-	90	3 1/2	
100	4	8	5/8	90	75	8	3/4	110	95	8	7/8	145	8	1 - 1/8	170	8	1 - 1/4	195	8	1 - 1/2	255	100	4	
125	5	8	3/4	90	80	8	3/4	120	100	8	1	165	8	1 - 1/4	190	8	1 - 1/2	250	8	1 - 3/4	300	125	5	
150	6	8	3/4	100	85	12	3/4	125	105	12	1	170	12	1 - 1/8	195	12	1 - 3/8	260	8	2	345	150	6	
200	8	8	3/4	110	90	12	7/8	140	110	12	1 - 1/8	195	12	1 - 3/8	220	12	1 - 5/8	290	12	2	380	200	8	
250	10	12	7/8	115	95	16	1	155	130	16	1 - 1/4	215	16	1 - 3/8	235	12	1 - 7/8	335	12	2 - 1/2	485	250	10	
300	12	12	7/8	120	100	16	1 - 1/8	170	145	20	1 - 1/4	220	20	1 - 3/8	255	16	2	375	12	2 - 3/4	540	300	12	
350	14	12	1	130	110	20	1 - 1/8	175	150	20	1 - 3/8	235	20	1 - 1/2	275	16	2 - 1/4	405				350	14	
400	16	16	1	135	115	20	1 - 1/4	190	160	20	1 - 1/2	255	20	1 - 5/8	285	16	2 - 1/2	445				400	16	
450	18	16	1 - 1/8	150	125	24	1 - 1/4	195	170	20	1 - 5/8	275	20	1 - 7/8	325	16	2 - 3/4	495				450	18	
500	20	20	1 - 1/8	160	135	24	1 - 1/4	205	180	24	1 - 5/8	290	20	2	345	16	3	540				500	20	
600	24	20	1 - 1/4	175	145	24	1 - 1/2	230	195	24	1 - 7/8	330	20	2 - 1/2	435	16	3 - 1/2	615				600	24	
750	30	28	1 - 1/4	190	160	28	1 - 3/4	290	250	28	2	355	PN150, 250 & 420 - NOT LISTED IN BS 3293								750	30		
900	36	32	1 - 1/2	215	180	32	2	325	280	28	2 - 1/2	400									900	36		

Raised Face height of 2 mm for PN20 & 50 and 7 mm for PN100, 150, 250 & 420 is included in dimension L (Bolt Length).

## MATERIAL SPECIFICATIONS

ASTM A193 Grade B7

Standard specification for alloy steel and stainless steel bolting materials for high temperature service.

ASTM A194 Grade 2H

Standard specification for carbon and alloy steel nuts for bolts for high pressure and high temperature service.

ASTM A320

Standard specification for alloy steel bolting materials for low temperature service.

Grade L7 covers alloy steel stud bolts.

Grade L4 covers alloy steel nuts to suit Grade L7 stud bolts.

OneSteel Piping Systems is the Australian distributor of the Shurjoint and Mech range of roll groove products.



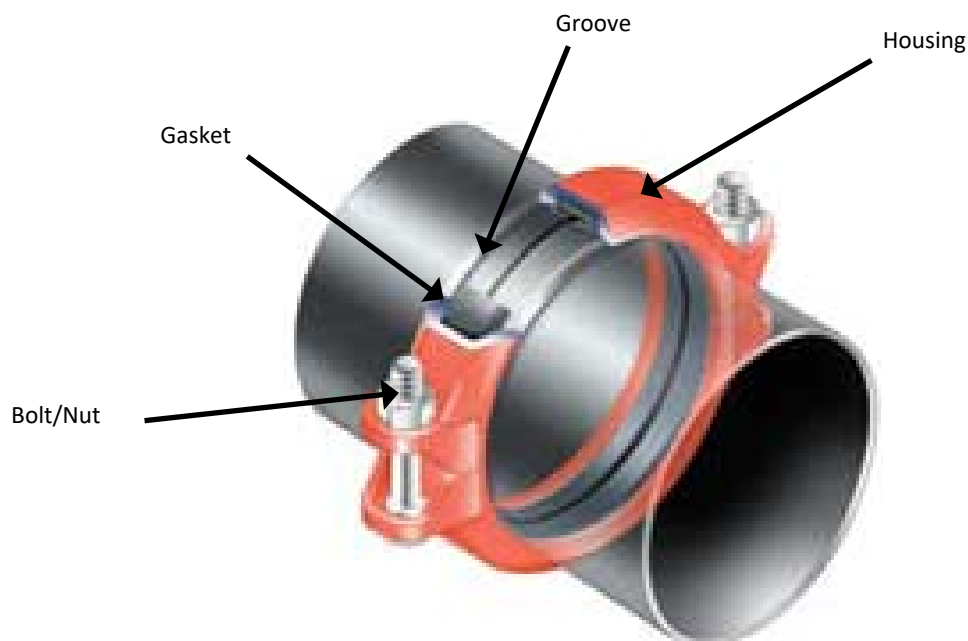
Shurjoint has over three decades of experience and is recognised as a world leader in the design and manufacturer of mechanical piping system components. Shurjoint manufactures the highest quality products by continually investing in research, engineering and development, which enables them to develop new and innovative solutions for the changing needs of industry.



Mech is manufactured by the largest pipe fittings manufacturer in the world, Jinan Meide Casting Co. Jinan Meide's core value of quality provides product of premium levels employing the latest manufacturing technology. MECH's commitment to quality is reflected in the fact that every product, even down to the smallest galvanised malleable fitting, is pressure tested. OneSteel has enjoyed a very successful relationship with Jinan Meide and their MECH product range. MECH products are sold in over 60 countries and are world leaders both in quality and value.

The Grooved System is one of the most advanced, versatile, economical and reliable systems available today. After the pipe ends are grooved, a gasket is stretched over the pipe ends. The coupling segments are then placed over the gasket and bolts and nuts are fastened resulting in a secure joint.

A coupling can be installed 3-4 times faster than a comparable welded or brazed joint and there is no need for a flame or welding torch on the job site. A coupling can be installed by fastening a pair of bolts and nuts while using only a spanner, whereas a comparable flanged joint requires the fastening of many bolts and nuts. The grooved system allows for easy material take-offs and unlike the threaded system, there is no need to allow for added pipe length for thread engagement. With the removal of just a few bolts, one can easily access the system for cleaning, maintenance, changes and or system expansion.





## RIGID COUPLINGS

Rigid couplings are the most popular and most widely used couplings today. They can be used in applications that require a rigid joint similar to that of a traditional flanged, welded and or threaded connection.

### Angle Pad Design

- As the bolts are tightened, the angled bolt pads slide in opposite directions causing the coupling keys to tightly grip the pipe, while at the same time the grooves are forced outwards against the coupling keys.



### Tongue and Groove Design

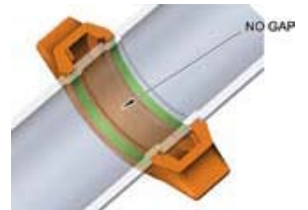
- The T & G Design mechanism provides a mechanical and frictional interlock resulting in a rigid joint which reduces undesired angular movement.



### Butt-Joint Design

- The Unique butt-joint design eliminates the gap in between pipe ends, thus eliminating not only angular and rotational movement but also axial displacement under normal service conditions\*.

\*Pipes must be cut true and square to achieve a butt-joint.



## FLEXIBLE COUPLINGS

Flexible couplings allow for full design features in applications such as curved or deflected layouts and/or when systems are exposed to outside forces beyond normal static conditions, such as seismic events or where vibration and/or noise attenuation are a concern. The ability to design in controlled flexibility is an advantageous feature when compared to traditional rigid jointing methods such as threading, flanging and welding. When designing with flexible couplings, allow for proper support to the system so as to eliminate undesired stress.



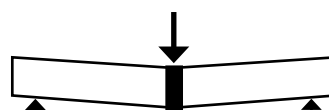
## PIPE SYSTEMS TERMINOLOGY



Rotational Movement



Axial Displacement

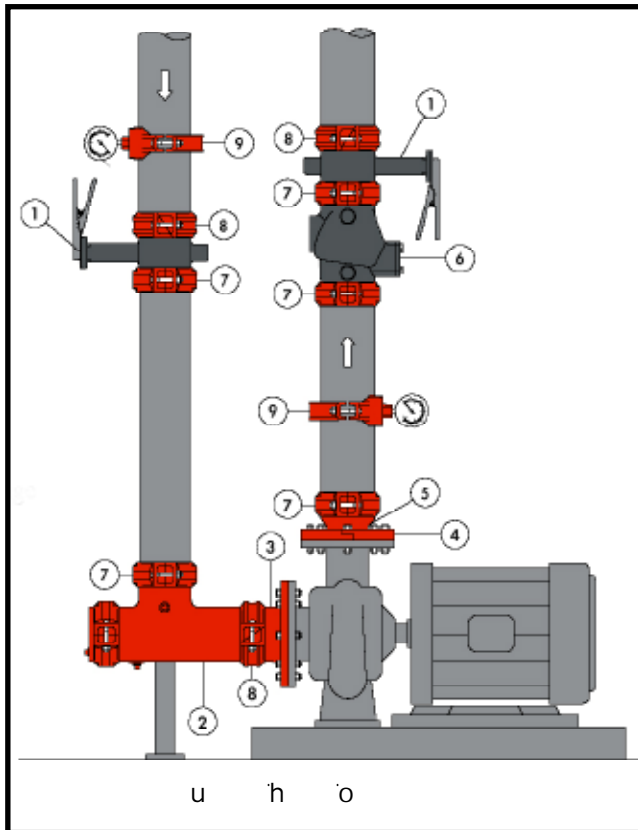


Angular Movement

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### 1GS - Rigid Coupling Light Duty



- Can be used in services up to 2070Kpa and is available in Painted Hot Dipped Galvanised.
- The built-in teeth on the coupling grip the groove shoulder and serve to reduce linear movement.
- The T&G mechanism features a slight offset at the foot of the coupling halves which serve to protect the gasket from exposure.
- With the T&G style coupling no metal-to-metal contact of the pads is required. There is normally a 1.6mm to 3.2mm gap between the bolt pads when installed.

### 1N - Flexible Coupling Light Duty



- Accommodates pipe deflection and or non-alignment: If nominal diameter <DN200, deflection angle is  $\geq 1^\circ$ ; if nominal diameter  $\geq$ DN200, deflection angle is  $\geq 0.5^\circ$  but  $< 1^\circ$ .
- The C-shaped rubber gasket provides excellent self-sealing capabilities in both low and high-pressure services as well as under certain vacuum conditions.
- The design and construction of the coupling with elastomeric gaskets can provide significant noise and vibration absorption as well as seismic stress.
- Coupling keys engage the full circumference of the grooves and provide significant pressure and end load restraint against pipe movement from internal and external forces.

### 1G - Rigid Coupling



- Can be used in services up to 3450Kpa and is available in painted or hot dipped galvanised.
- The built-in teeth on the coupling grip the groove shoulder and serve to reduce linear movement.
- The T&G mechanism features a slight offset at the foot of the coupling halves which serve to protect the gasket from exposure.
- With the T&G style coupling no metal-to-metal contact of the pads is required. There is normally a 1.6mm to 3.2mm gap between the bolt pads when installed.

### 90S - 90deg Elbow Light Duty

### 130S - Light Duty Tee

### 120 - Elbow 45deg

### 300 - Cap



- Painted in acrylic enamel (MSDS available).
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Available in Galvanised finish. Galvanising conforms to ASTM A-153.
- Also available – Concentric Reducers, Eccentric Reducers, Reducing Tees and more.

### 3G – Mechanical Tee Grooved 3I

### – Mechanical Tee Threaded



- Designed for creating an easy and effective branch/outlet in pipe work.
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Available in Galvanised finish. Galvanising conforms to ASTM A-153.
- Available with threaded or grooved outlets.

### 321G - Flange Adaptor Stub



- Holes are incorporated into the fitting, available in different hole configurations.
- Painted in acrylic enamel (MSDS available).
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Available in Galvanised. Galvanising conforms to ASTM A-153.

## Z07-Rigid Coupling Heavy Duty



- Angle-pad design standard rigid coupling for general piping applications where rigidity is required.
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Also available in Galvanised. Galvanising conforms to ASTM A-153.

## 7707 Flexible Coupling Heavy Duty



- Features flexibility that can deal with misalignment, distortion, thermal stress, vibration and noise and also resist seismic tremors.
- Designed for use in a variety of general piping applications of moderate or high-pressure services.
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Available in Galvanised. Galvanising conforms to ASTM A-153.

## 7041 Flange Adaptor Hinged Type



- This fitting allows quick and direct connection to PN10 or PN16 flanges.
- The specially designed gasket enables the transition from a grooved system to a flanged system in one fitting.
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Available in Galvanised. Galvanising conforms to ASTM A-153.

## XH-70EP- Rigid Coupling Extra Heavy



- The wider housing keys grip the grooves with the aid of heavy duty bolts and nuts for high pressure services.
- Made to ASTM A-536 - Specification for Ductile Iron Castings Grade.
- Housings are designed to be incorporated with the specially engineered EP cut-grooves on the pipe (enquire for details).
- Painted in green enamel.

## Heavy Duty Fittings

7110 – 90deg Elbow

7111 – 45deg Elbow

7150 – Concentric Reducer

7120 – Equal Tee

7160 – Cap



- Painted in acrylic enamel (MSDS available).
- Pressure rating conforms to the coupling and/or pipe that is being used.
- Available in Galvanised. Galvanising conforms to ASTM A-153.

**Butterfly Valve SJ-300N Lever & Gear Type**



- The valve consists of epoxy coated ductile iron body and EPDM or Nitrile rubber encapsulated dual-seal disc.
- Available in 10 position lever handle or a worm gear operator.
- Sizes 50mm-600mm.

**Check Valve Model SJ-915**



- Grooved-end dual-plate check valve designed to provide positive and silent protection against backflow in piping systems.
- Sizes 65mm – 600mm.

**Suction Diffuser Model 725G**



- Installed in the inlet side of a pump that gives significant space saving capability. Also features an integrated strainer with easy access.
- Sizes 65mm – 400mm.

**Check Valve Model SJ-900**



- Features a spring-loaded wide-open clapper and non-stick tight EPDM rubber seal. Can be installed in the vertical or horizontal position.
- Sizes 65mm – 600mm.

**Y-Strainer Model 726**



- Straight flow design to remove debris with lower pressure drop. The stainless steel screen is easily accessible by removing a single coupling.
- Sizes 50mm – 400mm.

## FIRE VALVES

**Monitored Butterfly Valve Model BB-G - Fire**



- Specifically used for indoor use only for fire services. Installed with a UL Approved Dual Tamper Switch.
- Sizes 50mm – 65mm.

**Monitored Butterfly Valve Model BO-G300 – Fire**



- Fire service butterfly valve that has a factory installed UL approved tampered switch for indoor and outdoor use.
- Sizes 65mm – 200mm.

**Check Valve Model DCG-300 – Fire**



- The clapper design provides low pressure drop in a compact body. Ductile Iron body with EPDM encapsulated disc.
- Sizes 50mm – 200mm.