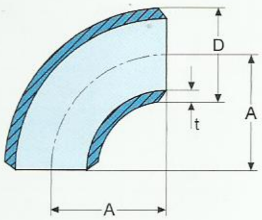
Butt welding fittings ASME standards

Standard grades according to ASTM A / ASME SA403, 304/L and 316/L (dual marked and certified), ASME B16.9, annealed and quenched, bevelled ends acc. to ASME B16.25, hardness acc. to NACE MR0175, IC acc. to ASTM A262E and PMI tested. With certificate acc. to EN10204/3.1

Special grades according to ASTM A815 in grades UNS S31803, UNS S32750, ASME B16.9, annealed and quenched, bevelled ends acc. to ASME B16.25, hardness acc. to NACE MR0175, G48A for UNS S32750 and PMI tested. With certificate acc. to EN10204/3.1.

Long radius elbows 90°

ASTM A403 / A815   ASME B16.9



Order example:

● = FBBLR-316L-3-10s

▲ = FBBLR-W316L-3-10s

● = FBBLR-31803-1-40s

● WP-S = made from seamless pipe

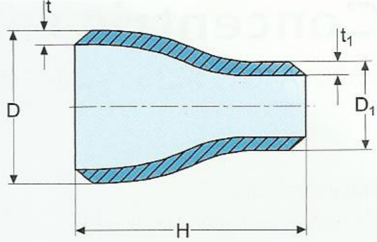
▲ WP-W = made from welded pipe or plate

FBBLR

Nominal pipe size	Schedule	Dimensions in mm D	t	A	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
½″	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		●		
¾″	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	●	●		
1¼″	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	●	●		
1½″	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	●	●		
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	●	●		
2½″	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	●	●		
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	●	●		
3½″	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	●	●		

Concentric reducers

ASTM A403 / A815 ASME B16.9



Order example:

- ● = FBRC-304L-2-1-10s
- ▲ = FBRC-W316L-6-4-10s
- ● = FBRC-31803-2-1-10s

● WP-S = made from seamless pipe
▲ WP-W = made from welded pipe or plate

FBRC

Nominal pipe size	Schedule	Dimensions in mm D	D_1	t-	t_1	H	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
2½ x 1″	10s	73.0	33.4	3.05	2.77	88.9	0.430		●		
2½ x 1½″	10s	73.0	48.3	3.05	2.77	88.9	0.440	●/▲	●/▲	●	
	40s	73.0	48.3	5.16	3.68	88.9	0.769	●	●		
2½ 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		●		
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	●	●		
3 x 1¼″	40s	88.9	42.2	5.49	3.56	88.9	0.750	●			
3 x 1½″	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		●		
3 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	●	●		
3 x 2½″	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		●		
4 x 1½″	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		●		
4 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		●		
4 x 2½″	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	●	●/▲	●	
4 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	●	●		
5 x 2½″	10s	141.3	73.0	3.40	3.05	127.0	1.400	●			
5 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		▲		
5 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	5.510		●		
6 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		●		
6 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	●/▲	●		

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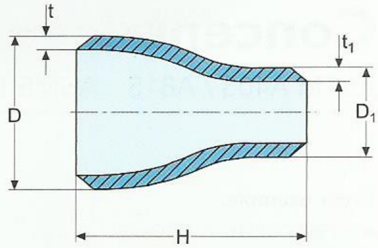
Concentric reducers

ASTM A403 / A815 ASME B16.9



Order example:

● = FBRC-304L-4-2-10s

▲ = FBRC-W316L-12-10-10s

▲ = FBRC-W31803-6-3-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

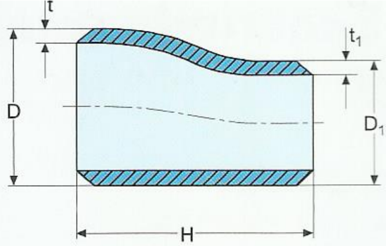
FBRC

Nominal pipe size	Schedule	Dimensions in mm D	D_1	t	t_1	H	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
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	●/▲	●/▲		
8 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	●	●		
8 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	●/▲	●/▲		
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	▲	●/▲		
10 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	6.580	▲	▲		
	40s	323.9	168.3	9.53	7.11	203.2	12.800	▲	▲		
12 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	▲	▲		
12 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	▲	▲		
14 x 10″	10s	355.6	273.1	4.78	4.19	330.2	14.410	▲	▲		
14 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	▲	▲		
16 x 10″	10s	406.4	273.1	4.78	4.19	355.6	17.720	▲	▲		
16 x 12″	10s	406.4	323.9	4.78	4.57	355.6	18.350	▲	▲		
16 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		▲		
18 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		▲		
20 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		▲		

While the figure illustrates a bell-shaped reducer, the use of a conical reducer is not prohibited.

Eccentric reducers

ASTM A403 ASME B16.9



Order example:

● = FBRE-304L-2-1-10s

▲ = FBRE-W316L-8-4-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

FBRE

Nominal pipe size	Schedule	Dimensions in mm D	D_1	t	t_1	H	Weight kg/pce	304L	316L
¾ x ½″	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	0.075		●
1 x ½″	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	0.133		●
1 x ¾″	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	0.147		●
1¼ x ¾″	10s	42.2	26.7	2.77	2.11	50.8	0.180		●
1¼ 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	0.206		●
1½ x ½″	40s	48.3	21.3	3.68	2.77	63.5	0.183	●	
1½ x ¾″	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	0.180		●
1½ 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	0.291		●
1½ x 1¼″	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	0.324		●
2 x ¾″	80s	60.3	26.7	5.54	3.91	76.2	0.406		●
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	0.438		●
2 x 1¼″	10s	60.3	42.2	2.77	2.77	76.2	0.300	▲	▲
	80s	60.3	42.2	5.54	4.85	76.2	0.478		●
2 x 1½″	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	0.508		●
2½ 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	●	●
3 x 1	40s	88.9	33.4	5.49	3.38	88.9	0.850	▲	
3 x 1½″	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	●/▲	●/▲
3 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	●/▲	●/▲
3 x 2½″	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	●	●

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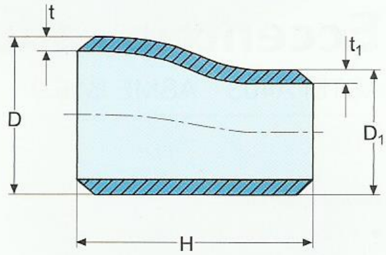
Eccentric reducers

ASTM A403 ASME B16.9



Order example:

● = FBRE-304L-2-1-10s

▲ = FBRE-W316L-8-4-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

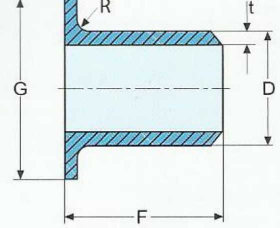
FBRE

Nominal pipe size	Schedule	Dimensions in mm D	D_1	t	t_1	H	Weight kg/pce	304L	316L
4 x 1½″	10s	114.3	48.3	3.05	2.77	101.6	0.629		▲
4 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	●/▲	●/▲
4 x 2½″	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	●	●
4 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	●/▲	●/▲
5 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		●
5 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	●	●
6 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	●/▲	●
6 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		●
8 x 4″	10s	219.1	114.4	3.76	3.05	152.4	3.020	●/▲	●/▲
	40s	219.1	114.4	8.18	6.02	152.4	6.550	●/▲	●/▲
8 x 5″	10s	219.1	141.3	3.76	3.05	152.4	3.080	●	●
	40s	219.1	141.3	8.18	6.02	152.4	6.700	●	●
8 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	●/▲	●/▲
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	▲	▲
10 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	▲	▲
12 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	▲	▲
12 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	▲	
14 x 10″	10s	355.6	273.1	4.78	4.19	330.2	14.410	▲	▲
14 x 12″	10s	355.6	323.9	4.78	4.19	330.2	15.290	▲	▲
16 x 10″	10s	406.4	273.1	4.78	4.19	355.6	17.720	▲	▲
16 x 12″	10s	406.4	323.9	4.78	4.19	355.6	18.350	▲	▲

While the figure illustrates a bell-shaped reducer, the use of a conical reducer is not prohibited.

Stub ends short length

ASTM A403 / A815 MSS-SP43 / Type A ASME B16.9 Short Pattern



Order example:

● = FBSES-316L-2-10s

▲ = FBSES-W316L-8-10s

▲ = FBSES-W31803-6-10s

Facing: 125 - 250 RMS (smooth finish)

● WP-S = made from seamless pipe or plate

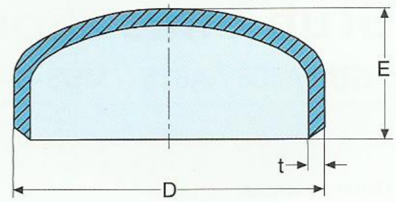
▲ WP-W = made from welded pipe or plate

FBSES

Nominal pipe size	Schedule	Dimensions in mm D	t	G	F	R. max.	Weight kg/pce	304L	316L	UNS S31803
½″	10s	21.3	2.11	34.9	50.8	3.18	0.070	●	●	
	40s	21.3	2.77	34.9	50.8	3.18	0.090	●	●	
¾″	10s	26.7	2.11	42.9	50.8	3.18	0.100	●	●	●
	40s	26.7	2.87	42.9	50.8	3.18	0.120	●	●	●
1″	10s	33.4	2.77	50.8	50.8	3.18	0.160	●/▲	●/▲	●
	40s	33.4	3.38	50.8	50.8	3.18	0.170	●	●	●
1¼″	10s	42.2	2.77	63.5	50.8	4.76	0.220	●	●	●
	40s	42.2	3.56	63.5	50.8	4.76	0.250	●	●	
1½″	10s	48.3	2.77	73.0	50.8	6.35	0.250	●/▲	●/▲	●
	40s	48.3	3.68	73.0	50.8	6.35	0.310	●	●	●
2″	10s	60.3	2.77	92.1	63.5	7.94	0.430	●/▲	●/▲	●
	40s	60.3	3.91	92.1	63.5	7.94	0.610	●	●	●
2½″	10s	73.0	3.05	104.8	63.5	7.94	0.570	●/▲	●/▲	●
	40s	73.0	5.16	104.8	63.5	7.94	0.800	●	●	
3″	10s	88.9	3.05	127.0	63.5	9.53	0.730	●/▲	●/▲	●
	40s	88.9	5.49	127.0	63.5	9.53	1.130	●	●	
4″	10s	114.3	3.05	157.2	76.2	11.11	1.090	●/▲	●/▲	●
	40s	114.3	6.02	157.2	76.2	11.11	1.870	●	●	
5″	10s	141.3	3.40	185.7	76.2	11.11	1.470	●/▲	●/▲	
	40s	141.3	6.55	185.7	76.2	11.11	2.280	●	●	
6″	10s	168.3	3.40	215.9	88.9	12.70	2.150	●/▲	●/▲	●/▲
	40s	168.3	7.11	215.9	88.9	12.70	3.570	●/▲	●/▲	●
8″	10s	219.1	3.76	269.9	101.6	12.70	3.220	●/▲	●/▲	▲
	40s	219.1	8.18	269.9	101.6	12.70	6.070	●/▲	▲	
10″	10s	273.1	4.19	323.9	127.0	12.70	5.130	▲	▲	▲
	40s	273.1	9.27	323.9	127.0	12.70	10.070	▲	▲	
12″	10s	323.9	4.57	381.0	152.4	12.70	8.160	▲	▲	▲
	40s	323.9	9.53	381.0	152.4	12.70	14.290	▲	▲	
14″	10s	355.6	4.78	412.8	152.4	12.70	10.890	▲	▲	
	STD	355.6	9.53	412.8	152.4	12.70	17.150		▲	
16″	10s	406.4	4.78	469.9	152.4	12.70	12.700	▲	▲	
	STD	406.4	9.53	469.9	152.4	12.70	20.410		▲	
18″	10s	457.2	4.78	533.4	152.4	12.70	17.240	▲	▲	
20″	10s	508.0	5.54	584.2	152.4	12.70	21.770	▲	▲	
24″	10s	609.6	6.35	692.2	152.4	12.70	27.220	▲	▲	

End caps

ASTM A403 / A815   ASME B16.9



Order example:

- ● = FBEC-316L-1-10s
- ● = FBEC-W31803-3-10s

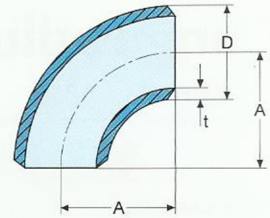
FBEC

● WP-S = made from plate

Nominal pipe size	Schedule	Dimensions in mm D	t	E	Weight kg/pce	304L	316L	UNS S31803
½″	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		●	
¾″	10s	26.7	2.11	25.4	0.050	●	●	●
	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		●	
1¼″	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		●	
1½″	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		●	
2½″	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		●	
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	●	●	●
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	●	●	
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		●	
8″	10s	219.1	3.76	101.6	2.490	●	●	●
	40s	219.1	8.18	101.6	5.670	●	●	
10″	10s	273.1	4.19	127.0	4.900	●	●	●
	40s	273.1	9.27	127.0	9.210	●	●	
12″	10s	323.9	4.57	152.4	6.530	●	●	●
	40s	323.9	9.53	152.4	13.060	●	●	
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		●	

Long radius elbows 90°

ASTM A403 / A815   ASME B16.9



Order example:

● = FBBLR-316L-3-10s

▲ = FBBLR-W316L-3-10s

▲ = FBBLR-W31803-8-10s

FBBLR

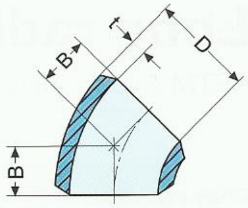
● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

Nominal pipe size	Schedule	Dimensions in mm D	t	A	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
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		●		
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	●	●		
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	●	●		
10″	10s	273.1	4.19	381.0	19.500	●/▲	●/▲	▲	
	40s	273.1	9.27	381.0	38.560	●/▲	●/▲		
12″	10s	323.9	4.57	457.2	27.220	▲	▲	▲	
	40s	323.9	9.53	457.2	59.420	▲	▲		
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	▲	▲		
20″	10s	508.0	5.54	762.0	99.790	▲	▲		
24″	10s	609.6	6.35	914.4	140.610	▲	▲		

Long radius elbows 45°

ASTM A403 / A815   ASME B16.9



Order example:

- ● = FBBLR45-304L-3-10s
- ▲ = FBBLR45-W304L-3-10s
- ● = FBBLR45-31803-3-10s

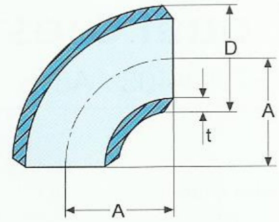
● WP-S = made from seamless pipe
▲ WP-W = made from welded pipe or plate

FBBLR45

Nominal pipe size	Schedule	Dimensions in mm D	t	B	Weight kg/pce	304L	316L	UNS S31803
½″	10s	21.3	2.11	15.9	0.030	▲	●	●
	40s	21.3	2.77	15.9	0.035	▲	●	
¾″	10s	26.7	2.11	19.0	0.030	▲	●	●
	40s	26.7	2.87	19.0	0.040	▲	●	
1″	10s	33.4	2.77	22.2	0.090	●/▲	●/▲	●
	40s	33.4	3.38	22.2	0.110	●/▲	●/▲	
1¼″	10s	42.4	2.77	25.4	0.110	●/▲	●/▲	
	40s	42.4	3.56	25.4	0.170	●/▲	●/▲	
1½″	10s	48.3	2.77	28.6	0.170	●/▲	●/▲	●
	40s	48.3	3.68	28.6	0.230	●	●/▲	
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	●		
2½″	10s	73.0	3.05	44.5	0.480	●/▲	●/▲	
	40s	73.0	5.16	44.5	0.770	▲	●/▲	
3″	10s	88.9	3.05	50.8	0.630	●/▲	●/▲	●
	40s	88.9	5.49	50.8	1.080	●/▲	●/▲	●
4″	10s	114.3	3.05	63.5	1.080	●/▲	●/▲	●
	40s	114.3	6.02	63.5	2.090	●/▲	●/▲	●
5″	10s	141.3	3.40	79.4	1.810	▲	▲	
	40s	141.3	6.55	79.4	3.430	●/▲	●/▲	
6″	10s	168.3	3.40	95.3	2.720	●/▲	●/▲	●/▲
	40s	168.3	7.11	95.3	5.440	●/▲	●/▲	●
8″	10s	219.1	3.76	127.0	5.330	●/▲	●/▲	▲
	40s	219.1	8.18	127.0	10.770	●/▲	●/▲	●
10″	10s	273.1	4.19	159.0	9.750	●/▲	●/▲	▲
	40s	273.1	9.27	159.0	19.280	●/▲	●/▲	
12″	10s	323.9	4.57	190.5	13.610	▲	▲	▲
	40s	323.9	9.53	190.5	29.710	▲	▲	
14″	10s	355.6	4.78	222.3	18.140	▲	▲	
16″	10s	406.4	4.78	254.0	23.810	▲	▲	
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 B16.28 / ASME B16.9



Order example:

● = FBBSR-316L-4-10s

▲ = FBBSR-W316L-4-10s

● WP-S = made from seamless pipe

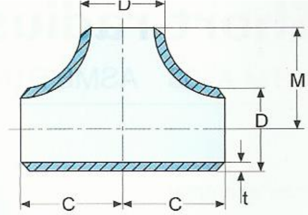
▲ WP-W = made from welded pipe or plate

FBBSR

Nominal pipe size	Schedule	Dimensions in mm D	t	A	Weight kg/pce	304L	316L
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	●	●
1¼″	40s	42.4	3.56	31.8	0.200	●	●
	80s	42.4	4.85	31.8	0.222	●	●
1½″	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	●	●
2½″	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	▲	▲
	STD	355.6	9.53	355.6	45.400		▲
16″	10s	406.4	4.78	406.4	30.840	▲	▲
	STD	406.4	9.53	406.4	59.400		▲
18″	10s	457.2	4.19	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 tees

ASTM A403 / A815   ASME B16.9



Order example:

● = FBT-316L-4-10s

▲ = FBT-W316L-4-10s

● = FBT-32750-2-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

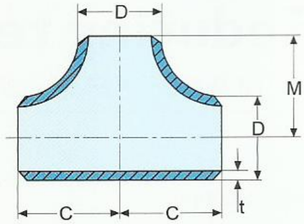
FBT

Nominal pipe size	Schedule	Dimensions in mm D	t	C/M	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
½″	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		●		
¾″	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		●		
1¼″	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		●		
1½″	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	1.430		●		
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		●		
2½″	10s	73.0	3.05	76.2	1.100	●/▲	●/▲	●	
	40s	73.0	5.16	76.2	1.700	●/▲	●/▲	●	
	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		●		
3½″	10s	101.6	3.05	95.3	1.740		●		
	40s	101.6	5.74	95.3	3.190		●/▲		

continued page

Equal tees

ASTM A403 / A815   ASME B16.9



Order example:

● = FBT-316L-4-10s

▲ = FBT-W316L-4-10s

● = FBT-32750-2-10s

● WP-S = made from seamless pipe

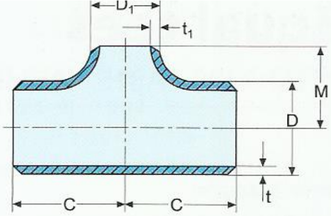
▲ WP-W = made from welded pipe or plate

FBT

Nominal pipe size	Schedule	Dimensions in mm D	t	C/M	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
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		●		
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		●		
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		●		
8″	10s	219.1	3.76	177.8	8.460	●/▲	●/▲	▲	
	40s	219.1	8.18	177.8	18.000	●/▲	●/▲		
10″	10s	273.1	4.19	215.9	14.200	●/▲	●/▲	▲	
	40s	273.1	9.27	215.9	30.800	●/▲	●/▲		
12″	10s	323.9	4.57	254.0	21.600	▲	▲	▲	
	40s	323.9	9.53	254.0	44.300	▲	▲		
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	▲	▲		
20″	10s	508.0	5.54	381.0	103.420	▲	▲		
24″	10s	609.6	6.35	431.8	155.580	▲	▲		

Reducing tees

ASTM A403 ASME B16.9



Order example:

● = FBRT-304L-4-2-10s

▲ = FBRT-W316L-2-1-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

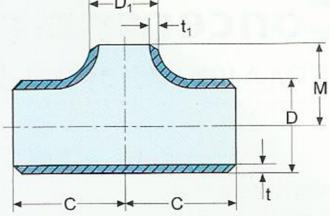
FBRT

Nom pipe size			Schedule	Dimensions in mm						Weight	304L	316L
Run	x	Outlet		D	D_1	t	t_1	C	M	kg/pce		
¾	x	½″	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		●
1	x	½″	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	●	●
1	x	¾″	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	0.270		▲
1¼	x	½″	40s	42.2	21.3	3.56	2.77	47.6	47.6	0.367	●	●
1¼	x	¾″	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	0.530		▲
1¼	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	●	●
			80s	42.2	33.4	4.85	4.55	47.6	47.6	0.600		▲
1½	x	½″	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	●	●
1½	x	¾″	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	0.690		▲
1½	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	●	●
2	x	¾″	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	0.990		▲
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	1.020	●	●
2	x	1¼″	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	1.07		▲
2	x	1½″	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	●	●
2½	x	1¼″	10s	73.0	42.2	3.05	2.77	76	67	0.874	●	
2½	x	1½″	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	●	●
2½	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		●
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	●	●
3	x	1½″	10s	88.9	48.3	3.05	2.77	86	73	1.190	●/▲	●/▲
			40s	88.9	48.3	5.49	3.68	86	73	2.050	●	●

continued page

Reducing tees

ASTM A403 ASME B16.9



Order example:

● = FBRT-304L-4-2-10s

▲ = FBRT-W316L-10-6-10s

● WP-S = made from seamless pipe

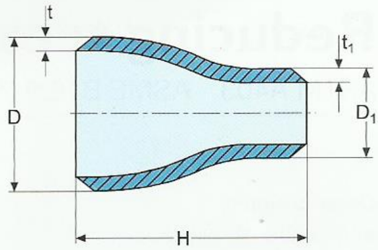
▲ WP-W = made from welded pipe or plate

FBRT

Nom pipe size Run	x	Outlet	Schedule	Dimensions in mm D	D_1	t	t_1	C	M	Weight kg/pce	304L	316L
3	x	2″	10s	88.9	60.3	3.05	2.77	86	76	1.230	●/▲	●/▲
			40s	88.9	60.3	5.49	3.91	86	76	2.160	●	●
3	x	2½″	10s	88.9	73.0	3.05	3.05	86	83	1.310	●/▲	●/▲
			40s	88.9	73.0	5.49	5.16	86	83	2.290		●
4	x	1½″	10s	114.3	48.3	3.05	2.77	105	86	1.750		▲
4	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	●	●
4	x	2½″	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		●
4	x	3″	10s	114.3	88.9	3.05	3.05	105	98	2.500	●/▲	●/▲
			40s	114.3	88.9	6.02	5.49	105	98	4.800	●	●
5	x	3″	10s	141.3	88.9	3.40	3.05	124	111	3.130		●
			40s	141.3	88.9	6.55	5.49	124	111	5.850		●
5	x	4″	10s	141.3	114.3	3.40	3.05	124	117	3.260		●/▲
			40s	141.3	114.3	6.55	6.02	124	117	6.140		●
6	x	2½″	10s	168.3	73.0	3.40	3.05	143	124	4.850	●	
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	●	●
6	x	4″	10s	168.3	114.3	3.40	3.05	143	130	5.100	●/▲	●/▲
			40s	168.3	114.3	7.11	6.02	143	130	10.000	●	●
6	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		●
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	●/▲	●/▲
8	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	●	●
8	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	●/▲	●/▲
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		▲
10	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	▲	●/▲
10	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	▲	●/▲
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	▲	▲
12	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	▲	▲
12	x	10″	10s	323.9	273.1	4.57	3.76	254	241	25.000	▲	▲
			40s	323.9	273.1	9.53	9.27	254	241	54.000	▲	▲

Concentric reducers

ASTM A403 / A815   ASME B16.9



Order example:

● = FBRC-304L-2-1-10s

▲ = FBRC-W316L-6-4-10s

● = FBRC-31803-2-1-10s

● WP-S = made from seamless pipe

▲ WP-W = made from welded pipe or plate

FBRC

Nominal pipe size	Schedule	Dimensions in mm D	D_1	t	t_1	H	Weight kg/pce	304L	316L	UNS S31803	UNS S32750
¾ x ½″	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		●		
1 x ½″	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		●		
1 x ¾″	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		●		
1¼ x ½″	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	●			
1¼ x ¾″	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	●			
1¼ 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		●		
1½ x ½″	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		●/▲		
1½ x ¾″	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		●		
1½ 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		●		
1½ x 1¼″	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		●		
2 x ½″	80s	60.3	21.3	5.54	3.73	76.2	0.380	●			
2 x ¾″	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	●	●		
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	●	●		
2 x 1¼″	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	●	●/▲		
2 x 1½″	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	●	●		

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