乘 风 破 浪 ， 坤 鹏 万 里

Brave the wind and waves
Create the future

TIANJIN EKUN STEEL GROUP LIMITED

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BUTTWELD FITTINGS

WHAT ARE BUTTWELD FITTINGS?
Buttweld fittings are accessories used in a piping connection that is designed to be welded on-site to allow the following changes:

a) Change in flow direction (Elbows)
b) Change in pipe diameter (Reducers)
c) Branching (Tees & Cross)
d) Ending (Cap)

BENEFITS OF USING BUTTWELD FITTINGS
Here at HH Stainless, we carry a wide range of Buttweld fittings ranging from various shapes (elbows, tees, reducers, caps, stub- ends) and sizes. We keep stocks in Stainless Steel (304 & 316), Duplex (F51 - 31803),Super Duplex (F53 – 32750 & F60 – F32760).

These are governed by the key specifications under MSS SP 43 that integrates ASME B16.9 for our products.

Butt welding fittings have the following benefits
- Welded Connections allows for a more stable connection
- Minimize pressure drops and the turbulence inside the pipeline
- Excellent service life that is readily available to purchase and deploy

AVAILABLE SIZE RANGE

BUTTWELD FITTINGS	TYPES	NOMINAL BORE SIZE RANGE	SCH/ THICKNESS	304/L 316/L		F51 31803/2205	F53 32750
AUSTENITIC STEELS - WELDED BUTTWELD FITTINGS	LONG RADIUS ELBOW 45 & 90 DEG	0.50” - 24.00”	S10S	•	•		
	SHORT RADIUS ELBOW 90 DEG	0.50” - 24.00”	S40S / STD	•	•		
	EQUAL & REDUCING TEE			•	•		
	CONCENTRIC & ECCENTRIC REDUCER	*304/L & 316/L WX from 8” onwards		•	•		
	END CAP			•	•		
	LAP JOINT (STUB END)			•	•		
AUSTENITIC STEELS - SEAMLESS BUTTWELD FITTINGS	LONG RADIUS ELBOW 45 & 90 DEG	0.50” - 12.00”	S10S	•	•		
	SHORT RADIUS ELBOW 90 DEG	0.50” - 12.00”	S40S / STD	•	•		
	EQUAL & REDUCING TEE	0.50” - 12.00”	S80S / XS	•	•		
	CONCENTRIC & ECCENTRIC REDUCER	0.50” - 8.00”	S160S	•	•		
	END CAP	0.50” - 6.00”	XXS	•	•		
	LAP JOINT (STUB END)			•	•		
DUPLEX & SUPER DUPLEX BUTT WELD FITTINGS	LONG RADIUS ELBOW 45 & 90 DEG	0.50” - 8.00”	S10S			•	•
	EQUAL TEE	0.50” - 8.00”	S40S / STD			•	•
	CONCENTRIC REDUCER	0.50” - 8.00”	S80S / XS			•	•
		0.50” - 6.00”	S160S			•	•
		0.50” - 4.00”	XXS			•	•

EXPLORING COMMON TYPES OF BUTTWELD FITTINGS

Below, we dive into the common types of buttweld fittings one would encounter in their course of usage:

01

90° LONG & SHORT RADIUS ELBOW
The buttweld elbow is designed to change the direction of fluid in the piping system. The most common types of elbows are 45°, 90° and 180°.

02

45° LONG RADIUS ELBOW
The buttweld elbow is designed to change the direction of fluid in the piping system. The most common types of elbows are 45°, 90° and 180°.

03

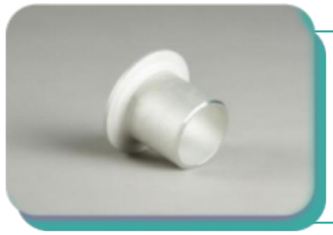
EQUAL & REDUCING TEE
The equal tee or otherwise known as the straight tee features three equal sides for both the run and branch sides. It is a buttweld fitting that is used to branch a pipeline at 90°. There is also another variant known as the reducing tee that has a smaller bore size on the branch side to reduce flow.

04

CONCENTRIC & ECCENTRIC REDUCER
Reducers are used to connect a larger pipe to a smaller pipe. These are available in concentric (centered) and eccentric (off-centered) types.

05

END CAP
Caps are used to cover the endings of a pipe system either permanently or temporarily. Temporarily being for maintenance or for future expansion of connections.



06

LAP JOINT (STUB END)
Stub ends are buttweld fittings that can be used in combination with a lap joint flange as an alternative to welding neck flanges to make flanged connections.

LONG RADIUS ELBOWS 90°

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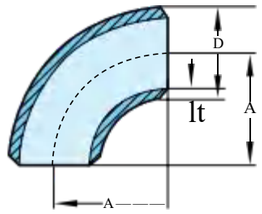

▲ WP-W = made from welded pipe or plate
WP-S = made from seamless pipe
• S31803 = made from seamless pipe
• S32750 = made from seamless pipe

We keep only seamless duplex and super duplex fittings. We do not keep welded duplex and super duplex fittings.

Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	A	kg/pce				
1/2"	10s	21.3	2.11	38.1	0.060	● / ▲	● / ▲	●	
	40s	21.3	2.77	38.1	0.080	● / ▲	● / ▲	●	
	80s	21.3	3.73	38.1	0.100	●	●	●	
	160	21.3	4.78	38.1	0.150		●	●	
3/4"	10s	26.7	2.11	38.1	0.070	● / ▲	● / ▲	●	
	40s	26.7	2.87	38.1	0.090	● / ▲	● / ▲	●	
	80s	26.7	3.91	38.1	0.110	●	●	●	
	160	26.7	5.56	38.1	0.230		●	●	
1"	10s	33.4	2.77	38.1	0.140	● / ▲	● / ▲	●	
	40s	33.4	3.38	38.1	0.160	● / ▲	● / ▲	●	
	80s	33.4	4.55	38.1	0.220	●	●	●	
	160	33.4	6.35	38.1	0.253		●	●	
	XXS	33.4	9.09	38.1	0.360		●		
1 1/4"	10s	42.2	2.77	47.6	0.230	● / ▲	● / ▲	●	
	40s	42.2	3.56	47.6	0.250	● / ▲	● / ▲	●	
	80s	42.2	4.85	47.6	0.400	●	●	●	
	160	42.2	6.35	47.6	0.419		●	●	
	XXS	42.2	9.70	47.6	0.640		●		
1 1/2"	10s	48.3	2.77	57.2	0.310	● / ▲	● / ▲	●	
	40s	48.3	3.68	57.2	0.400	● / ▲	● / ▲	●	
	80s	48.3	5.08	57.2	0.510	●	●	●	
	160	48.3	7.14	57.2	0.649		●	●	
	XXS	48.3	10.15	57.2	0.930		●		
2"	10s	60.3	2.77	76.2	0.510	● / ▲	● / ▲	●	●
	40s	60.3	3.91	76.2	0.710	● / ▲	● / ▲	●	●
	80s	60.3	5.54	76.2	0.910	●	●	●	●
	160	60.3	8.74	76.2	1.330		●	●	
	XXS	60.3	11.07	76.2	1.690		●	●	
2 1/2"	10s	73.0	3.05	95.3	0.850	● / ▲	● / ▲	●	
	40s	73.0	5.16	95.3	1.360	● / ▲	● / ▲	●	
	80s	73.0	7.01	95.3	1.810	●	●	●	
	160	73.0	9.52	95.3	2.330		●	●	
	XXS	73.0	14.02	95.3	3.430		●		
3"	10s	88.9	3.05	114.3	1.220	● / ▲	● / ▲	●	●
	40s	88.9	5.49	114.3	2.180	● / ▲	● / ▲	●	●
	80s	88.9	7.62	114.3	2.980	●	●	●	●
	160	88.9	11.13	114.3	3.830		●	●	
	XXS	88.9	15.24	114.3	5.250		●	●	
3 1/2"	10s	101.6	3.05	133.4	1.700		▲		
	40s	101.6	5.74	133.4	1.830		▲		
4"	10s	114.3	3.05	152.4	2.150	● / ▲	● / ▲	●	●
	40s	114.3	6.02	152.4	4.170	● / ▲	● / ▲	●	●
	80s	114.3	8.56	152.4	6.180	●	●	●	●
	160	114.3	13.49	152.4	8.020		●	●	
	XXS	114.3	17.12	152.4	10.200		●	●	
5"	10s	141.3	3.40	190.5	3.630	● / ▲	● / ▲	●	
	40s	141.3	6.55	190.5	6.860	● / ▲	● / ▲	●	
	80s	141.3	9.53	190.5	9.580		●	●	
	160	141.3	9.53	190.5	9.580			●	
6"	10s	168.3	3.40	228.6	4.900	● / ▲	● / ▲	●	●
	40s	168.3	7.11	228.6	10.890	● / ▲	● / ▲	●	●
	80s	168.3	10.97	228.6	16.330	●	●	●	●
	160	168.3	18.26	228.6	24.200	●	●	●	
8"	10s	219.1	3.76	304.8	10.660	● / ▲	● / ▲	●	
	40s	219.1	8.18	304.8	21.550	● / ▲	● / ▲	●	●
	80s	219.1	12.70	304.8	33.110	●	●	●	●
	160	219.1	23.01	304.8	53.200		●		
10"	10s	273.1	4.19	381.0	19.500	● / ▲	● / ▲		
	40s	273.1	9.27	381.0	38.560	● / ▲	● / ▲		
	80s	273.1	12.70	381.0	47.7000	●	●		
12"	10s	323.9	4.57	457.2	27.220	● / ▲	● / ▲		
	40s	323.9	9.53	457.2	59.420	● / ▲	● / ▲		
	80s	323.9	12.70	457.2	68.700	●	●		
14"	10s	355.6	4.78	533.4	36.300	▲	▲		
	STD	355.6	9.53	533.4	70.300	▲	▲		
16"	10s	406.4	4.78	609.6	47.630	▲	▲		
	STD	406.4	9.53	609.6	91.630	▲	▲		
18"	10s	457.2	4.78	685.8	59.870	▲	▲		
	STD	457.2	9.53	685.8	122.000	▲	▲		
20"	10s	508.0	5.54	762.0	99.790	▲	▲		
	STD	508.0	9.53	762.0	140.000	▲	▲		
24"	10s	609.6	6.35	914.4	140.610	▲	▲		
	STD	609.6	9.53	914.4	202.000		▲		

LONG RADIUS ELBOWS 45°

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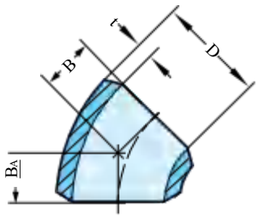

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Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	B	kg/pce				
1/2"	10s	21.3	2.11	15.9	0.030	● / ▲	● / ▲	●	
	40s	21.3	2.77	15.9	0.035	● / ▲	● / ▲	●	
	80S	21.3	3.73	15.9	0.050	●	●	●	
	160	21.3	4.78	15.9	0.070		●		
3/4"	10s	26.7	2.11	19	0.03	● / ▲	● / ▲	●	
	40s	26.7	2.87	19	0.04	● / ▲	● / ▲	●	
	80S	26.7	3.91	19	0.07	●	●	●	
	160	26.7	5.56	19	0.12		●		
1"	10s	33.4	2.77	22.2	0.09	● / ▲	● / ▲	●	
	40s	33.4	3.38	22.2	0.110	● / ▲	● / ▲	●	
	80S	33.4	4.55	22.2	0.130	●	●	●	
	160	33.4	6.35	22.2	0.150		●		
1 1/4"	10s	42.4	2.77	25.4	0.11	● / ▲	● / ▲	●	
	40s	42.4	3.56	25.4	0.17	● / ▲	● / ▲		
	80S	42.4	4.85	25.4	0.18		●		
	160	42.4	6.35	25.4	0.23		●		
1 1/2"	10s	48.3	2.77	28.6	0.170	● / ▲	● / ▲	●	
	40s	48.3	3.68	28.6	0.230	● / ▲	● / ▲	●	
	80S	48.3	5.08	28.6	0.25	●	●	●	
	160	48.3	7.14	28.6	0.37		●		
2"	10s	60.3	2.77	34.9	0.250	● / ▲	● / ▲	●	
	40s	60.3	3.91	34.9	0.400	● / ▲	● / ▲	●	
	80s	60.3	5.54	34.9	0.510	●	●	●	
	160	60.3	8.74	34.9	0.740		●	●	
	XXS	60.3	11.07	34.9	0.850		●		
2 1/2"	10s	73.0	3.05	44.5	0.480	● / ▲	● / ▲	●	
	40s	73.0	5.16	44.5	0.770	● / ▲	● / ▲	●	
	80s	73.0	7.01	44.5	0.900	●	●	●	
	160	73.0	9.53	44.5	1.280		●		
	XXS	73.0	14.02	44.5	1.720		●		
3"	10s	88.9	3.05	50.8	0.630	● / ▲	● / ▲	●	
	40s	88.9	5.49	50.8	1.080	● / ▲	● / ▲	●	●
	80s	88.9	7.62	50.8	1.370	●	●	●	●
	160	88.9	11.13	50.8	2.070		●		
	XXS	88.9	15.24	50.8	2.630		●	●	
4"	10s	114.3	3.05	63.5	1.080	● / ▲	● / ▲	●	
	40s	114.3	6.02	63.5	2.090	● / ▲	● / ▲	●	●
	80s	114.3	8.56	63.5	2.680	●	●	●	●
	160	114.3	13.49	63.5	4.300		●		
	XXS	114.3	17.12	63.5	5.090		●		
5"	10s	141.3	3.40	79.4	1.810	● / ▲	●	●	
	40s	141.3	6.55	79.4	3.430	▲	●	●	
	80s	141.3	9.53	79.4	4.570		●	●	
	160	141.3	15.88	79.4	7.350		●		
6"	10s	168.3	3.40	95.3	2.720	● / ▲	● / ▲	●	
	40s	168.3	7.11	95.3	5.440	● / ▲	● / ▲	●	●
	80s	168.3	10.97	95.3	7.500	●	●	●	●
	160	168.3	18.26	95.3	12.100		●		
	XXS	168.3	21.95	95.3	14.500		●		
8"	10s	219.1	3.76	127	5.330	● / ▲	● / ▲	●	
	40s	219.1	8.18	127	10.770	● / ▲	● / ▲	●	●
	80s	219.1	12.7	127	15.300	●	●	●	●
	160	219.1	23.01	127	26.600		●		
10"	10s	273.1	4.19	159.0	9.750	● / ▲	● / ▲		
	40s	273.1	9.27	159.0	19.280	● / ▲	● / ▲		
	80s	273.1	12.7	159.0	23.900	●	●		
12"	10s	323.9	4.57	190.5	13.610	● / ▲	● / ▲		
	40s	323.9	9.53	190.5	29.710	● / ▲	● / ▲		
	80s	323.9	12.7	190.5	34.400	●	● / ▲		
14"	10s	355.6	4.78	222.3	18.140	▲	▲		
16"	10s	406.4	4.78	254.0	23.810	▲	▲		
	SSTD	406.4	9.53	254.0	44.5		▲		
18"	10s	457.2	4.78	285.8	29.940	▲	▲		
20"	10s	508.0	5.54	317.5	49.890	▲	▲		
24"	10s	609.6	6.35	381.0	70.310	▲	▲		

SHORT RADIUS ELBOWS 90°

ASTM A403 ASME B16.9

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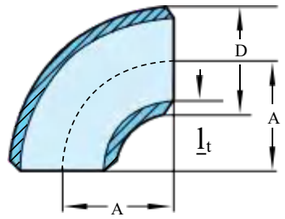
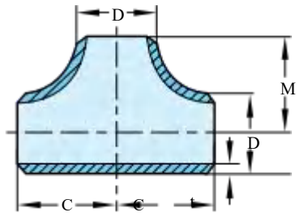


Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	A	kg/pce				
1"	10s	33.4	2.77	25.4	0.100	• / ▲	▲		
	40s	33.4	3.38	25.4	0.120	▲	▲		
	80s	33.4	4.55	25.4	0.129				
1 1/4"	40s	42.4	3.56	31.8	0.2	▲	▲		
	80s	42.4	4.85	31.8	0.222				
1 1/2"	10s	48.3	2.77	38.1	0.220	• / ▲	▲		
	40s	48.3	3.68	38.1	0.290	▲	▲		
	80s	48.3	5.08	38.1	0.323				
2"	10s	60.3	2.77	50.8	0.370	• / ▲	▲		
	40s	60.3	3.91	50.8	0.510	▲	▲		
	80s	60.3	5.54	50.8	0.596		•		
2 1/2"	10s	73.0	3.05	63.5	0.620	▲	▲		
	40s	73.0	5.16	63.5	1.020	▲	▲		
	80s	73.0	7.01	63.5	1.140				
3"	10s	88.9	3.05	76.2	0.980	• / ▲	• / ▲		
	40s	88.9	5.49	76.2	1.500	▲	▲		
	80s	88.9	7.62	76.2	1.850				
4"	10s	114.3	3.05	101.6	1.720	• / ▲	• / ▲		
	40s	114.3	6.02	101.6	3.120	▲	▲		
	80s	114.3	8.56	101.6	3.560				
5"	10s	141.3	3.40	127.0	2.78	▲	▲		
	40s	141.3	6.55	127.0	5.28	▲	▲		
6"	10s	168.3	3.40	152.4	4.150	• / ▲	• / ▲		
	40s	168.3	7.11	152.4	7.150	▲	• / ▲		
	80s	168.3	10.97	152.4	11.790		•		
8"	10s	219.1	3.76	203.2	8.000	• / ▲	▲		
	40s	219.1	8.18	203.2	17.050	▲	▲		
10"	10s	273.1	4.19	254.0	12.400	• / ▲	▲		
	40s	273.1	9.27	254.0	24.000	▲	▲		
12"	10s	323.9	4.57	304.8	17.200	• / ▲	▲		
	40s	323.9	9.53	304.8	38.100	• / ▲	▲		
14"	10s	355.6	4.78	355.6	23.590	▲	▲		
16"	10s	406.4	4.78	406.4	30.840	▲	▲		
18"	10s	457.2	4.78	457.2	39.500	▲	▲		
20"	10s	508.0	4.78	508.0	65.000		▲		
24"	10s	609.6	6.35	609.6	92.000	▲	▲		

EQUAL TEE

ASTM A403 ASME B16.9



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Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	C/M	kg/pce				
1/2"	10s	21.3	2.11	25.4	0.065	● / ▲	● / ▲	●	
	40s	21.3	2.77	25.4	0.085	● / ▲	● / ▲	●	
	80s	21.3	3.73	25.4	0.140	●	●	●	
	160	21.3	4.78	25.4	0.150		●	●	
3/4"	10s	26.7	2.11	28.6	0.092	● / ▲	● / ▲	●	
	40s	26.7	2.87	28.6	0.115	● / ▲	● / ▲	●	
	80s	26.7	3.91	28.6	0.200	●	●	●	
	160	26.7	5.56	28.6	0.300		●	●	
1"	10s	33.4	2.77	38.1	0.200	● / ▲	● / ▲	●	
	40s	33.4	3.38	38.1	0.245	● / ▲	● / ▲	●	
	80s	33.4	4.55	38.1	0.390	●	●	●	
	160	33.4	6.35	38.1	0.470		●	●	
1 1/4"	10s	42.2	2.77	47.6	0.330	● / ▲	● / ▲	●	
	40s	42.2	3.56	47.6	0.420	● / ▲	● / ▲	●	
	80s	42.2	4.85	47.6	0.548	●	●	●	
	160	42.2	6.35	47.6	0.890		●		
	XXS	42.2	9.70	47.6	1.200		●		
1 1/2"	10s	48.3	2.77	57.2	0.460	● / ▲	● / ▲	●	
	40s	48.3	3.68	57.2	0.595	● / ▲	● / ▲	●	
	80s	48.3	5.08	57.2	1.020	●	●	●	
	160	48.3	7.14	57.2	1.43		●	●	
	XXS	48.3	10.15	57.2	1.700		●		
2"	10s	60.3	2.77	63.5	0.630	● / ▲	● / ▲	●	●
	40s	60.3	3.91	63.5	0.872	● / ▲	● / ▲	●	●
	80s	60.3	5.54	63.5	1.590	●	●	●	●
	160	60.3	8.74	63.5	3.180		●	●	
	XXS	60.3	11.07	63.5	3.500		●	●	
2 1/2"	10s	73.0	3.05	76.2	1.100	● / ▲	● / ▲	●	
	40s	73.0	5.16	76.2	1.700	● / ▲	● / ▲	●	
	80s	73.0	7.01	76.2	2.790	●	●	●	
	160	73.0	9.52	76.2	3.630		●		
3"	10s	88.9	3.05	85.7	1.370	● / ▲	● / ▲	●	●
	40s	88.9	5.49	85.7	1.900	● / ▲	● / ▲	●	●
	80s	88.9	7.62	85.7	4.450	●	●	●	●
	160	88.9	11.13	85.7	5.870		●	●	
	XXS	88.9	15.24	85.7	7.000		●	●	
3 1/2"	10s	101.6	3.05	95.3	1.740		● / ▲		
	40s	101.6	5.74	95.3	3.190		● / ▲		
4"	10s	114.3	3.05	104.8	2.150	● / ▲	● / ▲	●	●
	40s	114.3	6.02	104.8	4.130	● / ▲	● / ▲	●	●
	80s	114.3	8.56	104.8	7.710	●	●	●	●
	160	114.3	13.49	104.8	9.760		●	●	
	XXS	114.3	17.12	104.8	10.600		●	●	
5"	10s	141.3	3.40	123.8	3.480	● / ▲	● / ▲	●	
	40s	141.3	6.55	123.8	6.550	● / ▲	● / ▲	●	
	80s	141.3	9.53	123.8	11.340	●		●	
	160	141.3	15.88	123.8	15.900		●		
6"	10s	168.3	3.40	142.9	4.760	● / ▲	● / ▲	●	●
	40s	168.3	7.11	142.9	9.730	● / ▲	● / ▲	●	●
	80s	168.3	10.97	142.9	13.610	●	●	●	●
	160	168.3	18.26	142.9	23.300		●	●	
	XXS	168.3	21.95	142.9	28.400		●		
8"	10s	219.1	3.76	177.8	8.460	● / ▲	● / ▲	●	
	40s	219.1	8.18	177.8	18.000	● / ▲	● / ▲	●	●
	80S	219.1	12.70	177.8	30.300	●	●	●	●
	160	219.1	23.01	177.8	50.700		●		
10"	10s	273.1	4.19	215.9	14.200	● / ▲	● / ▲		
	40s	273.1	9.27	215.9	30.800	● / ▲	● / ▲		
	80S	273.1	12.70	215.9	44.200	●	●		
12"	10s	323.9	4.57	254.0	21.600	● / ▲	● / ▲		
	40s	323.9	9.53	254.0	44.300	● / ▲	● / ▲		
	80S	323.9	12.70	254.0	70.800	●	●		
14"	10s	355.6	4.78	279.4	48.530	▲	▲		
	STD	355.6	9.53	279.4	79.380	▲	▲		
16"	10s	406.4	4.78	304.8	58.970	▲	▲		
	STD	406.4	9.53	304.8	99.790	▲	▲		
18"	10s	457.2	4.78	342.9	76.660	▲	▲		
	STD	457.2	9.53	342.9	84.000		▲		
20"	10s	508.0	5.54	381.0	103.420	▲	▲		
	STD	508.0	9.53	381.0	114.000		▲		
24"	10s	609.6	6.35	431.8	155.580	▲	▲		
	STD	609.6	9.53	431.8	179.000		▲		

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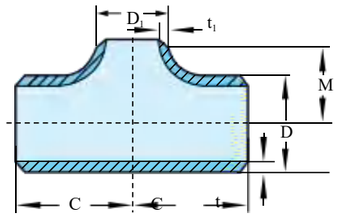
ASTM A403 ASME B16.9



▲ WP-W = made from welded pipe or plate
WP-S = made from seamless pipe
• S31803 = made from seamless pipe
• S32750 = made from seamless pipe

We keep only seamless duplex and super duplex fittings. We do not keep welded duplex and super duplex fittings.

Nominal pipe size			Schedule	Dimension in mm						Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	C	M	kg/pce				
3/4	x	1/2"	10s	26.7	21.3	2.11	2.11	29	29	0.110	• / ▲	• / ▲	•	
			40s	26.7	21.3	2.87	2.77	29	29	0.150	• / ▲	• / ▲	•	
			80s	26.7	21.3	3.91	3.73	29	29	0.190	•	•	•	
			160	26.7	21.3	5.56	4.78	29	29	0.210		•		
1	x	1/2"	10s	33.4	21.3	2.77	2.11	38	38	0.190	• / ▲	• / ▲	•	
			40s	33.4	21.3	3.38	2.77	38	38	0.220	• / ▲	• / ▲	•	
			80s	33.4	21.3	4.55	3.73	38	38	0.281	•	•	•	
			160	33.4	21.3	6.35	4.78	38	38	0.370		•		
	x	3/4"	10s	33.4	26.7	2.77	2.11	38	38	0.190	• / ▲	• / ▲	•	
			40s	33.4	26.7	3.38	2.87	38	38	0.230	• / ▲	• / ▲	•	
			80s	33.4	26.7	4.55	3.91	38	38	0.385	•	•	•	
			160	33.4	26.7	6.35	5.56	38	38	0.400		•		
1 1/4	x	1/2"	10s	42.2	21.3	2.77	2.11	47.6	47.6	0.367	• / ▲	•		
			40s	42.2	21.3	3.56	2.77	47.6	47.6	0.470	• / ▲	• / ▲		
	x	3/4"	10s	42.2	26.7	2.77	2.11	47.6	47.6	0.440	• / ▲	• / ▲	•	
			40s	42.2	26.7	3.56	2.87	47.6	47.6	0.500	• / ▲	• / ▲	•	
	x	1"	10s	42.2	33.4	2.77	2.77	47.6	47.6	0.450	▲	•	•	
			40s	42.2	33.4	3.56	3.38	47.6	47.6	0.530	•	• / ▲	•	
1 1/2	x	1/2"	10s	48.3	21.3	2.77	2.11	57	57	0.390	• / ▲	• / ▲		
			40s	48.3	21.3	3.68	2.77	57	57	0.520	• / ▲	• / ▲		
			80s	48.3	21.3	5.08	3.73	57	57	0.700		•		
	x	3/4"	10s	48.3	26.7	2.77	2.11	57	57	0.390	• / ▲	• / ▲	•	
			40s	48.3	26.7	3.68	2.87	57	57	0.520	• / ▲	• / ▲	•	
			80S	48.3	26.7	5.08	3.91	57	57	1.000	•	•	•	
	x	1"	10s	48.3	33.4	2.77	2.77	57	57	0.420	• / ▲	• / ▲	•	
			40s	48.3	33.4	3.68	3.38	57	57	0.550	• / ▲	• / ▲	•	
			80s	48.3	33.4	5.08	4.55	57	57	0.724	•	•	•	
			160	48.3	33.4	7.14	6.35	57	57	1.280		•		
	x	1 1/4"	10s	48.3	42.2	2.77	2.77	57	57	0.680	▲		•	
			40s	48.3	42.2	3.68	3.56	57	57	0.850	▲		•	
2	x	1/2"	10s	60.3	21.3	2.77	2.11	64	44	0.780	• / ▲	• / ▲		
			40s	60.3	21.3	3.91	2.77	64	44	0.960	• / ▲	• / ▲		
			80s	60.3	21.3	5.54	3.73	64	44	1.140	• / ▲	•		
	x	3/4"	10s	60.3	26.7	2.77	2.11	64	44	0.510	• / ▲	• / ▲		
			40s	60.3	26.7	3.91	2.87	64	44	0.710	• / ▲	• / ▲		
			80s	60.3	26.7	5.54	3.91	64	44	1.020	•	•		
			160	60.3	26.7	8.74	5.56	64	44	1.520		•		
			XXS	60.3	26.7	11.07	7.82	64	44	1.760		•		

Nominal pipe size			Schedule	Dimension in mm						Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	C	M	kg/pce				
2	x	1"	10s	60.3	33.4	2.77	2.77	64	51	0.540	• / ▲	• / ▲	•	
			40s	60.3	33.4	3.91	3.38	64	51	0.740	• / ▲	• / ▲	•	
			80s	60.3	33.4	5.54	4.55	64	51	1.160	•	•	•	
			160	60.3	33.4	8.74	6.35	64	51	1.580		•		
			XXS	60.3	33.4	11.07	9.09	64	51	1.810		•		
	x	1 1/4"	10s	60.3	42.2	2.77	2.77	64	57	0.571	• / ▲	• / ▲	•	
			40s	60.3	42.2	3.91	3.56	64	57	0.804	• / ▲	• / ▲	•	
			80s	60.3	42.2	5.54	4.85	64	57	1.370		•		
			160	60.3	42.2	8.74	6.35	64	57	1.600		•		
			XXS	60.3	42.2	11.07	9.70	64	57	2.150		•		
	x	1 1/2"	10s	60.3	48.3	2.77	2.77	64	60	0.590	• / ▲	• / ▲	•	
			40s	60.3	48.3	3.91	3.68	64	60	0.830	• / ▲	• / ▲	•	
			80s	60.3	48.3	5.54	5.08	64	60	1.410	•	•	•	
			160	60.3	48.3	8.74	7.14	64	60	2.050		•	•	
			XXS	60.3	48.3	11.07	10.15	64	60	2.160		•		
2 1/2	x	1/2"	10s	73.0	21.3	3.05	2.11	76	67	1.230		▲		
	x	3/4"	10s	73.0	26.7	3.05	2.11	76	67	1.240		▲		
	x	1"	10s	73.0	33.4	3.05	2.77	76	67	1.250	• / ▲	▲		
			40s	73.0	33.4	5.16	3.38	76	67	1.800	•	•		
			80s	73.0	33.4	7.01	4.55	76	67	2.220	•	•		
			160	73.0	33.4	9.53	6.35	76	67	2.830		•		
	x	1 1/4"	10s	73.0	42.2	3.05	2.77	76	67	0.874	• / ▲	• / ▲		
	x	1 1/2"	10s	73.0	48.3	3.05	2.77	76	67	0.900	• / ▲	• / ▲		
			40s	73.0	48.3	5.16	3.68	76	67	1.490	•	• / ▲	•	
			80s	73.0	48.3	7.01	5.08	76	67	2.280	•	•		
			160	73.0	48.3	9.53	7.14	76	67	2.880		•		
	x	2"	10s	73.0	60.3	3.05	2.77	76	70	0.940	• / ▲	• / ▲		
			40s	73.0	60.3	5.16	3.91	76	70	1.530	•	• / ▲	•	
			80s	73.0	60.3	7.01	5.54	76	70	2.320	•	•		
			160	73.0	60.3	9.53	8.74	76	70	2.930		•		
3	x	1"	10s	88.9	33.4	3.05	2.77	86	73	1.150	• / ▲	• / ▲	•	
			40s	88.9	33.4	5.49	3.38	86	73	2.050	• / ▲	• / ▲	•	
			80s	88.9	33.4	7.62	4.55	86	73	2.740	•	•	•	
	x	1 1/4"	10s	88.9	48.3	3.05	2.77	86	73	1.450	• / ▲	•		
			40s	88.9	48.3	5.49	3.56	86	73	2.280	•	•		
			160	88.9	48.3	11.13	6.35	86	73	4.130		•		
	x	1 1/2"	10s	88.9	48.3	3.05	2.77	86	73	1.650	• / ▲	• / ▲	•	
			40s	88.9	48.3	5.49	3.68	86	73	2.410	• / ▲	• / ▲	•	
			80s	88.9	48.3	7.62	5.08	86	73	2.800	•	•	•	
			160	88.9	48.3	11.13	7.14	86	73	4.330		•		
	x	2"	10s	88.9	60.3	3.05	2.77	86	76	1.750	• / ▲	• / ▲	•	
			40s	88.9	60.3	5.49	3.91	86	76	2.500	• / ▲	• / ▲	•	
			80s	88.9	60.3	7.62	5.54	86	76	2.880	•	•	•	
			160	88.9	60.3	11.13	8.74	86	76	4.130		•	•	
			XXS	88.9	60.3	15.24	11.07	86	76	5.180		•	•	
	x	2 1/2"	10s	88.9	73.0	3.05	3.05	86	83	1.870	• / ▲	• / ▲	•	
			40s	88.9	73.0	5.49	5.16	86	83	2.800	• / ▲	• / ▲	•	
			80s	88.9	73.0	7.62	7.01	86	76	3.430		•		
			160	88.9	73.0	11.13	9.53	86	76	4.930		•		

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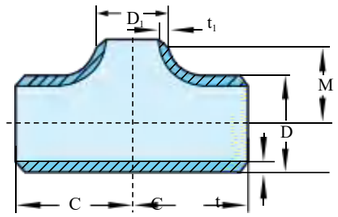


▲ WP-W = made from welded pipe or plate
WP-S = made from seamless pipe
• S31803 = made from seamless pipe
• S32750 = made from seamless pipe

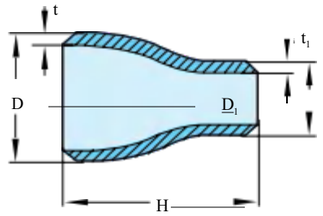
We keep only seamless duplex and super duplex fittings. We do not keep welded duplex and super duplex fittings.

Nominal pipe size			Schedule	Dimension in mm						Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	C	M	kg/pce				
4	x	11/2"	10s	114.3	48.3	3.05	2.77	105	86	2.220	• / ▲	• / ▲		
			40s	114.3	48.3	6.02	3.68	105	86	3.960	• / ▲	• / ▲		
			80S	114.3	48.3	8.56	5.08	105	86	4.900		•		
			160	114.3	48.3	13.49	7.14	105	86	7.300		•		
	x	11/2"	XXS	114.3	48.3	17.12	10.15	105	86	8.870		•		
	x	2"	10s	114.3	60.3	3.05	2.77	105	89	2.350	• / ▲	• / ▲	•	
			40s	114.3	60.3	6.02	3.91	105	89	4.500	• / ▲	• / ▲	•	
			80s	114.3	60.3	8.56	5.54	105	89	5.000	•	•	•	
			160	114.3	60.3	13.49	8.74	105	89	8.900		•		
			XXS	114.3	60.3	17.12	11.07	105	89	9.020		•		
	x	2 1/2"	10s	114.3	73.0	3.05	3.05	105	95	2.450	• / ▲	• / ▲	•	
			40s	114.3	73.0	6.02	5.16	105	95	4.700	• / ▲	• / ▲	•	
			80s	114.3	73.0	8.56	7.01	105	95	6.090		•		
			160	114.3	73.0	13.49	9.53	105	95	8.960		•		
	x	3"	10s	114.3	88.9	3.05	3.05	105	98	2.5	• / ▲	• / ▲	•	
			40s	114.3	88.9	6.02	5.49	105	98	4.800	• / ▲	• / ▲	•	
			80s	114.3	88.9	8.56	7.62	105	98	6.120	•	•	•	
			160	114.3	88.9	13.49	11.13	105	98	9.290		•		
			XXS	114.3	88.9	17.12	15.24	105	98	9.760		•		
5	x	2 1/2"	10s	141.3	88.9	3.40	3.05	124	111	3.860	•	•		
			40s	141.3	88.9	6.55	5.16	124	111	5.700		•		
	x	3"	10s	141.3	88.9	3.40	3.05	124	111	4.350	• / ▲	• / ▲	•	
			40s	141.3	88.9	6.55	5.49	124	111	5.850	• / ▲	• / ▲	•	
	x	4"	10s	141.3	114.3	3.40	3.05	124	117	4.480	• / ▲	• / ▲	•	
			40s	141.3	114.3	6.55	6.02	124	117	6.140	• / ▲	• / ▲	•	
6	x	3"	10s	168.3	88.9	3.40	3.05	143	124	4.900	• / ▲	• / ▲	•	
			40s	168.3	88.9	7.11	5.49	143	124	9.800	• / ▲	• / ▲	•	
			80s	168.3	88.9	10.97	7.62	105	98	13.200	•	•	•	
			160	168.3	88.9	18.26	11.13	105	98	20.100		•		
			XXS	168.3	88.9	21.95	15.24	105	98	23.700		•		
	x	4"	10s	168.3	114.3	3.4	3.05	143	130	5.100	• / ▲	• / ▲	•	
			40s	168.3	114.3	7.11	6.02	143	130	10.000	• / ▲	• / ▲	•	
			80s	168.3	114.3	10.97	8.56	143	130	14.200	•	•	•	
	x	5"	10s	168.3	141.3	3.40	3.40	143	137	5.300	• / ▲	• / ▲	•	
			40s	168.3	141.3	7.11	6.55	143	137	10.400	• / ▲	• / ▲	•	

Nominal pipe size			Schedule	Dimension in mm						Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	C	M	kg/pce				
8	x	4"	10s	219.1	114.3	3.76	3.05	178	156	8.000	• / ▲	• / ▲	•	
			40s	219.1	114.3	8.18	6.02	178	156	17.500	• / ▲	• / ▲	•	
			80s	219.1	114.3	12.70	8.56	178	156	25.500	•	•	•	
			160	219.1	114.3	23.01	13.49	178	156	40.300		•		
	x	5"	10s	219.1	141.3	3.76	3.40	178	162	8.250	• / ▲	• / ▲		
			40s	219.1	141.3	8.18	6.55	178	162	17.800	• / ▲	• / ▲		
	x	6"	10s	219.1	168.3	3.76	3.40	178	168	8.400	• / ▲	• / ▲	•	
			40s	219.1	168.3	8.18	7.11	178	168	18.100	• / ▲	• / ▲	•	
			80s	219.1	168.3	12.70	10.97	178	168	29.000	•	•	•	
10	x	4"	10s	273.1	114.3	4.19	3.05	216	184	13.500	• / ▲	• / ▲		
			40s	273.1	114.3	9.27	6.02	216	184	29.300	• / ▲	• / ▲		
			80s	273.1	114.3	12.70	8.56	216	184	36.200		•		
	x	5"	10s	273.1	141.3	4.19	3.40	216	184	13.700	▲			
	x	6"	10s	273.1	168.3	4.19	3.40	216	194	14.000	• / ▲	• / ▲		
			40s	273.1	168.3	9.27	7.11	216	194	30.000	• / ▲	• / ▲		
			80s	273.1	168.3	12.70	10.97	216	194	37.000		•		
	x	8"	10s	273.1	219.1	4.19	3.76	216	203	14.500	• / ▲	• / ▲		
			40s	273.1	219.1	9.27	8.18	216	203	31.000	• / ▲	• / ▲		
			80s	273.1	219.1	12.70	12.7	216	203	38.900		•		
12	x	6"	10s	323.9	168.5	4.57	3.40	254	219	23.000	• / ▲	• / ▲		
			40s	323.9	168.5	9.53	7.11	254	219	52.000	• / ▲	• / ▲		
	x	8"	10s	323.9	219.1	4.57	3.76	254	229	24.000	• / ▲	• / ▲		
			40s	323.9	219.1	9.53	8.18	254	229	53.000	• / ▲	• / ▲		
			80s	323.9	219.1	12.70	12.7	254	229	57.300		•		
	x	10"	10s	323.9	273.1	4.57	4.19	254	241	25.000	• / ▲	• / ▲		
			40s	323.9	273.1	9.53	9.27	254	241	54.000	• / ▲	• / ▲		
			80s	323.9	273.1	12.7	12.7	254	241	67.100		•		
14	x	8"	10s	355.6	219.1	4.78	3.76	279	270	27.100		▲		
	x	10"	10s	355.6	273.1	4.78	4.19	279	270	27.400		▲		
	x	12"	10s	355.6	323.9	4.78	4.57	279	270	28.000	▲	▲		
16	x	10"	10s	406.4	273.1	4.78	4.19	305	283	34.000		▲		
	x	12"	10s	406.4	323.9	4.78	4.57	305	283	34.900		▲		
18	x	12"	10s	457.0	323.9	4.78	4.57	343	321	49.900		▲		

CONCENTRIC REDUCER

ASTM A403 ASME B16.9



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• S31803 = made from seamless pipe
• S32750 = made from seamless pipe

We keep only seamless duplex and super duplex fittings. We do not keep welded duplex and super duplex fittings.

Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
3/4	x	3/8"	10s	26.7	17.1	2.11	1.65	39.3	0.070	▲			
	x	1/2"	10s	26.7	21.3	2.11	2.11	39.3	0.100	• / ▲	• / ▲	•	
			40s	26.7	21.3	2.87	2.77	39.3	0.140	• / ▲	• / ▲		
			80s	26.7	21.3	3.91	3.73	39.3	0.180	•	•		
			160	26.7	21.3	5.56	4.78	39.3	0.210		•		
1	x	1/2"	10s	33.4	21.3	2.77	2.11	50.8	0.120	• / ▲	• / ▲	•	
			40s	33.4	21.3	3.38	2.77	50.8	0.150	• / ▲	• / ▲	•	
			80s	33.4	21.3	4.55	3.73	50.8	0.200	•	•	•	
			160	33.4	21.3	6.35	4.78	50.8	0.230		•		
	x	3/4"	10s	33.4	26.7	2.77	2.11	50.8	0.130	• / ▲	• / ▲	•	
			40s	33.4	26.7	3.38	2.87	50.8	0.160	• / ▲	• / ▲	•	
			80s	33.4	26.7	4.55	3.91	50.8	0.220	•	•	•	
			160	33.4	26.7	6.35	5.56	50.8	0.250		•		
1 1/4	x	1/2"	10s	42.2	21.3	2.77	2.11	50.8	0.103	• / ▲	• / ▲	•	
			40s	42.2	21.3	3.56	2.77	50.8	0.132	• / ▲	• / ▲	•	
			80s	42.2	21.3	4.85	3.73	50.8	0.180		•		
	x	3/4"	10s	42.2	26.7	2.77	2.11	50.8	0.180	• / ▲	• / ▲	•	
			40s	42.2	26.7	3.56	2.87	50.8	0.220	• / ▲	• / ▲	•	
			80s	42.2	26.7	4.85	3.91	50.8	0.250	•	• / ▲		
	x	1"	10s	42.2	33.4	2.77	2.77	50.8	0.180	• / ▲	• / ▲	•	
			40s	42.2	33.4	3.56	3.38	50.8	0.220	• / ▲	• / ▲	•	
			80s	42.2	33.4	4.85	4.55	50.8	0.270		•		
1 1/2	x	1/2"	10s	48.3	21.3	2.77	2.11	63.5	0.200	• / ▲	• / ▲		
			40s	48.3	21.3	3.68	2.77	63.5	0.250	•	• / ▲		
			80s	48.3	21.3	5.08	3.73	63.5	0.310	•	•		
	x	3/4"	10s	48.3	26.7	2.77	2.11	63.5	0.200	• / ▲	• / ▲	•	
			40s	48.3	26.7	3.68	2.87	63.5	0.260	• / ▲	• / ▲	•	
			80s	48.3	26.7	5.08	3.91	63.5	0.370	•	•	•	
1 1/2	x	1"	10s	48.3	33.4	2.77	2.77	63.5	0.200	• / ▲	• / ▲	•	
			40s	48.3	33.4	3.68	3.38	63.5	0.260	• / ▲	• / ▲	•	
			80s	48.3	33.4	5.08	4.55	63.5	0.340	•	•	•	
			160	48.3	33.4	7.14	6.35	63.5	0.380		•		
			XXS	48.3	33.4	10.15	9.09	63.5	0.500		•		
1 1/2	x	1 1/4"	10s	48.3	42.2	2.77	2.77	63.5	0.210	• / ▲	• / ▲	•	
			40s	48.3	42.2	3.68	3.56	63.5	0.280	• / ▲	• / ▲	•	
			80s	48.3	42.2	5.08	4.85	63.5	0.360	•	•		
			160	48.3	42.2	7.14	4.85	63.5	0.410		•		
			XXS	48.3	42.2	10.15	4.85	63.5	0.570		•		
2	x	1/2"	10s	60.3	21.3	2.77	2.11	76.2	0.210	▲	▲		
			40s	60.3	21.3	3.91	2.77	76.2	0.350		▲		
			80s	60.3	21.3	5.54	3.73	76.2	0.380		•		
	x	3/4"	10s	60.3	26.7	2.77	2.11	76.2	0.250	• / ▲	• / ▲		
			40s	60.3	26.7	3.91	2.87	76.2	0.370	• / ▲	• / ▲		
			80s	60.3	26.7	5.54	3.91	76.2	0.410	•	•		
			160	60.3	26.7	8.74	5.56	76.2	0.590		•	•	
			XXS	60.3	26.7	11.07	7.82	76.2	0.690		•		
2	x	1"	10s	60.3	33.4	2.77	2.77	76.2	0.280	• / ▲	• / ▲	•	
			40s	60.3	33.4	3.91	3.38	76.2	0.400	• / ▲	• / ▲	•	
			80s	60.3	33.4	5.54	4.55	76.2	0.540	•	•	•	
			160	60.3	33.4	8.74	6.35	76.2	0.650		•	•	
			XXS	60.3	33.4	11.07	9.09	76.2	0.770		•	•	
2	x	1 1/4"	10s	60.3	42.2	2.77	2.77	76.2	0.300	• / ▲	• / ▲	•	
			40s	60.3	42.2	3.91	3.56	76.2	0.440	• / ▲	• / ▲	•	
			80s	60.3	42.2	5.54	4.85	76.2	0.480	•	•		
			160	60.3	42.2	8.74	6.35	76.2	0.710		•		
			XXS	60.3	42.2	11.07	9.7	76.2	0.850		•		
2	x	1 1/2"	10s	60.3	48.3	2.77	2.77	76.2	0.310	• / ▲	• / ▲	•	
			40s	60.3	48.3	3.91	3.68	76.2	0.450	• / ▲	• / ▲	•	
			80s	60.3	48.3	5.54	5.08	76.2	0.590	•	•	•	
			160	60.3	48.3	8.74	7.14	76.2	0.760		•		
			XXS	60.3	48.3	11.07	10.15	76.2	0.910		•		

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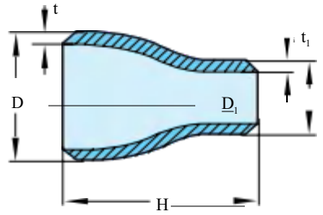

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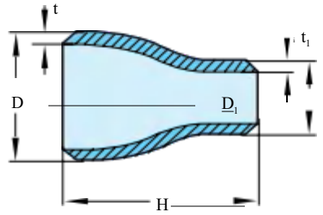
Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
2 1/2	x	1"	10s	73.0	33.4	3.05	2.77	88.9	0.430	● / ▲	● / ▲	●	
			40s	73.0	33.4	5.16	3.38	88.9	0.590	● / ▲	● / ▲	●	
			80s	73.0	33.4	7.01	4.55	88.9	0.770		●	●	
			160	73.0	33.4	9.53	6.35	88.9	0.990		●		
	x	1 1/4"	10s	73.0	42.2	3.05	2.77	88.9	0.440	● / ▲	● / ▲	●	
			40s	73.0	42.2	5.16	3.56	88.9	0.640	● / ▲	● / ▲	●	
			80s	73.0	42.2	7.01	4.85	88.9	0.830		●		
	x	1 1/2"	10s	73.0	48.3	3.05	2.77	88.9	0.450	● / ▲	● / ▲	●	
			40s	73.0	48.3	5.16	3.68	88.9	0.769	● / ▲	● / ▲	●	
			80S	73.0	48.3	7.01	5.08	88.9	0.870	●	●	●	
			160	73.0	48.3	9.53	7.14	88.9	1.130		●		
			XXS	73.0	48.3	14.02	10.15	88.9	1.580		●		
	x	2"	10s	73.0	60.3	3.05	2.77	88.9	0.470	● / ▲	● / ▲	●	
			40s	73.0	60.3	5.16	3.91	88.9	0.800	● / ▲	● / ▲	●	
			80s	73.0	60.3	7.01	5.54	88.9	1.030	●	●		
			160	73.0	60.3	9.53	8.74	88.9	1.240		●		
			XXS	73.0	60.3	14.02	11.07	88.9	1.680		●		
3	x	1"	10s	88.9	33.4	3.05	2.77	88.9	0.490	● / ▲	● / ▲	●	
			40s	88.9	33.4	5.49	3.38	88.9	0.850	● / ▲	● / ▲	●	
			80S	88.9	33.4	7.62	4.55	88.9	0.960	●	●	●	
	x	1 1/4"	10s	88.9	42.2	3.05	2.77	88.9	0.530	● / ▲	● / ▲		
			40s	88.9	42.2	5.49	3.56	88.9	0.750	● / ▲	● / ▲		
			80s	88.9	42.2	7.62	4.85	88.9	1.030	●	●		
	x	1 1/2"	10s	88.9	48.3	3.05	2.77	88.9	0.510	● / ▲	● / ▲	●	
			40s	88.9	48.3	5.49	3.68	88.9	0.940	● / ▲	● / ▲	●	
			80s	88.9	48.3	7.62	5.08	88.9	1.210	●	●	●	
			160	88.9	48.3	11.13	7.14	88.9	1.450		●		
	x	2"	10s	88.9	60.3	3.05	2.77	88.9	0.550	● / ▲	● / ▲	●	
			40s	88.9	60.3	5.49	3.91	88.9	1.000	● / ▲	● / ▲	●	
			80s	88.9	60.3	7.62	5.54	88.9	1.290	●	●	●	
			160	88.9	60.3	11.13	8.74	88.9	1.590	●	●	●	
			XXS	88.9	60.3	15.24	11.07	88.9	2.000		●	●	
	x	2 1/2"	10s	88.9	73.0	3.05	3.05	88.9	0.590	● / ▲	● / ▲	●	
			40s	88.9	73.0	5.49	5.16	88.9	1.080	● / ▲	● / ▲	●	
			80s	88.9	73.0	7.62	7.01	88.9	1.490	●	●		
			160	88.9	73.0	11.13	9.53	88.9	1.770		●		
4	x	1 1/2"	10s	114.3	48.3	3.05	2.77	101.6	0.710	● / ▲	● / ▲	●	
			40s	114.3	48.3	6.02	3.68	101.6	1.180	● / ▲	● / ▲	●	
			80s	114.3	48.3	8.56	5.08	101.6	1.670	●	●	●	
			XXS	114.3	48.3	17.12	10.15	101.6	2.890		●		
	x	2"	10s	114.3	60.3	3.05	2.77	101.6	0.780	● / ▲	● / ▲	●	
			40s	114.3	60.3	6.02	3.91	101.6	1.570	● / ▲	● / ▲	●	
			80s	114.3	60.3	8.56	5.54	101.6	1.950	●	●	●	
			160	114.3	60.3	13.49	8.74	101.6	2.620		●	●	
			XXS	114.3	60.3	17.12	11.07	101.6	3.110		●	●	
	x	2 1/2"	10s	114.3	73.0	3.05	3.05	101.6	0.830	● / ▲	● / ▲	●	
			40s	114.3	73.0	6.02	5.16	101.6	1.660	● / ▲	● / ▲	●	
			80s	114.3	73.0	8.56	7.01	101.6	1.920	●	●	●	
			160	114.3	73.0	13.49	9.53	101.6	2.850		●		
	x	3"	10s	114.3	88.9	3.05	3.05	101.6	0.870	● / ▲	● / ▲	●	●
			40s	114.3	88.9	6.02	5.49	101.6	1.740	● / ▲	● / ▲	●	
			80s	114.3	88.9	8.56	7.62	101.6	2.330	●	●	●	
			160	114.3	88.9	13.49	11.13	101.6	3.040		●	●	
			XXS	114.3	88.9	17.12	15.24	101.6	4.000		●	●	
5	x	2 1/2"	10s	141.3	73.0	3.40	3.05	127.0	1.400	●	●		
			40s	141.3	73.0	6.55	5.16	127.0	2.190	●	●	●	
			160	141.3	73.0	15.88	9.53	127.0	4.780		●		
	x	3"	10s	141.3	88.9	3.40	3.05	127.0	1.450	● / ▲	● / ▲		
			40s	141.3	88.9	6.55	5.49	127.0	2.850	●	●	●	
			160	141.3	88.9	15.88	11.13	127.0	5.050		●		
	x	4"	10s	141.3	114.3	3.40	3.05	127.0	1.490	● / ▲	● / ▲		
			40s	141.3	114.3	6.55	6.02	127.0	2.980	● / ▲	● / ▲	●	
			80S	141.3	114.3	9.53	13.49	127.0	2.980		●		
			160	141.3	114.3	15.88	17.12	127.0	2.980		●		
6	x	2"	10s	168.3	60.3	3.40	2.77	139.7	0.170	●			
	x	3"	10s	168.3	88.9	3.40	3.05	139.7	1.820	● / ▲	● / ▲	●	
			40s	168.3	88.9	7.11	5.49	139.7	3.980	● / ▲	● / ▲	●	
			80s	168.3	88.9	10.97	7.62	139.7	5.510	●	●	●	
			160	168.3	88.9	18.26	11.13	139.7	7.150		●		
	x	4"	10s	168.3	114.3	3.40	3.05	139.7	1.950	● / ▲	● / ▲	●	●
			40s	168.3	114.3	7.11	6.02	139.7	4.080	● / ▲	● / ▲	●	
			80s	168.3	114.3	10.97	8.56	139.7	5.960	●	●	●	
			160	168.3	114.3	18.26	13.49	139.7	7.830		●		
			XXS	168.3	114.3	21.95	17.12	139.7	8.980		●		
	x	5"	10s	168.3	141.4	3.40	3.40	139.7	2.050	● / ▲	● / ▲		
			40s	168.3	141.4	7.11	6.55	139.7	4.180	● / ▲	● / ▲	●	
			80S	168.3	141.4	10.97	9.53	139.7	5.430		●		
			160	168.3	141.4	18.26	15.88	139.7	8.530		●		

CONCENTRIC REDUCER

ASTM A403 ASME B16.9



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WP-S = made from seamless pipe • S32750 = made from seamless pipe

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Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
	x	4"	10s	219.1	114.3	3.76	3.05	152.4	3.020	● / ▲	● / ▲	●	
			40s	219.1	114.3	8.18	6.02	152.4	6.550	● / ▲	● / ▲	●	
			80s	219.1	114.3	12.70	8.56	152.4	7.800	●	●	●	
			10s	219.1	141.3	3.76	3.40	152.4	3.080	● / ▲	● / ▲		
8	x	5"	40s	219.1	141.3	8.18	6.55	152.4	6.700	●	●		
			80s	219.1	141.3	12.70	9.53	152.4	8.250		●		
	x	6"	10s	219.1	168.3	3.76	3.40	152.4	3.190	● / ▲	● / ▲	●	
			40s	219.1	168.3	8.18	7.11	152.4	6.940	● / ▲	● / ▲	●	
			80s	219.1	168.3	12.70	10.97	152.4	8.750	●	●	●	
	x	4"	10s	273.1	114.3	4.19	3.05	177.8	4.800	● / ▲	● / ▲		
			40s	273.1	114.3	9.27	6.02	177.8	8.300	● / ▲	●		
			80s	273.1	114.3	12.70	8.56	177.8	11.400	●			
	x	5"	40s	273.1	141.3	9.27	6.55	177.8	8.600	▲			
			80s	273.1	141.3	12.70	9.53	177.8	11.600		●		
10	x	6"	10s	273.1	168.3	4.19	3.40	177.8	5.000	● / ▲	● / ▲		
			40s	273.1	168.3	9.27	7.11	177.8	11.120	● / ▲	● / ▲		
			80s	273.1	168.3	12.70	10.97	177.8	12.300	●	●		
	x	8"	10s	273.1	219.1	4.19	3.76	177.8	5.250	● / ▲	● / ▲		
			40s	273.1	219.1	9.27	8.18	177.8	11.560	● / ▲	● / ▲		
			80s	273.1	219.1	12.7	12.7	177.8	12.9		●		
	x	6"	10s	323.9	168.3	4.57	3.40	203.2	6.580	● / ▲	● / ▲		
			40s	323.9	168.3	9.53	7.11	203.2	12.800	● / ▲	● / ▲		
			80s	323.9	168.3	12.7	10.97	203.2	15.7		●		
	x	8"	10s	323.9	219.1	4.57	3.76	203.2	7.670	● / ▲	● / ▲		
12			40s	323.9	219.1	9.53	8.18	203.2	15.980	● / ▲	● / ▲		
			80s	323.9	219.1	12.70	12.70	203.2	16.800	●	●		
	x	10"	10s	323.9	273.1	4.57	4.19	203.2	7.980	● / ▲	● / ▲		
			40s	323.9	273.1	9.53	9.27	203.2	16.630	● / ▲	● / ▲		
			80s	323.9	273.1	12.70	12.70	203.2	18.200	●	●		
14	x	6"	10s	355.6	168.3	4.78	3.40	330.2	13.200	▲			
	x	8"	10s	355.6	219.1	4.78	3.76	330.2	13.880	▲	▲		
	x	10"	10s	355.6	273.1	4.78	4.19	330.2	14.410	▲	▲		
	x	12"	10s	355.6	323.9	4.78	4.57	330.2	15.290	▲	▲		
16	x	8"	10s	406.4	219.1	4.78	3.76	355.6	16.500	▲	▲		
	x	10"	10s	406.4	273.1	4.78	4.19	355.6	17.720	▲	▲		
	x	12"	10s	406.4	323.9	4.78	4.57	355.6	18.350	▲	▲		
	x	14"	10s	406.4	355.6	4.78	4.78	355.6	18.900	▲	▲		
18	x	14"	10s	457.2	355.6	4.78	4.78	381.0	21.900		▲		
	x	16"	10s	457.2	406.4	4.78	4.78	381.0	19.200		▲		
20	x	16"	10s	508.0	406.4	5.54	4.78	508.0	38.410		▲		
	x	18"	10s	508.0	457.2	5.54	4.78	508.0	33.100		▲		
24	x	20"	10s	609.6	508.0	6.35	5.54	508.0	46.720		▲		

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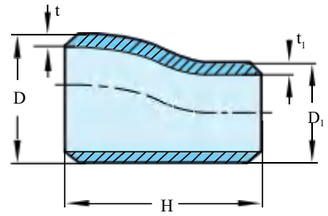
ASTM A403 ASME B16.9



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WP-S = made from seamless pipe • S32750 = made from seamless pipe

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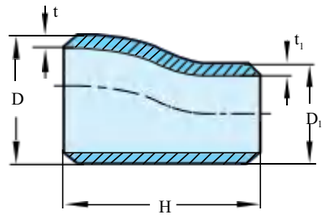
Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
3/4	x	1/2"	10s	26.7	21.3	2.11	2.11	39.3	0.100	● / ▲	● / ▲		
			40s	26.7	21.3	2.87	2.77	39.3	0.140	● / ▲	● / ▲		
			80s	26.7	21.3	3.91	3.73	39.3	0.165		●		
1	x	1/2"	10s	33.4	21.3	2.77	2.11	50.8	0.120	● / ▲	● / ▲	●	
			40s	33.4	21.3	3.38	2.77	50.8	0.150	● / ▲	● / ▲		
			80s	33.4	21.3	4.55	3.73	50.8	0.175	●	●		
	x	3/4"	10s	33.4	26.7	2.77	2.11	50.8	0.130	● / ▲	● / ▲		
			40s	33.4	26.7	3.38	2.87	50.8	0.160	● / ▲	● / ▲		
			80s	33.4	26.7	4.55	3.91	50.8	0.180	●	●		
1 1/4	x	1/2"	10s	42.2	33.4	2.77	2.77	50.8	0.180	▲			
			40S	42.2	33.4	3.56	3.38	50.8	0.220	▲			
	x	1"	10s	42.2	33.4	2.77	2.77	50.8	0.180	● / ▲	● / ▲		
			40S	42.2	33.4	3.56	3.38	50.8	0.220	● / ▲	● / ▲		
			160	42.2	33.4	6.35	6.35	50.8	0.260		●		
1 1/2	x	1/2"	10s	48.3	21.3	2.77	2.11	63.5	0.186	● / ▲	● / ▲		
			40s	48.3	21.3	3.68	2.77	63.5	0.193	● / ▲	● / ▲		
			80s	48.3	21.3	5.08	3.73	63.5	0.25		●		
			160	48.3	21.3	7.14	4.78	63.5	0.32		●		
	x	3/4"	10s	48.3	26.7	2.77	2.11	63.5	0.200	● / ▲	● / ▲		
			40s	48.3	26.7	3.68	2.87	63.5	0.260	● / ▲	● / ▲		
			80s	48.3	26.7	5.08	3.91	63.5	0.27		●		
	x	1"	10s	48.3	33.4	2.77	2.77	63.5	0.200	● / ▲	● / ▲		
			40s	48.3	33.4	3.68	3.38	63.5	0.260	● / ▲	● / ▲		
			80s	48.3	33.4	5.08	4.55	63.5	0.300	●	●		
	x	1 1/4"	10s	48.3	42.2	2.77	2.77	63.5	0.210	● / ▲	● / ▲		
			40s	48.3	42.2	3.68	3.56	63.5	0.280	● / ▲	● / ▲		
2	x	1/2"	40a	60.3	21.3	3.91	2.77	76.2	0.380		●		
			80s	60.3	21.3	5.54	3.73	76.2	0.400		●		
	x	3/4"	10s	60.3	26.7	2.77	2.11	76.2	0.280	●	● / ▲		
			40s	60.3	26.7	3.91	2.87	76.2	0.380	● / ▲	● / ▲		
			80s	60.3	26.7	5.54	3.91	63.5	0.410	●	●		
			XXS	60.3	26.7	11.07	7.82	63.5	0.690		●		
2	x	1"	10s	60.3	33.4	2.77	2.77	76.2	0.280	● / ▲	● / ▲		
			40s	60.3	33.4	3.91	3.38	76.2	0.400	● / ▲	● / ▲		
			80S	60.3	33.4	5.54	4.55	76.2	0.440	●	●		
			160	60.3	33.4	8.74	6.35	76.2	0.650		●		
			XXS	60.3	33.4	11.07	9.09	76.2	0.770		●		
	x	1 1/4"	10s	60.3	42.2	2.77	2.77	76.2	0.300	● / ▲	● / ▲		

ECCENTRIC REDUCER

ASTM A403 ASME B16.9



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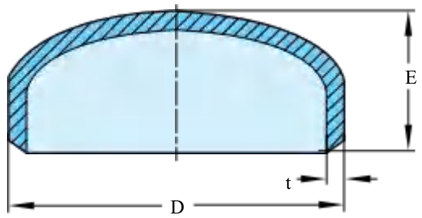
Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
2	x	1 1/2"	10s	60.3	48.3	2.77	2.77	76.2	0.310	● / ▲	● / ▲		
			80S	60.3	48.3	5.54	5.08	76.2	0.510	●	●		
			XXS	60.3	48.3	11.07	10.15	76.2	0.910		●		
2 1/2	x	1"	10S	73	33.4	3.05	2.77	88.9	0.440	●	●		
			40s	73	33.4	5.16	3.38	88.9	0.590		●		
	x	1 1/4"	40s	73	42.2	5.16	3.56	88.9	0.640		▲		
	x	1 1/2"	10S	73	48.3	3.05	2.77	88.9	0.440		●		
			80S	73	48.3	7.01	5.08	88.9	0.870	●	●		
		2"	10s	73	60.3	3.05	2.77	88.9	0.470	● / ▲	● / ▲		
			40s	73	60.3	5.16	3.91	88.9	0.800	●	● / ▲		
			80S	73	48.3	7.01	5.54	88.9	0.960		●		
3	x	1"	40s	88.9	33.4	5.49	3.38	88.9	0.760	●	●		
	x	1 1/2"	10s	88.9	48.3	3.05	2.77	88.9	0.510	● / ▲	● / ▲		
			40s	88.9	48.3	5.49	3.68	88.9	0.940	● / ▲	● / ▲		
			80s	88.9	48.3	7.62	5.08	88.9	1.050	●	●		
	x	2"	10s	88.9	60.3	3.05	2.77	88.9	0.550	● / ▲	● / ▲		
			40s	88.9	60.3	5.49	3.91	88.9	1.000	● / ▲	● / ▲		
			80s	88.9	60.3	7.62	5.54	88.9	1.140	●	●		
			160	88.9	60.3	11.13	8.74	88.9	1.590		●		
	x	2 1/2"	10s	88.9	73.0	3.05	2.77	88.9	0.590	● / ▲	● / ▲		
			40s	88.9	73.0	5.49	5.16	88.9	1.080	●	●		
4	x	1 1/2"	10s	114.3	48.3	3.05	2.77	101.6	0.629	▲	▲		
			40s	114.3	48.3	6.02	3.68	101.6	1.200	●	●		
			80s	114.3	48.3	8.56	5.08	101.6	1.670	●	●		
			XXS	114.3	48.3	17.12	10.15	101.6	2.890		●		
	x	2"	10s	114.3	60.3	3.05	2.77	101.6	0.780	● / ▲	● / ▲		
			40s	114.3	60.3	6.02	3.91	101.6	1.570	● / ▲	● / ▲		
			80s	114.3	60.3	8.56	5.54	101.6	1.780	●	●		
			XXS	114.3	60.3	17.12	11.07	101.6	3.740		●		
	x	2 1/2"	10s	114.3	73	3.05	3.05	101.6	0.830	● / ▲	● / ▲		
			40s	114.3	73	6.02	5.16	101.6	1.660	●	●		
			80S	114.3	73	8.56	7.01	101.6	1.920		●		
	x	3"	10s	114.3	88.9	3.05	3.05	101.6	0.870	● / ▲	● / ▲		
			40s	114.3	88.9	6.02	5.49	101.6	1.740	● / ▲	● / ▲		
			80s	114.3	88.9	8.56	7.62	101.6	2.040	●	●		
			XXS	114.3	88.9	17.12	15.24	101.6	3.650		●		

Nominal pipe size			Schedule	Dimension in mm					Approximate Weight	304L	316L	S31803	S32750
Run	x	Outlet		D	D1	t	t1	H	kg/pce				
5	x	3"	10s	141.3	88.9	3.40	3.05	127.0	1.450	● / ▲			
	x	4"	10s	141.3	114.3	3.40	3.05	127.0	1.490	● / ▲	● / ▲		
			40s	141.3	114.3	6.55	6.02	127.0	2.980	● / ▲	● / ▲		
6	x	3"	10s	168.3	88.9	3.40	3.05	139.7	1.820	● / ▲	● / ▲		
			40s	168.3	88.9	7.11	5.49	139.7	3.980	● / ▲	● / ▲		
			80s	168.3	88.9	10.97	7.62	139.7	4.610	●	●		
	x	4"	10s	168.3	114.3	3.40	3.05	139.7	1.950	● / ▲	● / ▲		
			40s	168.3	114.3	7.11	6.02	139.7	4.080	● / ▲	● / ▲		
			80s	168.3	114.3	10.97	8.56	139.7	5.000	●	●		
	x	5"	10s	168.3	141.3	3.40	3.40	139.7	2.000	● / ▲	● / ▲		
			40s	168.3	141.3	7.11	6.55	139.7	4.150	● / ▲	● / ▲		
			80s	168.3	114.3	10.97	9.53	139.7	5.430		●		
8	x	4"	10s	219.1	114.3	3.76	3.05	152.4	3.020	● / ▲	● / ▲		
			40s	219.1	114.3	8.18	6.02	152.4	6.550	● / ▲	● / ▲		
			80s	219.1	114.3	12.70	8.56	152.4	7.800	●	●		
	x	5"	10s	219.1	141.3	3.76	3.40	152.4	3.080	● / ▲	● / ▲		
			40s	219.1	141.3	8.18	6.55	152.4	6.700	● / ▲	● / ▲		
	x	6"	10s	219.1	168.3	3.76	3.40	152.4	3.190	● / ▲	● / ▲		
			40s	219.1	168.3	8.18	7.11	152.4	6.940	● / ▲	● / ▲		
			80s	219.1	168.3	12.7	10.97	152.4	8.750	●	●		
10	x	4"	10s	273.1	114.3	4.19	3.05	177.8	4.800	● / ▲	▲		
			40s	273.1	114.3	9.27	6.02	177.8	8.300	▲	● / ▲		
	x	5"	10s	273.1	141.3	4.19	3.40	177.8	4.890	▲	▲		
			40s	273.1	141.3	9.27	6.55	177.8	8.600	▲	▲		
	x	6"	10s	273.1	168.3	4.19	3.40	177.8	5.000	● / ▲	● / ▲		
			40s	273.1	168.3	9.27	7.11	177.8	11.120	● / ▲	● / ▲		
	x	8"	10s	273.1	219.1	4.19	3.76	177.8	5.250	● / ▲	● / ▲		
			40s	273.1	219.1	9.27	8.18	177.8	11.560	● / ▲	● / ▲		
12	x	6"	10s	323.9	168.3	4.57	3.40	203.2	7.450	● / ▲	● / ▲		
			40s	323.9	168.3	9.53	7.11	203.2	11.120	● / ▲	● / ▲		
	x	8"	10s	323.9	219.1	4.57	3.76	203.2	7.670	● / ▲	● / ▲		
			40s	323.9	219.1	9.53	8.18	203.2	15.980	● / ▲	● / ▲		
	x	10"	10s	323.9	273.1	4.57	4.19	203.2	7.980	● / ▲	● / ▲		
			40s	323.9	273.1	9.53	9.27	203.2	16.630	● / ▲	● / ▲		
14	x	8"	10s	355.6	219.1	4.78	3.76	330.2	13.880	▲	▲		
	x	10"	10s	355.6	273.1	4.78	4.19	330.2	14.410	▲	▲		
	x	12"	10s	355.6	323.9	4.78	4.19	330.2	15.290	▲	▲		
16	x	8"	10s	406.4	219.1	4.78	3.78	355.6	16.700	▲			
	x	10"	10s	406.4	273.1	4.78	4.19	355.6	17.720	▲	▲		
	x	12"	10s	406.4	323.9	4.78	4.57	355.6	18.350	▲	▲		
18	x	12"	10s	457.0	323.9	4.78	4.57	381.0	21.480	▲			
20	x	16"	10s	508.0	406.4	5.54	4.78	508.0	38.410	▲			
24	x	18"	10s	610.0	457.0	6.35	4.78	508.0	45.360	▲			
	x	20"	10s	610.0	508.0	6.35	5.54	508.0	46.720	▲			

END CAP

ASTM A403 ASME B16.9



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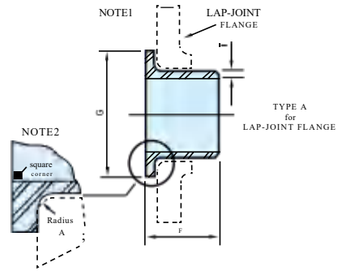
Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	E	kg/pce				
1/2"	10s	21.3	2.11	25.4	0.040	●	●		
	40s	21.3	2.77	25.4	0.050	●	●		
	80s	21.3	3.73	25.4	0.050	●	●		
	10s	26.7	2.11	25.4	0.050	●	●		
3/4"	40s	26.7	2.87	25.4	0.060	●	●		
	80s	26.7	3.91	25.4	0.060	●	●		
1"	10s	33.4	2.77	38.1	0.090	●	●		
	40s	33.4	3.38	38.1	0.130	●	●		
	80s	33.4	4.55	38.1	0.130	●	●		
1 1/4"	10s	42.2	2.77	38.1	0.130	●	●		
	40s	42.2	3.56	38.1	0.170	●	●		
	80s	42.2	4.85	38.1	0.180	●	●		
1 1/2"	10s	48.3	2.77	38.1	0.140	●	●		
	40s	48.3	3.68	38.1	0.230	●	●		
	80s	48.3	5.08	38.1	0.240	●	●		
2"	10s	60.3	2.77	38.1	0.170	●	●		
	40s	60.3	3.91	38.1	0.270	●	●		
	80s	60.3	5.54	38.1	0.340	●	●		
	160	60.3	8.74	38.1	0.520		●		
2 1/2"	10s	73.0	3.05	38.1	0.250	●	●		
	40s	73.0	5.16	38.1	0.450	●	●		
	80s	73.0	7.01	38.1	0.510	●	●		
	160	73.0	9.53	38.1	1.400		●		
3"	10s	88.9	3.05	50.8	0.400	●	●		
	40s	88.9	5.49	50.8	0.710	●	●		
	80s	88.9	7.62	50.8	0.850	●	●		
	160	88.9	11.13	50.8	1.840		●	●	

Nominal pipe size	Schedule	Dimension in mm			Approximate Weight	304L	316L	S31803	S32750
		D	t	A	kg/pce				
4"	10s	114.3	3.05	63.5	0.650	●	●		
	40s	114.3	6.02	63.5	1.220	●	●		
	80s	114.3	8.56	63.5	1.610	●	●		
	160	114.3	13.49	63.5	2.760		●		
5"	10s	141.3	3.40	76.2	1.020	●	●		
	40s	141.3	6.55	76.2	1.910	●	●		
	80s	141.3	9.53	76.2	2.550		●		
6"	10s	168.3	3.40	88.9	1.360	●	●		
	40s	168.3	7.11	88.9	3.230	●	●		
	80s	168.3	10.97	88.9	4.540	●	●		
	XXS	168.3	21.95	88.9	9.380		●		
8"	10s	219.1	3.76	101.6	2.490	●	●		
	40s	219.1	8.18	101.6	5.670	●	●		
	80s	219.1	12.70	101.6	7.910	●	●		
10"	10s	273.1	4.19	127.0	4.900	●	●		
	40s	273.1	9.27	127.0	9.210	●	●		
	80s	273.10	12.70	127.0	12.380		●		
12"	10s	323.9	4.57	152.4	6.530	●	●		
	40s	323.9	9.53	152.4	13.060	●	●		
	80s	323.90	12.70	152.4	17.400		●		
14"	10s	355.6	4.78	165.1	8.160	●	●		
	STD	355.6	9.53	165.1	15.900		●		
16"	10s	406.4	4.78	177.8	14.510	●	●		
	STD	406.4	9.53	177.8	20.000		●		
18"	10s	457.2	4.78	203.2	17.960	●	●		
20"	10s	508.0	5.54	228.6	27.220	●	●		
24"	10s	609.6	6.35	266.7	34.470	●	●		

LAP JOINT (STUB END)

SCH 10S, 40S



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• S32750 = made from seamless pipe

We keep only seamless duplex and super duplex fittings. We do not keep welded duplex and super duplex fittings.

Nominal pipe size	Outside Diameter OD	Length F	Dia. of Lap-G Nominal & Maximum	Radius of Fillet A	Schedule	Wall hickness T	Approx. Weight (kg)	304L	316L	S31803	S32750
1/2"	0.84	2.00	1.38	0.12	10s	0.083	0.062	•	•		
					40s	0.109	0.079	•	•		
3/4"	1.05	2.00	1.69	0.12	10s	0.083	0.081	•	•		
					40s	0.113	0.101		•		
1"	1.32	2.00	2.00	0.12	10s	0.109	0.134	▲	▲		
					40s	0.133	0.160		•		
1 1/4"	1.66	2.00	2.50	0.19	10s	0.109	0.178	• / ▲	•		
					40s	0.140	0.225	•	•		
1 1/2"	1.90	2.00	2.88	0.25	10s	0.109	0.213	•			
					40s	0.145	0.279				
2"	2.38	2.50	3.62	0.31	10s	0.109	0.338				
					40s	0.154	0.471				
2 1/2"	2.88	2.50	4.12	0.31	10s	0.120	0.448	•	•		
					40s	0.203	0.740	•	•		
3"	3.50	2.50	5.00	0.38	10s	0.120	0.574				
					40s	0.216	1.010				
3 1/2"	4.00	3.00	5.50	0.38	10s	0.120	0.150				
					40s	0.226	1.380				
4"	4.50	3.00	6.19	0.44	10s	0.120	0.870				
					40s	0.237	1.68	•			
5"	5.56	3.00	7.31	0.44	10s	0.134	1.21	•	•		
					40s	0.258	2.28	•	•		
6"	6.62	3.50	8.50	0.50	10s	0.134	1.64				
					40s	0.280	3.37		▲		
8"	8.62	4.00	10.62	0.50	10s	0.148	2.65				
					40s	0.322	5.67				
10"	10.75	5.00	12.75	0.50	10s	0.166	4.38				
					40s	0.365	9.55				
12"	12.75	6.00	15.00	0.50	10s	0.180	6.74				
					40s	0.375	13.8				
14"	14.00	6.00	16.25	0.50	10s	0.188	7.73				
16"	16.00	6.00	18.50	0.50	10s	0.188	9.00				
18"	18.00	6.00	21.00	0.50	10s	0.188	10.5				
20"	20.00	6.00	23.00	0.50	10s	0.218	13.5				
24"	24.00	6.00	27.25	0.50	10s	0.250	18.9	▲			

IN-HOUSE PMI TESTING

FORGED FLANGES

WHAT ARE FLANGES?

Flanges offer a reliable way to connect pipe systems with various equipment, valves and other components to make a pipework system. Using flanges adds flexibility when maintaining piping systems by allowing for easier disassembly and improved access to system components.

Atypical flange connection is comprised of three parts:

- Pipe Flange
- Gasket
- Bolting

Typically, flanges are either welded or threaded and two flanges are connected together by bolting them with gaskets to provide a seal that provides easy access to the piping system. These Flanges are available in various types such as slip-on flange, weld neck flange, blind flange, and socket weld flange, etc.

COMMON TYPES OF FLANGES CLASSIFICATION:

Flanges are often classified based on their ability to withstand temperatures and pressures. This is designated using a number and “#” or “LB” such as 150#, 300# etc. Exact pressure and temperature tolerances will vary by the materials used, flange design and flange size. The only constant is that in all cases, pressure ratings decrease as temperatures rise. Below are some of the sizes that we stock at EkunSteel:

FLANGES ASTM A182 ASME SA182 ANSI B16.5	TYPES	304/L	316/L	31803/ 2205	SIZE RANGE (NONIMAL BORE - NB)
SLIP-ON	#150 RF	•	•		NB: 0.50" - 24.00"
	#300 RF	•	•		NB: 0.50" - 12.00"
	#600 RF	•	•		NB: 1.00" - 3.00"
	JIS 5K FF	•	•		NB: 0.50" - 4.00"
	JIS 10K FF	•	•		NB: 0.50" - 4.00"
	JIS 16K FF	•	•		NB: 0.50" - 4.00"
BLIND	#150 RF	•	•	•	NB: 0.50” - 24.00” Duplex NB: 0.75” - 4.00”
	#300 RF	•	•		NB: 0.50" - 20.00"
	#600 RF	•	•		NB: 0.50" - 12.00"
	#1500 RF/RTJ	•	•	•	NB: 0.50” - 6.00” Duplex NB: 1.00” - 6.00”
	#2500 RF/RTJ	•	•	•	NB: 0.50” - 4.00” Duplex NB: 0.75” - 1.00”
	JIS 5K FF	•	•		NB: 0.50" - 4.00"
	JIS 10K FF	•	•		NB: 0.50" - 4.00"
	JIS 16K FF	•	•		NB: 0.50" - 4.00"
WELD NECK	#150 RF	•	•	•	NB: 0.50” - 24.00” Duplex NB: 0.50” - 10.00”
	#300 RF	•	•	•	NB: 0.50” - 18.00” Duplex NB: 0.50” - 8.00”
	#600 RF	•	•	•	NB: 0.50” - 12.00” Duplex NB: 0.50” - 8.00”
	#900 RF			•	NB: 2.00” - 6.00” Duplex NB: 2.00” - 6.00”
	#1500 RF/RTJ	•	•	•	NB: 0.50” - 6.00” Duplex NB: 0.50” - 6.00”
	#2500 RF/RTJ	•	•		NB: 0.50” - 4.00” Duplex NB: 0.50” - 6.00”
SOCKET WELD	#150 RF	•	•		NB: 0.50" - 3.00"
	#300 RF	•	•		NB: 0.50" - 2.00"
	#600 RF	•	•		NB: 0.50" - 2.00"
THREADED	#150 RF	•	•		NB: 0.50" - 6.00"
	#300 RF	•	•		NB: 0.50" - 2.00"

EXPLORING COMMON TYPES OF FLANGES

Below, we dive into the common types of flanges one would encounter in their course of usage:

01 WELDING NECK FLANGE

The welding neck flange is normally referred as the high hub flange due to its long tapered hub that is easily recognizable. The smooth transition from flange thickness to pipe or fitting wall thickness effected by the taper is extremely beneficial, under conditions of repeated bending, caused by line expansion or other variable forces. These flanges are bored to match the inside diameter of the mating pipe or fitting so there will be no restriction of product flow. This prevents turbulence at the joint and reduces erosion. They also provide excellent stress distribution through the tapered hub and are easily radiographed for flaw detection. This Flange type will be welded to a pipe or fitting with a single full penetration, V weld (buttweld).

02 SLIP-ON FLANGE

The slip on flange has a low hub to allow the pipe to slip into the flange prior to welding. It is welded both inside and out to provide sufficient strength and to prevent leakages. Slip-on flanges are all bored slightly larger than the outer diameter of the matching pipe. The connection with the pipe is done via 2 fillet welds, one on the outside and one on the inside of the flange.

03 SOCKET WELD FLANGE

Socket weld flanges are similar to a slip-on flange except that it has a bore and a counter bore dimension. These are Ideal for smaller pipe diameters in low-temperature and low-pressure scenarios. The connection with the pipe is done with 1 fillet weld, at the outside of the flange. But before welding, a space must be created between flange or fitting and pipe. The purpose for the bottoming clearance in a Socket Weld is usually to reduce the residual stress at the root of the weld that could occur during solidification of the weld metal.

04 LAP JOINT STUB END FLANGE

Lap Joint Flanges are practically identical to a slip-on flange in terms of dimensions. It is usually used in conjunction with a stub end as a backing flange hence the commonly used term of Lap Joint Stub End for its naming. These flanges will be slipped over the pipe and are not welded or fastened to it. This design style is suitable for use in systems that require frequent dismantling or maintenance.

05 THREADED (SCREWED) FLANGE

The threaded flange is similar to the slip-on flange but the bore is threaded. Its usage stems from the fact that it can be assembled without welding explaining its use in low pressure services. Threaded flanges are typically used in thicker pipes as cutting thread on a pipe is not feasible.

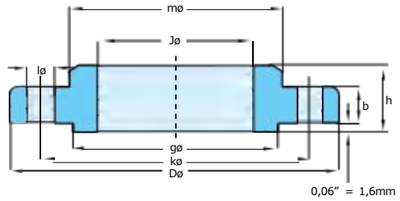
06 BLIND FLANGE

The blind flange is a flange with a bore / opening. It is used to close off the ends of a piping system and/or a pressure vessel opening. It also permits easy access to the interior of a pipe system or vessel once it has been sealed and must be reopened.

SLIP-ON FLANGE

150 LB/SQ.IN.

ASME B16.5



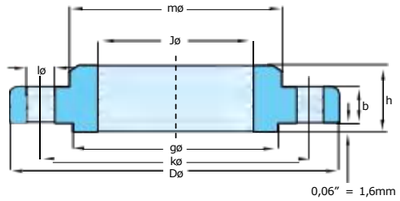
Pipe		Flange				Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.50	0.88	0.44	0.62	1.19	1.38	4	0.62	2.38	0.9
	21.3	88.9	22.4	11.2	15.7	30.2	35.1		15.7	60.5	0.39
3/4"	1.05	3.88	1.09	0.50	0.62	1.50	1.69	4	0.62	2.75	1.2
	26.7	98.6	27.7	12.7	15.7	38.1	42.9		15.7	69.9	0.56
1"	1.315	4.25	1.36	0.56	0.69	1.94	2.00	4	0.62	3.12	1.7
	33.4	108.0	34.5	14.2	17.5	49.3	50.8		15.7	79.2	0.78
1¹/4"	1.66	4.62	1.70	0.62	0.81	2.31	2.50	4	0.62	3.50	2.3
	42.2	117.3	43.2	15.7	20.6	58.7	63.5		15.7	88.9	1.03
11/2"	1.90	5.00	1.95	0.69	0.88	2.56	2.88	4	0.62	3.88	2.9
	48.3	127.0	49.5	17.5	22.4	65.0	73.2		15.7	98.6	1.32
2"	2.375	6.00	2.44	0.75	1.00	3.06	3.62	4	0.75	4.75	4.5
	60.3	152.4	62.0	19.1	25.4	77.7	91.9		19.1	120.7	2.06
21/2"	2.875	7.00	2.94	0.88	1.12	3.56	4.12	4	0.75	5.50	7.2
	73.0	177.8	74.7	22.4	28.4	90.4	104.6		19.1	139.7	3.28
3"	3.50	7.50	3.57	0.94	1.19	4.25	5.00	4	0.75	6.00	8.5
	88.9	190.5	90.7	23.9	30.2	108.0	127.0		19.1	152.4	3.85
3¹/2"	4.00	8.50	4.07	0.94	1.25	4.81	5.50	8	0.75	7.00	10.6
	101.6	215.9	103.4	23.9	31.8	122.2	139.7		19.1	177.8	4.81
4"	4.50	9.00	4.57	0.94	1.31	5.31	6.19	8	0.75	7.50	11.7
	114.3	228.6	116.1	23.9	33.3	134.9	157.2		19.1	190.5	5.30
5"	5.563	10.00	5.66	0.94	1.44	6.44	7.31	8	0.88	8.50	13.4
	141.3	254.0	143.8	23.9	36.6	163.6	185.7		22.4	215.9	6.07
6"	6.625	11.00	6.72	1.00	1.56	7.56	8.50	8	0.88	9.50	16.4
	168.3	279.4	170.7	25.4	39.6	192.0	215.9		22.4	241.3	7.45
8"	8.625	13.50	8.72	1.12	1.75	9.69	10.62	8	0.88	11.75	26.7
	219.1	342.9	221.5	28.4	44.5	246.1	269.7		22.4	298.5	12.1
10"	10.75	16.00	10.88	1.19	1.94	12.00	12.75	12	1.00	14.25	36.3
	273	406.4	276.4	30.2	49.3	304.8	323.9		25.4	362.0	16.5
12"	12.75	19.00	12.88	1.25	2.19	14.38	15.00	12	1.00	17.00	57.7
	323.8	482.6	327.2	31.8	55.6	365.3	381.0		25.4	431.8	26.2
14"	14.0	21.00	14.14	1.38	2.25	15.75	16.25	12	1.12	18.75	76.2
	355.6	533.4	359.2	35.1	57.2	400.1	412.8		28.4	476.3	34.6
16"	16.0	23.50	16.16	1.44	2.50	18.00	18.50	16	1.12	21.25	98.7
	406.4	596.9	410.5	36.6	63.5	457.2	469.9		28.4	539.8	44.8
18"	18.0	25.00	18.18	1.56	2.69	19.88	21.00	16	1.25	22.75	108
	457.2	635.0	461.8	39.6	68.3	505.0	533.4		31.8	577.9	48.9
20"	20.0	27.50	20.20	1.69	2.88	22.00	23.00	20	1.25	25.00	136
	508	698.5	513.1	42.9	73.2	558.8	584.2		31.8	635.0	61.9
24"	24.0	32.00	24.25	1.88	3.25	26.12	27.25	20	1.38	29.50	191
	609.6	812.8	616.0	47.8	82.6	663.4	692.2		35.1	749.3	86.9

We keep only RF (Raised Face).
We don't keep RTJ, FF (Flat Face).

SLIP-ON FLANGE

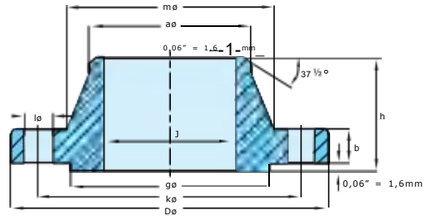
300 LB/SQ.IN.

ASME B16.5



Pipe		Flange				Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.75	0.88	0.56	0.88	1.50	1.38	4	0.62	2.62	1.4
	21.3	95.3	22.4	14.2	22.4	38.1	35.1		15.7	66.0	0.64
3/4"	1.05	4.62	1.09	0.66	1.00	1.88	1.69	4	0.75	3.25	2.5
	26.7	117.3	27.7	15.7	25.4	47.8	42.9		19. 1	82.6	1.12
1"	1.315	4.88	1.36	0.69	1.06	2.12	2.00	4	0.75	3.50	3.0
	33.4	123.9	34.5	17.5	26.9	53.8	50.8		19.1	88.9	1.36
1 1/4"	1.66	5.25	1.70	0.75	1.06	2.50	2.50	4	0.75	3.88	3.7
	42.2	133.4	43.2	19.1	26.9	63.5	63.5		19. 1	98.6	1.68
1 ¹/2"	1.90	6.12	1.95	0.81	1.19	2.75	2.88	4	0.88	4.50	5.5
	48.3	155.4	49.5	20.6	30.2	69.9	73.2		22.4	114.3	2.49
2"	2.375	6.50	2.44	0.88	1.31	3.31	3.62	8	0.75	5.00	6.3
	60.3	165.1	62.0	22.4	33.3	84.1	91.9		19.1	127.0	2.87
2 ¹/2"	2.875	7.50	2.94	1.00	1.50	3.94	4.12	8	0.88	5.88	9.5
	73.0	190.5	74.7	25.4	38.1	100.1	104.6		22.4	149.4	4.32
3"	3.50	8.25	3.57	1.12	1.69	4.62	5.00	8	0.88	6.62	12.9
	88.9	209.6	90.7	28.4	42.9	117.3	127.0		22.4	168.1	5.85
3 ¹/2"	4.00	9.00	4.07	1.19	1.75	5.25	5.50	8	0.88	7.25	16.2
	101.6	228.6	103.4	30.2	44.5	133.4	139.7		22.4	184.2	7.34
4"	4.50	10.00	4.57	1.25	1.88	5.75	6.19	8	0.88	7.88	21.2
	114.3	254.0	116.1	31.8	47.8	146.1	157.2		22.4	200.2	9.61
5"	5.563	11.00	5.66	1.38	2.00	7.00	7.31	8	0.88	9.25	27.1
	141.3	279.4	143.8	35.1	50.8	177.8	185.7		22.4	235	12.3
6"	6.625	12.50	6.72	1.44	2.06	8.12	8.50	12	0.88	10.62	34.4
	168.3	317.5	170.7	36.6	52.3	206.2	215.9		22.4	269.7	15.6
8"	8.625	15.00	8.72	1.62	2.44	10.25	10.62	12	1.00	13.00	53.3
	219.1	381.0	221.5	41.1	62	260.4	269.7		25.4	330.2	24.2
10"	10.75	17.50	10.88	1.88	2.62	12.62	12.75	16	1.12	15.25	75.1
	273	444.5	276.4	47.8	66.5	320.5	323.9		28.4	387.4	34.1
12"	12.75	20.50	12.88	2.00	2.88	14.75	15.00	16	1.25	17.75	110
	1323.8	520.7	327.2	50.8	73.2	374.7	381.0		31.8	450.9	49.8
14"	14.0	23.00	14.14	2.12	3.00	16.75	16.25	20	1.25	20.25	154
	355.6	584.2	359.2	53.8	76.2	425.5	412.8		31.8	514.4	69.9
16"	16.0	25.50	16.16	2.25	3.25	19.00	18.50	20	1.38	22.505	194
	406.4	647.7	410.5	57.2	82.6	482.6	469.9		35.1	571.5	88.1
18"	18.0	28.00	18.18	2.38	3.50	21.00	21.00	24	1.38	24.75	240
	457.2	711.2	461.8	60.5	88.9	533.4	533.4		35.1	628.7	109
20"	20.0	30.50	20.20	2.50	3.75	23.12	23.00	24	1.38	27.008	295
	508	774.7	513.1	63.5	95.3	587.2	584.2		35.1	685.8	134
24"	24.0	36.00	24.25	2.75	4.19	27.62	27.25	24	1.62	32.00	443
	609.6	914.4	616.0	69.9	106.4	701.5	692.2		41.1	812.8	201

WELDING NECK FLANGES



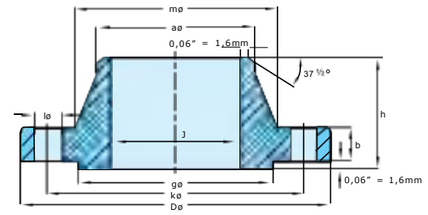
150 LB/SQ.IN.

ASME B16.5

Pipe		Flange				Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.50	0.88	0.44	0.62	1.19	1.38	4	0.62	2.38	0.9
	21.3	88.9	22.4	11.2	15.7	30.2	35.1		15.7	60.5	0.39
3/4"	1.05	3.88 98.6	1.09	0.50	0.62	1.50	1.69	4	0.62	2.75	1.2
	26.7	98.6	27.7	12.7	15.7	38.1	42.9		15.7	69.9	0.56
1"	1.315	4.25	1.36	0.56	0.69	1.94	2.00	4	0.62	3.12	1.7
	33.4	108.0	34.5	14.2	17.5	49.3	50.8		15.7	79.2	0.78
1¹/4"	1.66	4.62	1.70	0.62	0.81	2.31	2.50	4	0.62	3.50	2.3
	42.2	117.3	43.2	15.7	20.6	58.7	63.5		15.7	88.9	1.03
11/2"	1.90	5.00	1.95	0.69	0.88	2.56	2.88	4	0.62	3.88	2.9
	48.3	127.0	49.5	17.5	22.4	65.0	73.2		15.7	98.6	1.32
2"	2.375	6.00	2.44	0.75	1.00	3.06	3.62	4	0.75	4.75	4.5
	60.3	152.4	62.0	19.1	25.4	77.7	91.9		19.1	120.7	2.06
21/2"	2.875	7.00	2.94	0.88	1.12	3.56	4.12	4	0.75	5.50	7.2
	73.0	177.8	74.7	22.4	28.4	90.4	104.6		19.1	139.7	3.28
3"	3.50	7.50	3.57	0.94	1.19	4.25	5.00	4	0.75	6.00	8.5
	88.9	190.5	90.7	23.9	30.2	108.0	127.0		19.1	152.4	3.85
3¹/²"	4.00	8.50	4.07	0.94	1.25	4.81	5.50	8	0.75	7.00	10.6
	101.6	215.9	103.4	23.9	31.8	122.2	139.7		19.1	177.8	4.81
4"	4.50	9.00	4.57	0.94	1.31	5.31	6.19	8	0.75	7.50	11.7
	114.3	228.6	116.1	23.9	33.3	134.9	157.2		19.1	190.5	5.30
5"	5.563	10.00	5.66	0.94	1.44	6.44	7.31	8	0.88	8.50	13.4
	141.3	254.0	143.8	23.9	36.6	163.6	185.7		22.4	215.9	6.07
6"	6.625	11.00	6.72	1.00	1.56	7.56	8.50	8	0.88	9.50	16.4
	168.3	279.4	170.7	25.4	39.6	192.0	215.9		22.4	241.3	7.45
8"	8.625	13.50	8.72	1.12	1.75	9.69	10.62	8	0.88	11.75	26.7
	219.1	342.9	221.5	28.4	44.5	246.1	269.7		22.4	298.5	12.1
10"	10.75	16.00	10.88	1.19	1.94	12.00	12.75	12	1.00	14.25	36.3
	273	406.4	276.4	30.2	49.3	304.8	323.9		25.4	362.0	16.5
12"	12.75	19.00	12.88	1.25	2.19	14.38	15.00	12	1.00	17.00	57.7
	323.8	482.6	327.2	31.8	55.6	365.3	381.0		25.4	431.8	26.2
14"	14.0	21.00	14.14	1.38	2.25	15.75	16.25	12	1.12	18.75	76.2
	355.6	533.4	359.2	35.1	57.2	400.1	412.8		28.4	476.3	34.6
16"	16.0	23.50	16.16	1.44	2.50	18.00	18.50	16	1.12	21.25	98.7
	406.4	596.9	410.5	36.6	63.5	457.2	469.9		28.4	539.8	44.8
18"	18.0	25.00	18.18	1.56	2.69	19.88	21.00	16	1.25	22.75	108
	457.2	635.0	461.8	39.6	68.3	505.0	533.4		31.8	577.9	48.9
20"	20.0	27.50	20.20	1.69	2.88	22.00	23.00	20	1.25	25.00	136
	508	698.5	513.1	42.9	73.2	558.8	584.2		31.8	635.0	61.9
24"	24.0	32.00	24.25	1.88	3.25	26.12	27.25	20	1.38	29.50	191
	609.6	812.8	616.0	47.8	82.6	663.4	692.2		35.1	749.3	86.9

We keep only RF (Raised Face).
We don't keep RTJ, FF (Flat Face).

WELDING NECK FLANGES

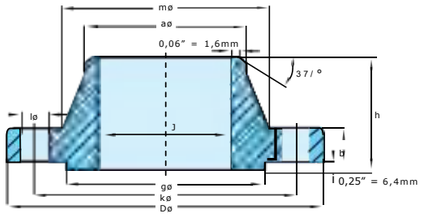


300 LB/SQ.IN.

ASME B16.5

Pipe		Flange				Hub		Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	a in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.75	To be specified by purchaser	0.56	2.06	0.84	1.50	1.38	4	0.62	2.62	1.7
	21.3	95.2		14.2	52.3	21.3	38.1	35.0		15.7	66.5	0.75
3/4"	1.05	4.62		0.62	2.25	1.05	1.88	1.69	4	0.75	3.25	2.8
	26.7	117.3		15.7	57.1	26.7	47.7	42.9		19.0	82.5	1.26
1"	1.315	4.88		0.69	2.44	1.32	2.12	2.00	4	0.75	3.50	3.5
	33.4	123.9		17.5	62.0	33.5	53.8	50.8		19.0	88.9	1.52
1 1/4"	1.66	5.25		0.75	2.56	1.66	2.50	2.50	4	0.75	3.88	4.5
	42.2	133.3		19.0	65.0	42.2	63.5	63.5		19.0	98.5	2.03
1 ¹/²"	1.90	6.12		0.81	2.69	1.90	2.75	2.88	4	0.75	3.88	4.5
	48.3	155.4		20.6	68.3	48.3	69.8	73.1		19.0	98.5	2.03
2"	2.375	6.50		0.88	2.75	2.38	3.31	3.62	8	0.75	3.88	4.5
	60.3	165.1		22.3	69.8	60.4	84.0	91.9		19.0	98.5	2.03
2 ¹/²"	2.875	7.50		1.00	3.00	2.88	3.94	4.12	8	0.88	5.88	11.4
	73.0	190.5		25.4	76.2	73.1	100.0	104.6		22.3	149.3	5.17
3"	3.50	8.25		1.12	3.12	3.50	4.62	5.00	8	0.88	6.62	15.3
	88.9	209.5		28.4	79.2	88.9	117.3	127.0		22.3	168.1	6.93
3 ¹/²"	4.00	9.00		1.19	3.19	4.00	5.25	5.50	8	0.88	7.25	19.1
	101.6	228.6		30.2	81.0	101.6	133.3	139.7		22.3	184.1	8.67
4"	4.50	10.00		1.25	3.38	4.50	5.75	6.19	8	0.88	7.88	24.7
	114.3	254.0		31.7	85.8	114.3	146.0	157.2		22.3	200.1	11.2
5"	5.563	11.00		1.38	3.88	5.56	7.00	7.31	8	0.88	9.25	33.3
	141.3	279.4		35.0	98.5	141.2	177.8	185.7		22.3	234.9	15.1
6"	6.625	12.50		1.44	3.88	6.63	8.12	8.50	12	0.88	10.62	42.4
	168.3	317.5		36.5	98.5	168.4	206.2	215.9		22.3	269.7	19.1
8"	8.625	15.00		1.62	4.38	8.63	10.25	10.62	12	1.00	13.002	65.9
	219.1	381.0		41.1	111.2	219.2	260.3	269.7		25.4	330.2	29.9
10"	10.75	17.50		1.88	4.62	10.75	12.62	12.75	16	1.12	15.253	94.1
	273	444.5		47.7	117.3	273	320.5	323.8		28.4	387.3	42.7
12"	12.75	20.50		2.00	5.12	12.75	14.75	15.00	16	1.25	17.75	136
	323.8	520.7		50.8	130.0	323.8	374.6	381.0		31.7	450.8	61.8
14"	14.0	23.00		2.12	5.62	14.00	16.75	16.25	20	1.25	20.25	189
	355.6	584.2		53.8	142.7	355.6	425.4	412.8		31.7	514.3	85.8
16"	16.0	25.50		2.25	5.75	16.00	19.00	18.50	20	1.38	22.50	234
	406.4	647.7		57.1	146.0	406.4	482.6	469.9		35.0	571.5	106
18"	18.0	28.00		2.38	6.25	18.00	21.00	21.00	24	1.38	24.75	289
	457.2	711.2		60.4	158.7	457.2	533.4	533.4		35.0	628.6	131
20"	20.0	30.50		2.50	6.38	20.00	23.12	23.00	24	1.38	27.00	348
	508	774.7		63.5	162.0	508	587.2	584.2		35.0	685.8	158
24"	24.0	36.00		2.75	6.62	24.00	27.62	27.25	24	1.62	32.00	507
	609.6	914.4		69.8	168.1	609.6	701.5	692.1		41.1	812.8	230

WELDING NECK FLANGES

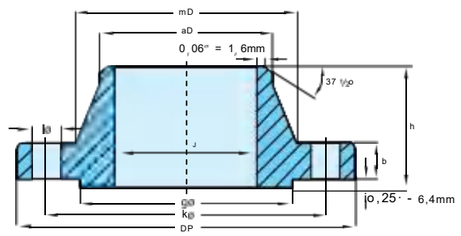


600 LB/SQ.IN.

ASME B16.5

Pipe		Flange					Hub		Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	a in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm		= Pounds Kilo
1/2"	0.84	3.75		0.56	2.06	0.84	1.50	1.38	4	0.62	2.62		1.9
	21.3	95.3		14.2	52.3	21.3	38.1	35.1		15.7	66.5		0.87
3/4"	1.05	4.62		0.62	2.25	1.05	1.88	1.69	4	0.75	3.25		3.2
	26.7	117.3		15.7	57.2	26.7	47.8	42.9		19.1	82.6		1.45
1"	1.315	4.88		0.69	2.44	1.32	2.12	2.00	4	0.75	3.50		3.9
	33.4	124.0		17.5	57.2	33.5	53.8	50.8		19.1	88.9		1.76
1 1/4"	1.66	5.25		0.81	2.62	1.66	2.50	2.50	4	0.75	3.88		5.5
	42.2	133.4		20.6	66.5	42.2	63.5	63.5		19.1	98.6		2.49
1 1/2"	1.90	6.12		0.88	2.75	1.90	2.75	2.88	4	0.88	4.50		7.7
	48.3	155.4		22.4	69.9	48.3	69.9	73.2		22.4	114.3		3.49
2"	2.375	6.50		1.00	2.88	2.38	3.31	3.60	8	0.75	5.00		9.6
	60.3	165.1		25.4	73.2	60.5	84.1	91.9		19.1	127.0		4.36
2 1/2"	2.875	7.50		1.12	3.12	2.88	3.94	4.12	8	0.88	5.88		14.2
	73.0	190.5		28.4	79.2	73.2	100.1	104.6		22.4	149.4		6.43
3"	3.50	8.25		1.25	3.25	3.50	4.62	5.00	8	0.88	6.62		18.8
	88.9	209.6		31.8	82.6	88.9	117.3	127.0		22.4	168.1		8.53
3 1/2"	4.00	9.00		1.38	3.38	4.00	5.25	5.50	8	1.00	7.25		23.6
	101.6	228.6		35.1	85.9	101.6	133.4	139.7		25.4	184.2		10.7
4"	4.50	10.75	To be specified by purchaser	1.50	4.00	4.50	6.00	6.19	8	1.00	8.50		38.3
	114.3	273.1		38.1	101.6	114.3	152.4	157.2		25.4	215.9		17.4
5"	5.563	13.00		1.75	4.50	5.56	7.44	7.31	8	1.12	10.507		64.3
	141.3	330.2		44.5	114.3	141.2	189.0	185.7		28.4	266.7		29.2
6"	6.625	14.00		1.88	4.62	6.63	8.75	8.50	12	1.12	11.50		76.9
	168.3	355.6		47.8	117.3	168.4	222.3	215.9		28.4	292.1		34.9
8"	8.625	16.50		2.19	5.25	8.63	10.75	10.62	12	1.25	13.75		119
	219.1	419.1		55.6	133.4	219.2	273.1	269.7		31.8	349.3		53.9
10"	10.75	20.00		2.50	6.00	10.75	13.50	12.75	16	1.38	17.00		191
	273	508.8		63.5	152.4	273.1	342.9	323.9		35.1	431.8		86.5
12"	12.75	22.00		2.62	6.12	12.75	15.75	15.00	20	1.38	19.25		227
	323.8	558.8		66.5	155.4	323.9	400.1	381.0		35.1	489.0		103
14"	14.00	23.75		2.75	6.50	14.00	17.00	16.25	20	1.50	20.75		269
	355.6	603.3		69.9	165.1	355.6	431.8	412.8		38.1	527.1		122
16"	16.00	27.00		3.00	7.00	16.00	19.50	18.50	20	1.62	23.75		374
	406.4	685.8		76.2	177.8	406.4	495.3	469.9		41.1	603.3		170
18"	18.0	29.25		3.25	7.25	18.00	21.50	21.00	20	1.75	25.75		449
	457.2	743.0		82.6	184.2	457.2	546.1	533.4		44.5	654.1		204
20"	20.00	32.00		3.50	7.50	20.00	24.00	23.00	24	1.75	28.50		560
	508	812.8		88.9	190.5	508.0	609.6	584.2		44.5	723.9		254
24"	24.00	37.00		4.00	8.00	24.00	28.25	27.25	24	2.00	33.00		789
	609.6	939.8		101.6	203.2	609.6	717.6	692.2		50.8	838.2		358

WELDING NECK FLANGES



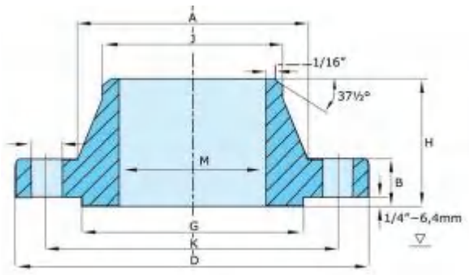
1500 LB/SQ.IN.

ASME B16.5

Pipe		Flange					Hub		Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	a in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm		= Pounds Kilo
1/2"	0.84	4.75		0.88	2.38	0.84	1.50	1.38	4	0.88	3.25		4.1
	21.3	120.6		22.3	60.4	21.3	38.1	35.0		22.3	82.5		1.87
3/4"	1.05	5.12		1.00	2.75	1.05	1.75	1.69	4	0.88	3.50		5.6
	26.7	130.0		25.4	69.8	26.7	44.4	42.9		22.3	88.9		2.56
1"	1.32	5.88		1.12	2.88	1.32	2.06	2.00	4	1.00	4.00		8.2
	33.4	149.3		28.4	73.1	33.4	52.3	50.8		25.4	101.6		3.74
1 1/4"	1.66	6.25		1.12	2.88	1.66	2.50	2.50	4	1.00	4.38		9.5
	42.2	158.7		28.4	73.1	42.2	63.5	63.5		25.4	111.2		4.33
1 1/2"	1.90	7.00		1.25	3.25	1.90	2.75	2.88	4	1.12	4.88		13.1
	48.3	177.8		31.7	82.5	48.3	69.8	73.1		28.4	123.9		5.94
2"	2.38	8.50		1.50	4.00	2.38	4.12	3.62	8	1.00	6.50		23.8
	60.3	215.9		38.1	101.6	60.3	104.6	91.9		25.4	165.1		10.8
2 1/2"	2.88	9.62		1.62	4.12	2.88	4.88	4.12	8	1.12	7.50		33.0
	73.0	244.3		41.1	104.6	73.0	123.9	104.6		28.4	190.5		15.0
3"	3.50	10.50		1.88	4.62	3.50	5.25	5.00	8	1.25	8.00		43.8
	88.9	266.7		47.7	117.3	88.9	133.3	127.0		31.7	203.2		19.9
4"	4.50	12.25		2.12	4.88	4.50	6.38	6.19	8	1.38	9.503		65.9
	114.3	311.1		53.8	123.9	114	162.0	157.2		35.0	241.3		29.9
5"	5.563	14.75	To be specified by purchaser	2.88	6.12	5.56	7.75	7.31	8	1.62	11.50		122
	141.3	374.6		73.1	155.4	141.2	196.8	185.6		41.1	292.1		55.4
6"	6.625	15.50		3.25	6.75	6.63	9.00	8.50	12	1.50	12.50		151
	168.3	393.7		82.5	171.4	168.4	228.6	215.9		38.1	317.5		68.4
8"	8.625	19.00		3.62	8.38	8.63	11.50	10.62	12	1.75	15.50		258
	219.1	482.6		91.9	212.8	219.2	292.1	269.7		44.4	393.7		117
10"	10.75	23.00		4.25	10.00	10.75	14.50	12.75	12	2.00	19.00		427
	273	584.2		107.9	254.0	273	368.3	323.8		50.8	482.6		194
12"	12.75	26.50		4.88	11.12	12.75	17.75	15.00	16	2.12	22.50		634
	323.8	673.1		123.9	282.4	323.9	450.8	381.0		53.8	571.5		288
14"	14.0	29.50		5.25	11.75	14.00	19.50	16.25	16	2.38	25.00		837
	355.6	749.3		133.3	298.4	355.6	495.3	412.7		60.4	635.0		380
16"	16.0	32.50		5.75	12.25	16.00	21.75	18.50	16	2.62	27.75		1068
	406.4	825.5		146.0	311.1	406.4	552.4	469.9		66.5	704.8		485
18"	18.0	36.00		6.38	12.88	18.00	23.50	21.00	16	2.88	30.50		1419
	457.2	914.4		162.0	327.1	457.2	596.9	533.4		73.1	774.7		644
20"	20.0	38.75		7.0	14.00	20.00	25.25	23.00	16	3.12	32.75		1707
	508	984.2		177.8	355.6	508	641.3	584.2		79.2	831.8		775
24"	24.00	46.00		8.00	16.00	24.00	30.00	27.25	16	3.62	39.00		2714
	609.6	1168.4		203.2	406.4	609.6	762.0	692.1		91.9	990.6		1232

We keep the following,
F51 is duplex S31803 material.

WELDING NECK FLANGES



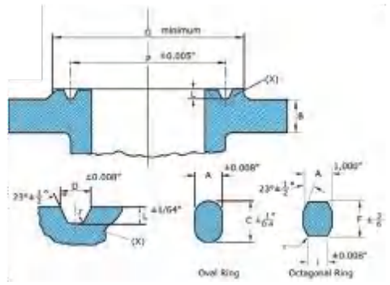
2500 LB/SQ.IN.

ASME B16.5

Nominal Pipe Size	Outside Diam. D in mm	Diam. of Bore J in mm	Thickness Min. B in mm	Length thru Hub H in mm	Diam. Hub at Bevel A in mm	Diam. at Base of Hub M in mm	O.D. Raised Face G in mm	Number of Holes	Diam of Holes I in mm	Bolt Circle Diam. K in mm	Approx Weight Kg
1/2"	133.4		30.2	73.2	21.3	42.9	35.1	4	22.4	88.9	3.2
3/4"	139.7		31.8	79.2	26.7	50.8	42.9	4	22.4	95.3	3.7
1"	158.8		35.1	88.9	33.5	57.2	50.8	4	25.4	108.0	5.3
1.1/4"	184.2		38.1	95.3	42.2	73.2	63.5	4	28.4	130.0	7.8
1.1/2"	203.2		44.5	111.3	48.3	79.2	73.2	4	31.8	146.1	11
2"	235.0		50.8	127.0	60.5	95.3	91.9	8	28.4	171.5	17
2.1/2"	266.7		57.2	142.7	73.2	114.3	104.6	8	31.8	196.9	24
3"	304.8		66.5	168.1	88.9	133.4	127.0	8	35.1	228.6	37
4"	355.6		76.2	190.5	114.3	165.1	157.2	8	41.1	273.1	56
5"	419.1		91.9	228.6	141.2	203.2	185.7	8	47.8	323.9	93
6"	482.6		108.0	273.1	168.4	235.0	215.9	8	53.8	368.3	143
8"	552.5		127.0	317.5	219.2	304.8	269.7	12	53.8	438.2	215
10"	673.1		165.1	419.1	273.0	374.7	323.9	12	66.5	539.8	406
12"	762.0		184.2	463.6	323.9	441.5	381.0	12	73.2	619.3	572

We keep the following,
F51 is duplex S31803 material.

RING JOINT DIMENSIONS

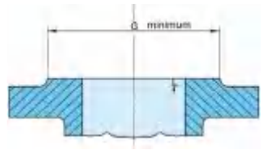


2500 LBS

ASME B16.5

Nominal Pipe Size	Raised Face Ring Joint G in mm	Pitch Diameter Groove P in mm	Depth of Groove L in mm	Radius at Bottom r in mm	Width of Groove D in mm	Width of Ring A in mm	Height Oval Ring C in mm	Height Octagonal Ring F in mm	Width of Flat Iin mm	Ring Number R
1/2"	65.0	42.9	6.35	0.8	8.7	7.9	14.3	12.7	5.2	13
3/4"	73.2	50.8	6.35	0.8	8.7	7.9	14.3	12.7	5.2	16
1"	82.6	60.3	6.35	0.8	8.7	7.9	14.3	12.7	5.2	18
1.1/4"	101.6	72.2	7.9	0.8	11.9	11.1	17.5	15.88	7.7	21
1.1/2"	114.3	82.6	7.9	0.8	11.9	11.1	17.5	15.88	7.7	23
2"	133.4	101.6	7.9	0.8	11.9	11.1	17.5	15.88	7.7	26
2.1/2"	149.4	111.1	9.5	1.6	13.5	12.7	19.0	17.46	8.7	28
3"	168.1	127.0	9.5	1.6	13.5	12.7	19.0	17.46	8.7	32
4"	203.2	157.2	11.1	1.6	16.7	15,9	22.2	20,64	10.5	38
5"	241.3	190.5	12.7	1.6	19.8	19.0	25.4	23.81	12.3	42
6"	279.4	228.6	12.7	1.6	19.8	19.0	25.4	23.81	12.3	47
8"	339.9	279.4	14.3	1.6	23.0	22.2	28.6	26.99	14.8	51
10"	425.5	342.9	17.5	2.4	30.2	28.6	36.5	34.92	19.8	55
12"	495.3	406.4	17.5	2.4	33.3	31.7	39.7	38.10	22.3	60

LARGE RAISED FACE



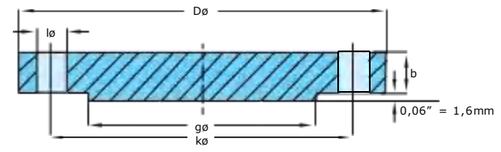
1500 LBS

Nominal Pipe Size	Raised Face G in mm	Depth of Groove L in mm
1/2"	60.5	6.35
3/4"	66.5	6.35
1"	71.4	6.35
1.1/4"	81.0	6.35
1.1/2"	91.9	6.35
2"	124.0	7.9
2.1/2"	136.7	7.9
3"	168.1	7.9
4"	193.5	7.9
5"	228.6	7.9
6"	247.7	9.5
8"	317.5	11.1
10"	371.3	11.1
12"	438.2	14.3
14"	489.0	15.9
16"	546.1	17.5
18"	612.6	17.5
20"	673.1	17.5
24"	793.8	20.6

2500 LBS

Nominal Pipe Size	Raised Face G in mm	Depth of Groove L in mm
1/2"	65.0	6.35
3/4"	73.2	6.35
1"	82.6	6.35
1.1/4"	101.6	7.9
1.1/2"	114.3	7.9
2"	133.4	7.9
2.1/2"	149.4	9.5
3"	168.1	9.5
4"	203.2	11.1
5"	241.3	12.7
6"	279.4	12.7
8"	339.9	14.3
10"	425.5	17.5
12"	495.3	17.5

BLIND FLANGE



150 LB/SQ.IN.

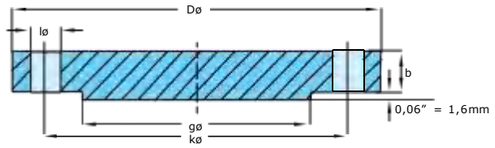
ASME B16.5

Nom. Size DN	Pipe OD in. mm	Flange D in. mm	Flange b in. mm	Raised Face g in. mm	Drilling Template Number	Drilling Template l in. mm	Drilling Template k in. mm	Approx. Weight = Pounds Kilo
1/2"	0.84	3.50	0.44	1.38	4	0.62	2.38	0.9
	21.3	88.9	11.2	35.1		15.7	60.5	0.42
3/4"	1.05	3.88	0.50	1.69	4	0.62	2.75	1.3
	26.7	98.6	12.7	42.9		15.7	69.9	0.61
1"	1.315	4.25	0.56	2.00	4	0.62	3.12	1.9
	33.4	108.0	14.2	50.8		15.7	79.2	0.86
1 1/4"	1.66	4.62	0.62	2.50	4	0.62	3.50	2.6
	42.2	117.3	15.7	63.5		15.7	88.9	1.17
1 1/2"	1.90	5.00	0.69	2.88	4	0.62	3.88	3.4
	48.3	127.0	17.5	73.2		15.7	98.6	1.53
2"	2.375	6.00	0.75	3.62	4	0.75	4.75	5.3
	60.3	152.4	19.1	91.9		19.1	120.7	2.42
2 1/2"	2.875	7.00	0.88	4.12	4	0.75	5.50	8.7
	73.0	177.8	22.4	104.6		19.1	139.7	3.94
3"	3.50	7.50	0.94	5.00	4	0.75	6.00	10.9
	88.9	190.5	23.9	127.0		19.1	152.4	4.93
3 1/2"	4.00	8.50	0.94	5.50	8	0.75	7.00	13.6
	101.6	215.9	23.9	139.7		19.1	177.8	6.17
4"	4.50	9.00	0.94	6.19	8	0.75	7.50	15.4
	114.3	228.6	23.9	157.2		19.1	190.5	7.00
5"	5.563	10.00	0.94	7.31	8	0.88	8.50	19.0
	141.3	254.0	23.9	185.7		22.4	215.9	8.63
6"	6.625	11.00	1.00	8.50	8	0.88	9.50	24.9
	168.3	279.4	25.4	215.9		22.4	241.3	11.3
8"	8.625	13.50	1.12	10.62	8	0.88	11.75	43.2
	219.1	342.9	28.4	269.7		22.4	298.5	19.6
10"	10.75	16.00	1.19	12.75	12	1.00	14.25	63.4
	273	406.4	30.2	323.9		25.4	362.0	28.8
12"	12.75	19.00	1.25	15.00	12	1.00	17.00	95.2
	323.8	482.6	31.8	381.0		25.4	431.8	43.2
14"	14.00	21.00	1.38	16.25	12	1.12	18.75	128
	355.6	533.4	35.1	412.8		28.4	476.3	58.1
16"	16.00	23.50	1.44	18.50	16	1.12	21.25	167
	406.4	596.9	36.6	469.9		28.4	539.8	76.0
18"	18.0	25.00	1.56	21.00	16	1.25	22.75	206
	457.2	635.0	39.6	533.4		31.8	577.9	93.7
20"	20.0	27.50	1.69	23.00	20	1.25	25.00	269
	508	698.5	42.9	584.2		31.8	635.0	122
24"	24.00	32.00	1.88	27.25	20	1.38	29.50	408
	609.6	812.8	47.8	692.2		35.1	749.3	185

BLIND FLANGE

300 LB/SQ.IN.

ASME B16.5

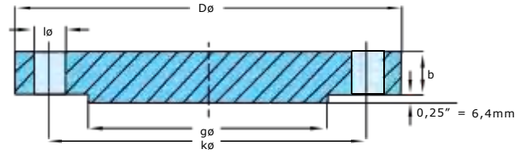


Pipe		Flange		Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	b in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.75	0.56	1.38	4	0.62	2.62	1.4
	21.3	95.2	14.2	35.0		15.7	66.5	0.64
3/4"	1.05	4.62	0.62	1.69	4	0.75	3.25	2.4
	26.7	117.3	15.7	42.9		19.0	82.5	1.11
1"	1.315	4.88	0.69	2.00	4	0.75	3.50	3.1
	33.4	123.9	17.5	50.8		19.0	88.9	1.39
1 1/4"	1.66	5.25	0.75	2.50	4	0.75	3.88	3.9
	42.2	133.3	19.0	63.5		19.0	98.5	1.79
1 ¹/₂"	1.90	6.12	0.81	2.88	4	0.88	4.50	5.9
	48.3	155.4	20.6	73.1		22.3	114.3	2.66
2"	2.375	6.50	0.88	3.62	8	0.75	5.00	7.0
	60.3	165.1	22.3	91.9		19.0	127.0	3.18
2 ¹/₂"	2.875	7.50	1.00	4.12	8	0.88	5.88	10.7
	73.0	190.5	25.4	104.6		22.3	149.3	4.85
3"	3.50	8.25	1.12	5.00	8	0.88	6.62	15.0
	88.9	209.5	28.4	127.0		22.3	168.1	6.81
3 ¹/₂"	4.00	9.00	1.19	5.50	8	0.88	7.25	19.2
	101.6	228.6	30.2	139.7		22.3	184.1	8.71
4"	4.50	10.00	1.25	6.19	8	0.88	7.88	25.3
	114.3	254.0	31.7	157.2		22.3	200.1	11.5
5"	5.563	11.00	1.38	7.31	8	0.88	9.25	34.4
	141.3	279.4	35.0	185.6		22.3	234.9	15.6
6"	6.625	12.50	1.44	8.50	12	0.88	10.62	46.0
	168.3	317.5	36.5	215.9		22.3	269.7	20.9
8"	8.625	15.00	1.62	10.62	12	1.00	13.00	75.6
	219.1	381.0	41.1	269.7		25.4	330.2	34.3
10"	10.75	17.50	1.88	12.75	16	1.12	15.25	117
	273	1444.5	47.7	323.8		28.4	387.3	53.3
12"	12.75	20.50	2.00	15.00	16	1.25	17.75	174
	323.8	520.7	50.8	1381.0		31.7	450.8	78.8
14"	14.00	23.00	2.12	16.25	20	1.25	20.25	231
	355.6	584.2	53.8	412.7		31.7	514.3	105
16"	16.00	25.50	2.25	18.50	20	1.38	22.50	302
	406.4	647.7	57.1	469.9		35.0	571.5	137
18"	18.0	28.00	2.38	21.00	24	1.38	24.75	386
	457.2	711.2	60.4	533.4		35.0	628.6	175
20"	20.0	30.50	2.50	23.00	24	1.38	27.00	487
	508	774.7	63.5	584.2		35.0	685.8	221
24"	24.00	36.00	2.75	27.25	24	1.62	32.00	747
	609.6	914.4	69.8	692.1		141.1	812.8	339

BLIND FLANGE

600 LB/SQ.IN.

ASME B16.5

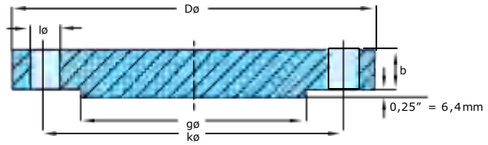


Pipe		Flange		Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	b in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.75	0.56	1.38	4	0.62	2.62	1.7
	21.3	95.3	14.2	35.1		15.7	66.5	0.76
3/4"	1.05	4.62	06.2	1.69	4	0.75	3.25	2.8
	26.7	117.3	15.7	42.9		19.1	82.6	1.28
1"	1.315	4.88	1.69	2.00	4	0.75	3.50	3.5
	33.4	124.0	17.5	50.8		19.1	88.9	1.60
1 1/4"	1.66	5.25	0.81	2.50	4	0.75	3.88	4.9
	42.2	133.4	20.6	63.5		19.1	98.6	2.23
1 ¹/₂"	1.90	6.12	0.88	2.88	4	0.88	4.50	7.2
	48.3	155.4	22.4	73.2		22.4	114.3	3.25
2"	2.375	6.50	1.00	3.62	8	0.75	5.00	9.1
	60.3	165.1	25.4	91.9		19.1	127.0	4.15
2 ¹/₂"	2.875	7.50	1.12	4.12	8	0.88	5.88	13.5
	73.0	190.5	28.4	104.6		22.4	149.4	6.13
3"	3.50	8.25	1.25	5.00	8	0.88	6.62	18.6
	88.9	209.6	31.8	127.0		22.4	168.1	8.44
3 ¹/₂"	4.00	9.00	1.38	5.50	8	1.00	7.25	24.2
	101.6	228.6	35.1	127.0		25.4	184.2	11.0
4"	4.50	10.75	1.50	6.19	8	1.00	8.50	38.1
	114.3	273.1	38.1	157.2		25.4	215.9	17.3
5"	5.563	13.00	1.75	7.31	8	1.12	10.50	64.8
	141.3	330.2	44.5	185.6		28.4	266.7	29.4
6"	6.625	14.00	1.88	8.50	12	1.12	11.50	79.5
	168.3	355.6	47.8	215.9		28.4	292.1	36.1
8"	8.625	16.50	2.19	10.62	12	1.25	13.75	130
	219.1	419.1	55.6	269.7		31.8	349.3	58.9
10"	10.75	20.22	2.50	12.75	16	1.38	17.00	215
	273	508.0	63.5	323.8		35.1	431.8	97.5
12"	12.75	22.00	2.62	15.00	20	1.38	19.25	273
	323.8	558.8	66.5	381.0		35.1	489.0	124
14"	14.00	23.75	2.75	16.25	20	1.50	20.75	333
	355.6	603.3	69.9	412.8		38.1	527.1	151
16"	16.00	27.00	3.00	18.50	20	1.62	23.75	471
	406.4	685.8	76.2	469.9		41.1	603.3	214
18"	18.0	29.25	3.25	21.00	20	1.75	25.75	599
	457.2	743.0	82.6	533.4		44.5	654.1	272
20"	20.0	32.00	3.50	23.00	24	1.75	28.50	769
	508	812.8	88.9	584.2		44.5	723.9	349
24"	24.00	37.00	4.00	27.25	24	2.00	33.00	1174
	609.6	939.8	101.6	692.2		50.8	838.2	533

BLIND FLANGE

1500 LB/SQ.IN.

ASME B16.5

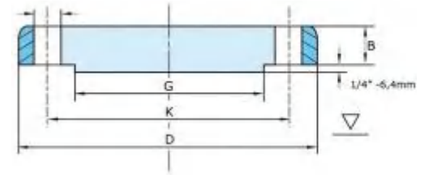


Pipe		Flange		Raised Face		Drilling Template		Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	b in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	4.75	0.88	1.38	4	0.88	3.25	3.9
	21.3	120.6	22.3	35.0		22.3	82.5	1.77
3/4"	1.05	5.12	1.00	1.69	4	0.88	3.50	5.3
	26.7	130.0	25.4	42.9		22.3	88.9	2.42
1"	1.315	5.88	1.12	2.00	4	1.00	4.00	7.9
	33.4	149.3	28.4	50.8		25.4	101.6	3.57
1 1/4"	1.66	6.25	1.12	2.50	4	1.00	4.38	9.1
	42.2	158.7	28.4	63.5		25.4	111.2	4.14
1 1/2"	1.90	7.00	1.25	2.88	4	1.12	4.88	12.7
	48.3	177.8	31.7	73.1		28.4	123.9	5.75
2"	2.375	8.50	1.50	3.62	8	1.00	6.50	22.2
	60.3	215.9	38.1	91.9		25.4	165.1	10.1
2 1/2"	2.875	9.26	1.62	4.12	8	1.12	7.50	30.8
	73.0	244.3	41.1	104.6		28.4	190.5	14.0
3"	3.50	10.50	1.88	5.00	8	1.25	8.00	42.1
	88.9	266.7	47.7	127.0		31.7	203.2	19.1
4"	4.50	12.25	2.12	6.19	8	1.38	9.50	65.9
	114.3	311.1	53.8	157.2		35.0	241.3	29.9
5"	5.563	14.75	2.88	7.31	8	1.62	11.50	129
	141.3	374.6	73.1	185.6		41.1	292.1	58.4
6"	6.625	15.50	3.25	8.50	12	1.50	12.50	158
	168.3	393.7	82.5	215.9		38.1	317.5	71.8
8"	8.625	19.00	3.62	10.62	12	1.75	15.50	269
	219.1	482.6	91.9	269.7		44.4	393.7	122
10"	10.75	23.00	4.25	12.75	12	2.00	19.00	463
	273	584.2	107.9	323.8		50.8	482.6	210
12"	12.75	26.50	4.88	15.00	16	2.12	22.50	696
	323.8	673.1	123.9	381.0		53.8	571.5	316
14"	14.00	29.50	5.25	16.25	16	2.38	25.00	925
	355.6	749.3	133.3	412.7		60.4	635.0	420
16"	16.00	32.50	5.75	18.50	16	2.62	27.75	1229
	406.4	825.5	146.0	469.9		66.5	2704.8	558
18"	18.0	36.00	6.38	21.00	16	2.88	30.50	1674
	457.2	914.4	162.0	533.4		73.1	774.7	760
20"	20.0	38.75	7.00	23.00	16	3.12	32.75	2126
	508	984.2	177.8	584.2		79.2	831.8	965
24"	24.00	46.00	8.00	27.25	16	3.62	39.00	3432
	609.6	1168.4	203.2	692.1		91.9	990.6	1558

BLIND FLANGE

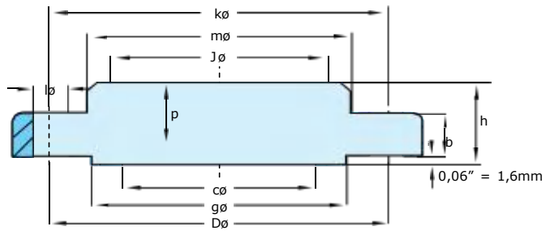
2500 LB/SQ.IN. 1/2"-24"

ASME B16.5



Nominal Pipe Size	Outside Diam. D in mm	Thickness Min. B in mm	O.D. of Raised Face G in mm	Number of Holes	Diam of Holes l in mm	Bolt Circle Diam. K in mm	Approx Weight in Kg
1/2"	133.4	30.2	35.1	4	22.4	88.9	3
3/4"	139.7	31.8	42.9	4	22.4	95.3	3.5
1"	158.8	35.1	50.8	4	25.4	108.0	5
1.1/4"	184.2	38.1	63.5	4	28.4	130.0	7.4
1.1/2"	203.2	44.5	73.2	4	31.8	146.1	10.4
2"	235.0	50.8	91.9	8	28.4	171.5	16
2.1/2"	266.7	57.2	104.6	8	31.8	196.9	23
3"	304.8	66.5	127.0	8	35.1	228.6	35
4"	355.6	76.2	157.2	8	41.1	273.1	54
5"	419.1	91.9	185.7	8	47.8	323.9	91
6"	482.6	108.0	215.9	8	53.8	368.3	141
8"	552.5	127.0	269.7	12	53.8	438.2	214
10"	673.1	165.1	323.9	12	66.5	539.8	411
12"	762.0	184.1	381.0	12	73.2	619.3	592

SOCKET WELDING FLANGES



150 LB/SG.IN.

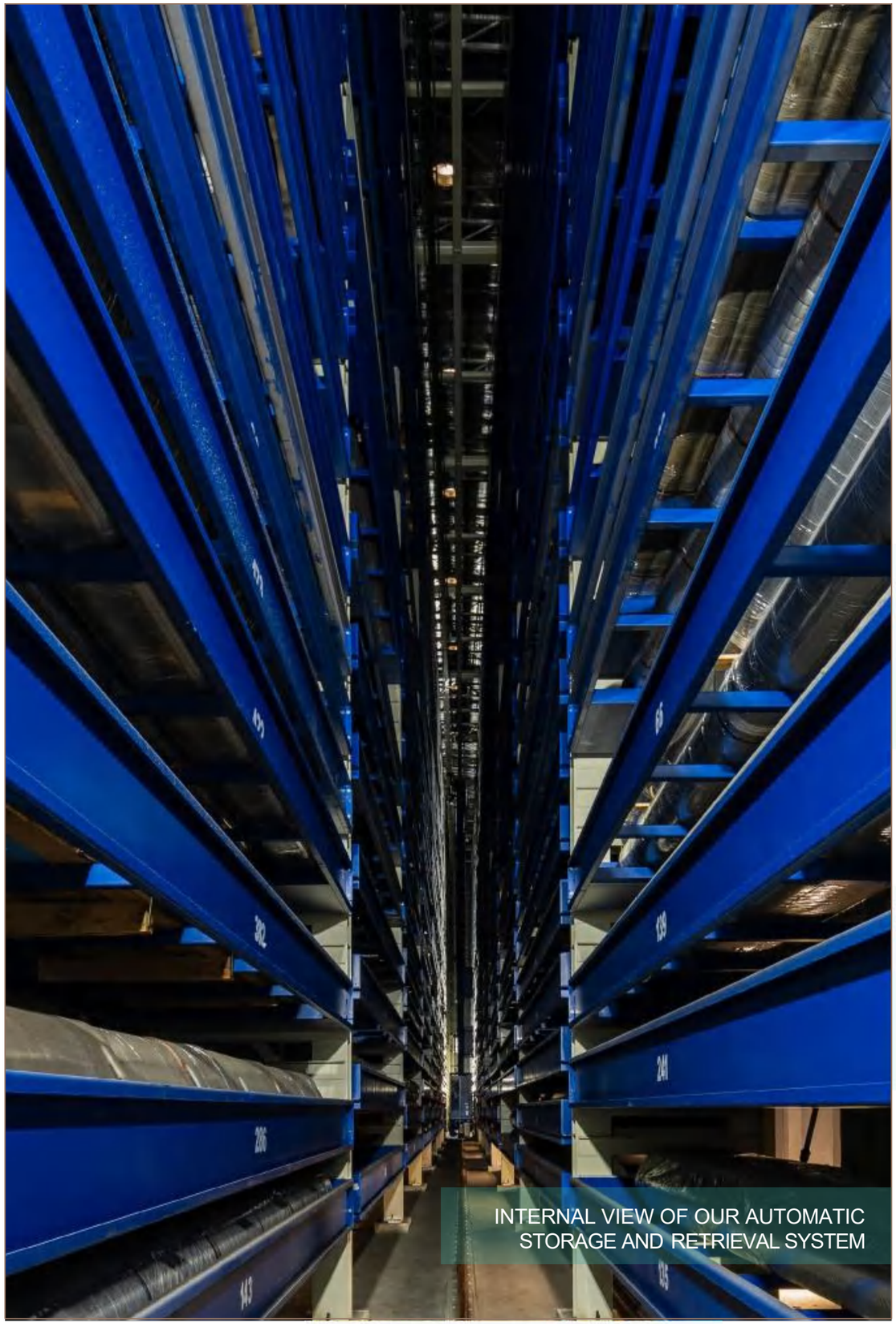
ASME B16.5

Pipe		Flange							Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	C in. mm	p in. mm	b in. mm	h in. mm		m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kg
1/2"	0.84	3.50	0.88	To be specified by purchaser	0.38	0.44	0.62		1.19	1.38	4	1.05	3.88	1.09
	21.3	88.9	22.4		9.6	11.2	15.7		30.2	35.1		26.7	98.6	27.7
3/4"	1.05	3.88	1.09		0.44	0.50	0.62		1.50	1.69	4	0.62	2.75	1.3
	26.7	98.6	27.7		11.1	12.7	15.7		38.1	42.9		15.7	69.9	0.59
1"	1.315	4.25	1.36		0.50	0.56	0.69		1.94	2.00	4	0.62	3.12	1.8
	33.4	108.0	34.6		12.7	14.2	17.5		49.3	50.8		15.7	79.2	0.81
1 1/4"	1.66	4.62	1.70		0.56	0.62	0.81		2.31	2.50	4	0.62	3.50	2.4
	42.2	117.3	43.2		14.0	15.7	20.6		58.7	63.5		15.7	88.9	1.07
1 1/2"	1.90	5.00	1.95		0.62	0.69	0.88		2.56	2.88	4	0.62	3.88	3.0
	48.3	127.0	49.5		15.7	17.5	22.4		65.0	73.1		15.7	98.6	1.36
2"	2.375	6.00	2.44		0.69	0.75	1.00		3.06	3.62	4	0.75	4.75	4.6
	60.3	152.4	62.0		17.5	19.1	25.4		77.7	91.9		19.1	120.7	2.10
2 1/2"	2.875	7.00	2.94		0.75	0.88	1.12		3.56	4.12	4	0.75	5.50	7.3
	73.0	177.8	74.7		19.0	22.4	28.4		90.4	104.6		19.1	139.7	3.33
3"	3.50	7.50	3.57		0.81	0.94	1.19		4.25	5.00	4	0.75	6.00	8.6
	88.9	190.5	90.7		20.6	23.9	30.2		108.0	127.0		19.1	152.4	3.90

300 LB/SG.IN.

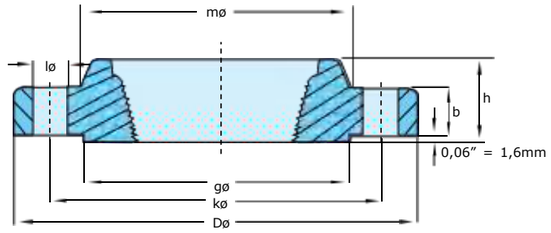
ASME B16.5

Pipe		Flange							Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	C in. mm	p in. mm	b in. mm	h in. mm		m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kg
1/2"	0.84	3.75	0.88	To be specified by purchaser	0.38	0.56	0.88		1.50	1.38	4	0.62	2.62	1.5
	21.3	95.2	22.4		9.6	14.2	22.3		38.1	35.1		15.7	66.5	0.66
3/4"	1.05	9.62	1.09		0.44	0.62	1.00		1.88	1.69	4	0.75	3.25	2.5
	26.7	117.3	27.7		11.1	15.7	25.4		47.7	42.9		19.0	82.5	1.15
1"	1.315	4.88	1.36		0.50	0.69	1.06		2.12	2.00	4	0.75	3.50	3.1
	33.4	123.9	34.5		12.7	17.5	26.9		53.8	50.8		19.0	88.9	1.40
1 1/4"	1.66	5.25	1.70		0.56	0.75	1.06		2.50	2.50	4	0.75	3.88	3.9
	42.2	133.3	43.2		14.2	19.0	26.9		63.5	63.5		19.0	98.5	1.75
1 1/2"	1.90	3.12	1.95		0.62	0.81	1.19		2.75	2.88	4	0.88	4.50	5.6
	48.3	155.4	49.5		15.7	20.6	30.2		69.8	73.1		22.3	114.3	2.55
2"	2.375	6.50	2.44		0.69	0.88	1.31		3.31	3.62	4	0.75	5.00	6.5
	60.3	165.1	62.0		17.5	22.3	33.2		84.0	91.9		19.0	127.0	2.93
2 1/2"	2.875	7.50	2.94		0.75	1.00	1.50		3.94	4.12	4	0.88	5.88	9.7
	73.0	190.5	74.7		19.0	25.4	38.1		100.0	104.6		22.3	149.3	4.40
3"	3.50	8.25	3.57		0.81	1.12	1.69		4.62	5.00	4	0.88	6.62	13.0
	88.9	209.5	90.7		20.6	28.4	42.9		117.3	127.0		22.3	168.1	5.92



INTERNAL VIEW OF OUR AUTOMATIC STORAGE AND RETRIEVAL SYSTEM

THREADED FLANGE



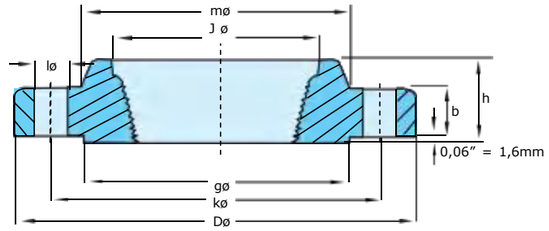
Thread type: Standard taper pipe thread to ANSI B 2.1

150 LB/SQ.IN.

ASME B16.5

Pipe		Flange					Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h/h1 in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.50		0.44	0.62	1.19	1.38	4	0.62	2.38	0.9
	21.3	88.9		11.2	15.7	30.2	35.0		15.7	60.5	0.39
3/4"	1.05	3.88		0.50	0.62	1.50	1.69	4	0.62	2.75	1.2
	26.7	98.6		12.7	15.7	38.1	42.9		15.7	69.9	0.56
1"	1.315	4.25		0.56	0.69	1.94	2.00	4	0.62	3.12	1.7
	33.4	108.0		14.2	17.5	49.3	50.8		15.7	79.2	0.78
1 1/4"	1.66	4.62		0.62	0.81	2.31	2.50	4	0.62	6.50	2.3
	42.2	117.3		15.7	20.6	58.7	63.5		15.7	88.9	1.03
1 1/2"	1.90	5.00		0.69	0.88	2.56	2.88	4	0.62	3.88	2.9
	48.3	127.0		17.5	22.4	65.0	73.1		15.7	98.6	1.32
2"	2.375	6.00		0.75	1.00	3.06	3.62	4	0.75	4.75	4.5
	60.3	152.4		19.1	25.4	77.7	91.9		19.1	120.7	2.06
2 1/2"	2.875	7.00		0.88	1.12	3.56	4.12	4	0.75	5.50	7.2
	73.0	177.8		22.4	28.4	90.4	104.6		19.1	139.7	3.28
3"	3.50	7.50		0.94	1.19	4.25	5.00	4	0.75	6.00	8.5
	88.9	190.5		23.9	30.2	108.0	127.0		19.1	152.4	3.85
3 1/2"	4.00	8.50		0.94	1.25	4.81	5.50	8	0.75	7.00	10.6
	101.6	215.9		23.9	31.8	122.2	139.7		19.1	177.8	4.81
4"	4.50	9.00	No counter Bore Required on 150 lb Threaded Flanges	0.94	1.31	5.31	6.19	8	0.75	7.50	11.7
	114.3	228.6		23.9	33.3	134.9	157.2		19.1	190.5	5.30
5"	5.563	10.00		0.94	1.44	6.44	7.31	8	0.88	8.50	13.4
	141.3	254.0		23.9	36.6	163.6	185.7		22.4	215.9	6.07
6"	6.625	11.00		1.00	1.56	7.56	8.50	8	0.88	9.50	16.4
	168.3	279.4		25.4	39.6	192.0	215.9		22.4	241.3	7.45
8"	8.625	13.50		1.12	1.75	9.69	10.62	8	0.88	11.75	26.7
	219.1	342.9		28.4	44.5	246.1	269.7		22.4	298.5	12.1
10"	10.75	16.00		1.19	1.94	12.00	12.75	12	1.00	14.25	36.3
	273	406.4		30.2	49.3	304.8	323.9		25.4	362.0	16.5
12"	12.75	19.00		1.25	2.19	14.38	15.00	12	1.00	17.00	57.7
	323.8	482.6		31.8	55.6	365.3	381.0		25.4	431.8	26.2
14"	14.00	21.00		1.38	2.25	15.75	16.25	12	1.12	18.75	76.2
	355.6	533.4		35.1	57.2	400.1	412.8		28.4	476.3	34.6
16"	16.00	23.50		1.44	2.50	18.00	18.50	16	1.12	21.25	98.7
	406.4	596.9		36.6	63.5	457.2	469.9		28.4	539.8	44.8
18"	18.0	25.00		1.56	2.69	19.88	21.00	16	1.25	22.75	108
	457.2	596.9		39.6	68.3	505.0	533.4		31.8	577.9	48.9
20"	20.0	27.50		1.69	2.88	22.00	23.00	20	1.25	25.00	136
	508	698.5		42.9	73.2	558.8	584.2		31.8	635.0	61.9
24"	24.00	32.00		1.88	3.25	26.12	27.25	20	1.38	29.50	191
	609.6	812.8		47.8	82.6	663.4	692.2		35.1	749.3	86.9

THREADED FLANGE

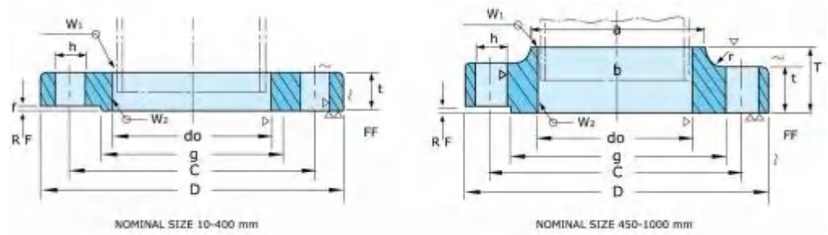


Thread type: Standard taper pipe thread to ANSI B 2.1

300 LB/SQ.IN.

ASME B16.5

Pipe		Flange						Hub	Raised Face	Drilling Template			Approx. Weight
Nom. Size DN	OD in. mm	D in. mm	J in. mm	b in. mm	h in. mm	h1 in. mm	m in. mm	g in. mm	Number	l in. mm	k in. mm	= Pounds Kilo
1/2"	0.84	3.75	0.93	0.56	0.88	0.62	1.50	1.38	4	0.62	2.62	1.4
	21.3	95.2	23.6	14.2	15.7	15.7	38.1	35.0		15.7	66.5	0.64
3/4"	1.05	4.62	1.14	0.62	1.00	0.62	1.88	1.69	4	0.75	3.25	2.5
	26.7	117.3	29.0	15.7	25.4	15.7	47.7	42.9		19.0	82.5	1.12
1"	1.315	4.88	1.41	0.69	1.06	0.62	2.12	2.00	4	0.75	3.50	3.0
	33.4	123.9	35.8	17.5	26.9	15.7	53.8	50.8		19.0	88.9	1.36
1 1/4"	1.66	5.25	1.75	0.75	1.06	0.81	2.50	2.50	4	0.75	3.88	3.7
	42.2	133.3	44.4	19.0	26.9	20.5	63.5	63.5		19.0	98.5	1.68
1 1/2"	1.90	6.12	1.99	0.81	1.19	0.88	2.75	2.88	4	0.88	4.50	5.5
	48.3	155.4	50.5	20.6	30.2	22.3	69.8	73.1		22.3	114.3	2.49
2"	2.375	6.50	2.50	0.88	1.31	1.12	3.31	3.62	8	0.75	5.00	6.3
	60.3	165.1	63.5	22.3	33.2	28.4	84.0	91.9		19.0	127.0	2.87
2 1/2"	2.875	7.50	3.00	1.00	1.50	1.25	3.94	4.12	8	0.88	5.88	9.5
	73.0	190.5	76.2	25.4	38.1	31.7	100.0	104.6		22.3	149.3	4.32
3"	3.50	8.25	3.63	1.12	1.69	1.25	4.62	5.00	8	0.88	6.62	12.9
	88.9	209.5	92.2	28.4	42.9	31.7	117.3	127.0		22.3	168.1	5.85
3 1/2"	4.00	9.00	4.13	1.19	1.75	1.44	5.25	5.50	8	0.88	7.25	16.2
	101.6	228.6	104.9	30.2	44.4	36.5	133.3	139.7		22.3	184.1	7.34
4"	4.50	10.00	4.63	1.25	1.88	1.44	5.75	6.19	8	0.88	7.88	21.2
	114.3	254.0	117.6	31.7	47.7	36.5	146.0	157.2		22.3	200.1	9.61
5"	5.563	11.00	5.69	1.38	2.00	1.69	7.00	7.31	8	0.88	9.25	27.1
	141.3	279.4	144.5	35.0	50.8	42.9	177.8	185.7		22.3	254.9	12.3
6"	6.625	12.50	6.75	1.44	2.06	1.81	8.12	8.50	12	0.88	10.62	34.4
	168.3	317.5	171.4	36.5	52.3	45.9	206.2	215.9		22.3	269.7	15.6
8"	8.625	15.00	8.75	1.62	2.44	2.00	10.25	10.62	12	1.00	13.00	53.3
	219.1	381.0	222.2	41.1	61.9	50.8	260.3	269.7		25.4	330.2	24.2
10"	10.75	17.50	10.88	1.88	2.62	2.19	12.625	12.75	16	1.12	15.25	75.1
	273	444.5	276.3	47.7	66.5	55.6	320.5	323.9		28.4	387.3	34.1
12"	12.75	20.50	12.94	2.00	2.88	2.38	14.75	15.00	16	1.25	17.75	110
	323.8	520.7	328.7	50.8	73.1	60.4	374.6	381.0		31.7	450.8	49.8
14"	14.00	23.00	14.19	2.12	3.00	2.50	16.75	16.25	20	1.25	20.25	154
	355.6	584.2	360.4	53.8	76.2	63.5	425.4	412.8		31.7	514.3	69.9
16"	16.00	25.50	16.19	2.25	3.25	2.69 68.3	19.00	18.50	20	1.38	22.50	194
	406.4	647.7	411.2	57.1	82.5	68.3	482.6	469.9		35.0	571.5	88.1
18"	18.0	28.00	18.19	2.38	3.50	2.75	21.00	21.00	24	1.38	24.75	240
	457.2	711.2	462	60.4	88.9	39.8	533.4	533.4		35.0	328.6	109
20"	20.0	30.50	20.19	2.50	3.75	2.88	23.12	23.00	24	1.38	27.00	295
	508	774.7	512.8	63.5	95.2	73.1	587.2	584.2		35.0	685.8	134
24"	24.00	36.00	24.19	2.75	4.19	3.25	27.62	27.25	24	1.62	32.00	443
	609.6	914.4	614.4	69.8	106.4	82.5	701.2	692.1		41.1	812.8	201

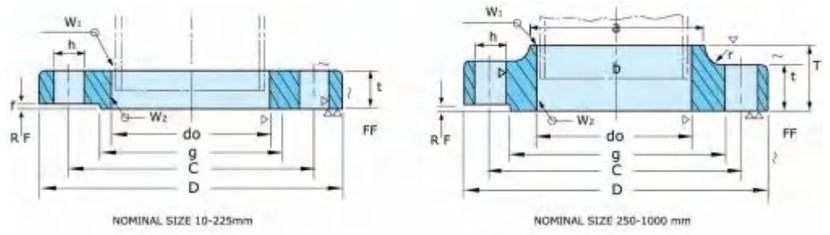


NOMINAL SIZE 10-400 mm

NOMINAL SIZE 450-1000 mm

KS B1503 JIS B2220 5K

Nominal Bore of Flange	Outside Dia. of Steel Pipe	Inside Dia. Of Flange do	Outside Dia. Of Flange D	Sectional Dimensions of Flange t	T	Dia. of Hub a	Dia. of Hub b	Radius r	Bolt Hole Raised Face f	Dia. of Raised Face g	Dia. of Bolt Circle c	Number of Bolt Holes	Hole Dia. H	Nominal Bolt size	Weld Length (Reference) W1	W2	Approx Weight (Kg)
10	17.3	17.8	75	9					1	39	55	4	12	M10	5	2.5	0.27
15	21.7	22.2	80	9					1	44	60	4	12	M10	5	3	0.30
20	27.2	27.7	85	10					1	49	65	4	12	M10	5	3	0.37
25	34.0	34.5	95	10					1	59	75	4	12	M10	5	3	0.45
32	42.7	43.2	115	12					2	70	90	4	15	M12	6	3	0.78
40	48.6	49.1	120	12					2	75	95	4	15	M12	6	3	0.83
50	60.5	61.1	130	14					2	85	105	4	15	M12	6	3	1.07
65	76.3	77.1	155	14					2	110	130	4	15	M12	6	4	1.49
80	89.1	90.0	180	14					2	121	145	4	19	M16	6	4	1.99
(90)	101.6	102.6	190	14					2	131	155	4	19	M16	6	4	2.09
100	114.3	115.4	200	16					2	141	165	8	19	M16	7	4	2.39
125	139.8	141.2	235	16					2	176	200	8	19	M16	7	4	3.23
150	165.2	166.6	265	18					2	206	230	8	19	M16	7	5	4.41
(175)	190.7	192.1	300	18					2	232	260	8	23	M20	7.5	5	5.51
200	216.3	218.0	320	20					2	252	280	8	23	M20	8.5	6	6.33
(225)	241.8	243.7	345	20					2	277	305	12	23	M20	9	6	6.64
250	267.4	269.5	385	22					2	317	345	12	23	M20	10	6	9.45
300	318.5	321.0	430	22					3	360	390	12	23	M20	10	6	10.30
350	355.6	358.1	480	24					3	403	435	12	25	M22	12	7	14.00
400	406.4	409.0	540	24					3	463	495	16	25	M22	12	7	16.90
450	457.2	460.0	605	24	40	495	500	5	3	523	555	16	25	M22	12	7	24.80
500	508.0	511.0	655	24	40	546	552	5	3	573	605	20	25	M22	12	7	26.90
(550)	558.8	562.0	720	26	42	597	603	5	3	630	665	20	27	M24	12	7	34.10
600	609.6	613.0	770	26	44	648	654	5	3	680	715	20	27	M24	12	7	37.50
(650)	660.4	664.0	825	26	48	702	708	5	3	735	770	24	27	M24	12	7	42.80
700	711.2	715.0	875	26	48	751	758	5	3	785	820	24	27	M24	12	7	45.40
(750)	762.0	766.0	945	28	52	802	810	5	3	840	880	24	33	M30	12	7	57.40
800	812.8	817.0	995	28	52	854	862	5	3	890	930	24	33	M30	13	8	60.80
(850)	863.6	868.0	1045	28	54	904	912	5	3	940	980	24	33	M30	13	8	63.50
900	914.4	919.0	1095	30	56	956	964	5	3	990	1030	24	33	M30	13	8	75.30
1000	1016.0	1021.0	1195	32	60	1058	1066	5	3	1090	1130	28	33	M30	14	9	88.50
*(1100)	1117.6	1123	1305	32					3	1200	1240	28	33	M30			
*1200	1219.2	1225	1420	34					3	1305	1350	32	33	M30			
*1350	1371.6		1575	34					3	1460	1505	32	33	M30			
*1500	1524.0		1730	36					3	1615	1660	36	33	M30			



NOMINAL SIZE 10-225mm

NOMINAL SIZE 250-1000 mm

KS B1503 JIS B2220 10K

Nominal Bore of Flange	Outside Dia. of Steel Pipe	Inside Dia. Of Flange do	Outside Dia. Of Flange D	Sectional Dimensions of Flange t	T	Dia. of Hub a	Dia. of Hub b	Radius r	Bolt Hole Raised Face f	Dia. of Raised Face g	Dia. of Bolt Circle c	Number of Bolt Holes	Hole Dia. H	Nominal Bolt size	Weld Length (Reference) W1	W2	Approx Weight (Kg)
10	17.3	17.8	90	12					1	46	65	4	15	M12	5	2.5	0.52
15	21.7	22.2	95	12					1	51	70	4	15	M12	5	3	0.57
20	27.2	27.7	100	14					1	56	75	4	15	M12	5	3	0.73
25	34.0	34.5	125	14					1	67	90	4	19	M16	5	3	1.13
32	42.7	43.2	135	16					2	76	100	4	19	M16	6	3	1.48
40	48.6	49.1	140	16					2	81	105	4	19	M16	6	3	1.56
50	60.5	61.1	155	16					2	96	120	4	19	M16	6	3	1.88
65	76.3	77.1	175	18					2	116	140	4	19	M16	6.5	4	2.60
80	89.1	90.0	185	18					2	126	150	8	19	M16	6.5	4	2.61
(90)	101.6	102.6	195	18					2	136	160	8	19	M16	6.5	4	2.76
100	114.3	115.4	210	18					2	151	175	8	19	M16	7	4	3.14
125	139.8	141.2	250	20					2	182	210	8	23	M20	7.5	4	4.77
150	165.2	166.6	280	22					2	212	240	8	23	M20	8	5	6.34
(175)	190.7	192.1	305	22					2	237	265	12	23	M20	9	5	6.82
200	216.3	218.0	330	22					2	262	290	12	23	M20	9	6	7.53
(225)	241.8	243.7	350	22					2	282	310	12	23	M20	9	6	7.74
250	267.4	269.5	400	24	36	288	292	6	2	324	355	12	25	M22	10	6	12.7
300	318.5	321.0	445	24	38	340	346	6	3	368	400	16	25	M22	10	6	13.8
350	355.6	358.1	490	26	42	380	386	6	3	413	445	16	25	M22	12	7	18.2
400	406.4	409.0	560	28	44	436	442	6	3	475	510	16	27	M24	12	7	25.2
450	457.2	460.0	620	30	48	496	502	6	3	530	565	20	27	M24	14	8	33.0
500	508.0	511.0	675	30	48	548	554	6	3	585	620	20	27	M24	14	8	37.6
(550)	558.8	562.0	745	32	52	604	610	6	3	640	680	20	33	M30	15	9	49.7
600	609.6	613.0	795	32	52	656	662	6	3	690	730	24	33	M30	16	10	52.6
(650)	660.4	664.0	845	34	56	706	712	6	3	740	780	24	33	M30	16	10	60.6
700	711.2	715.0	905	34	58	762	770	6	3	800	840	24	33	M30	17	10	70.6
(750)	762.0	766.0	970	36	62	816	824	6	3	855	900	24	33	M30	18	11	85.8
800	812.8	817.0	1020	36	64	868	876	6	3	905	950	28	33	M30	19	12	91.2
(850)	863.6	868.0	1070	36	66	920	928	6	3	955	1000	28	33	M30	19	12	98.6
900	914.4	919.0	1120	38	70	971	979	6	3	1005	1050	28	33	M30	22	14	109
1000	1016.0	1021.0	1235	40	74	1073	1081	6	3	1110	1160	28	39	M36	22	14	133
*(1100)	1117.6	1123	1345	42	76				3	1220	1270	28	39	M36			
*1200	1219.2	1225	1465	44	78				3	1325	1380	32	39	M36			
*1350	1371.6		1630	48	82				3	1480	1540	36	45	M42			
*1500	1524.0		1795	50	90				3	1635	1700	40	45	M42			