



GHWA Industries Co. ■

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Innovation. Precision. Integration.

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Intro

G HWA Industries Co., Ltd. was founded in 2005, with a registered capital of 208 million Baht. Over the past decade, the company has observed a dramatic shift not only in consumer trends, but also market demands for a more service oriented and reliable manufacturing partner, who offers quick responsiveness and reasonable pricings for Western-material-made products.

G HWA has been constantly improving manufacturing procedures and productivity to cut costs, without compromising the high quality standard that G HWA is well known for, integrating strict management systems to assure that our shipments are delivered on the exact date that we offered in each quotation, every time.

As a true market pioneer in Asia with over 20 years of experiences and a resolved understanding of changing market trends, G HWA has evolved into the most trusted manufacturer of hygienic stainless steel components for dairy, food & beverage, cosmetic, vacuum, pharmaceutical and semiconductor industries, currently with more than 300 employees and over 35,000 squaremeters of facility area in Khao Yoi plant.

The Company's long-term strategy envisages the development of partnership with its clients in each region, to assists their business not just by expanding its production facility or widen product range, but most importantly, by understanding and fulfilling the client's demands as a manufacturing specialist.

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Comparison Table

ASME-BPE			3-A Inch Size			BS 4825			SMS/ ISO 2037		DIN 11850					
Nominal	OD	t	Nominal	OD	t	Nominal	OD	t	OD	t	Nominal	Series			t	
Inch	mm	mm	Inch	mm	mm	Inch	mm	mm	mm	mm	DN	1	2	3	mm	
1/4	6.35	0.89	1/2	12.70	1.65	1/2	12.70	1.6	12	1	10	12			1.0	
3/8	9.53	0.89	3/4	19.05	1.65	3/4	19.05	1.6	12.7	1			13			1.5
1/2	12.70	1.65	1	25.40	1.65	1	25.40	1.6	17.2	1					14	2.0
3/4	19.05	1.65	1 1/2	38.10	1.65	1 1/2	38.10	1.6	21.3	1	15	18			1.0	
1	25.40	1.65	2	50.80	1.65	2	50.80	1.6	25	1.2/1.6			19			1.5
1 1/2	38.10	1.65	2 1/2	63.50	1.65	2 1/2	63.50	1.6	33.7	1.2/1.6					20	2.0
2	50.80	1.65	3	76.20	1.65	3	76.20	1.6	38	1.2/1.6	20	22			1.0	
2 1/2	63.50	1.65	4	101.60	2.11	4	101.60	2.0	40	1.2/1.6			23			1.5
3	76.20	1.65	6	152.40	2.77		114.30	2.0	51	1.2/1.6					24	2.0
4	101.60	2.11					139.70	2.0	63.5	1.6	25	28			1.0	
6	152.40	2.77							70	1.6			29			1.5
									76.1	1.6					30	2.0
									88.9	2	32	34			1.0	
									101.6	2			35			1.5
									114.3	2					36	2.0
									139.7	2	40	40			1.0	
													41			1.5
															42	2.0
											50	52			1.0	
													53			1.5
															54	2.0
											65	70			2.0	
											80	85			2.0	
											100	104			2.0	
											125	129			2.0	
											150	154			2.0	

DIN 11866									JIS G3459					JIS G3447		
Series A/ DIN 11850			Series B/ ISO 1127			Series C/ ASME-BPE			Nominal	Nominal	OD	5S	10S	Nominal	OD	t
DN/ ID	OD	t	DN/ OD	OD	t	DN/ OD	OD	t	A	B	mm	t	t	A	mm	mm
6	8	1.0	10.2	10.2	1.6	1/4	6.35	0.89	6A	1/8	10.5	1.0	1.2	1.0S	25.4	1.2
8	10	1.0	13.5	13.5	1.6	3/8	9.53	0.89	8A	1/4	13.8	1.2	1.65	1.25S	31.8	1.2
10	13	1.5	17.2	17.2	1.6	1/2	12.70	1.65	10A	3/8	17.3	1.2	1.65	1.5S	38.1	1.2
15	19	1.5	21.3	21.3	1.6	3/4	19.05	1.65	15A	1/2	21.7	1.65	2.1	2.0S	50.8	1.5
20	23	1.5	26.9	26.9	1.6	1	25.40	1.65	20A	3/4	27.2	1.65	2.1	2.5S	63.5	2.0
25	29	1.5	33.7	33.7	2.0	1 1/2	38.10	1.65	25A	1	34.0	1.65	2.8	3.0S	76.3	2.0
32	35	1.5	42.4	42.4	2.0	2	50.80	1.65	32A	1 1/4	42.7	1.65	2.8	3.5S	89.1	2.0
40	41	1.5	48.3	48.3	2.0	2 1/2	63.50	1.65	40A	1 1/2	48.6	1.65	2.8	4.0S	101.6	2.0
50	53	1.5	60.3	60.3	2.0	3	76.20	1.65	50A	2	60.5	1.65	2.8	4.5S	114.3	3.0
65	70	2.0	76.1	76.1	2.0	4	101.60	2.11	65A	2 1/2	76.3	2.1	3.0	5.5S	139.8	3.0
80	85	2.0	88.9	88.9	2.3	6	152.40	2.77	80A	3	89.1	2.1	3.0	6.5S	165.2	3.0
100	104	2.0	114.3	114.3	2.3				90A	3 1/2	101.6	2.1	3.0			
125	129	2.0	139.7	139.7	2.6				100A	4	114.3	2.1	3.0			
150	154	2.0	168.3	168.3	2.6				125A	5	139.8	2.8	3.4			
200	204	2.0	219.1	219.1	2.6				150A	6	165.2	2.8	3.4			
									200A	8	216.3	2.8	4.0			
									250A	10	267.4	3.4	4.0			
									300A	12	318.5	4.0	4.5			

Tubes



BPE DT-4-1 (DT-1) Stainless Steel Tube

Nominal Size		Tube Wall Thickness		SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	0.035	0.89	2201B014089-##	
3/8	9.53	0.035	0.89	2201B038089-##	
1/2	12.70	0.065	1.65	2201B050165-##	
3/4	19.05	0.065	1.65	2201B075165-##	
1	25.40	0.065	1.65	2201B100165-##	
1 1/2	38.10	0.065	1.65	2201B150165-##	
2	50.80	0.065	1.65	2201B200165-##	
2 1/2	63.50	0.065	1.65	2201B250165-##	
3	76.20	0.065	1.65	2201B300165-##	
4	101.60	0.083	2.11	2201B400211-##	
6	152.40	0.109	2.77	2201B600277-##	



ASTM A249/A269/A270 Stainless Steel Tube

Nominal Size		Tube Wall Thickness		X=ID	Y=OD
Inch	mm	Inch	mm	#=Material Grade	
1/2	12.70	0.065	1.65	2401#050165-XY	
3/4	19.05	0.065	1.65	2401#075165-XY	
1	25.40	0.065	1.65	2401#100165-XY	
1 1/2	38.10	0.065	1.65	2401#150165-XY	
2	50.80	0.065	1.65	2401#200165-XY	
2 1/2	63.50	0.065	1.65	2401#250165-XY	
3	76.20	0.065	1.65	2401#300165-XY	
4	101.60	0.083	2.11	2401#400211-XY	
6	152.40	0.109	2.77	2401#600277-XY	

Material Grades

- A** = 304/ 304L
- B** = 316/ 316L
- C** = 1.4404
- D** = 1.4435
- H** = 904L
- I** = Hastelloy® C-22®
- J** = Hastelloy® C-276
- L** = AL-6XN®
- E** = EPDM
- S** = Silicone/ VMQ or SS Reinforced Teflon®
- T** = PTFE/ Teflon®
- N** = NBR/ Buna-N/ Nitrile
- V** = FKM/ Viton®
- G** = RTFE(Reinforced Teflon®)
- F** = FRN(Fiberglass Reinforced Nylon)

Surface Finishes

- 0** = Unpolished / Mill finish
- 1** = 0.8 µm Ra Max./ 180 Grit
- 2** = 0.5 µm Ra Max./ 240 Grit
- 3** = 0.4 µm Ra Max./ 320 Grit
- 6** = Sandblasted
- 9** = Tumble Finish
- P** = Pickling / Passivation
- BA** = Bright Annealed

SMS Stainless Steel Tube

Nominal Size		Tube Wall Thickness		ID#320	OD#240
DN	mm	Inch	mm	#=Material Grade	
25	25.40	0.047	1.2	3101#100120-32	
25	25.40	0.047	1.5	3101#100150-32	
38	38.10	0.047	1.2	3101#150120-32	
38	38.10	0.047	1.5	3101#150150-32	
51	50.80	0.047	1.2	3101#200120-32	
51	50.80	0.047	1.5	3101#200150-32	
63.5	63.50	0.059	1.5	3101#250150-32	
76.1	76.20	0.063	1.6	3101#300165-32	
101.6	101.60	0.079	2.0	3101#400210-32	

G HWA Industries has become the first manufacturer of both tubes and fittings to receive ASME-BPE Certificate of Authorization in Asia for its production facility in Khao Yoi, Thailand.

In today's modern world where the global sourcing has become a common business strategy, and the need for high quality/cost efficient products are increasingly important, regulations on manufacturing practice and quality assurance program are essential.

The ASME Bioprocessing Equipment (ASME-BPE) Standard first launched in 1997 provides designers and process engineers with a reliable and measurable way of specifying Hygienic Tubes, Valves and Fittings for use in pharmaceutical and High Purity applications.

It is the leading Standard on how to design and build equipment and systems used in the production of biopharmaceuticals, it incorporates current best-practices for enhancing product purity and safety. Through the American Society of Mechanical Engineers harmonization programme this very inclusive standard has achieved world wide acceptance.

The ASME-BPE brings together standard stainless steel component types, length sizing, round & squareness tolerances, and additionally the manufacturing materials are standardized but there is however flexibility to use other materials with proven characteristics in the bioprocessing industry.

Standard mechanically polished and electropolished internal surface finishes are defined by finish codes that are marked on components for ease of identification.

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BPE

CERTIFICATE OF AUTHORIZATION

The named company is authorized by the American Society of Mechanical Engineers (ASME) for the scope shown below in accordance with the applicable rules of the ASME BPE Standard on Bioprocessing Equipment. The use of the certification mark and the authority granted by this Certificate of Authorization are subject to the provisions of the agreement set forth in the application. Any component certified under this authorization shall have been produced, assembled, and tested in accordance with the provisions of the aforementioned ASME standard.

COMPANY:

**G HWA Industries Co., Ltd.
52 Moo 7 Nongchumpon
Khaoyoi, Phetchaburi 76140
Thailand**

SCOPE:

Manufacturer of Ferrous Fittings and Tubing (excluding circumferential welds) at the above location only

AUTHORIZED: **January 20, 2016**

EXPIRES: **January 20, 2021**

CERTIFICATE NUMBER: **BPE-107**

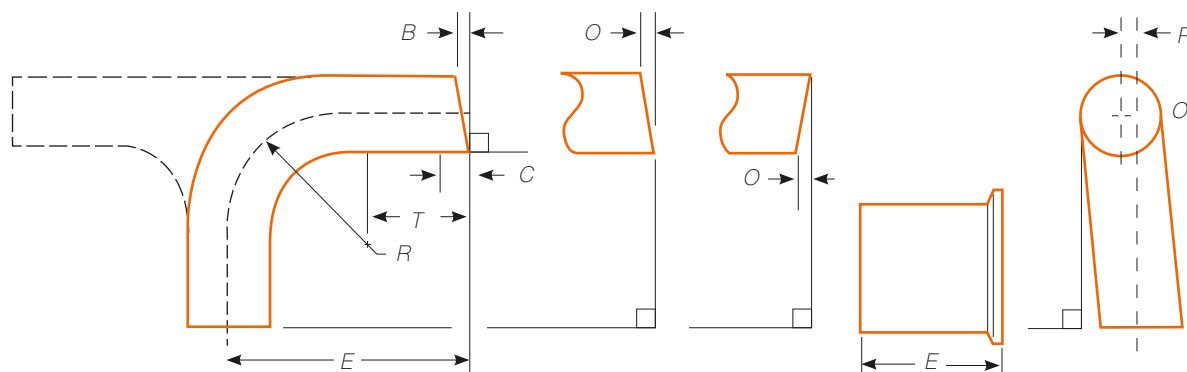

Vice President, Conformity Assessment


Director, Conformity Assessment



All Fittings Comply with ASME BPE Table DT-3-1

Final Tolerances for Mechanically Polished Fittings and Process Components



Nominal Size, in.	O.D.		Wall Thickness		Squareness Face to Tangent, B		Off Angle, O		Equivalent Angle (for O) deg	Off Plane, P		Centerline Radius (CLR), R	
	in.	mm	in.	mm	in.	mm	in.	mm		in.	mm	in.	mm
1/4	±0.005	±0.13	+0.003/-0.004	+0.08/-0.10	0.005	0.13	0.009	0.23	2.1	0.030	0.76	0.563	14.3
3/8	±0.005	±0.13	+0.003/-0.004	+0.08/-0.10	0.005	0.13	0.012	0.30	1.8	0.030	0.76	1.125	28.58
1/2	±0.005	±0.13	+0.005/-0.008	+0.13/-0.20	0.005	0.13	0.014	0.36	1.6	0.030	0.76	1.125	28.58
3/4	±0.005	±0.13	+0.005/-0.008	+0.13/-0.20	0.005	0.13	0.018	0.46	1.4	0.030	0.76	1.125	28.58
1	±0.005	±0.13	+0.005/-0.008	+0.13/-0.20	0.008	0.20	0.025	0.64	1.4	0.030	0.76	1.5	38.1
1 1/2	±0.008	±0.20	+0.005/-0.008	+0.13/-0.20	0.008	0.20	0.034	0.86	1.3	0.050	1.27	2.25	57.1
2	±0.008	±0.20	+0.005/-0.008	+0.13/-0.20	0.008	0.20	0.043	1.09	1.2	0.050	1.27	3.000	76.2
2 1/2	±0.010	±0.25	+0.005/-0.008	+0.13/-0.20	0.010	0.25	0.054	1.37	1.2	0.050	1.27	3.750	95.25
3	±0.010	±0.25	+0.005/-0.008	+0.13/-0.20	0.016	0.41	0.068	1.73	1.3	0.050	1.27	4.500	114.30
4	±0.015	±0.38	+0.008/-0.010	+0.20/-0.25	0.016	0.41	0.086	2.18	1.2	0.060	1.52	6.000	152.40
6	±0.030	±0.76	+0.015/-0.015	+0.38/-0.38	0.030	0.76	0.135	3.43	1.3	0.060	1.52	9.000	228.60

General Notes:

- (a) Tolerance on end-to-end and center-to-end dimension E is ±0.050" (1.27 mm)
- (b) Tolerance for centerline radius (CLR) is ±10% of the nominal dimension
- (c) The length of the control portion C is fixed for all sizes at 0.75" (19 mm)

Weld End Chemical Compositions (wt. %)

	C	Si	Mn	P	S	Ni	Cr	Mo
Min.	-	-	-	-	0.005	10.000	16.000	2.000
Max.	0.035	1.000	2.000	0.045	0.017	14.000	18.000	3.000

BPE Process Contact Surface Finish Requirements Table SF-2.4-1

Surface Designation	Mechanically Polished Ra Max.	
	µin.	µm
SF0	No finish requirement	No finish requirement
SF1	20	0.51
SF2	25	0.64
SF3	30	0.76
Surface Designation	Electropolished Ra Max.	
	µin.	µm
SF4	15	0.38
SF5	20	0.51
SF6	25	0.64

Acceptance Criteria for Metallic Process Contact Surface Finishes Table SF-2.2-1

Anomaly or Indication	Acceptance Criteria
Pits	If diameter <0.020" (0.51 mm) and bottom is shiny [Notes (1) and (2)]. Pits <0.003" (0.08 mm) diameter is irrelevant and acceptable.
Cluster of pits	No more than 4 pits per each ½" x ½" (13 mm x 13 mm) inspection window. The cumulative total diameter of all relevant pits shall not exceed 0.040" (1.02 mm).
Dents	None accepted [Note (3)].
Finishing marks	If Ra max. is met.
Welds	Welds used in the as-welded condition shall meet the requirements of MJ-8. Welds finished afterwelding shall be flush with the base metal, and concavity and convexity shall meet the requirements of MJ-8. Such finishing shall meet the Ra requirements of Table SF-2.4-1.
Nicks	None accepted.
Scratches	For tubing, if cumulative length is <12.0" (305 mm) per 20' (6.1 m) tube length or prorated and if depth is <0.003" (0.08 mm). For fittings, valves and other process components, if cumulative length is <0.25" (6.4 mm), depth <0.003" (0.08 mm), and Ra max. is met. For vessels, if length <0.50" (13 mm) at 0.003" (0.08 mm) depth and if <3 per inspection window [Note (4)].
Surface cracks	None accepted.
Surface inclusions	If Ra max. is met.
Surface residuals	None accepted, visual inspection.
Surface roughness (Ra)	See Table SF-2.4-1.
Weld slag	For tubing, up to 3 per 20' (6.1 m) length or prorated, if <75% of the width of the weld bead. For fittings, valves, vessels, and other process components, none accepted (as welded shall meet the requirements of MJ-8 and Table MJ-8.4-1).
Porosity	None open to the surface.
Buffing	None accepted.

General Notes :

- (1) Black bottom pit of any depth is not acceptable.
- (2) Pits in super-austenitic and nickel alloys may exceed this value. Acceptance criteria for pit size shall be established by agreement between owner/user and supplier. All other pit criteria remain the same.
- (3) For vessels, dents in the area covered by and resulting from welding dimple heat transfer jackets are acceptable.
- (4) An inspection window is defined as an area 4" x 4" (100 mm x 100 mm).

Additional Acceptance Criteria for Electropolished Metallic Process Contact Surface Finishes Table SF-2.2-2

Anomaly or Indication	Acceptance Criteria
Blistering	None accepted
Buffering	None accepted
Cloudiness	None accepted
End grain effect	Acceptable if Ra max. is met
Fixture marks	Acceptable if electropolished
Haze	None accepted
Orange peel	Acceptable if Ra max. is met
Stringer indication	Acceptable if Ra max. is met
Weld whitening	Acceptable if Ra max. is met
Variance in luster	Acceptable if Ra max. is met

Reference

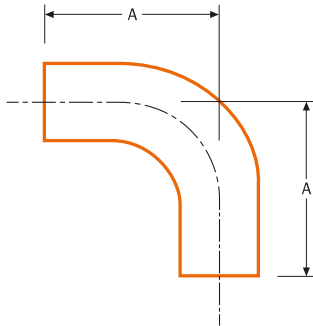
- American Society of Mechanical Engineers, 2014. 'ASME BPE-2014 Bioprocessing Equipment', Part DT Dimensions and Tolerances for Process Components: 96
- ASTM International, 2015. 'A270/A270M-15', Table 1 Chemical Requirements: 3
- American Society of Mechanical Engineers, 2014. 'ASME BPE-2014 Bioprocessing Equipment', Part SF Process Contact Surface Finishes: 141, 142

BPE Tube Fittings

DT-7

DT-4.1.1-1

90° Elbow WW

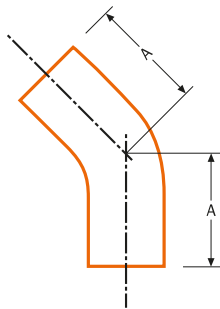


Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	2.625	66.70	2207B014-##	
3/8	9.53	2.625	66.70	2207B038-##	
1/2	12.70	3.000	76.20	2207B050-##	
3/4	19.05	3.000	76.20	2207B075-##	
1	25.40	3.000	76.20	2207B100-##	
1 1/2	38.10	3.750	95.30	2207B150-##	
2	50.80	4.750	120.70	2207B200-##	
2 1/2	63.50	5.500	139.70	2207B250-##	
3	76.20	6.250	158.80	2207B300-##	
4	101.60	8.000	203.20	2207B400-##	
6	152.40	11.500	292.10	2207B600-##	

DT-8

DT-4.1.1-4

45° Elbow WW



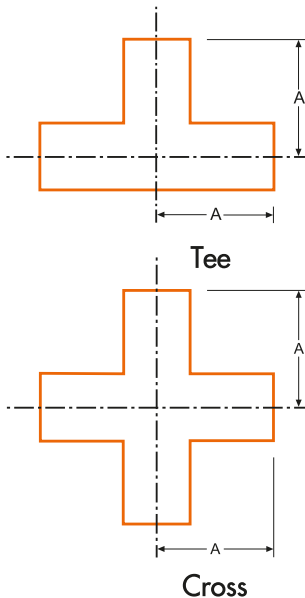
Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	2.000	50.80	2208B014-##	
3/8	9.53	2.000	50.80	2208B038-##	
1/2	12.70	2.250	57.20	2208B050-##	
3/4	19.05	2.250	57.20	2208B075-##	
1	25.40	2.250	57.20	2208B100-##	
1 1/2	38.10	2.500	63.50	2208B150-##	
2	50.80	3.000	76.20	2208B200-##	
2 1/2	63.50	3.375	85.70	2208B250-##	
3	76.20	3.625	92.10	2208B300-##	
4	101.60	4.500	114.30	2208B400-##	
6	152.40	6.250	158.80	2208B600-##	

DT-9 & DT-9C

DT-4.1.2-1

Equal Tee WWW

Equal Cross WWWW

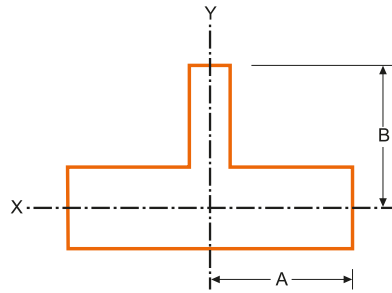


Nominal Size		A		Equal Tee		Equal Cross	
				SF1	SF4	SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4	##=F1	##=F4
1/4	6.35	1.750	44.50	2209B014-##		2209CB014-##	
3/8	9.53	1.750	44.50	2209B038-##		2209CB038-##	
1/2	12.70	1.875	47.60	2209B050-##		2209CB050-##	
3/4	19.05	2.000	50.80	2209B075-##		2209CB075-##	
1	25.40	2.125	54.00	2209B100-##		2209CB100-##	
1 1/2	38.10	2.375	60.30	2209B150-##		2209CB150-##	
2	50.80	2.875	73.00	2209B200-##		2209CB200-##	
2 1/2	63.50	3.125	79.40	2209B250-##		2209CB250-##	
3	76.20	3.375	85.70	2209B300-##		2209CB300-##	
4	101.60	4.125	104.80	2209B400-##		2209CB400-##	
6	152.40	5.625	142.90	2209B600-##		2209CB600-##	

DT-10

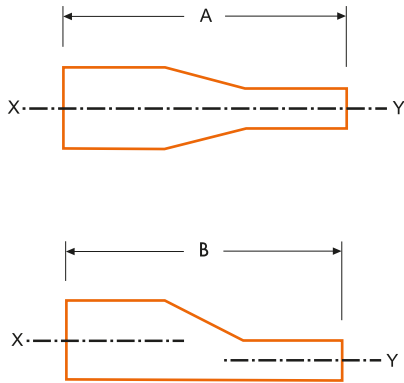
DT-4.1.2-6

Reducing Tee WWW



Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	1.750	44.50	1.750	44.50	2210B038014-##	
1/2 x 1/4	12.70 x 6.35	1.875	47.60	1.875	47.60	2210B050014-##	
1/2 x 3/8	12.70 x 9.53	1.875	47.60	1.875	47.60	2210B050038-##	
3/4 x 1/4	19.05 x 6.35	2.000	50.80	2.000	50.80	2210B075014-##	
3/4 x 3/8	19.05 x 9.53	2.000	50.80	2.000	50.80	2210B075038-##	
3/4 x 1/2	19.05 x 12.70	2.000	50.80	2.000	50.80	2210B075050-##	
1 x 1/4	25.40 x 6.35	2.125	54.00	2.125	54.00	2210B100014-##	
1 x 3/8	25.40 x 9.53	2.125	54.00	2.125	54.00	2210B100038-##	
1 x 1/2	25.40 x 12.70	2.125	54.00	2.125	54.00	2210B100050-##	
1 x 3/4	25.40 x 19.05	2.125	54.00	2.125	54.00	2210B100075-##	
1 1/2 x 1/2	38.10 x 12.70	2.375	60.30	2.375	60.30	2210B150050-##	
1 1/2 x 3/4	38.10 x 19.05	2.375	60.30	2.375	60.30	2210B150075-##	
1 1/2 x 1	38.10 x 25.40	2.375	60.30	2.375	60.30	2210B150100-##	
2 x 1/2	50.80 x 12.70	2.875	73.00	2.625	66.70	2210B200050-##	
2 x 3/4	50.80 x 19.05	2.875	73.00	2.625	66.70	2210B200075-##	
2 x 1	50.80 x 25.40	2.875	73.00	2.625	66.70	2210B200100-##	
2 x 1 1/2	50.80 x 38.10	2.875	73.00	2.625	66.70	2210B200150-##	
2 1/2 x 1/2	63.50 x 12.70	3.125	79.40	2.875	73.00	2210B250050-##	
2 1/2 x 3/4	63.50 x 19.05	3.125	79.40	2.875	73.00	2210B250075-##	
2 1/2 x 1	63.50 x 25.40	3.125	79.40	2.875	73.00	2210B250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.125	79.40	2.875	73.00	2210B250150-##	
2 1/2 x 2	63.50 x 50.80	3.125	79.40	2.875	73.00	2210B250200-##	
3 x 1/2	76.20 x 12.70	3.375	85.70	3.125	79.40	2210B300050-##	
3 x 3/4	76.20 x 19.05	3.375	85.70	3.125	79.40	2210B300075-##	
3 x 1	76.20 x 25.40	3.375	85.70	3.125	79.40	2210B300100-##	
3 x 1 1/2	76.20 x 38.10	3.375	85.70	3.125	79.40	2210B300150-##	
3 x 2	76.20 x 50.80	3.375	85.70	3.125	79.40	2210B300200-##	
3 x 2 1/2	76.20 x 63.50	3.375	85.70	3.125	79.40	2210B300250-##	
4 x 1/2	101.60 x 12.70	4.125	104.80	3.625	92.10	2210B400050-##	
4 x 3/4	101.60 x 19.05	4.125	104.80	3.625	92.10	2210B400075-##	
4 x 1	101.60 x 25.40	4.125	104.80	3.625	92.10	2210B400100-##	
4 x 1 1/2	101.60 x 38.10	4.125	104.80	3.625	92.10	2210B400150-##	
4 x 2	101.60 x 50.80	4.125	104.80	3.875	98.40	2210B400200-##	
4 x 2 1/2	101.60 x 63.50	4.125	104.80	3.875	98.40	2210B400250-##	
4 x 3	101.60 x 76.20	4.125	104.80	3.875	98.40	2210B400300-##	
6 x 3	152.40 x 76.20	5.625	142.90	4.875	123.80	2210B600300-##	
6 x 4	152.40 x 101.60	5.625	142.90	5.125	130.20	2210B600400-##	

DT-11C(a)
Concentric Reducer WW
DT-11E(a)
Eccentric Reducer WW



Nominal Size		CR				ER			
		A		SF1	SF4	B		SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4	Inch	mm	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	3.250	82.60	2211CB038014-##		4.000	101.60	2211EB038014-##	
1/2 x 1/4	12.70 x 6.35	3.250	82.60	2211CB050014-##		4.000	101.60	2211EB050014-##	
1/2 x 3/8	12.70 x 9.53	3.250	82.60	2211CB050038-##		4.000	101.60	2211EB050038-##	
3/4 x 1/4	19.05 x 6.35	3.250	82.60	2211CB075014-##		4.000	101.60	2211EB075014-##	
3/4 x 3/8	19.05 x 9.53	3.250	82.60	2211CB075038-##		4.000	101.60	2211EB075038-##	
3/4 x 1/2	19.05 x 12.70	4.000	101.60	2211CB075050-##		4.000	101.60	2211EB075050-##	
1 x 1/4	25.40 x 6.35	4.500	114.30	2211CB100014-##		4.500	114.30	2211EB100014-##	
1 x 3/8	25.40 x 9.53	4.500	114.30	2211CB100038-##		4.500	114.30	2211EB100038-##	
1 x 1/2	25.40 x 12.70	4.500	114.30	2211CB100050-##		4.500	114.30	2211EB100050-##	
1 x 3/4	25.40 x 19.05	4.000	101.60	2211CB100075-##		4.000	101.60	2211EB100075-##	
1 1/2 x 1/2	38.10 x 12.70	5.500	139.70	2211CB150050-##		5.500	139.70	2211EB150050-##	
1 1/2 x 3/4	38.10 x 19.05	5.000	127.00	2211CB150075-##		5.000	127.00	2211EB150075-##	
1 1/2 x 1	38.10 x 25.40	5.000	127.00	2211CB150100-##		5.000	127.00	2211EB150100-##	
2 x 1/2	50.80 x 12.70	7.750	196.90	2211CB200050-##		7.750	196.90	2211EB200050-##	
2 x 3/4	50.80 x 19.05	7.250	184.20	2211CB200075-##		7.250	184.20	2211EB200075-##	
2 x 1	50.80 x 25.40	7.250	184.20	2211CB200100-##		7.250	184.20	2211EB200100-##	
2 x 1 1/2	50.80 x 38.10	5.250	133.40	2211CB200150-##		5.250	133.40	2211EB200150-##	
2 1/2 x 1/2	63.50 x 12.70	9.750	247.70	2211CB250050-##		9.750	247.70	2211EB250050-##	
2 1/2 x 3/4	63.50 x 19.05	9.250	235.00	2211CB250075-##		9.250	235.00	2211EB250075-##	
2 1/2 x 1	63.50 x 25.40	9.250	235.00	2211CB250100-##		9.250	235.00	2211EB250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	7.250	184.20	2211CB250150-##		7.250	184.20	2211EB250150-##	
2 1/2 x 2	63.50 x 50.80	5.500	139.70	2211CB250200-##		5.500	139.70	2211EB250200-##	
3 x 1	76.20 x 25.40	11.250	285.80	2211CB300100-##		11.250	285.80	2211EB300100-##	
3 x 1 1/2	76.20 x 38.10	9.250	235.00	2211CB300150-##		9.250	235.00	2211EB300150-##	
3 x 2	76.20 x 50.80	7.500	190.50	2211CB300200-##		7.500	190.50	2211EB300200-##	
3 x 2 1/2	76.20 x 63.50	5.500	139.70	2211CB300250-##		5.500	139.70	2211EB300250-##	
4 x 1	101.60 x 25.40	15.500	393.70	2211CB400100-##		15.500	393.70	2211EB400100-##	
4 x 1 1/2	101.60 x 38.10	13.500	342.90	2211CB400150-##		13.500	342.90	2211EB400150-##	
4 x 2	101.60 x 50.80	11.750	298.50	2211CB400200-##		11.750	298.50	2211EB400200-##	
4 x 2 1/2	101.60 x 63.50	9.750	247.70	2211CB400250-##		9.750	247.70	2211EB400250-##	
4 x 3	101.60 x 76.20	7.750	196.90	2211CB400300-##		7.750	196.90	2211EB400300-##	
6 x 3	152.40 x 76.20	10.000	254.00	2211CB600300-##		9.750	247.70	2211EB600300-##	
6 x 4	152.40 x 101.60	10.000	254.00	2211CB600400-##		10.000	254.00	2211EB600400-##	

DT-11C(b)

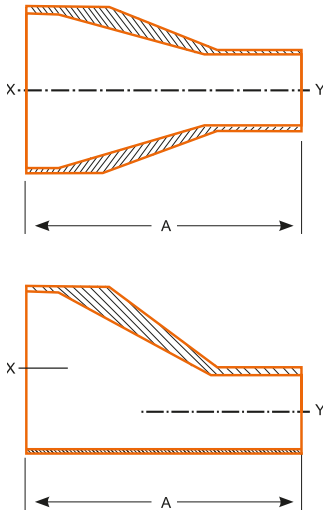
BPE DT-4.1.3-1

Concentric Reducer WW

DT-11E(b)

BPE DT-4.1.3-1

Eccentric Reducer WW

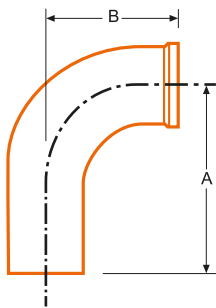


Nominal Size		CR				ER	
		A		SF1	SF4	SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	1.625	41.30	2211CBB038014-##		2211EBB038014-##	
1/2 x 1/4	12.70 x 6.35	1.875	47.60	2211CBB050014-##		2211EBB050014-##	
1/2 x 3/8	12.70 x 9.53	1.875	47.60	2211CBB050038-##		2211EBB050038-##	
3/4 x 3/8	19.05 x 9.53	2.000	50.80	2211CBB075038-##		2211EBB075038-##	
3/4 x 1/2	19.05 x 12.70	2.125	54.00	2211CBB075050-##		2211EBB075050-##	
1 x 1/2	25.40 x 12.70	2.500	63.50	2211CBB100050-##		2211EBB100050-##	
1 x 3/4	25.40 x 19.05	2.125	54.00	2211CBB100075-##		2211EBB100075-##	
1 1/2 x 3/4	38.10 x 19.05	3.000	76.20	2211CBB150075-##		2211EBB150075-##	
1 1/2 x 1	38.10 x 25.40	2.500	63.50	2211CBB150100-##		2211EBB150100-##	
2 x 1	50.80 x 25.40	3.375	85.70	2211CBB200100-##		2211EBB200100-##	
2 x 1 1/2	50.80 x 38.10	2.500	63.50	2211CBB200150-##		2211EBB200150-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.375	85.70	2211CBB250150-##		2211EBB250150-##	
2 1/2 x 2	63.50 x 50.80	2.500	63.50	2211CBB250200-##		2211EBB250200-##	
3 x 1 1/2	76.20 x 38.10	4.250	108.00	2211CBB300150-##		2211EBB300150-##	
3 x 2	76.20 x 50.80	3.375	85.70	2211CBB300200-##		2211EBB300200-##	
3 x 2 1/2	76.20 x 63.50	2.625	66.70	2211CBB300250-##		2211EBB300250-##	
4 x 2	101.60 x 50.80	5.125	130.20	2211CBB400200-##		2211EBB400200-##	
4 x 2 1/2	101.60 x 63.50	4.250	108.00	2211CBB400250-##		2211EBB400250-##	
4 x 3	101.60 x 76.20	3.875	98.40	2211CBB400300-##		2211EBB400300-##	
6 x 3	152.40 x 76.20	7.250	184.20	2211CBB600300-##		2211EBB600300-##	
6 x 4	152.40 x 101.60	5.625	142.90	2211CBB600400-##		2211EBB600400-##	

DT-12

DT-4.1.1-2

90° Elbow CW

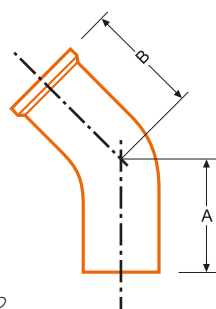


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	2.625	66.70	1.625	41.30	2212B014-##	
3/8	9.53	2.625	66.70	1.625	41.30	2212B038-##	
1/2	12.70	3.000	76.20	1.625	41.30	2212B050-##	
3/4	19.05	3.000	76.20	1.625	41.30	2212B075-##	
1	25.40	3.000	76.20	2.000	50.80	2212B100-##	
1 1/2	38.10	3.750	95.30	2.750	69.90	2212B150-##	
2	50.80	4.750	120.70	3.500	88.90	2212B200-##	
2 1/2	63.50	5.500	139.70	4.250	108.00	2212B250-##	
3	76.20	6.250	158.80	5.000	127.00	2212B300-##	
4	101.60	8.000	203.20	6.625	168.20	2212B400-##	
6	152.40	11.500	292.10	10.500	266.70	2212B600-##	

DT-13

DT-4.1.1-5

45° Elbow CW

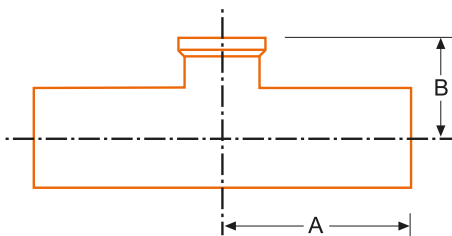


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	2.000	50.80	1.000	25.40	2213B014-##	
3/8	9.53	2.000	50.80	1.000	25.40	2213B038-##	
1/2	12.70	2.250	57.20	1.000	25.40	2213B050-##	
3/4	19.05	2.250	57.20	1.000	25.40	2213B075-##	
1	25.40	2.250	57.20	1.125	28.60	2213B100-##	
1 1/2	38.10	2.500	63.50	1.438	36.50	2213B150-##	
2	50.80	3.000	76.20	1.750	44.50	2213B200-##	
2 1/2	63.50	3.375	85.70	2.063	52.40	2213B250-##	
3	76.20	3.625	92.10	2.375	60.30	2213B300-##	
4	101.60	4.500	114.30	3.125	79.40	2213B400-##	
6	152.40	6.250	158.80	5.250	133.40	2213B600-##	

DT-14

DT-4.1.2-7

Short Outlet Reducing Tee WCW

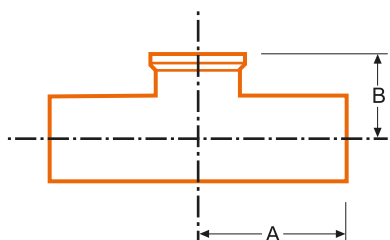


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	1.750	44.50	1.000	25.40	2214B038014-##	
1/2 x 1/4	12.70 x 6.35	1.875	47.60	1.000	25.40	2214B050014-##	
1/2 x 3/8	12.70 x 9.53	1.875	47.60	1.000	25.40	2214B050038-##	
3/4 x 1/4	19.05 x 6.35	2.000	50.80	1.000	25.40	2214B075014-##	
3/4 x 3/8	19.05 x 9.53	2.000	50.80	1.000	25.40	2214B075038-##	
3/4 x 1/2	19.05 x 12.70	2.000	50.80	1.000	25.40	2214B075050-##	
1 x 1/4	25.40 x 6.35	2.125	54.00	1.125	28.60	2214B100014-##	
1 x 3/8	25.40 x 9.53	2.125	54.00	1.125	28.60	2214B100038-##	
1 x 1/2	25.40 x 12.70	2.125	54.00	1.125	28.60	2214B100050-##	
1 x 3/4	25.40 x 19.05	2.125	54.00	1.125	28.60	2214B100075-##	
1 1/2 x 1/2	38.10 x 12.70	2.375	60.30	1.375	34.90	2214B150050-##	
1 1/2 x 3/4	38.10 x 19.05	2.375	60.30	1.375	34.90	2214B150075-##	
1 1/2 x 1	38.10 x 25.40	2.375	60.30	1.375	34.90	2214B150100-##	
2 x 1/2	50.80 x 12.70	2.875	73.00	1.625	41.30	2214B200050-##	
2 x 3/4	50.80 x 19.05	2.875	73.00	1.625	41.30	2214B200075-##	
2 x 1	50.80 x 25.40	2.875	73.00	1.625	41.30	2214B200100-##	
2 x 1 1/2	50.80 x 38.10	2.875	73.00	1.625	41.30	2214B200150-##	
2 1/2 x 1/2	63.50 x 12.70	3.125	79.40	1.875	47.60	2214B250050-##	
2 1/2 x 3/4	63.50 x 19.05	3.125	79.40	1.875	47.60	2214B250075-##	
2 1/2 x 1	63.50 x 25.40	3.125	79.40	1.875	47.60	2214B250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.125	79.40	1.875	47.60	2214B250150-##	
2 1/2 x 2	63.50 x 50.80	3.125	79.40	1.875	47.60	2214B250200-##	
3 x 1/2	76.20 x 12.70	3.375	85.70	2.125	54.00	2214B300050-##	
3 x 3/4	76.20 x 19.05	3.375	85.70	2.125	54.00	2214B300075-##	
3 x 1	76.20 x 25.40	3.375	85.70	2.125	54.00	2214B300100-##	
3 x 1 1/2	76.20 x 38.10	3.375	85.70	2.125	54.00	2214B300150-##	
3 x 2	76.20 x 50.80	3.375	85.70	2.125	54.00	2214B300200-##	
3 x 2 1/2	76.20 x 63.50	3.375	85.70	2.125	54.00	2214B300250-##	
4 x 1/2	101.60 x 12.70	4.125	104.80	2.625	66.70	2214B400050-##	
4 x 3/4	101.60 x 19.05	4.125	104.80	2.625	66.70	2214B400075-##	
4 x 1	101.60 x 25.40	4.125	104.80	2.625	66.70	2214B400100-##	
4 x 1 1/2	101.60 x 38.10	4.125	104.80	2.625	66.70	2214B400150-##	
4 x 2	101.60 x 50.80	4.125	104.80	2.625	66.70	2214B400200-##	
4 x 2 1/2	101.60 x 63.50	4.125	104.80	2.625	66.70	2214B400250-##	
4 x 3	101.60 x 76.20	4.125	104.80	2.625	66.70	2214B400300-##	
6 x 1/2	152.40 x 12.70	5.625	142.90	3.625	92.10	2214B600050-##	
6 x 3/4	152.40 x 19.05	5.625	142.90	3.625	92.10	2214B600075-##	
6 x 1	152.40 x 25.40	5.625	142.90	3.625	92.10	2214B600100-##	
6 x 1 1/2	152.40 x 38.10	5.625	142.90	3.625	92.10	2214B600150-##	
6 x 2	152.40 x 50.80	5.625	142.90	3.625	92.10	2214B600200-##	
6 x 2 1/2	152.40 x 63.50	5.625	142.90	3.625	92.10	2214B600250-##	
6 x 3	152.40 x 76.20	5.625	142.90	3.625	92.10	2214B600300-##	
6 x 4	152.40 x 101.60	5.625	142.90	3.750	95.30	2214B600400-##	

DT-15

DT-4.1.2-2

Short Outlet Equal Tee WCW

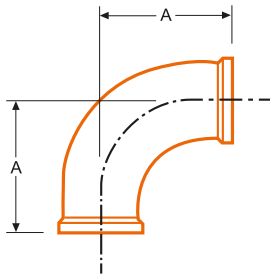


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	1.750	44.50	1.000	25.40	2215B014-##	
3/8	9.53	1.750	44.50	1.000	25.40	2215B038-##	
1/2	12.70	1.875	47.60	1.000	25.40	2215B050-##	
3/4	19.05	2.000	50.80	1.125	28.60	2215B075-##	
1	25.40	2.125	54.00	1.125	28.60	2215B100-##	
1 1/2	38.10	2.375	60.30	1.375	34.90	2215B150-##	
2	50.80	2.875	73.00	1.625	41.30	2215B200-##	
2 1/2	63.50	3.125	79.40	1.875	47.60	2215B250-##	
3	76.20	3.375	85.70	2.125	54.00	2215B300-##	
4	101.60	4.125	104.80	2.750	69.90	2215B400-##	
6	152.40	5.625	142.90	4.625	117.50	2215B600-##	

DT-16

DT-4.1.1-3

90° Clamp Elbow CC

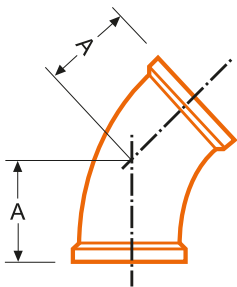


Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	## = F1	## = F4
1/4	6.35	1.625	41.30	2216B014-##	
3/8	9.53	1.625	41.30	2216B038-##	
1/2	12.70	1.625	41.30	2216B050-##	
3/4	19.05	1.625	41.30	2216B075-##	
1	25.40	2.000	50.80	2216B100-##	
1 1/2	38.10	2.750	69.90	2216B150-##	
2	50.80	3.500	88.90	2216B200-##	
2 1/2	63.50	4.250	108.00	2216B250-##	
3	76.20	5.000	127.00	2216B300-##	
4	101.60	6.625	168.30	2216B400-##	
6	152.40	10.500	266.70	2216B600-##	

DT-17

DT-4.1.1-6

45° Clamp Elbow CC



Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	## = F1	## = F4
1/4	6.35	1.000	25.40	2217B014-##	
3/8	9.53	1.000	25.40	2217B038-##	
1/2	12.70	1.000	25.40	2217B050-##	
3/4	19.05	1.000	25.40	2217B075-##	
1	25.40	1.125	28.60	2217B100-##	
1 1/2	38.10	1.438	36.50	2217B150-##	
2	50.80	1.750	44.50	2217B200-##	
2 1/2	63.50	2.063	52.40	2217B250-##	
3	76.20	2.375	60.30	2217B300-##	
4	101.60	3.125	79.40	2217B400-##	
6	152.40	5.250	133.40	2217B600-##	

DT-18

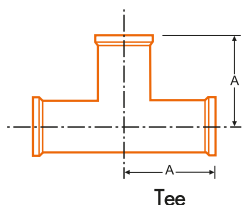
DT-4.1.2-4

Clamp Equal Tee CCC

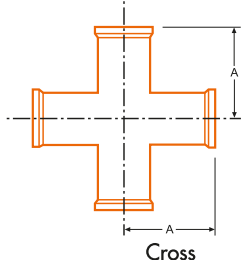
DT-18C

DT-4.1.2-4

Clamp Equal Cross CCCC



Tee



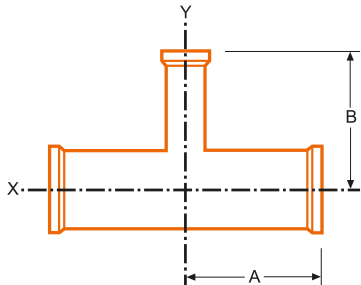
Cross

Nominal Size		A		SF1	SF4	SF1	SF4
Inch	mm	Inch	mm	## = F1	## = F4	## = F1	## = F4
1/4	6.35	2.250	57.20	2218B014-##		2218CB014-##	
3/8	9.53	2.250	57.20	2218B038-##		2218CB038-##	
1/2	12.70	2.250	57.20	2218B050-##		2218CB050-##	
3/4	19.05	2.375	60.30	2218B075-##		2218CB075-##	
1	25.40	2.625	66.70	2218B100-##		2218CB100-##	
1 1/2	38.10	2.875	73.00	2218B150-##		2218CB150-##	
2	50.80	3.375	85.70	2218B200-##		2218CB200-##	
2 1/2	63.50	3.625	92.10	2218B250-##		2218CB250-##	
3	76.20	3.875	98.40	2218B300-##		2218CB300-##	
4	101.60	4.750	120.70	2218B400-##		2218CB400-##	
6	152.40	7.125	181.00	2218B600-##		2218CB600-##	

DT-19

DT-4.1.2-8

Clamp Reducing Tee CCC

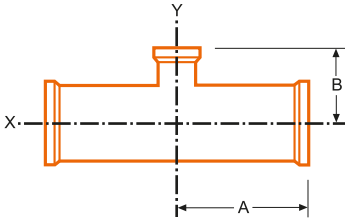


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	2.250	57.20	2.250	57.20	2219B038014-##	
1/2 x 1/4	12.70 x 6.35	2.375	60.30	2.375	60.30	2219B050014-##	
1/2 x 3/8	12.70 x 9.53	2.375	60.30	2.375	60.30	2219B050038-##	
3/4 x 1/4	19.05 x 6.35	2.500	63.50	2.500	63.50	2219B075014-##	
3/4 x 3/8	19.05 x 9.53	2.500	63.50	2.500	63.50	2219B075038-##	
3/4 x 1/2	19.05 x 12.70	2.500	63.50	2.500	63.50	2219B075050-##	
1 x 1/4	25.40 x 6.35	2.625	66.70	2.625	66.70	2219B100014-##	
1 x 3/8	25.40 x 9.53	2.625	66.70	2.625	66.70	2219B100038-##	
1 x 1/2	25.40 x 12.70	2.625	66.70	2.625	66.70	2219B100050-##	
1 x 3/4	25.40 x 19.05	2.625	66.70	2.625	66.70	2219B100075-##	
1 1/2 x 1/2	38.10 x 12.70	2.875	73.00	2.875	73.00	2219B150050-##	
1 1/2 x 3/4	38.10 x 19.05	2.875	73.00	2.875	73.00	2219B150075-##	
1 1/2 x 1	38.10 x 25.40	2.875	73.00	2.875	73.00	2219B150100-##	
2 x 1/2	50.80 x 12.70	3.375	85.70	3.125	79.40	2219B200050-##	
2 x 3/4	50.80 x 19.05	3.375	85.70	3.125	79.40	2219B200075-##	
2 x 1	50.80 x 25.40	3.375	85.70	3.125	79.40	2219B200100-##	
2 x 1 1/2	50.80 x 38.10	3.375	85.70	3.125	79.40	2219B200150-##	
2 1/2 x 1/2	63.50 x 12.70	3.625	92.10	3.375	85.70	2219B250050-##	
2 1/2 x 3/4	63.50 x 19.05	3.625	92.10	3.375	85.70	2219B250075-##	
2 1/2 x 1	63.50 x 25.40	3.625	92.10	3.375	85.70	2219B250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.625	92.10	3.375	85.70	2219B250150-##	
2 1/2 x 2	63.50 x 50.80	3.625	92.10	3.375	85.70	2219B250200-##	
3 x 1/2	76.20 x 12.70	3.875	98.40	3.625	92.10	2219B300050-##	
3 x 3/4	76.20 x 19.05	3.875	98.40	3.625	92.10	2219B300075-##	
3 x 1	76.20 x 25.40	3.875	98.40	3.625	92.10	2219B300100-##	
3 x 1 1/2	76.20 x 38.10	3.875	98.40	3.625	92.10	2219B300150-##	
3 x 2	76.20 x 50.80	3.875	98.40	3.625	92.10	2219B300200-##	
3 x 2 1/2	76.20 x 63.50	3.875	98.40	3.625	92.10	2219B300250-##	
4 x 1/2	101.60 x 12.70	4.750	120.70	4.125	104.80	2219B400050-##	
4 x 3/4	101.60 x 19.05	4.750	120.70	4.125	104.80	2219B400075-##	
4 x 1	101.60 x 25.40	4.750	120.70	4.125	104.80	2219B400100-##	
4 x 1 1/2	101.60 x 38.10	4.750	120.70	4.125	104.80	2219B400150-##	
4 x 2	101.60 x 50.80	4.750	120.70	4.375	111.10	2219B400200-##	
4 x 2 1/2	101.60 x 63.50	4.750	120.70	4.375	111.10	2219B400250-##	
4 x 3	101.60 x 76.20	4.750	120.70	4.375	111.10	2219B400300-##	
6 x 3	152.40 x 76.20	7.125	181.00	5.375	136.50	2219B600300-##	
6 x 4	152.40 x 101.60	7.125	181.00	5.750	146.10	2219B600400-##	

DT-20

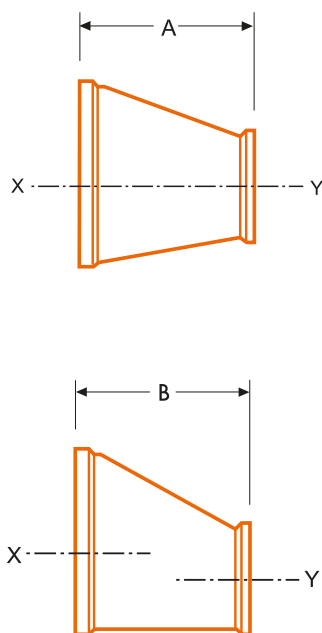
DT-4.1.2-9

Short Outlet Reducing Tee CCC



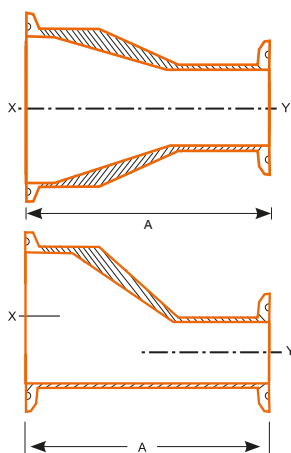
Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
3/8 x 1/4	9.53 x 6.35	2.250	57.20	1.000	25.40	2220B038014-##	
1/2 x 1/4	12.70 x 6.35	2.375	60.30	1.000	25.40	2220B050014-##	
1/2 x 3/8	12.70 x 9.53	2.375	60.30	1.000	25.40	2220B050038-##	
3/4 x 1/4	19.05 x 6.35	2.500	63.50	1.000	25.40	2220B075014-##	
3/4 x 3/8	19.05 x 9.53	2.500	63.50	1.000	25.40	2220B075038-##	
3/4 x 1/2	19.05 x 12.70	2.500	63.50	1.000	25.40	2220B075050-##	
1 x 1/4	25.40 x 6.35	2.625	66.70	1.125	28.60	2220B100014-##	
1 x 3/8	25.40 x 9.53	2.625	66.70	1.125	28.60	2220B100038-##	
1 x 1/2	25.40 x 12.70	2.625	66.70	1.125	28.60	2220B100050-##	
1 x 3/4	25.40 x 19.05	2.625	66.70	1.125	28.60	2220B100075-##	
1 1/2 x 1/2	38.10 x 12.70	2.875	73.00	1.375	34.90	2220B150050-##	
1 1/2 x 3/4	38.10 x 19.05	2.875	73.00	1.375	34.90	2220B150075-##	
1 1/2 x 1	38.10 x 25.40	2.875	73.00	1.375	34.90	2220B150100-##	
2 x 1/2	50.80 x 12.70	3.375	85.70	1.625	41.30	2220B200050-##	
2 x 3/4	50.80 x 19.05	3.375	85.70	1.625	41.30	2220B200075-##	
2 x 1	50.80 x 25.40	3.375	85.70	1.625	41.30	2220B200100-##	
2 x 1 1/2	50.80 x 38.10	3.375	85.70	1.625	41.30	2220B200150-##	
2 1/2 x 1/2	63.50 x 12.70	3.625	92.10	1.875	47.60	2220B250050-##	
2 1/2 x 3/4	63.50 x 19.05	3.625	92.10	1.875	47.60	2220B250075-##	
2 1/2 x 1	63.50 x 25.40	3.625	92.10	1.875	47.60	2220B250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.625	92.10	1.875	47.60	2220B250150-##	
2 1/2 x 2	63.50 x 50.80	3.625	92.10	1.875	47.60	2220B250200-##	
3 x 1/2	76.20 x 12.70	3.875	98.40	2.125	54.00	2220B300050-##	
3 x 3/4	76.20 x 19.05	3.875	98.40	2.125	54.00	2220B300075-##	
3 x 1	76.20 x 25.40	3.875	98.40	2.125	54.00	2220B300100-##	
3 x 1 1/2	76.20 x 38.10	3.875	98.40	2.125	54.00	2220B300150-##	
3 x 2	76.20 x 50.80	3.875	98.40	2.125	54.00	2220B300200-##	
3 x 2 1/2	76.20 x 63.50	3.875	98.40	2.125	54.00	2220B300250-##	
4 x 1/2	101.60 x 12.70	4.750	120.70	2.625	66.70	2220B400050-##	
4 x 3/4	101.60 x 19.05	4.750	120.70	2.625	66.70	2220B400075-##	
4 x 1	101.60 x 25.40	4.750	120.70	2.625	66.70	2220B400100-##	
4 x 1 1/2	101.60 x 38.10	4.750	120.70	2.625	66.70	2220B400150-##	
4 x 2	101.60 x 50.80	4.750	120.70	2.625	66.70	2220B400200-##	
4 x 2 1/2	101.60 x 63.50	4.750	120.70	2.625	66.70	2220B400250-##	
4 x 3	101.60 x 76.20	4.750	120.70	2.625	66.70	2220B400300-##	
6 x 1/2	152.40 x 12.70	7.125	7.125	3.625	92.10	2220B600050-##	
6 x 3/4	152.40 x 19.05	7.125	7.125	3.625	92.10	2220B600075-##	
6 x 1	152.40 x 25.40	7.125	7.125	3.625	92.10	2220B600100-##	
6 x 1 1/2	152.40 x 38.40	7.125	7.125	3.625	92.10	2220B600150-##	
6 x 2	152.40 x 50.80	7.125	7.125	3.625	92.10	2220B600200-##	
6 x 2 1/2	152.40 x 63.50	7.125	7.125	3.625	92.10	2220B600250-##	
6 x 3	152.40 x 76.20	7.125	181.00	3.625	92.10	2220B600300-##	
6 x 4	152.40 x 101.60	7.125	181.00	3.750	95.30	2220B600400-##	

DT-21C(a)
Concentric Reducer CC
DT-21E(a)
Eccentric Reducer CC



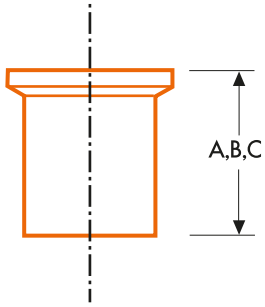
Nominal Size		A		CR		B		ER	
Inch	mm	Inch	mm	##=F1	##=F4	Inch	mm	SF1 ##=F1	SF4 ##=F4
3/4 x 1/2	19.05 x 12.70	2.000	50.80	2221CB075050-##		2.000	50.80	2221EB075050-##	
1 x 1/2	25.40 x 12.70	2.500	63.50	2221CB100050-##		2.500	63.50	2221EB100050-##	
1 x 3/4	25.40 x 19.05	2.000	50.80	2221CB100075-##		2.000	50.80	2221EB100075-##	
1 1/2 x 1/2	38.10 x 12.70	3.500	88.90	2221CB150050-##		3.500	88.90	2221EB150050-##	
1 1/2 x 3/4	38.10 x 19.05	3.000	76.20	2221CB150075-##		3.000	76.20	2221EB150075-##	
1 1/2 x 1	38.10 x 25.40	3.000	76.20	2221CB150100-##		3.000	76.20	2221EB150100-##	
2 x 1/2	50.80 x 12.70	5.500	139.70	2221CB200050-##		5.500	139.70	2221EB200050-##	
2 x 3/4	50.80 x 19.05	5.000	127.00	2221CB200075-##		5.000	127.00	2221EB200075-##	
2 x 1	50.80 x 25.40	5.000	127.00	2221CB200100-##		5.000	127.00	2221EB200100-##	
2 x 1 1/2	50.80 x 38.10	3.000	76.20	2221CB200150-##		3.000	76.20	2221EB200150-##	
2 1/2 x 1/2	63.50 x 12.70	7.500	190.50	2221CB250050-##		7.500	190.50	2221EB250050-##	
2 1/2 x 3/4	63.50 x 19.05	7.000	177.80	2221CB250075-##		7.000	177.80	2221EB250075-##	
2 1/2 x 1	63.50 x 25.40	7.000	177.80	2221CB250100-##		7.000	177.80	2221EB250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	5.000	127.00	2221CB250150-##		5.000	127.00	2221EB250150-##	
2 1/2 x 2	63.50 x 50.80	3.000	76.20	2221CB250200-##		3.000	76.20	2221EB250200-##	
3 x 1	76.20 x 25.40	9.000	228.60	2221CB300100-##		9.000	228.60	2221EB300100-##	
3 x 1 1/2	76.20 x 38.10	7.000	177.80	2221CB300150-##		7.000	177.80	2221EB300150-##	
3 x 2	76.20 x 50.80	5.000	127.00	2221CB300200-##		5.000	127.00	2221EB300200-##	
3 x 2 1/2	76.20 x 63.50	3.000	76.20	2221CB300250-##		3.000	76.20	2221EB300250-##	
4 x 1	101.60 x 25.40	13.125	333.40	2221CB400100-##		13.125	333.40	2221EB400100-##	
4 x 1 1/2	101.60 x 38.10	11.125	282.60	2221CB400150-##		11.125	282.60	2221EB400150-##	
4 x 2	101.60 x 50.80	9.125	231.80	2221CB400200-##		9.125	231.80	2221EB400200-##	
4 x 2 1/2	101.60 x 63.50	7.125	181.00	2221CB400250-##		7.125	181.00	2221EB400250-##	
4 x 3	101.60 x 76.20	5.125	130.20	2221CB400300-##		5.125	130.20	2221EB400300-##	
6 x 3	152.40 x 76.20	7.500	190.50	2221CB600300-##		7.625	193.70	2221EB600300-##	
6 x 4	152.40 x 101.60	7.625	193.70	2221CB600400-##		7.625	193.70	2221EB600400-##	

DT-21C(b)
DT-4.1.3-3
Concentric Reducer CC
DT-21E(b)
DT-4.1.3-3
Eccentric Reducer CC



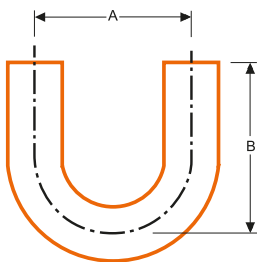
Nominal Size		A		CR		ER	
Inch	mm	Inch	mm	##=F1	##=F4	SF1 ##=F1	SF4 ##=F4
3/8 x 1/4	9.53 x 6.35	2.625	66.70	2221CBB038014-##		2221EBB038014-##	
1/2 x 1/4	12.70 x 6.35	2.875	73.00	2221CBB050014-##		2221EBB050014-##	
1/2 x 3/8	12.70 x 9.53	2.875	73.00	2221CBB050038-##		2221EBB050038-##	
3/4 x 3/8	19.05 x 9.53	3.000	76.20	2221CBB075038-##		2221EBB075038-##	
3/4 x 1/2	19.05 x 12.70	3.125	79.40	2221CBB075050-##		2221EBB075050-##	
1 x 1/2	25.40 x 12.70	3.500	88.90	2221CBB100050-##		2221EBB100050-##	
1 x 3/4	25.40 x 19.05	3.125	79.40	2221CBB100075-##		2221EBB100075-##	
1 1/2 x 3/4	38.10 x 19.05	4.000	101.60	2221CBB150075-##		2221EBB150075-##	
1 1/2 x 1	38.10 x 25.40	3.500	88.90	2221CBB150100-##		2221EBB150100-##	
2 x 1	50.80 x 25.40	4.375	111.10	2221CBB200100-##		2221EBB200100-##	
2 x 1 1/2	50.80 x 38.10	3.500	88.90	2221CBB200150-##		2221EBB200150-##	
2 1/2 x 1 1/2	63.50 x 38.10	4.375	111.10	2221CBB250150-##		2221EBB250150-##	
2 1/2 x 2	63.50 x 50.80	3.500	88.90	2221CBB250200-##		2221EBB250200-##	
3 x 1 1/2	76.20 x 38.10	5.250	133.40	2221CBB300150-##		2221EBB300150-##	
3 x 2	76.20 x 50.80	4.375	111.10	2221CBB300200-##		2221EBB300200-##	
3 x 2 1/2	76.20 x 63.50	3.625	92.10	2221CBB300250-##		2221EBB300250-##	
4 x 2	101.60 x 50.80	6.250	158.80	2221CBB400200-##		2221EBB400200-##	
4 x 2 1/2	101.60 x 63.50	5.375	136.50	2221CBB400250-##		2221EBB400250-##	
4 x 3	101.60 x 76.20	5.000	127.00	2221CBB400300-##		2221EBB400300-##	
6 x 3	152.40 x 76.20	8.500	215.90	2221CBB600300-##		2221EBB600300-##	
6 x 4	152.40 x 101.60	7.000	177.80	2221CBB600400-##		2221EBB600400-##	

DT-22A
DT-22B
DT-22C
DT-4.1.4-1
Ferrule



Nominal Size		A		DT-22A		B		DT-22B		C		DT-22C	
Inch	mm	Inch	mm	SF1 ##=F1	SF4 ##=F4	Inch	mm	SF1 ##=F1	SF4 ##=F4	Inch	mm	SF1 ##=F1	SF4 ##=F4
1/4	6.35	1.750	44.50	2222AB014-##		1.130	28.70	2222BB014-##		0.500	12.70	2222CB014-##	
3/8	9.53	1.750	44.50	2222AB038-##		1.130	28.70	2222BB038-##		0.500	12.70	2222CB038-##	
1/2	12.70	1.750	44.50	2222AB050-##		1.130	28.70	2222BB050-##		0.500	12.70	2222CB050-##	
3/4	19.05	1.750	44.50	2222AB075-##		1.130	28.70	2222BB075-##		0.500	12.70	2222CB075-##	
1	25.40	1.750	44.50	2222AB100-##		1.130	28.70	2222BB100-##		0.500	12.70	2222CB100-##	
1 1/2	38.10	1.750	44.50	2222AB150-##		1.130	28.70	2222BB150-##		0.500	12.70	2222CB150-##	
2	50.80	2.250	57.20	2222AB200-##		1.130	28.70	2222BB200-##		0.500	12.70	2222CB200-##	
2 1/2	63.50	2.250	57.20	2222AB250-##		1.130	28.70	2222BB250-##		0.500	12.70	2222CB250-##	
3	76.20	2.250	57.20	2222AB300-##		1.130	28.70	2222BB300-##		0.500	12.70	2222CB300-##	
4	101.60	2.250	57.20	2222AB400-##		1.130	28.70	2222BB400-##		0.625	15.90	2222CB400-##	
6	152.40	3.000	76.20	2222AB600-##		1.500	38.10	2222BB600-##		0.750	19.10	2222CB600-##	

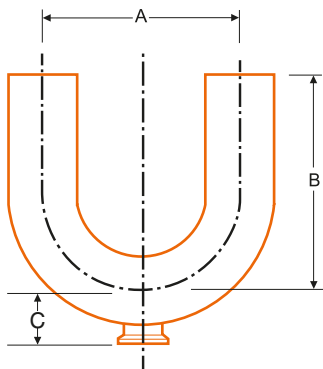
DT-23
DT-4.1.1-7
180° Return Bend WW



Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	4.500	114.30	2.625	66.70	2223B014-##	
3/8	9.53	4.500	114.30	2.625	66.70	2223B038-##	
1/2	12.70	4.500	114.30	3.000	76.20	2223B050-##	
3/4	19.05	4.500	114.30	3.000	76.20	2223B075-##	
1	25.40	3.000	76.20	3.000	76.20	2223B100-##	
1 1/2	38.10	4.500	114.30	4.500	114.30	2223B150-##	
2	50.80	6.000	152.40	5.000	127.00	2223B200-##	
2 1/2	63.50	7.500	190.50	5.750	146.10	2223B250-##	
3	76.20	9.000	228.60	6.500	165.10	2223B300-##	
4	101.60	12.000	304.80	8.500	215.90	2223B400-##	
6	152.40	18.000	457.20	11.500	292.10	2223B600-##	

DT-23T

180° Tee Bottom Outlet WCW

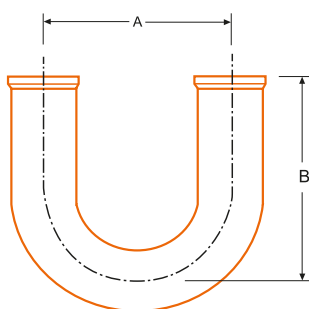


Nominal Size		A		B		C		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1 x 1/2	25.40 x 12.70	3.000	76.20	3.000	76.20	1.125	28.58	2223TB100050-##	
1 x 3/4	25.40 x 19.05	3.000	76.20	3.000	76.20	1.125	28.58	2223TB100075-##	
1 x 1	25.40 x 25.40	3.000	76.20	3.000	76.20	1.125	28.58	2223TB100100-##	
1 1/2 x 1/2	38.10 x 12.70	4.500	114.30	4.500	114.30	1.375	34.93	2223TB150050-##	
1 1/2 x 3/4	38.10 x 19.05	4.500	114.30	4.500	114.30	1.375	34.93	2223TB150075-##	
1 1/2 x 1	38.10 x 25.40	4.500	114.30	4.500	114.30	1.375	34.93	2223TB150100-##	
1 1/2 x 1 1/2	38.10 x 38.10	4.500	114.30	4.500	114.30	1.375	34.93	2223TB150150-##	
2 x 1/2	50.80 x 12.70	6.000	152.40	5.000	127.00	1.625	41.28	2223TB200050-##	
2 x 3/4	50.80 x 19.05	6.000	152.40	5.000	127.00	1.625	41.28	2223TB200075-##	
2 x 1	50.80 x 25.40	6.000	152.40	5.000	127.00	1.625	41.28	2223TB200100-##	
2 x 1 1/2	50.80 x 38.10	6.000	152.40	5.000	127.00	1.625	41.28	2223TB200150-##	
2 x 2	50.80 x 50.80	6.000	152.40	5.000	127.00	1.625	41.28	2223TB200200-##	
2 1/2 x 1/2	63.50 x 12.70	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250050-##	
2 1/2 x 3/4	63.50 x 19.05	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250075-##	
2 1/2 x 1	63.50 x 25.40	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250150-##	
2 1/2 x 2	63.50 x 50.80	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250200-##	
2 1/2 x 2 1/2	63.50 x 63.50	7.500	190.50	5.750	146.05	1.875	47.63	2223TB250250-##	
3 x 1/2	76.20 x 12.70	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300050-##	
3 x 3/4	76.20 x 19.05	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300075-##	
3 x 1	76.20 x 25.40	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300100-##	
3 x 1 1/2	76.20 x 38.10	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300150-##	
3 x 2	76.20 x 50.80	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300200-##	
3 x 2 1/2	76.20 x 63.50	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300250-##	
3 x 3	76.20 x 76.20	9.000	228.60	6.500	165.10	2.125	53.98	2223TB300300-##	
4 x 1/2	101.60 x 12.70	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400050-##	
4 x 3/4	101.60 x 19.05	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400075-##	
4 x 1	101.60 x 25.40	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400100-##	
4 x 1 1/2	101.60 x 38.10	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400150-##	
4 x 2	101.60 x 50.80	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400200-##	
4 x 2 1/2	101.60 x 63.50	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400250-##	
4 x 3	101.60 x 76.20	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400300-##	
4 x 4	101.60 x 101.60	12.000	304.80	8.500	215.90	2.625	66.68	2223TB400400-##	

DT-24

DT-4.1.1-8

180° Return Bend CC

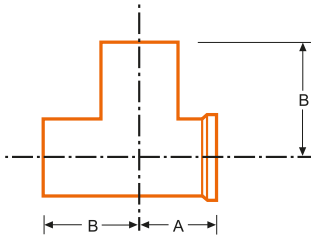


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	4.500	114.30	3.125	79.40	2224B014-##	
3/8	9.53	4.500	114.30	3.125	79.40	2224B038-##	
1/2	12.70	4.500	114.30	3.500	88.90	2224B050-##	
3/4	19.05	4.500	114.30	3.500	88.90	2224B075-##	
1	25.40	3.000	76.20	3.500	88.90	2224B100-##	
1 1/2	38.10	4.500	114.30	5.000	127.00	2224B150-##	
2	50.80	6.000	152.40	5.500	139.70	2224B200-##	
2 1/2	63.50	7.500	190.50	6.250	158.80	2224B250-##	
3	76.20	9.000	228.60	7.000	177.80	2224B300-##	
4	101.60	12.000	304.80	9.125	231.80	2224B400-##	
6	152.40	18.000	457.20	13.000	330.20	2224B600-##	

DT-25

DT-4.1.2-3

Short Outlet Run Tee WWC



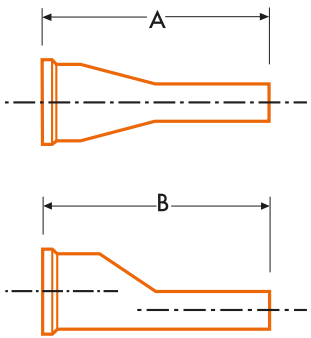
Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/4	6.35	0.875	22.20	1.750	44.50	2225B014-##	
3/8	9.53	0.875	22.20	1.750	44.50	2225B038-##	
1/2	12.70	0.875	22.20	1.875	47.60	2225B050-##	
3/4	19.05	1.000	25.40	2.000	50.80	2225B075-##	
1	25.40	1.125	28.60	2.125	54.00	2225B100-##	
1 1/2	38.10	1.375	34.90	2.375	60.30	2225B150-##	
2	50.80	1.625	41.30	2.875	73.00	2225B200-##	
2 1/2	63.50	1.875	47.60	3.125	79.40	2225B250-##	
3	76.20	2.125	54.00	3.375	85.70	2225B300-##	
4	101.60	2.750	69.90	4.125	104.80	2225B400-##	
6	152.40	4.625	117.50	5.625	142.90	2225B600-##	

DT-26C(a)

Concentric Reducer CW

DT-26E(a)

Eccentric Reducer CW



Nominal Size		A		CR		B		ER	
Inch	mm	Inch	mm	##=F1	##=F4	Inch	mm	SF1 ##=F1	SF4 ##=F4
3/4 x 1/2	19.05 x 12.70	3.000	76.20	2226CB075050-##		3.000	76.20	2226EB075050-##	
1 x 1/2	25.40 x 12.70	3.500	88.90	2226CB100050-##		3.500	88.90	2226EB100050-##	
1 x 3/4	25.40 x 19.05	3.000	76.20	2226CB100075-##		3.000	76.20	2226EB100075-##	
1 1/2 x 1/2	38.10 x 12.70	4.500	114.30	2226CB150050-##		4.500	114.30	2226EB150050-##	
1 1/2 x 3/4	38.10 x 19.05	4.000	101.60	2226CB150075-##		4.000	101.60	2226EB150075-##	
1 1/2 x 1	38.10 x 25.40	4.000	101.60	2226CB150100-##		4.000	101.60	2226EB150100-##	
2 x 1/2	50.80 x 12.70	6.500	165.10	2226CB200050-##		6.500	165.10	2226EB200050-##	
2 x 3/4	50.80 x 19.05	6.000	152.40	2226CB200075-##		6.000	152.40	2226EB200075-##	
2 x 1	50.80 x 25.40	6.000	152.40	2226CB200100-##		6.000	152.40	2226EB200100-##	
2 x 1 1/2	50.80 x 38.10	4.000	101.60	2226CB200150-##		4.000	101.60	2226EB200150-##	
2 1/2 x 1/2	63.50 x 12.70	8.500	215.90	2226CB250050-##		8.500	215.90	2226EB250050-##	
2 1/2 x 3/4	63.50 x 19.05	8.000	203.20	2226CB250075-##		8.000	203.20	2226EB250075-##	
2 1/2 x 1	63.50 x 25.40	8.000	203.20	2226CB250100-##		8.000	203.20	2226EB250100-##	
2 1/2 x 1 1/2	63.50 x 38.10	6.000	152.40	2226CB250150-##		6.000	152.40	2226EB250150-##	
2 1/2 x 2	63.50 x 50.80	4.250	108.00	2226CB250200-##		4.250	108.00	2226EB250200-##	
3 x 1	76.20 x 25.40	10.000	254.00	2226CB300100-##		10.000	254.00	2226EB300100-##	
3 x 1 1/2	76.20 x 38.10	8.000	203.20	2226CB300150-##		8.000	203.20	2226EB300150-##	
3 x 2	76.20 x 50.80	6.250	158.80	2226CB300200-##		6.250	158.80	2226EB300200-##	
3 x 2 1/2	76.20 x 63.50	4.250	108.00	2226CB300250-##		4.250	108.00	2226EB300250-##	
4 x 1	101.60 x 25.40	14.125	358.80	2226CB400100-##		14.125	358.80	2226EB400100-##	
4 x 1 1/2	101.60 x 38.10	12.125	308.00	2226CB400150-##		12.125	308.00	2226EB400150-##	
4 x 2	101.60 x 50.80	10.375	263.50	2226CB400200-##		10.375	263.50	2226EB400200-##	
4 x 2 1/2	101.60 x 63.50	8.375	212.70	2226CB400250-##		8.375	212.70	2226EB400250-##	
4 x 3	101.60 x 76.20	6.375	161.90	2226CB400300-##		6.375	161.90	2226EB400300-##	
6 x 3	152.40 x 76.20	9.000	228.60	2226CB600300-##		8.750	222.30	2226EB600300-##	
6 x 4	152.40 x 101.60	9.000	228.60	2226CB600400-##		9.000	228.60	2226EB600400-##	

DT-26C(b)

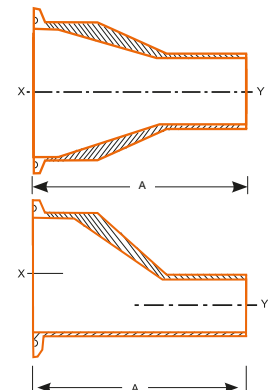
DT-4.1.3-2

Concentric Reducer CW

DT-26E(b)

DT-4.1.3-2

Eccentric Reducer CW

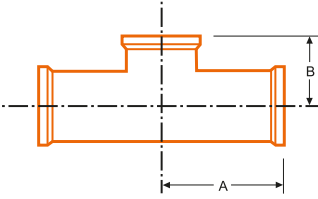


Nominal Size		A		CR		ER	
Inch	mm	Inch	mm	SF1 ##=F1	SF4 ##=F4	SF1 ##=F1	SF4 ##=F4
3/8 x 1/4	9.53 x 6.35	2.125	54.00	2226CBB038014-##		2226EBB038014-##	
1/2 x 1/4	12.70 x 6.35	2.375	60.30	2226CBB050014-##		2226EBB050014-##	
1/2 x 3/8	12.70 x 9.53	2.375	60.30	2226CBB050038-##		2226EBB050038-##	
3/4 x 3/8	19.05 x 9.53	2.500	63.50	2226CBB075038-##		2226EBB075038-##	
3/4 x 1/2	19.05 x 12.70	2.625	66.70	2226CBB075050-##		2226EBB075050-##	
1 x 1/2	25.40 x 12.70	3.000	76.20	2226CBB100050-##		2226EBB100050-##	
1 x 3/4	25.40 x 19.05	2.625	66.70	2226CBB100075-##		2226EBB100075-##	
1 1/2 x 3/4	38.10 x 19.05	3.500	88.90	2226CBB150075-##		2226EBB150075-##	
1 1/2 x 1	38.10 x 25.40	3.000	76.20	2226CBB150100-##		2226EBB150100-##	
2 x 1	50.80 x 25.40	3.875	98.40	2226CBB200100-##		2226EBB200100-##	
2 x 1 1/2	50.80 x 38.10	3.000	76.20	2226CBB200150-##		2226EBB200150-##	
2 1/2 x 1 1/2	63.50 x 38.10	3.875	98.40	2226CBB250150-##		2226EBB250150-##	
2 1/2 x 2	63.50 x 50.80	3.000	76.20	2226CBB250200-##		2226EBB250200-##	
3 x 1 1/2	76.20 x 38.10	4.750	120.70	2226CBB300150-##		2226EBB300150-##	
3 x 2	76.20 x 50.80	3.875	98.40	2226CBB300200-##		2226EBB300200-##	
3 x 2 1/2	76.20 x 63.50	3.125	79.40	2226CBB300250-##		2226EBB300250-##	
4 x 2	101.60 x 50.80	5.750	146.10	2226CBB400200-##		2226EBB400200-##	
4 x 2 1/2	101.60 x 63.50	4.875	123.80	2226CBB400250-##		2226EBB400250-##	
4 x 3	101.60 x 76.20	4.500	114.30	2226CBB400300-##		2226EBB400300-##	
6 x 3	152.40 x 76.20	8.000	203.20	2226CBB600300-##		2226EBB600300-##	
6 x 4	152.40 x 101.60	6.375	161.90	2226CBB600400-##		2226EBB600400-##	

DT-27

DT-4.1.2-5

Short Outlet Tee CCC

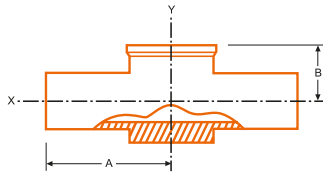


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/2	12.70	2.250	57.20	1.000	25.40	2227B050-##	
3/4	19.05	2.350	60.70	1.125	28.60	2227B075-##	
1	25.40	2.625	66.70	1.125	28.60	2227B100-##	
1 1/2	38.10	2.875	73.00	1.375	34.90	2227B150-##	
2	50.80	3.375	85.70	1.625	41.30	2227B200-##	
2 1/2	63.50	3.625	92.10	1.875	47.60	2227B250-##	
3	76.20	3.875	98.40	2.125	54.00	2227B300-##	
4	101.60	4.750	120.70	2.750	69.90	2227B400-##	
6	152.40	7.125	181.00	4.625	117.50	2227B600-##	

DT-28

DT-4.1.2-10

Instrument Tee WCW

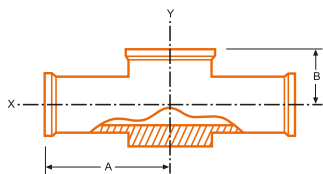


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/2 x 1 1/2	12.70 x 38.10	2.500	63.50	0.875	22.20	2228B050150-##	
3/4 x 1 1/2	19.05 x 38.10	2.500	63.50	1.000	25.40	2228B075150-##	
1 x 1 1/2	25.40 x 38.10	2.500	63.50	1.125	28.60	2228B100150-##	
1/2 x 2	12.70 x 50.80	2.750	69.90	1.000	25.40	2228B050200-##	
3/4 x 2	19.05 x 50.80	2.750	69.90	1.125	28.60	2228B075200-##	
1 x 2	25.40 x 50.80	2.750	69.90	1.250	31.80	2228B100200-##	
1 1/2 x 2	38.10 x 50.80	2.750	69.90	1.500	38.10	2228B150200-##	

DT-29

DT-4.1.2-11

Instrument Tee CCC

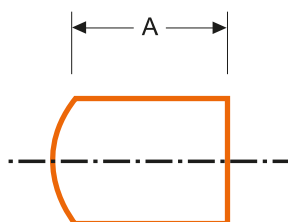


Nominal Size		A		B		SF1	SF4
Inch	mm	Inch	mm	Inch	mm	##=F1	##=F4
1/2 x 1 1/2	12.70 x 38.10	3.000	76.20	0.875	22.20	2229B050150-##	
3/4 x 1 1/2	19.05 x 38.10	3.000	76.20	1.000	25.40	2229B075150-##	
1 x 1 1/2	25.40 x 38.10	3.000	76.20	1.125	28.60	2229B100150-##	
1/2 x 2	12.70 x 50.80	3.250	82.60	1.000	25.40	2229B050200-##	
3/4 x 2	19.05 x 50.80	3.250	82.60	1.125	28.60	2229B075200-##	
1 x 2	25.40 x 50.80	3.250	82.60	1.250	31.80	2229B100200-##	
1 1/2 x 2	38.10 x 50.80	3.250	82.60	1.500	38.10	2229B150200-##	

DT-30

DT-4.1.5-1

Tube Weld End Cap

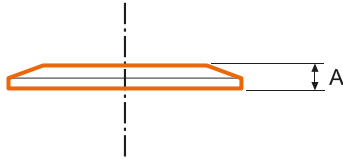


Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	##=F1	##=F4
1/2	12.70	1.500	38.10	2230B050-##	
3/4	19.05	1.500	38.10	2230B075-##	
1	25.40	1.500	38.10	2230B100-##	
1 1/2	38.10	1.500	38.10	2230B150-##	
2	50.80	1.500	38.10	2230B200-##	
2 1/2	63.50	1.500	38.10	2230B250-##	
3	76.20	1.750	44.50	2230B300-##	
4	101.60	2.000	50.80	2230B400-##	
6	152.40	2.500	63.50	2230B600-##	

DT-31

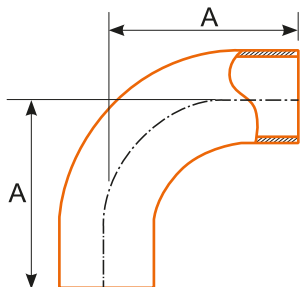
DT-4.1.5-2

Solid End Cap



Nominal Size		A		SF1	SF4
Inch	mm	Inch	mm	## = F1	## = F4
1/4	6.35	0.187	4.70	2231B014-##	
3/8	9.53	0.187	4.70	2231B038-##	
1/2 & 3/4	12.70, 19.05	0.187	4.70	2231B075-##	
1 & 1 1/2	25.40, 38.10	0.250	6.40	2231B150-##	
2	50.80	0.250	6.40	2231B200-##	
2 1/2	63.50	0.250	6.40	2231B250-##	
3	76.20	0.250	6.40	2231B300-##	
4	101.60	0.312	7.90	2231B400-##	
6	152.40	0.437	11.10	2231B600-##	

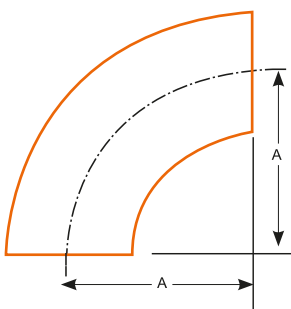
2S 90° Long Elbow WW



Nominal Size		A		Nominal Wall	Part Number	
Inch	mm	Inch	mm	mm	304	316L
1/2	12.70	3.000	76.20	1.65	242SA050-11	242SB050-11
3/4	19.05	3.000	76.20	1.65	242SA075-11	242SB075-11
1	25.40	2.063	52.40	1.65	242SA100-11	242SB100-11
1 1/2	38.10	2.938	74.60	1.65	242SA150-11	242SB150-11
2	50.80	4.063	103.20	1.65	242SA200-11	242SB200-11
2 1/2	63.50	5.188	131.80	1.65	242SA250-11	242SB250-11
3	76.20	6.312	160.30	1.65	242SA300-11	242SB300-11
4	101.60	8.313	211.20	2.11	242SA400-11	242SB400-11
6	152.40	12.460	316.50	2.77	242SA600-11	242SB600-11

Different dimensions available upon request

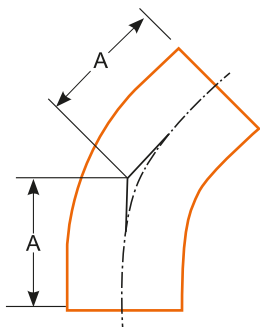
2WCL 90° Short Elbow WW



Nominal Size		A		Nominal Wall	Part Number	
Inch	mm	Inch	mm	mm	304	316L
1/2	12.70	1.125	28.60	1.65	242WCLA050-11	242WCLB050-11
3/4	19.05	1.125	28.60	1.65	242WCLA075-11	242WCLB075-11
1	25.40	1.500	38.10	1.65	242WCLA100-11	242WCLB100-11
1 1/2	38.10	2.250	57.20	1.65	242WCLA150-11	242WCLB150-11
2	50.80	3.000	76.20	1.65	242WCLA200-11	242WCLB200-11
2 1/2	63.50	3.750	95.25	1.65	242WCLA250-11	242WCLB250-11
3	76.20	4.500	114.30	1.65	242WCLA300-11	242WCLB300-11
4	101.60	6.000	152.40	2.11	242WCLA400-11	242WCLB400-11
6 x 2.11	152.40	9.000	228.60	2.11	242WCLA600211-99	242WCLB600211-99
6	152.40	9.000	228.60	2.77	242WCLA600-11	242WCLB600-11
8 x 2.00	203.20	12.000	304.80	2.00	242WCLA800200-11	242WCLB800200-11
8	203.20	12.000	304.80	2.77	242WCLA800-11	242WCLB800-11
10 x 2.00	254.00	15.000	381.00	2.00	242WCLA1000200-11	242WCLB1000200-11
10	254.00	15.000	381.00	2.77	242WCLA1000-11	242WCLB1000-11
12	304.80	18.000	457.20	3.00	242WCLA1200-11	242WCLB1200-11

Different dimensions available upon request

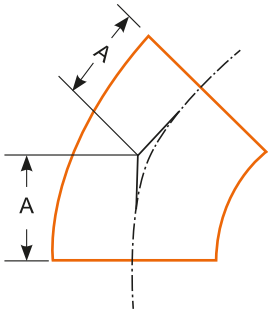
2KS 45° Long Elbow WW



Nominal Size		A		Nominal Wall	Part Number	
Inch	mm	Inch	mm	mm	304	316L
1/2	12.70	2.250	57.20	1.65	242KSA050-11	242KSB050-11
3/4	19.05	2.250	57.20	1.65	242KSA075-11	242KSB075-11
1	25.40	1.188	30.20	1.65	242KSA100-11	242KSB100-11
1 1/2	38.10	1.625	41.30	1.65	242KSA150-11	242KSB150-11
2	50.80	2.312	58.70	1.65	242KSA200-11	242KSB200-11
2 1/2	63.50	3.000	76.20	1.65	242KSA250-11	242KSB250-11
3	76.20	3.688	93.70	1.65	242KSA300-11	242KSB300-11
4	101.60	4.812	122.20	2.11	242KSA400-11	242KSB400-11
6 x 2.11	152.40	7.330	186.18	2.11	242KSA600186-99	242KSB600186-99
6	152.40	6.252	158.80	2.77	242KSA600-11	242KSB600-11

Different dimensions available upon request

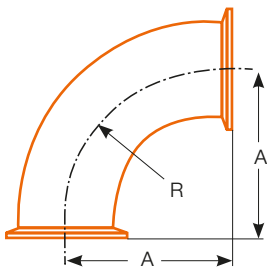
2WK 45° Short Elbow WW



Nominal Size		A		Nominal Wall	Part Number	
Inch	mm	Inch	mm	mm	304	316L
1/2	12.70	0.466	11.90	1.65	242WKA050-11	242WKB050-11
3/4	19.05	0.466	11.90	1.65	242WKA075-11	242WKB075-11
1	25.40	0.625	15.80	1.65	242WKA100-11	242WKB100-11
1 1/2	38.10	0.937	23.80	1.65	242WKA150-11	242WKB150-11
2	50.80	1.250	31.75	1.65	242WKA200-11	242WKB200-11
2 1/2	63.50	1.562	39.60	1.65	242WKA250-11	242WKB250-11
3	76.20	1.875	47.60	1.65	242WKA300-11	242WKB300-11
4	101.60	2.500	63.50	2.11	242WKA400-11	242WKB400-11
6 x 2.11	152.40	3.750	95.30	2.11	242WKA600211-99	242WKB600211-99
6	152.40	3.750	95.30	2.77	242WKA600-11	242WKB600-11
8	203.20	5.000	127.00	2.77	242WKA800-11	242WKB800-11
10	254.00	6.250	158.75	2.77	242WKA1000-11	242WKB1000-11
12	304.80	7.500	190.50	3.00	242WKA1200-11	242WKB1200-11

Different dimensions available upon request

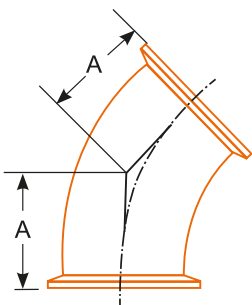
2CMP 90° Clamp Short Elbow CC



Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
1/2	12.70	1.625	41.30	242CMPA050-11	242CMPB050-11
3/4	19.05	1.625	41.30	242CMPA075-11	242CMPB075-11
1	25.40	2.000	50.80	242CMPA100-11	242CMPB100-11
1 1/2	38.10	2.750	69.90	242CMPA150-11	242CMPB150-11
2	50.80	3.500	88.90	242CMPA200-11	242CMPB200-11
2 1/2	63.50	4.250	107.95	242CMPA250-11	242CMPB250-11
3	76.20	5.000	127.00	242CMPA300-11	242CMPB300-11
4	101.60	6.625	168.20	242CMPA400-11	242CMPB400-11
6	152.40	9.875	250.83	242CMPA600-11	242CMPB600-11
8	203.20	12.875	327.00	242CMPA800-11	242CMPB800-11
10	254.00	15.875	403.20	242CMPA1000-11	242CMPB1000-11
12	304.80	18.875	479.40	242CMPA1200-11	242CMPB1200-11

Different dimensions available upon request

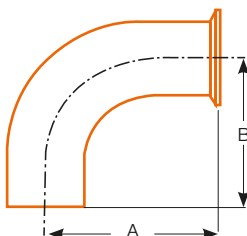
2KMP 45° Clamp Short Elbow CC



Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
1/2	12.70	0.966	24.60	242KMPA050-11	242KMPB050-11
3/4	19.05	0.966	24.60	242KMPA075-11	242KMPB075-11
1	25.40	1.125	28.50	242KMPA100-11	242KMPB100-11
1 1/2	38.10	1.437	36.50	242KMPA150-11	242KMPB150-11
2	50.80	1.750	44.45	242KMPA200-11	242KMPB200-11
2 1/2	63.50	2.062	52.30	242KMPA250-11	242KMPB250-11
3	76.20	2.375	60.30	242KMPA300-11	242KMPB300-11
4	101.60	3.125	79.30	242KMPA400-11	242KMPB400-11
6	152.40	4.625	117.50	242KMPA600-11	242KMPB600-11
8	203.20	5.875	149.20	242KMPA800-11	242KMPB800-11
10	254.00	7.125	181.00	242KMPA1000-11	242KMPB1000-11
12	304.80	8.375	212.70	242KMPA1200-11	242KMPB1200-11

Different dimensions available upon request

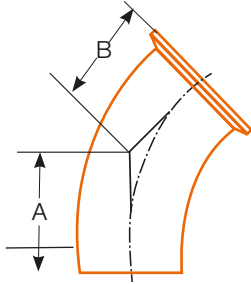
2CM 90° Clamp X Weld Long Elbow CW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1/2	12.70	3.5	88.90	3.000	76.20	242CMA050-11	242CMB050-11
3/4	19.05	3.5	88.90	3.000	76.20	242CMA075-11	242CMB075-11
1	25.40	2.562	65.10	2.063	52.40	242CMA100-11	242CMB100-11
1 1/2	38.10	3.438	87.30	2.938	74.60	242CMA150-11	242CMB150-11
2	50.80	4.562	115.90	4.063	103.20	242CMA200-11	242CMB200-11
2 1/2	63.50	5.688	144.50	5.188	131.80	242CMA250-11	242CMB250-11
3	76.20	6.812	173.00	6.312	160.30	242CMA300-11	242CMB300-11
4	101.60	8.937	226.90	8.313	211.10	242CMA400-11	242CMB400-11

Different dimensions available upon request

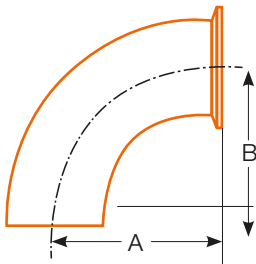
2KM 45° Clamp X Weld Long Elbow CW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	1.188	30.2	1.688	42.88	242KMA100-11	242KMB100-11
1 1/2	38.10	1.625	41.3	2.125	53.98	242KMA150-11	242KMB150-11
2	50.80	2.312	58.7	2.812	71.42	242KMA200-11	242KMB200-11
2 1/2	63.50	3.000	76.2	3.500	88.90	242KMA250-11	242KMB250-11
3	76.20	3.688	93.7	4.188	106.38	242KMA300-11	242KMB300-11
4	101.60	4.812	122.2	5.437	138.10	242KMA400-11	242KMB400-11

Different dimensions available upon request

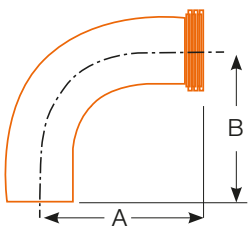
2CMS 90° Clamp X Weld Short Elbow CW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1/2	12.70	1.625	41.30	1.125	28.60	242CMSA050-11	242CMSB050-11
3/4	19.05	1.625	41.30	1.125	28.60	242CMSA075-11	242CMSB075-11
1	25.40	2.000	50.80	1.500	38.10	242CMSA100-11	242CMSB100-11
1 1/2	38.10	2.750	69.90	2.250	57.20	242CMSA150-11	242CMSB150-11
2	50.80	3.500	88.90	3.000	76.20	242CMSA200-11	242CMSB200-11
2 1/2	63.50	4.250	107.95	3.750	95.25	242CMSA250-11	242CMSB250-11
3	76.20	5.000	127.00	4.500	114.30	242CMSA300-11	242CMSB300-11
4	101.60	6.625	168.28	6.000	152.40	242CMSA400-11	242CMSB400-11
6	152.40	9.875	250.80	9.000	228.60	242CMSA600-11	242CMSB600-11

Different dimensions available upon request

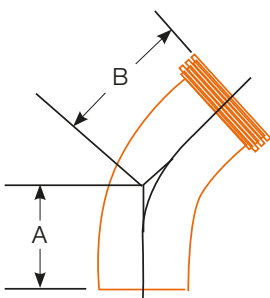
2T 90° Threaded Bevel Seat x Weld Elbow



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.780	70.61	2.062	52.37	242TA100-11	242TB100-11
1 1/2	38.10	3.656	92.86	2.937	74.6	242TA150-11	242TB150-11
2	50.80	4.812	122.22	4.062	103.17	242TA200-11	242TB200-11
2 1/2	63.50	6.062	153.97	5.187	131.75	242TA250-11	242TB250-11
3	76.20	7.218	183.34	6.312	160.32	242TA300-11	242TB300-11
4	101.60	9.343	237.31	8.312	211.12	242TA400-11	242TB400-11

MOQ required

2KT 45° Threaded Bevel Seat x Weld Elbow

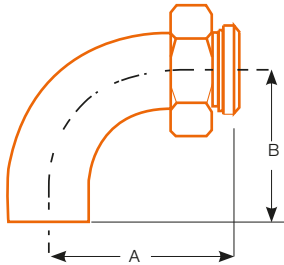


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	1.188	30.18	1.906	48.41	242KTA100-11	242KTB100-11
1 1/2	38.10	1.625	41.28	2.343	59.51	242KTA150-11	242KTB150-11
2	50.80	2.312	58.72	3.062	77.77	242KTA200-11	242KTB200-11
2 1/2	63.50	3.000	76.2	3.875	98.43	242KTA250-11	242KTB250-11
3	76.20	3.688	93.68	4.594	116.69	242KTA300-11	242KTB300-11
4	101.60	4.812	122.22	5.843	148.41	242KTA400-11	242KTB400-11

MOQ required

2FP

90° Plain Bevel Seat with Hex Nut x Weld Elbow

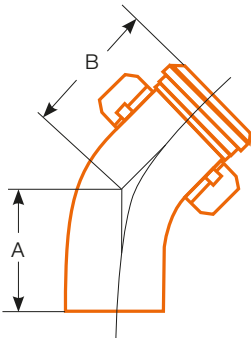


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.780	70.61	2.062	52.37	242FPA100-11	242FPB100-11
1 1/2	38.10	3.656	92.86	2.937	74.6	242FPA150-11	242FPB150-11
2	50.80	4.812	122.22	4.062	103.17	242FPA200-11	242FPB200-11
2 1/2	63.50	6.062	153.97	5.187	131.75	242FPA250-11	242FPB250-11
3	76.20	7.218	183.34	6.312	160.32	242FPA300-11	242FPB300-11
4	101.60	9.343	237.31	8.312	211.12	242FPA400-11	242FPB400-11

MOQ required

2KP

45° Plain Bevel Seat with Hex Nut x Weld Elbow

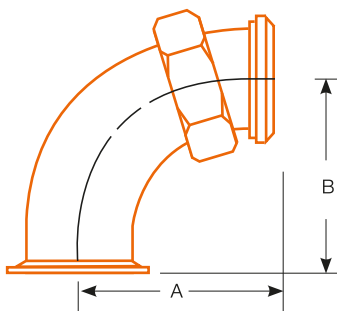


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	1.188	30.18	1.906	48.41	242KPA100-11	242KPB100-11
1 1/2	38.10	1.625	41.28	2.343	59.51	242KPA150-11	242KPB150-11
2	50.80	2.312	58.72	3.062	77.77	242KPA200-11	242KPB200-11
2 1/2	63.50	3.000	76.2	3.875	98.43	242KPA250-11	242KPB250-11
3	76.20	3.688	93.68	4.594	116.69	242KPA300-11	242KPB300-11
4	101.60	4.812	122.22	5.843	148.41	242KPA400-11	242KPB400-11

MOQ required

2FMP-14

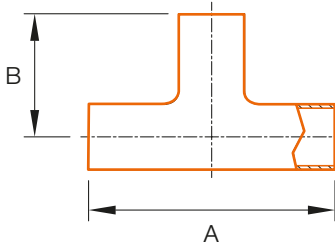
90° Plain Bevel Seat with Hex Nut x Clamp Elbow



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.218	56.34	2.000	50.8	242FMP14A100-11	242FMP14B100-11
1 1/2	38.10	2.968	75.39	2.750	69.85	242FMP14A150-11	242FMP14B150-11
2	50.80	3.750	95.25	3.500	88.9	242FMP14A200-11	242FMP14B200-11
2 1/2	63.50	4.625	117.48	4.250	107.95	242FMP14A250-11	242FMP14B250-11
3	76.20	5.406	137.31	5.000	127	242FMP14A300-11	242FMP14B300-11
4	101.60	7.031	178.59	6.625	168.28	242FMP14A400-11	242FMP14B400-11

MOQ required

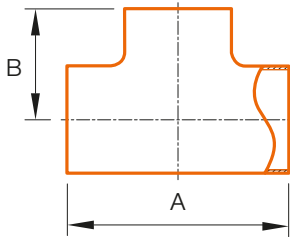
7W Long Equal Tee



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1/2	12.70	3.750	95.25	1.875	47.63	247WA050-11	247WB050-11
3/4	19.05	4.000	101.60	2.000	50.80	247WA075-11	247WB075-11
1	25.40	3.750	95.25	1.875	47.63	247WA100-11	247WB100-11
1 1/2	38.10	4.500	114.30	2.250	57.20	247WA150-11	247WB150-11
2	50.80	6.000	152.40	3.000	76.20	247WA200-11	247WB200-11
2 1/2	63.50	6.000	152.40	3.000	76.20	247WA250-11	247WB250-11
3	76.20	6.500	165.20	3.250	82.60	247WA300-11	247WB300-11
4	101.60	7.750	196.80	3.875	98.40	247WA400-11	247WB400-11
6	152.40	11.250	285.75	5.625	142.88	247WA600-11	247WB600-11
8	203.20	14.000	355.60	7.000	177.80	247WA800-11	247WB800-11
10	254.00	16.929	430.00	8.465	215.00	247WA1000-11	247WB1000-11
12	304.80	20.000	508.00	10.000	254.00	247WA1200-11	247WB1200-11

Different dimensions available upon request

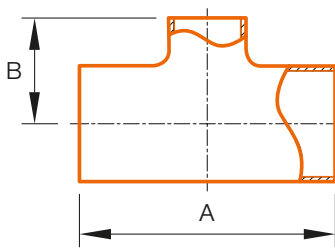
7WWW Short Equal Tee



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.250	57.20	1.125	28.60	247WWWWA100-11	247WWWWB100-11
1 1/2	38.10	3.312	84.20	1.656	42.10	247WWWWA150-11	247WWWWB150-11
2	50.80	4.124	104.80	2.062	52.40	247WWWWA200-11	247WWWWB200-11
2 1/2	63.50	4.688	119.00	2.344	59.50	247WWWWA250-11	247WWWWB250-11
3	76.20	5.188	131.80	2.594	65.90	247WWWWA300-11	247WWWWB300-11
4	101.60	6.876	174.60	3.438	87.30	247WWWWA400-11	247WWWWB400-11

Different dimensions available upon request

7RW Long Reducing Tee

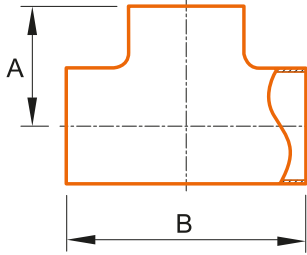


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	4.000	101.60	2.000	50.80	247RWA075050-11	247RWB075050-11
1 x 1/2	25.40 x 12.70	4.250	107.96	2.125	53.98	247RWA100050-11	247RWB100050-11
1 x 3/4	25.40 x 19.05	4.250	107.96	2.125	53.98	247RWA100075-11	247RWB100075-11
1 1/2 x 1/2	38.10 x 12.70	4.750	120.66	2.375	60.33	247RWA150050-11	247RWB150050-11
1 1/2 x 3/4	38.10 x 19.05	4.750	120.66	2.375	60.33	247RWA150075-11	247RWB150075-11
1 1/2 x 1	38.10 x 25.40	4.500	114.30	1.375	53.98	247RWA150100-11	247RWB150100-11
2 x 1/2	50.80 x 12.70	5.750	146.06	2.625	66.68	247RWA200050-11	247RWB200050-11
2 x 3/4	50.80 x 19.05	5.750	146.06	2.625	66.68	247RWA200075-11	247RWB200075-11
2 x 1	50.80 x 25.40	6.000	152.40	1.625	60.33	247RWA200100-11	247RWB200100-11
2 x 1 1/2	50.80 x 38.10	6.000	152.40	1.906	63.50	247RWA200150-11	247RWB200150-11
2 1/2 x 1	63.50 x 25.40	6.000	152.40	2.625	66.68	247RWA250100-11	247RWB250100-11
2 1/2 x 1 1/2	63.50 x 38.10	6.000	152.40	2.156	69.85	247RWA250150-11	247RWB250150-11
2 1/2 x 2	63.50 x 50.80	6.000	152.40	2.312	82.55	247RWA250200-11	247RWB250200-11
3 x 1	76.20 x 25.40	6.500	165.10	2.874	73.00	247RWA300100-11	247RWB300100-11
3 x 1 1/2	76.20 x 38.10	6.500	165.10	2.406	76.20	247RWA300150-11	247RWB300150-11
3 x 2	76.20 x 50.80	6.500	165.10	2.562	88.90	247RWA300200-11	247RWB300200-11
3 x 2 1/2	76.20 x 63.50	6.500	165.10	2.594	82.55	247RWA300250-11	247RWB300250-11
4 x 1	101.60 x 25.40	7.750	196.86	3.374	85.70	247RWA400100-11	247RWB400100-11
4 x 1 1/2	101.60 x 38.10	7.750	196.86	3.500	88.90	247RWA400150-11	247RWB400150-11
4 x 2	101.60 x 50.80	7.750	196.86	3.062	101.60	247RWA400200-11	247RWB400200-11
4 x 2 1/2	101.60 x 63.50	7.750	196.86	3.094	95.25	247RWA400250-11	247RWB400250-11
4 x 3	101.60 x 76.20	7.750	196.86	3.094	95.25	247RWA400300-11	247RWB400300-11
6 x 1.5	152.40 x 38.10	11.250	285.76	4.500	114.30	247RWA600150-11	247RWB600150-11
6 x 2	152.40 x 50.80	11.250	285.76	4.500	114.30	247RWA600200-11	247RWB600200-11
6 x 3	152.40 x 76.20	11.250	285.76	4.875	123.83	247RWA600300-11	247RWB600300-11
6 x 4	152.40 x 101.60	11.250	285.76	5.125	130.18	247RWA600400-11	247RWB600400-11

Different dimensions available upon request

7RWWW

Short Reducing Tee

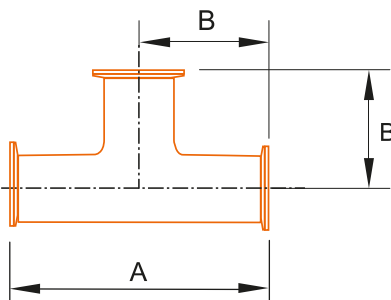


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	3.750	95.25	1.000	25.40	247RWWWWA075050-11	247RWWWWB075050-11
1 x 1/2	25.40 x 12.70	3.750	95.25	1.500	38.10	247RWWWWA100050-11	247RWWWWB100050-11
1 x 3/4	25.40 x 19.05	3.750	95.25	2.000	50.80	247RWWWWA100075-11	247RWWWWB100075-11
1 1/2 x 1/2	38.10 x 12.70	4.500	114.3	2.250	57.15	247RWWWWA150050-11	247RWWWWB150050-11
1 1/2 x 3/4	38.10 x 19.05	4.500	114.3	2.250	57.15	247RWWWWA150075-11	247RWWWWB150075-11
1 1/2 x 1	38.10 x 25.40	3.312	84.12	1.375	34.93	247RWWWWA150100-11	247RWWWWB150100-11
2 x 1/2	50.80 x 12.70	4.124	104.76	1.625	41.28	247RWWWWA200050-11	247RWWWWB200050-11
2 x 3/4	50.80 x 19.05	4.124	104.76	1.625	41.28	247RWWWWA200075-11	247RWWWWB200075-11
2 x 1	50.80 x 25.40	4.124	104.76	1.625	41.28	247RWWWWA200100-11	247RWWWWB200100-11
2 x 1 1/2	50.80 x 38.10	4.124	104.76	1.906	48.41	247RWWWWA200150-11	247RWWWWB200150-11
2 1/2 x 1	63.50 x 25.40	4.688	119.08	1.875	47.63	247RWWWWA250100-11	247RWWWWB250100-11
2 1/2 x 1 1/2	63.50 x 38.10	4.688	119.08	2.156	54.76	247RWWWWA250150-11	247RWWWWB250150-11
2 1/2 x 2	63.50 x 50.80	4.688	119.08	2.312	58.72	247RWWWWA250200-11	247RWWWWB250200-11
3 x 1	76.20 x 25.40	5.188	131.78	2.126	54.00	247RWWWWA300100-11	247RWWWWB300100-11
3 x 1 1/2	76.20 x 38.10	5.188	131.78	2.406	61.11	247RWWWWA300150-11	247RWWWWB300150-11
3 x 2	76.20 x 50.80	5.188	131.78	2.562	65.07	247RWWWWA300200-11	247RWWWWB300200-11
3 x 2 1/2	76.20 x 63.50	5.188	131.78	2.594	65.89	247RWWWWA300250-11	247RWWWWB300250-11
4 x 1	101.60 x 25.40	6.876	174.66	2.626	66.70	247RWWWWA400100-11	247RWWWWB400100-11
4 x 1 1/2	101.60 x 38.10	6.876	174.66	2.906	73.81	247RWWWWA400150-11	247RWWWWB400150-11
4 x 2	101.60 x 50.80	6.876	174.66	3.062	77.77	247RWWWWA400200-11	247RWWWWB400200-11
4 x 2 1/2	101.60 x 63.50	6.876	174.66	3.094	78.59	247RWWWWA400250-11	247RWWWWB400250-11
4 x 3	101.60 x 76.20	6.876	174.66	3.094	78.59	247RWWWWA400300-11	247RWWWWB400300-11
6 x 1.5	152.40 x 38.10	10.000	254.00	4.500	120.65	247RWWWWA600150-11	247RWWWWB600150-11
6 x 2	152.40 x 50.80	10.000	254.00	4.500	120.65	247RWWWWA600200-11	247RWWWWB600200-11
6 x 3	152.40 x 76.20	10.000	254.00	4.875	123.83	247RWWWWA600300-11	247RWWWWB600300-11
6 x 4	152.40 x 101.60	10.000	254.00	5.125	120.65	247RWWWWA600400-11	247RWWWWB600400-11

Different dimensions available upon request

7MP

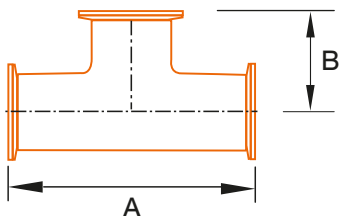
Clamp Long Equal Tee



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1/2	12.70	4.750	120.65	2.375	60.33	247MPA050-11	247MPB050-11
3/4	19.05	5.000	127.00	2.500	63.50	247MPA075-11	247MPB075-11
1	25.40	4.750	120.60	2.375	60.30	247MPA100-11	247MPB100-11
1 1/2	38.10	5.500	139.80	2.750	69.90	247MPA150-11	247MPB150-11
2	50.80	7.000	177.80	3.500	88.90	247MPA200-11	247MPB200-11
2 1/2	63.50	7.000	177.80	3.500	88.90	247MPA250-11	247MPB250-11
3	76.20	7.500	190.60	3.750	95.30	247MPA300-11	247MPB300-11
4	101.60	9.000	228.40	4.500	114.20	247MPA400-11	247MPB400-11
6	152.40	13.000	330.20	6.500	165.10	247MPA600-11	247MPB600-11
8	203.20	15.750	400.05	7.875	200.03	247MPA800-11	247MPB800-11
10	254.00	18.750	476.25	9.735	247.27	247MPA1000-11	247MPB1000-11
12	304.80	21.750	552.45	10.735	272.67	247MPA1200-11	247MPB1200-11

Different dimensions available upon request

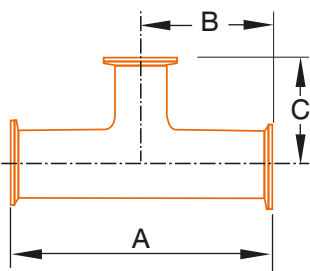
7MPS Clamp Short Equal Tee



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	3.250	82.60	1.625	41.30	247MPSA100-11	247MPSB100-11
1 1/2	38.10	4.315	109.60	2.157	54.80	247MPSA150-11	247MPSB150-11
2	50.80	5.125	130.20	2.562	65.10	247MPSA200-11	247MPSB200-11
2 1/2	63.50	5.685	144.40	2.842	72.20	247MPSA250-11	247MPSB250-11
3	76.20	6.188	157.20	3.440	78.60	247MPSA300-11	247MPSB300-11
4	101.60	8.118	206.20	4.059	103.10	247MPSA400-11	247MPSB400-11

Different dimensions available upon request

7RMP Clamp Long Reducing Tee

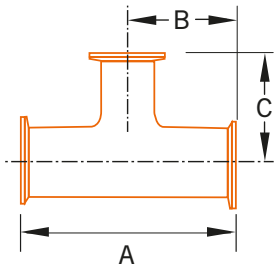


Nominal Size		A		B		C		Part Number	
Inch	mm	Inch	mm	Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05x12.70	5.000	127.00	2.500	63.50	2.500	63.50	247RMPA075050-11	247RMPB075050-11
1 x 1/2	25.40x12.70	5.250	133.35	2.625	66.68	2.625	66.68	247RMPA100050-11	247RMPB100050-11
1 x 3/4	25.40x19.05	5.250	133.35	2.625	66.68	2.625	66.68	247RMPA100075-11	247RMPB100075-11
1 1/2 x 1/2	38.10x12.70	5.750	146.05	2.875	73.03	2.875	73.03	247RMPA150050-11	247RMPB150050-11
1 1/2 x 3/4	38.10x19.05	5.750	146.05	2.875	73.03	2.875	73.03	247RMPA150075-11	247RMPB150075-11
1 1/2 x 1	38.10x25.40	5.500	139.70	2.750	69.85	2.625	66.68	247RMPA150100-11	247RMPB150100-11
2 x 1/2	50.80x12.70	6.750	171.45	3.375	85.73	3.125	79.38	247RMPA200050-11	247RMPB200050-11
2 x 3/4	50.80x19.05	6.750	171.45	3.375	85.73	3.125	79.38	247RMPA200075-11	247RMPB200075-11
2 x 1	50.80x25.40	7.000	177.80	3.500	88.90	2.875	73.00	247RMPA200100-11	247RMPB200100-11
2 x 1 1/2	50.80x38.10	7.000	177.80	3.500	88.90	3.000	76.20	247RMPA200150-11	247RMPB200150-11
2 1/2 x 1 1/2	63.50x38.10	7.000	177.80	3.500	88.90	3.250	82.55	247RMPA250150-11	247RMPB250150-11
2 1/2 x 2	63.50x50.80	7.000	177.80	3.500	88.90	3.750	95.25	247RMPA250200-11	247RMPB250200-11
3 x 1	76.20x25.40	7.500	190.50	3.750	95.25	3.374	85.70	247RMPA300100-11	247RMPB300100-11
3 x 1 1/2	76.20x38.10	7.500	190.50	3.750	95.25	3.500	88.90	247RMPA300150-11	247RMPB300150-11
3 x 2	76.20x50.80	7.500	190.50	3.750	95.25	4.000	101.60	247RMPA300200-11	247RMPB300200-11
3 x 2 1/2	76.20x63.50	7.500	190.50	3.750	95.25	3.750	95.25	247RMPA300250-11	247RMPB300250-11
4 x 1	101.60x25.40	8.994	228.46	4.497	114.23	3.874	98.40	247RMPA400100-11	247RMPB400100-11
4 x 1 1/2	101.60x38.10	8.994	228.46	4.497	114.23	4.000	101.60	247RMPA400150-11	247RMPB400150-11
4 x 2	101.60x50.80	8.994	228.46	4.497	114.23	4.500	114.30	247RMPA400200-11	247RMPB400200-11
4 x 2 1/2	101.60x63.50	8.994	228.46	4.497	114.23	4.250	107.95	247RMPA400250-11	247RMPB400250-11
4 x 3	101.60x76.20	8.994	228.46	4.497	114.23	4.250	107.95	247RMPA400300-11	247RMPB400300-11
6 x 1.5	152.40 x 38.10	13.000	330.20	6.500	165.10	5.000	127.00	247RMPA600150-11	247RMPB600150-11
6 x 2	152.40 x 50.80	13.000	330.20	6.500	165.10	5.000	127.00	247RMPA600200-11	247RMPB600200-11
6 x 3	152.40 x 76.20	13.000	330.20	6.500	165.10	5.375	136.53	247RMPA600300-11	247RMPB600300-11
6 x 4	152.40 x 101.60	13.000	330.20	6.500	165.10	5.747	145.98	247RMPA600400-11	247RMPB600400-11

Different dimensions available upon request

7RMPS

Clamp Short Reducing Tee

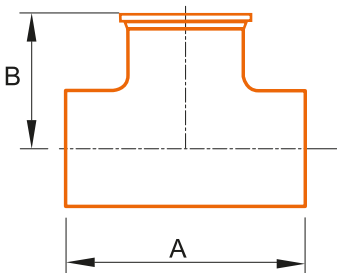


Nominal Size		A		B		C		Part Number	
Inch	mm	Inch	mm	Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05x12.70	4.750	120.66	2.375	60.33	19.050	38.10	247RMPSA075050-11	247RMPSB075050-11
1 x 1/2	25.40x12.70	4.750	120.66	2.375	60.33	25.400	50.80	247RMPSA100050-11	247RMPSB100050-11
1 x 3/4	25.40x19.05	4.750	120.66	2.375	60.33	31.750	63.50	247RMPSA100075-11	247RMPSB100075-11
1 1/2 x 3/4	38.10x19.05	5.500	139.70	2.750	69.85	34.925	69.85	247RMPSA150075-11	247RMPSB150075-11
1 1/2 x 1	38.10x25.40	4.312	109.52	2.156	54.76	23.815	47.63	247RMPSA150100-11	247RMPSB150100-11
2 x 1	50.80x25.40	5.124	130.16	2.562	65.08	26.990	53.98	247RMPSA200100-11	247RMPSB200100-11
2 x 1 1/2	50.80x38.10	5.124	130.16	2.562	65.08	30.555	61.11	247RMPSA200150-11	247RMPSB200150-11
2 1/2 x 1 1/2	63.50x38.10	5.688	144.48	2.844	72.24	33.730	67.46	247RMPSA250150-11	247RMPSB250150-11
2 1/2 x 2	63.50x50.80	5.688	144.48	2.844	72.24	35.710	71.42	247RMPSA250200-11	247RMPSB250200-11
3 x 1	76.20x25.40	6.188	157.18	3.094	78.59	33.350	66.70	247RMPSA300100-11	247RMPSB300100-11
3 x 1 1/2	76.20x38.10	6.188	157.18	3.094	78.59	36.905	73.81	247RMPSA300150-11	247RMPSB300150-11
3 x 2	76.20x50.80	6.188	157.18	3.094	78.59	38.885	77.77	247RMPSA300200-11	247RMPSB300200-11
3 x 2 1/2	76.20x63.50	6.188	157.18	3.094	78.59	39.295	78.59	247RMPSA300250-11	247RMPSB300250-11
4 x 1	101.60x25.40	8.120	206.26	4.060	103.13	39.700	79.40	247RMPSA400100-11	247RMPSB400100-11
4 x 1 1/2	101.60x38.10	8.120	206.26	4.060	103.13	43.255	86.51	247RMPSA400150-11	247RMPSB400150-11
4 x 2	101.60x50.80	8.120	206.26	4.060	103.13	45.235	90.47	247RMPSA400200-11	247RMPSB400200-11
4 x 2 1/2	101.60x63.50	8.120	206.26	4.060	103.13	45.645	91.29	247RMPSA400250-11	247RMPSB400250-11
4 x 3	101.60x76.20	8.120	206.26	4.060	103.13	45.645	91.29	247RMPSA400300-11	247RMPSB400300-11
6 x 2	152.40 x 50.80	11.750	298.44	5.875	149.22	66.675	133.35	247RMPSA600200-11	247RMPSB600200-11
6 x 3	152.40 x 76.20	11.750	298.44	5.875	149.22	68.265	136.53	247RMPSA600300-11	247RMPSB600300-11
6 x 4	152.40 x 101.60	11.750	298.44	5.875	149.22	68.225	136.45	247RMPSA600400-11	247RMPSB600400-11

Different dimensions available upon request

7WWM

Short Equal Tee WCW

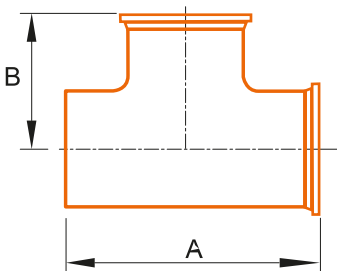


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.250	57.20	1.625	41.30	247WWMMA100-11	247WWMMA100-11
1 1/2	38.10	3.312	84.20	2.156	54.80	247WWMMA150-11	247WWMMA150-11
2	50.80	4.124	104.80	2.562	65.10	247WWMMA200-11	247WWMMA200-11
2 1/2	63.50	4.688	119.00	2.844	72.20	247WWMMA250-11	247WWMMA250-11
3	76.20	5.188	131.80	3.094	78.60	247WWMMA300-11	247WWMMA300-11
4	101.60	6.876	174.60	4.063	103.10	247WWMMA400-11	247WWMMA400-11

Different dimensions available upon request

7WMM

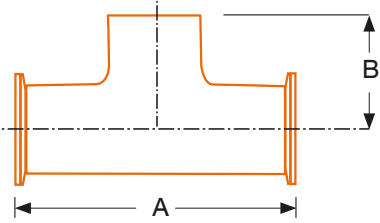
Short Equal Tee WCC



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.750	69.90	1.625	41.30	247WMMMA100-11	247WMMMA100-11
1 1/2	38.10	3.812	96.90	2.156	54.80	247WMMMA150-11	247WMMMA150-11
2	50.80	4.624	117.50	2.562	65.10	247WMMMA200-11	247WMMMA200-11
2 1/2	63.50	5.188	131.70	2.844	72.20	247WMMMA250-11	247WMMMA250-11
3	76.20	5.688	144.50	3.094	78.60	247WMMMA300-11	247WMMMA300-11
4	101.60	7.500	190.40	4.063	103.10	247WMMMA400-11	247WMMMA400-11

Different dimensions available upon request

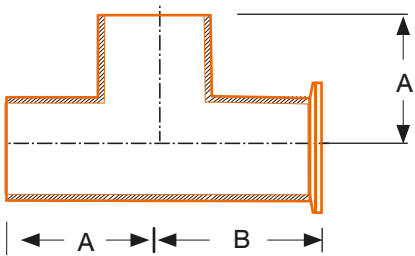
7MMW Short Equal Tee CWC



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	3.250	82.60	1.125	28.60	247MMWA100-11	247MMWB100-11
1 1/2	38.10	4.312	109.60	1.656	42.10	247MMWA150-11	247MMWB150-11
2	50.80	5.124	130.20	2.062	52.40	247MMWA200-11	247MMWB200-11
2 1/2	63.50	5.688	144.40	2.062	59.50	247MMWA250-11	247MMWB250-11
3	76.20	6.188	157.20	2.594	65.90	247MMWA300-11	247MMWB300-11
4	101.60	8.124	206.20	3.438	87.30	247MMWA400-11	247MMWB400-11

Different dimensions available upon request

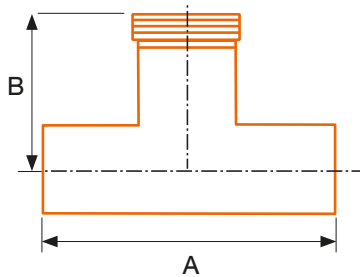
7WMW Short Equal Tee WWC



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	1.125	28.6	1.625	41.30	247WMWA100-11	247WMWB100-11
1 1/2	38.10	1.656	42.1	2.156	54.80	247WMWA150-11	247WMWB150-11
2	50.80	2.062	52.4	2.562	65.10	247WMWA200-11	247WMWB200-11
2 1/2	63.50	2.062	59.5	2.844	72.20	247WMWA250-11	247WMWB250-11
3	76.20	2.594	65.9	3.094	78.60	247WMWA300-11	247WMWB300-11
4	101.60	3.438	87.3	4.063	103.10	247WMWA400-11	247WMWB400-11

Different dimensions available upon request

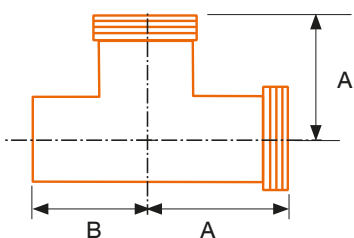
7WWT Short Equal Threaded Bevel Seat x Weld Tee WTW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.250	57.20	1.843	46.81	247WWT A100-11	247WWT B100-11
1 1/2	38.10	3.312	84.20	2.374	60.30	247WWT A150-11	247WWT B150-11
2	50.80	4.124	104.80	2.812	71.42	247WWT A200-11	247WWT B200-11
2 1/2	63.50	4.688	119.00	3.219	81.76	247WWT A250-11	247WWT B250-11
3	76.20	5.188	131.80	3.500	88.90	247WWT A300-11	247WWT B300-11
4	101.60	6.876	174.60	4.469	113.51	247WWT A400-11	247WWT B400-11

MOQ required

7WTT Short Equal Threaded Bevel Seat x Weld Tee WTT

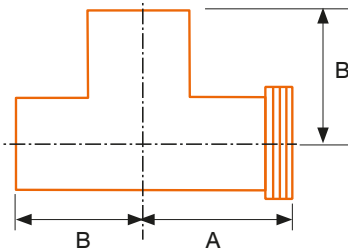


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.250	57.20	1.843	46.81	247WTT A100-11	247WTT B100-11
1 1/2	38.10	3.312	84.20	2.374	60.30	247WTT A150-11	247WTT B150-11
2	50.80	4.124	104.80	2.812	71.42	247WTT A200-11	247WTT B200-11
2 1/2	63.50	4.688	119.00	3.219	81.76	247WTT A250-11	247WTT B250-11
3	76.20	5.188	131.80	3.500	88.90	247WTT A300-11	247WTT B300-11
4	101.60	6.876	174.60	4.469	113.51	247WTT A400-11	247WTT B400-11

MOQ required

7WTW

Short Equal Threaded
Bevel Seat x Weld Tee WWT

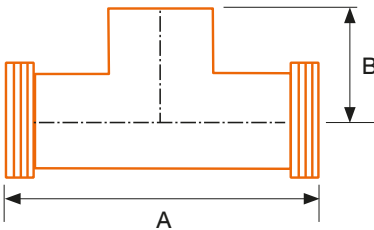


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	1.843	46.81	1.125	28.6	247WTWA100-11	247WTWB100-11
1 1/2	38.10	2.374	60.30	1.656	42.1	247WTWA150-11	247WTWB150-11
2	50.80	2.812	71.42	2.062	52.4	247WTWA200-11	247WTWB200-11
2 1/2	63.50	3.219	81.76	2.344	59.5	247WTWA250-11	247WTWB250-11
3	76.20	3.500	88.90	2.594	65.9	247WTWA300-11	247WTWB300-11
4	101.60	4.469	113.51	3.438	87.3	247WTWA400-11	247WTWB400-11

MOQ required

7TTW

Short Equal Threaded
Bevel Seat x Weld Tee TWT

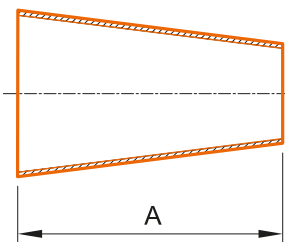


Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	3.687	93.65	1.125	28.6	247TTWA100-11	247TTWB100-11
1 1/2	38.10	4.750	120.64	1.656	42.1	247TTWA150-11	247TTWB150-11
2	50.80	5.625	142.87	2.062	52.4	247TTWA200-11	247TTWB200-11
2 1/2	63.50	6.437	163.49	2.344	59.5	247TTWA250-11	247TTWB250-11
3	76.20	7.000	177.81	2.594	65.9	247TTWA300-11	247TTWB300-11
4	101.60	8.937	227.00	3.438	87.3	247TTWA400-11	247TTWB400-11

MOQ required

31W

Concentric Reducer WW

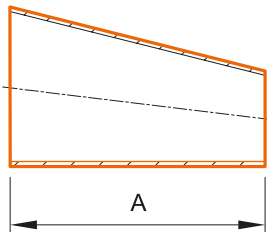


Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	1.000	25.40	2431WA075050-11	2431WB075050-11
1 x 1/2	25.40 x 12.70	1.000	25.40	2431WA100050-11	2431WB100050-11
1 x 1/2	25.40 x 12.70	2.000	50.80	2431WA100050508-11	2431WB100050508-11
1 x 3/4	25.40 x 19.05	1.000	25.40	2431WA100075-11	2431WB100075-11
1 1/2 x 1/2	38.10 x 12.70	2.500	63.50	2431WA150050-11	2431WB150050-11
1 1/2 x 3/4	38.10 x 19.05	2.000	50.80	2431WA150075-11	2431WB150075-11
1 1/2 x 1	38.10 x 25.40	2.000	50.80	2431WA150100-11	2431WB150100-11
2 x 1/2	50.80 x 12.70	6.000	152.40	2431WA200050-11	2431WB200050-11
2 x 3/4	50.80 x 19.05	5.000	127.00	2431WA200075-11	2431WB200075-11
2 x 1	50.80 x 25.40	4.000	101.60	2431WA200100-11	2431WB200100-11
2 x 1 1/2	50.80 x 38.10	2.000	50.80	2431WA200150-11	2431WB200150-11
2 1/2 x 1 1/2	63.50 x 38.10	4.000	101.60	2431WA250150-11	2431WB250150-11
2 1/2 x 2	63.50 x 50.80	2.000	50.80	2431WA250200-11	2431WB250200-11
3 x 1	76.20 x 25.40	8.000	203.20	2431WA300100-11	2431WB300100-11
3 x 1 1/2	76.20 x 38.10	6.000	152.40	2431WA300150-11	2431WB300150-11
3 x 2	76.20 x 50.80	4.000	101.60	2431WA300200-11	2431WB300200-11
3 x 2 1/2	76.20 x 63.50	2.000	50.80	2431WA300250-11	2431WB300250-11
4 x 1	101.60 x 25.40	12.000	304.80	2431WA400100-11	2431WB400100-11
4 x 1 1/2	101.60 x 38.10	10.000	254.00	2431WA400150-11	2431WB400150-11
4 x 2	101.60 x 50.80	8.000	203.20	2431WA400200-11	2431WB400200-11
4 x 2 1/2	101.60 x 63.50	6.000	152.40	2431WA400250-11	2431WB400250-11
4 x 3	101.60 x 76.20	4.000	101.60	2431WA400300-11	2431WB400300-11
6 x 2	152.40 x 50.80	5.500	139.70	2431WA600200-11	2431WB600200-11
6 x 3	152.40 x 76.20	5.500	139.70	2431WA600300-11	2431WB600300-11
6 x 3	152.40 x 76.20	6.000	152.40	2431WA600300152-11	2431WB600300152-11
6 x 4	152.40 x 101.60	5.500	139.70	2431WA600400-11	2431WB600400-11
6 x 4	152.40 x 101.60	6.000	152.40	2431WA600400152-11	2431WB600400152-11
8 x 4	203.2 x 101.60	6.000	152.40	2431WA800400-11	2431WB800400-11
8 x 6	203.2 x 152.40	6.000	152.40	2431WA800600-11	2431WB800600-11
8 x 3	203.2 x 76.20	8.000	203.20	3431WA800300-11	3431WB800300-11
8 x 4	203.2 x 101.60	8.000	203.20	2431WA800400-11	2431WB800400-11
8 x 6	203.2 x 152.40	8.000	203.20	3431WA800600203-11	3431WB800600203-11

Different dimensions available upon request

32W

Eccentric Reducer WW

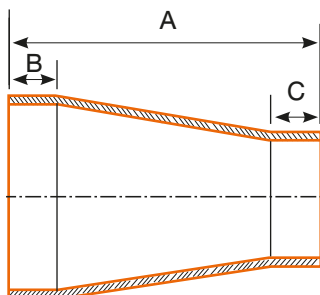


Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	1.000	25.40	2432WA075050-11	2432WB075050-11
1 x 1/2	25.40 x 12.70	1.000	25.40	2432WA100050-11	2432WB100050-11
1 x 1/2	25.40 x 12.70	2.000	50.80	2432WA100050508-11	2432WB100050508-11
1 x 3/4	25.40 x 19.05	1.000	25.40	2432WA100075-11	2432WB100075-11
1 1/2 x 1/2	38.10 x 12.70	3.000	63.50	2432WA150050-11	2432WB150050-11
1 1/2 x 1/2	38.10 x 12.70	4.000	101.60	2432WA150050101-11	2432WB150050101-11
1 1/2 x 3/4	38.10 x 19.05	2.000	50.80	2432WA150075-11	2432WB150075-11
1 1/2 x 3/4	38.10 x 19.05	3.000	76.20	2432WA150075762-11	2432WB150075762-11
1 1/2 x 1	38.10 x 25.40	2.000	50.80	2432WA150100-11	2432WB150100-11
2 x 1/2	50.80 x 12.70	6.000	152.40	2432WA200050-11	2432WB200050-11
2 x 3/4	50.80 x 19.05	5.000	127.00	2432WA200075-11	2432WB200075-11
2 x 1	50.80 x 25.40	4.000	101.60	2432WA200100-11	2432WB200100-11
2 x 1 1/2	50.80 x 38.10	2.000	50.80	2432WA200150-11	2432WB200150-11
2 1/2 x 1 1/2	63.50 x 38.10	4.000	101.60	2432WA250150-11	2432WB250150-11
2 1/2 x 2	63.50 x 50.80	2.000	50.80	2432WA250200-11	2432WB250200-11
3 x 1	76.20 x 25.40	8.000	203.20	2432WA300100-11	2432WB300100-11
3 x 1 1/2	76.20 x 38.10	6.000	152.40	2432WA300150-11	2432WB300150-11
3 x 2	76.20 x 50.80	4.000	101.60	2432WA300200-11	2432WB300200-11
3 x 2 1/2	76.20 x 63.50	2.000	50.80	2432WA300250-11	2432WB300250-11
4 x 1 1/2	101.60 x 38.10	10.000	254.00	2432WA400150-11	2432WB400150-11
4 x 2	101.60 x 50.80	8.000	203.20	2432WA400200-11	2432WB400200-11
4 x 2 1/2	101.60 x 63.50	6.000	152.40	2432WA400250-11	2432WB400250-11
4 x 3	101.60 x 76.20	4.000	101.60	2432WA400300-11	2432WB400300-11
6 x 3	152.40 x 76.20	5.500	139.70	2432WA600300-11	2432WB600300-11
6 x 4	152.40 x 101.60	5.500	139.70	2432WA600400-11	2432WB600400-11
8 x 4	203.2 x 101.60	6.000	152.40	2432WA800400-11	2432WB800400-11
8 x 6	203.2 x 152.40	6.000	152.40	2432WA800600-11	2432WB800600-11

Different dimensions available upon request

31

Concentric Reducer with Tangents

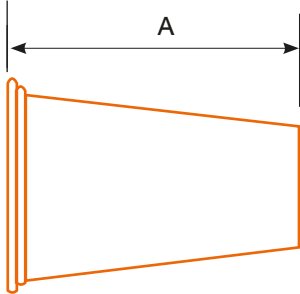


Nominal Size		A		B		C		Part Number	
Inch	mm	Inch	mm	Inch	mm	Inch	mm	304	316L
1 x 3/4	25.40 x 19.05	2.375	60.33	0.375	9.53	0.375	9.53	2431A100075-11	2431B100075-11
1 1/2 x 3/4	38.10 x 19.05	2.375	60.33	0.375	9.53	0.375	9.53	2431A150075-11	2431B150075-11
1 1/2 x 1	38.10 x 25.40	2.375	60.33	0.375	9.53	0.375	9.53	2431A150100-11	2431B150100-11
2 x 1/2	50.80 x 12.70	4.969	126.20	1.000	25.40	1.000	25.40	2431A200050-11	2431B200050-11
2 x 3/4	50.80 x 19.05	7.000	177.80	1.000	25.40	1.000	25.40	2431A200075-11	2431B200075-11
2 x 1	50.80 x 25.40	2.375	60.33	0.375	9.53	0.375	9.53	2431A200100-11	2431B200100-11
2 x 1 1/2	50.80 x 38.10	2.375	60.33	0.375	9.53	0.375	9.53	2431A200150-11	2431B200150-11
2 1/2 x 1 1/2	63.50 x 38.10	2.375	60.33	0.375	9.53	0.375	9.53	2431A250150-11	2431B250150-11
2 1/2 x 2	63.50 x 50.80	2.375	60.33	0.375	9.53	0.375	9.53	2431A250200-11	2431B250200-11
3 x 1 1/2	76.20 x 38.10	3.625	92.08	0.375	9.53	0.375	9.53	2431A300150-11	2431B300150-11
3 x 2	76.20 x 50.80	3.625	92.08	0.375	9.53	0.375	9.53	2431A300200-11	2431B300200-11
3 x 2 1/2	76.20 x 63.50	3.625	92.08	0.375	9.53	0.375	9.53	2431A300250-11	2431B300250-11
4 x 1 1/2	101.60 x 38.10	5.500	139.70	0.375	9.53	0.375	9.53	2431A400150-11	2431B400150-11
4 x 2	101.60 x 50.80	3.625	92.08	0.375	9.53	0.375	9.53	2431A400200-11	2431B400200-11
4 x 2 1/2	101.60 x 63.50	3.625	92.08	0.375	9.53	0.375	9.53	2431A400250-11	2431B400250-11
4 x 3	101.60 x 76.20	3.625	92.08	0.375	9.53	0.375	9.53	2431A400300-11	2431B400300-11
6 x 3	152.40 x 76.20	5.500	139.70	0.375	9.53	0.375	9.53	2431A600300211-11	2431B600300211-11
6 x 3	152.40 x 76.20	9.000	228.60	1.500	38.10	1.500	38.10	2431A600300381-11	2431B600300381-11
6 x 3	152.40 x 76.20	9.000	228.60	1.750	44.45	1.750	44.45	2431A600300-11	2431B600300-11
6 x 4	152.40 x 101.60	5.500	139.70	0.375	9.53	0.375	9.53	2431A600400211-11	2431B600400211-11
6 x 4	152.40 x 101.60	9.000	228.60	1.500	38.10	1.500	38.10	2431A600400381-11	2431B600400381-11
6 x 4	152.40 x 101.60	9.000	228.60	1.750	44.45	1.750	44.45	2431A600400-11	2431B600400-11

Different dimensions available upon request

31M

Concentric Reducer CW

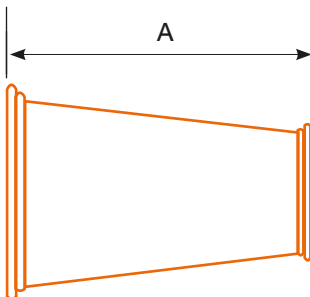


Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	1.500	38.10	2431MA075050-11	2431MB075050-11
1 x 1/2	25.40 x 12.70	1.500	38.10	2431MA100050-11	2431MB100050-11
1 x 3/4	25.40 x 19.05	1.500	38.10	2431MA100075-11	2431MB100075-11
1 1/2 x 1	38.10 x 25.40	2.500	63.50	2431MA150100-11	2431MB150100-11
2 x 1	50.80 x 25.40	4.500	114.30	2431MA200100-11	2431MB200100-11
2 x 1 1/2	50.80 x 38.10	2.500	63.50	2431MA200150-11	2431MB200150-11
2 1/2 x 1 1/2	63.50 x 38.10	4.500	114.30	2431MA250150-11	2431MB250150-11
2 1/2 x 2	63.50 x 50.80	2.500	63.50	2431MA250200-11	2431MB250200-11
3 x 1 1/2	76.20 x 38.10	6.500	165.10	2431MA300150-11	2431MB300150-11
3 x 2	76.20 x 50.80	4.500	114.30	2431MA300200-11	2431MB300200-11
3 x 2 1/2	76.20 x 63.50	2.500	63.50	2431MA300250-11	2431MB300250-11
4 x 2	101.60 x 50.80	8.625	219.08	2431MA400200-11	2431MB400200-11
4 x 2 1/2	101.60 x 63.50	6.625	168.28	2431MA400250-11	2431MB400250-11
4 x 3	101.60 x 76.20	4.625	117.48	2431MA400300-11	2431MB400300-11

Different dimensions available upon request

31MP

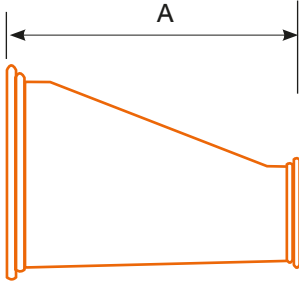
Concentric Reducer CC



Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	2.000	50.80	2431MPA075050-11	2431MPB075050-11
1 x 1/2	25.40 x 12.70	2.000	50.80	2431MPA100050-11	2431MPB100050-11
1 x 3/4	25.40 x 19.05	2.000	50.80	2431MPA100075-11	2431MPB100075-11
1 1/2 x 1/2	38.10 x 12.70	3.500	88.90	2431MPA150050-11	2431MPB150050-11
1 1/2 x 3/4	38.10 x 19.05	3.000	76.20	2431MPA150075-11	2431MPB150075-11
1 1/2 x 1	38.10 x 25.40	3.000	76.20	2431MPA150100-11	2431MPB150100-11
2 x 1/2	50.80 x 12.70	7.000	177.80	2431MPA200050-11	2431MPB200050-11
2 x 3/4	50.80 x 19.05	6.000	152.40	2431MPA200075-11	2431MPB200075-11
2 x 1	50.80 x 25.40	5.000	127.00	2431MPA200100-11	2431MPB200100-11
2 x 1 1/2	50.80 x 38.10	3.000	76.20	2431MPA200150-11	2431MPB200150-11
2 1/2 x 1 1/2	63.50 x 38.10	5.000	127.00	2431MPA250150-11	2431MPB250150-11
2 1/2 x 2	63.50 x 50.80	3.000	76.20	2431MPA250200-11	2431MPB250200-11
3 x 1	76.20 x 25.40	9.000	228.60	2431MPA300100-11	2431MPB300100-11
3 x 1 1/2	76.20 x 38.10	7.000	177.80	2431MPA300150-11	2431MPB300150-11
3 x 2	76.20 x 50.80	5.000	127.00	2431MPA300200-11	2431MPB300200-11
3 x 2 1/2	76.20 x 63.50	3.000	76.20	2431MPA300250-11	2431MPB300250-11
4 x 1 1/2	101.60 x 38.10	11.125	282.50	2431MPA400150-11	2431MPB400150-11
4 x 2	101.60 x 50.80	9.125	231.70	2431MPA400200-11	2431MPB400200-11
4 x 2 1/2	101.60 x 63.50	7.125	180.90	2431MPA400250-11	2431MPB400250-11
4 x 3	101.60 x 76.20	5.125	130.10	2431MPA400300-11	2431MPB400300-11
6 x 2	152.40 x 50.80	6.875	174.63	2431MPA600200-11	2431MPB600200-11
6 x 3	152.40 x 76.20	6.875	174.63	2431MPA600300-11	2431MPB600300-11
6 x 4	152.40 x 101.60	7.000	177.80	2431MPA600400-11	2431MPB600400-11
8 x 4	203.2 x 101.60	7.500	190.50	2431MPA800400-11	2431MPB800400-11
8 x 6	203.2 x 152.40	7.750	196.85	2431MPA800600-11	2431MPB800600-11

Different dimensions available upon request

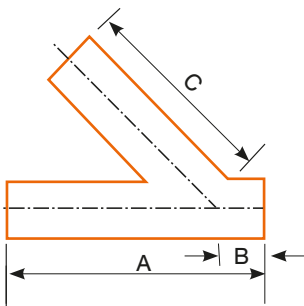
32MP Eccentric Reducer CC



Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
3/4 x 1/2	19.05 x 12.70	2.000	50.800	2432MPA075050-11	2432MPB075050-11
1 x 1/2	25.40 x 12.70	2.000	50.800	2432MPA100050-11	2432MPB100050-11
1 x 3/4	25.40 x 19.05	2.000	50.800	2431MPA100075-11	2432MPB100075-11
1 1/2 x 1/2	38.10 x 12.70	5.000	88.900	2432MPA150050-11	2432MPB150050-11
1 1/2 x 3/4	38.10 x 19.05	4.000	76.200	2432MPA150075-11	2432MPB150075-11
1 1/2 x 1	38.10 x 25.40	3.000	76.200	2432MPA150100-11	2432MPB150100-11
2 x 1/2	50.80 x 12.70	7.000	177.800	2432MPA200050-11	2432MPB200050-11
2 x 3/4	50.80 x 19.05	6.000	152.400	2432MPA200075-11	2432MPB200075-11
2 x 1	50.80 x 25.40	5.000	127.000	2432MPA200100-11	2432MPB200100-11
2 x 1 1/2	50.80 x 38.10	3.000	76.200	2432MPA200150-11	2432MPB200150-11
2 1/2 x 1 1/2	63.50 x 38.10	5.000	127.000	2432MPA250150-11	2432MPB250150-11
2 1/2 x 2	63.50 x 50.80	3.000	76.200	2432MPA250200-11	2432MPB250200-11
3 x 1	76.20 x 25.40	9.000	228.600	2432MPA300100-11	2432MPB300100-11
3 x 1 1/2	76.20 x 38.10	7.000	177.800	2432MPA300150-11	2432MPB300150-11
3 x 2	76.20 x 50.80	5.000	127.000	2432MPA300200-11	2432MPB300200-11
3 x 2 1/2	76.20 x 63.50	3.000	76.200	2432MPA300250-11	2432MPB300250-11
4 x 1 1/2	101.60 x 38.10	11.125	282.500	2432MPA400150-11	2432MPB400150-11
4 x 2	101.60 x 50.80	9.125	231.700	2432MPA400200-11	2432MPB400200-11
4 x 2 1/2	101.60 x 63.50	7.125	180.900	2432MPA400250-11	2432MPB400250-11
4 x 3	101.60 x 76.20	5.125	130.100	2432MPA400300-11	2432MPB400300-11
6 x 3	152.40 x 76.20	6.875	174.630	2432MPA600300-11	2432MPB600300-11
6 x 4	152.40 x 101.60	7.000	177.800	2432MPA600400-11	2432MPB600400-11
8 x 4	203.2 x 101.60	7.500	190.50	2432MPA800400-11	2432MPB800400-11
8 x 6	203.2 x 152.40	7.750	196.85	2432MPA800600-11	2432MPB800600-11

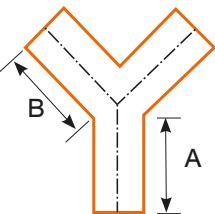
Different dimensions available upon request

28WA Lateral WWW



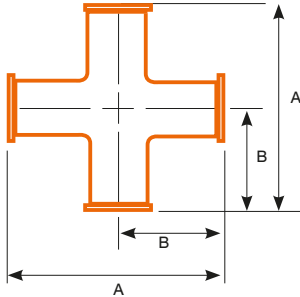
Nominal Size		A		B		C		Part Number	
Inch	mm	Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	6.000	152.40	1.000	25.40	5.000	127.00	2428WAA100-11	2428WAB100-11
1 1/2	38.10	7.375	187.33	1.188	30.18	6.188	157.18	2428WAA150-11	2428WAB150-11
2	50.80	8.750	222.25	1.625	41.28	7.125	180.98	2428WAA200-11	2428WAB200-11
2 1/2	63.50	10.000	254.00	1.500	38.10	8.500	215.90	2428WAA250-11	2428WAB250-11
3	76.20	10.750	273.05	1.875	47.63	8.875	225.43	2428WAA300-11	2428WAB300-11
4	101.60	12.812	325.42	2.015	51.18	10.750	273.05	2428WAA400-11	2428WAB400-11

28W True Y WWW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.000	50.80	2.438	61.93	2428WA100-11	2428WB100-11
1 1/2	38.10	2.000	50.80	2.438	61.93	2428WA150-11	2428WB150-11
2	50.80	2.625	66.68	3.250	82.55	2428WA200-11	2428WB200-11
2 1/2	63.50	3.370	85.60	4.125	104.78	2428WA250-11	2428WB250-11
3	76.20	4.000	101.60	4.875	123.83	2428WA300-11	2428WB300-11
4	101.60	5.375	136.53	5.575	141.61	2428WA400-11	2428WB400-11

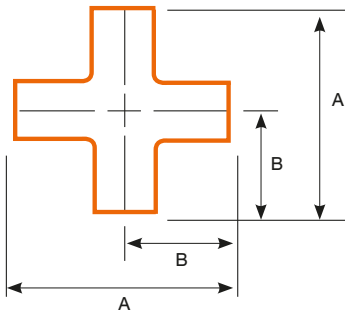
9MP Clamp Long Equal 4-Way Cross



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	4.750	120.60	2.375	60.30	249MPA100-11	249MPB100-11
1 1/2	38.10	5.500	139.80	2.750	69.90	249MPA150-11	249MPB150-11
2	50.80	7.000	177.80	3.500	88.90	249MPA200-11	249MPB200-11
2 1/2	63.50	7.000	177.80	3.500	88.90	249MPA250-11	249MPB250-11
3	76.20	7.500	190.60	3.750	95.30	249MPA300-11	249MPB300-11
4	101.60	9.000	228.40	4.500	114.20	249MPA400-11	249MPB400-11

Different dimensions available upon request

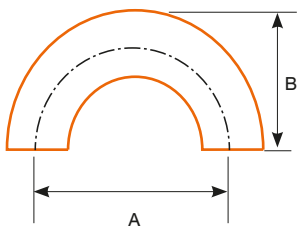
9WWWW Short Equal 4-Way Cross



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.250	57.20	1.125	28.60	249WWWWA100-11	249WWWWB100-11
1 1/2	38.10	3.312	84.20	1.656	42.10	249WWWWA150-11	249WWWWB150-11
2	50.80	4.125	104.80	2.062	52.40	249WWWWA200-11	249WWWWB200-11
2 1/2	63.50	4.687	119.00	2.343	59.50	249WWWWA250-11	249WWWWB250-11
3	76.20	5.187	131.80	2.593	65.90	249WWWWA300-11	249WWWWB300-11
4	101.60	6.875	174.60	3.437	87.30	249WWWWA400-11	249WWWWB400-11

Different dimensions available upon request

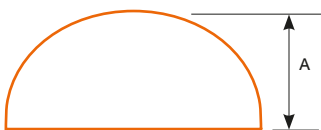
2WUL 180° Short U Bend WW



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	3.000	76.20	2.000	50.80	242WULA100-11	242WULB100-11
1 1/2	38.10	4.500	114.30	3.000	76.20	242WULA150-11	242WULB150-11
2	50.80	6.000	152.40	4.000	101.60	242WULA200-11	242WULB200-11
2 1/2	63.50	7.500	190.50	5.000	127.00	242WULA250-11	242WULB250-11
3	76.20	9.000	228.60	6.000	152.40	242WULA300-11	242WULB300-11
4	101.60	12.000	304.80	8.000	203.20	242WULA400-11	242WULB400-11

Different dimensions available upon request

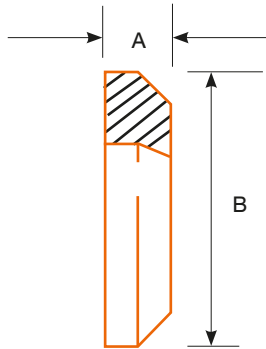
16W Tube Weld Cap



Nominal Size		A		Part Number	
Inch	mm	Inch	mm	304	316L
1/2	12.70	0.250	6.400	2416WA050-11	2416WB050-11
3/4	19.05	0.312	7.900	2416WA075-11	2416WB075-11
1	25.40	0.375	9.500	2416WA100-11	2416WB100-11
1 1/2	38.10	0.562	14.300	2416WA150-11	2416WB150-11
2	50.80	0.750	19.100	2416WA200-11	2416WB200-11
2 1/2	63.50	1.000	25.400	2416WA250-11	2416WB250-11
3	76.20	1.250	31.800	2416WA300-11	2416WB300-11
4	101.60	1.500	38.100	2416WA400-11	2416WB400-11
6	152.40	2.000	50.800	2416WA600-11	2416WB600-11
8	203.20	2.500	63.500	2416WA800-11	2416WB800-11

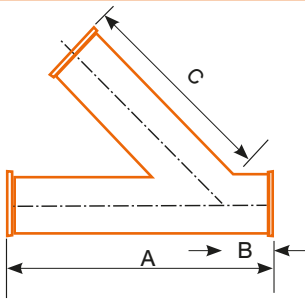
Different dimensions available upon request

16AMP Solid End Cap



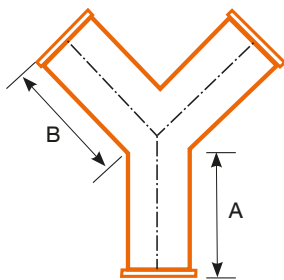
Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1/2 - 3/4	4.75	25.20				2416AMPA07511	2416AMPB07511
1 - 1 1/2	6.40	50.40				2416AMPA15011	2416AMPB15011
2	6.40	63.90				2416AMPA20011	2416AMPB20011
2 1/2	6.40	77.40				2416AMPA25011	2416AMPB25011
3	6.40	90.90				2416AMPA30011	2416AMPB30011
4	7.90	118.90				2416AMPA40011	2416AMPB40011
5	7.90	144.50				2416AMPA50011	2416AMPB50011
6	11.10	166.90				2416AMPA60011	2416AMPB60011
8	11.10	217.70				2416AMPA80011	2416AMPB80011
10	11.10	268.50				2416AMPA100011	2416AMPB100011
12	11.10	319.30				2416AMPA120011	2416AMPB120011

28AMP Clamp End Lateral CCC



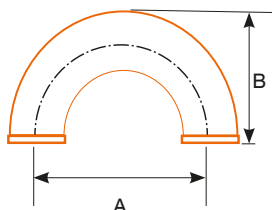
Nominal Size		A		B		C		Part Number	
Inch	mm	Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	7.000	177.80	1.500	38.10	5.500	139.70	2428AMPA100-11	2428AMPB100-11
1 1/2	38.10	8.375	212.73	1.688	42.88	6.688	169.88	2428AMPA150-11	2428AMPB150-11
2	50.80	9.750	247.65	2.125	53.98	7.625	193.68	2428AMPA200-11	2428AMPB200-11
2 1/2	63.50	11.000	279.40	2.000	50.80	9.000	228.60	2428AMPA250-11	2428AMPB250-11
3	76.20	11.750	298.45	2.375	60.33	9.375	238.13	2428AMPA300-11	2428AMPB300-11
4	101.60	14.062	357.17	2.640	67.06	11.312	287.32	2428AMPA400-11	2428AMPB400-11

28BMP Clamp End True Y CCC



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	2.500	63.50	63.500	63.50	2428BMPA100-11	2428BMPB100-11
1 1/2	38.10	2.500	63.50	63.500	63.50	2428BMPA150-11	2428BMPB150-11
2	50.80	3.125	79.38	79.380	79.38	2428BMPA200-11	2428BMPB200-11
2 1/2	63.50	3.875	98.43	98.430	98.43	2428BMPA250-11	2428BMPB250-11
3	76.20	4.500	114.30	114.300	114.30	2428BMPA300-11	2428BMPB300-11
4	101.60	6.000	152.40	152.400	152.40	2428BMPA400-11	2428BMPB400-11

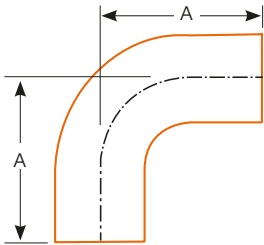
2WUMP 180° Clamp U Bend CC



Nominal Size		A		B		Part Number	
Inch	mm	Inch	mm	Inch	mm	304	316L
1	25.40	3.000	76.20	2.500	63.50	242WUMPA100-11	242WUMPB100-11
1 1/2	38.10	4.500	114.30	3.500	88.90	242WUMPA150-11	242WUMPB150-11
2	50.80	6.000	152.40	4.500	114.30	242WUMPA200-11	242WUMPB200-11
2 1/2	63.50	7.500	190.50	5.500	139.70	242WUMPA250-11	242WUMPB250-11
3	76.20	9.000	228.60	6.500	165.10	242WUMPA300-11	242WUMPB300-11
4	101.60	12.000	304.80	8.625	219.08	242WUMPA400-11	242WUMPB400-11

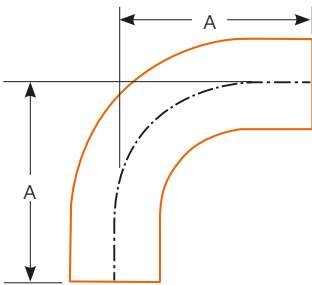
Different dimensions available upon request

BS 90° Long Tube Bend 1D



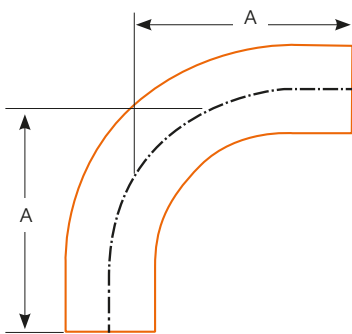
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	55	1.60	2507L1DA100-11	2507L1DB100-11
1 1/2	38.1	70	1.60	2507L1DA150-11	2507L1DB150-11
2	50.8	82	1.60	2507L1DA200-11	2507L1DB200-11
2 1/2	63.5	105	1.60	2507L1DA250-11	2507L1DB250-11
3	76.2	110	1.60	2507L1DA300-11	2507L1DB300-11
4	101.6	150	2.10	2507L1DA400-11	2507L1DB400-11

BS 90° Long Tube Bend 1.5D



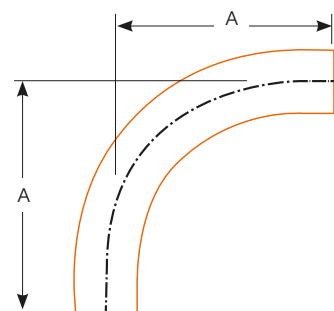
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1/2	12.7	62	1.60	2507LA050-11	2507LB050-11
3/4	19.05	62	1.60	2507LA075-11	2507LB075-11
1	25.4	65	1.60	2507LA100-11	2507LB100-11
1 1/2	38.1	85	1.60	2507LA150-11	2507LB150-11
2	50.8	110	1.60	2507LA200-11	2507LB200-11
2 1/2	63.5	135	1.60	2507LA250-11	2507LB250-11
3	76.2	155	1.60	2507LA300-11	2507LB300-11
4	101.6	195	2.10	2507LA400-11	2507LB400-11

BS 90° Long Tube Bend 2D



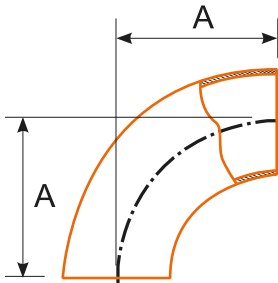
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	80	1.60	2507L2DA100-11	2507L2DB100-11
1 1/2	38.1	105	1.60	2507L2DA150-11	2507L2DB150-11
2	50.8	130	1.60	2507L2DA200-11	2507L2DB200-11
2 1/2	63.5	160	1.60	2507L2DA250-11	2507L2DB250-11
3	76.2	215	1.60	2507L2DA300-11	2507L2DB300-11
4	101.6	213.2	2.10	2507L2DA400-11	2507L2DB400-11

BS 90° Long Tube Bend 3D



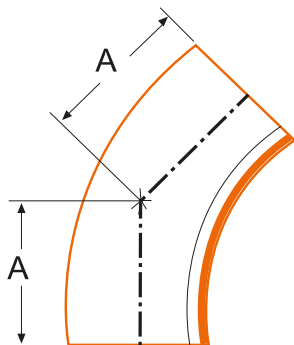
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	115	1.60	2507L3DA100-11	2507L3DB100-11
1 1/2	38.1	140	1.60	2507L3DA150-11	2507L3DB150-11
2	50.8	225	1.60	2507L3DA200-11	2507L3DB200-11
2 1/2	63.5	230	1.60	2507L3DA250-11	2507L3DB250-11
3	76.2	240	1.60	2507L3DA300-11	2507L3DB300-11
4	101.6	365.6	2.10	2507L3DA400-11	2507L3DB400-11

BS 90° Short Tube Bend 1.5D



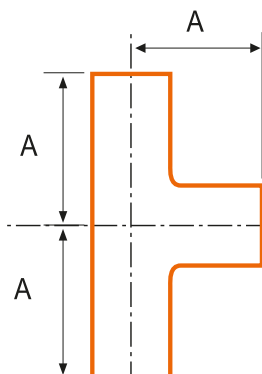
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	43.5	1.60	2507SA100-11	2507SB100-11
1 1/2	38.1	63.5	1.60	2507SA150-11	2507SB150-11
2	50.8	88.5	1.60	2507SA200-11	2507SB200-11
2 1/2	63.5	113.5	1.60	2507SA250-11	2507SB250-11
3	76.2	133.5	1.60	2507SA300-11	2507SB300-11
4	101.6	173.5	2.10	2507SA400-11	2507SB400-11

BS 45° Long Tube Bend 1.5D



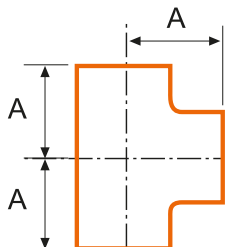
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	30.2	1.60	2508LA100-11	2508LB100-11
1 1/2	38.1	41.3	1.60	2508LA150-11	2508LB150-11
2	50.8	58.7	1.60	2508LA200-11	2508LB200-11
2 1/2	63.5	76.2	1.60	2508LA250-11	2508LB250-11
3	76.2	93.7	1.60	2508LA300-11	2508LB300-11
4	101.6	122.2	2.10	2508LA400-11	2508LB400-11

BS Long Equal Tee



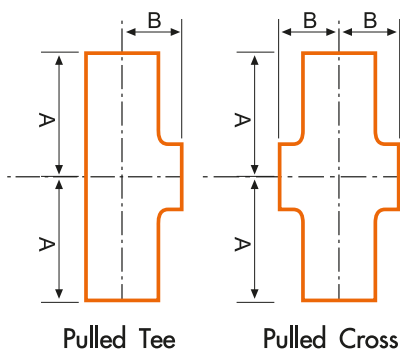
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	130	1.60	2509LA100-11	2509LB100-11
1 1/2	38.1	170	1.60	2509LA150-11	2509LB150-11
2	50.8	220	1.60	2509LA200-11	2509LB200-11
2 1/2	63.5	270	1.60	2509LA250-11	2509LB250-11
3	76.2	310	1.60	2509LA300-11	2509LB300-11
4	101.6	390	2.10	2509LA400-11	2509LB400-11

BS Short Equal Tee



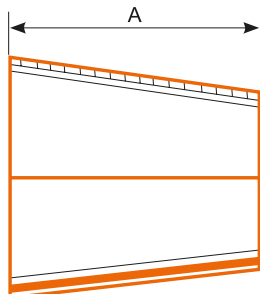
Nominal Size		A	Nominal Wall	Part Number	
Inch	mm	mm	mm	304	316L
1	25.4	44	1.60	2509SA100-11	2509SB100-11
1 1/2	38.1	64	1.60	2509SA150-11	2509SB150-11
2	50.8	89	1.60	2509SA200-11	2509SB200-11
2 1/2	63.5	114	1.60	2509SA250-11	2509SB250-11
3	76.2	134	1.60	2509SA300-11	2509SB300-11
4	101.6	174	2.10	2509SA400-11	2509SB400-11

BS Pulled Tee / Pulled Cross



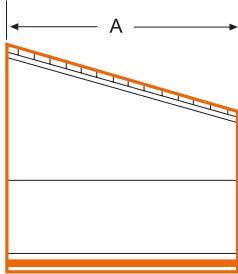
Nominal Size		A	B	Part Number	
Inch	mm	mm	mm	Pulled Tee	Pulled Cross
1	25.4	44	14	2515SB100-11	2515SCB100-11
1 1/2	38.1	64	22	2515SB150-11	2515SCB150-11
2	50.8	89	29	2515SB200-11	2515SCB200-11
2 1/2	63.5	114	35	2515SB250-11	2515SCB250-11
3	76.2	134	41	2515SB300-11	2515SCB300-11
4	101.6	174	54	2515SB400-11	2515SCB400-11

BS Concentric Reducer



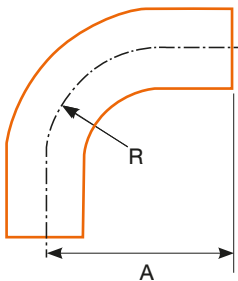
Nominal Size		A	Part Number	
Inch	mm	mm	304	316L
3/4 x 1/2	19.05 x 12.7	25.4	2511CA075050-11	2511CB075050-11
1 x 1/2	25.4 x 12.7	43	2511CA100050-11	2511CB100050-11
1 x 3/4	25.4 x 19.05	30	2511CA100075-11	2511CB100075-11
1 1/2 x 3/4	38.1 x 19.05	50.8	2511CA150075-11	2511CB150075-11
1 1/2 x 1	38.1 x 25.4	48	2511CA150100-11	2511CB150100-11
2 x 1	50.8 x 25.4	50	2511CA200100-11	2511CB200100-11
2 x 1 1/2	50.8 x 38.1	66	2511CA200150-11	2511CB200150-11
2 1/2 x 1	63.5 x 25.4	68	2511CA250100-11	2511CB250100-11
2 1/2 x 1 1/2	63.5 x 38.1	48	2511CA250150-11	2511CB250150-11
2 1/2 x 2	63.5 x 50.8	66	2511CA250200-11	2511CB250200-11
3 x 1	76.2 x 25.4	98	2511CA300100-11	2511CB300100-11
3 x 1 1/2	76.2 x 38.1	75	2511CA300150-11	2511CB300150-11
3 x 2	76.2 x 50.8	70	2511CA300200-11	2511CB300200-11
3 x 2 1/2	76.2 x 63.5	72	2511CA300250-11	2511CB300250-11
4 x 1	101.6 x 25.4	304.8	2511CA400100-11	2511CB400100-11
4 x 1 1/2	101.6 x 38.1	60	2511CA400150-11	2511CB400150-11
4 x 2	101.6 x 50.8	101	2511CA400200-11	2511CB400200-11
4 x 2 1/2	101.6 x 63.5	76	2511CA400250-11	2511CB400250-11
4 x 3	101.6 x 76.2	50	2511CA400300-11	2511CB400300-11

BS Eccentric Reducer



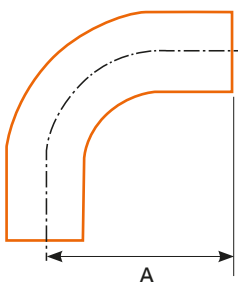
Nominal Size		A	Part Number	
Inch	mm	mm	304	316L
3/4 x 1/2	19.05 x 12.7	25.4	2511EA075050-11	2511EB075050-11
1 x 1/2	25.4 x 12.7	38.1	2511EA100050-11	2511EB100050-11
1 x 3/4	25.4 x 19.05	25.4	2511EA100075-11	2511EB100075-11
1.5 x 1	38.1 x 25.4	33	2511EA150100-11	2511EB150100-11
2 x 1	50.8 x 25.4	66	2511EA200100-11	2511EB200100-11
2 x 1.5	50.8 x 38.1	33	2511EA200150-11	2511EB200150-11
2.5 x 1	63.5 x 25.4	73	2511EA250100-11	2511EB250100-11
2.5 x 1.5	63.5 x 38.1	68	2511EA250150-11	2511EB250150-11
2.5 x 2	63.5 x 50.8	39	2511EA250200-11	2511EB250200-11
3 x 1	76.2 x 25.4	95	2511EA300100-11	2511EB300100-11
3 x 1.5	76.2 x 38.1	70	2511EA300150-11	2511EB300150-11
3 x 2	76.2 x 50.8	48	2511EA300200-11	2511EB300200-11
3 x 2.5	76.2 x 63.5	40	2511EA300250-11	2511EB300250-11
4 x 2	101.6 x 50.8	70	2511EA400200-11	2511EB400200-11
4 x 2.5	101.6 x 63.5	77	2511EA400250-11	2511EB400250-11
4 x 3	101.6 x 76.2	152.4	2511EA400300-11	2511EB400300-11

SMS 90° Long Tube Bend 1D



Nominal Size		A	R	Part Number	
Inch	mm	mm	mm	304	316L
25	1.25	55	32	2307L1DA025-11	2307L1DB025-11
38	1.25	70	45	2307L1DA038-11	2307L1DB038-11
51	1.25	82	58	2307L1DA051-11	2307L1DB051-11
63.5	1.50	105	70	2307L1DA635-11	2307L1DB635-11
76.1	1.60	110	76	2307L1DA761-11	2307L1DB761-11
101.6	2.00	150	110	2307L1DA101-11	2307L1DB101-11
104	2.00	150	110	2307L1DA104-11	2307L1DB104-11

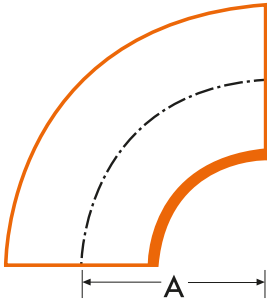
SMS 90° Long Tube Bend 1.5D



Nominal Size		A	Part Number	
Inch	mm	mm	304	316L
25	1.25	53	2307LA025-11	2307LB025-11
38	1.25	72	2307LA038-11	2307LB038-11
51	1.25	92	2307LA051-11	2307LB051-11
63.5	1.50	113	2307LA635-11	2307LB635-11
76.1	1.60	132	2307LA761-11	2307LB761-11
101.6	2.10	211	2307LA101-11	2307LB101-11
104	2.00	172	2307LA104-11	2307LB104-11

SMS

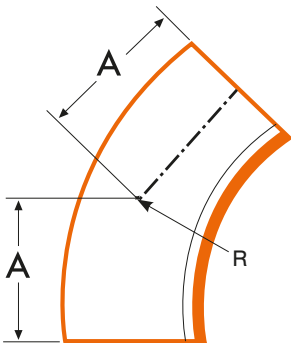
90° Short Tube Bend 1.5D



Nominal Size		A	Part Number	
Inch	mm	mm	304	316L
25	1.25	38	2307SA025-11	2307SB025-11
38	1.25	57	2307SA038-11	2307SB038-11
51	1.25	77	2307SA051-11	2307SB051-11
63.5	1.50	95	2307SA635-11	2307SB635-11
76.1	1.60	114	2307SA761-11	2307SB761-11
101.6	2.10	152	2307SA101-11	2307SB101-11
104	2.00	152	2307SA104-11	2307SB104-11

SMS

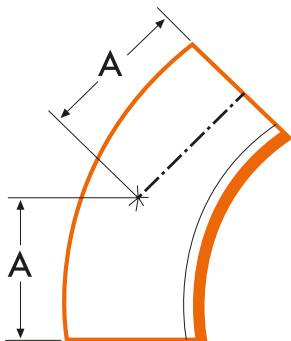
45° Long Tube Bend 1D



Nominal Size		A	R	Part Number	
Inch	mm	mm	mm	304	316L
25	1.25	42	32	2308L1DA025-11	2308L1DB025-11
38	1.25	49	45	2308L1DA038-11	2308L1DB038-11
51	1.25	58	58	2308L1DA051-11	2308L1DB051-11
63.5	1.50	75	70	2308L1DA635-11	2308L1DB635-11
76.1	1.60	79	76	2308L1DA761-11	2308L1DB761-11
101.6	2.00	86	110	2308L1DA101-11	2308L1DB101-11
104	2.00	86	110	2308L1DA104-11	2308L1DB104-11

SMS

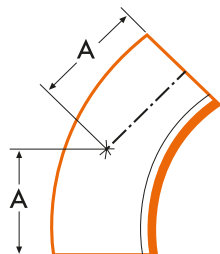
45° Long Tube Bend 1.5D



Nominal Size		A	Part Number	
Inch	mm	mm	304	316L
25	1.25	43	2308LA025-11	2308LB025-11
38	1.25	57	2308LA038-11	2308LB038-11
51	1.25	69	2308LA051-11	2308LB051-11
63.5	1.50	77	2308LA635-11	2308LB635-11
76.1	1.60	85	2308LA761-11	2308LB761-11
101.6	2.10	122	2308LA101-11	2308LB101-11
104	2.00	103	2308LA104-11	2308LB104-11

SMS

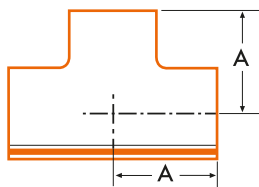
45° Short Tube Bend 1.5D



Nominal Size		A	Part Number	
DN	Thickness	mm	304	316L
25	1.25	16	2308SA025-11	2308SB025-11
38	1.25	24	2308SA038-11	2308SB038-11
51	1.25	32	2308SA051-11	2308SB051-11
63.5	1.50	39	2308SA635-11	2308SB635-11
76.1	1.60	47	2308SA761-11	2308SB761-11
101.6	2.10	64	2308SA101-11	2308SB101-11
104	2.00	63	2308SA104-11	2308SB104-11

SMS

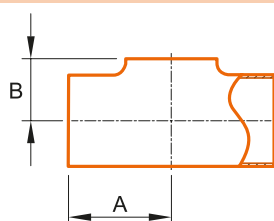
Equal Tee



Nominal Size		A	Part Number	
DN	Thickness	mm	304	316L
25	1.25	55	2309A025-11	2309B025-11
38	1.25	70	2309A038-11	2309B038-11
51	1.25	82	2309A051-11	2309B051-11
63.5	1.50	105	2309A635-11	2309B635-11
76.1	1.60	110	2309A761-11	2309B761-11
101.6	2.10	98	2309A101-11	2309B101-11
104	2.00	150	2309A104-11	2309B104-11

SMS

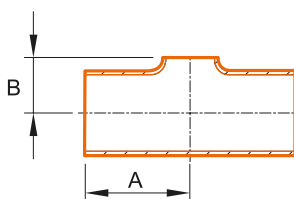
Equal Tee without Straight End



Nominal Size		A	B	Part Number	
DN	Thickness	mm	mm	304	316L
25	1.25	55	15	2315A025-11	2315B025-11
38	1.25	70	22	2315A038-11	2315B038-11
51	1.25	82	28	2315A051-11	2315B051-11
63.5	1.50	105	36	2315A635-11	2315B635-11
76.1	1.60	110	43	2315A761-11	2315B761-11
101.6	2.10	98	54	2315A101-11	2315B101-11
104	2.00	150	58	2315A104-11	2315B104-11

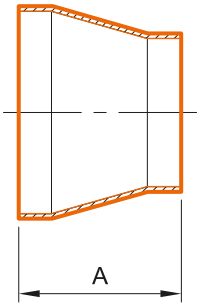
SMS

Reducing Tee without Straight End



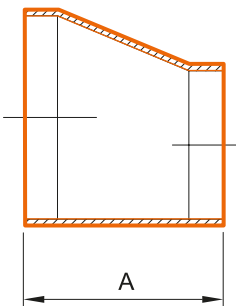
Nominal Size		A	B	Part Number	
DN	Thickness	mm	mm	304	316L
38 x 25	1.25 x 1.25	70	22	2314A038025-11	2314B038025-11
51 x 25	1.25 x 1.25	82	29	2314A051025-11	2314B051025-11
51 x 38	1.25 x 1.25	82	29	2314A051038-11	2314B051038-11
63.5 x 25	1.50 x 1.25	105	35	2314A635025-11	2314B635025-11
63.5 x 38	1.50 x 1.25	105	35	2314A635038-11	2314B635038-11
63.5 x 51	1.50 x 1.25	105	36	2314A635051-11	2314B635051-11
76.1 x 25	1.60 x 1.25	110	42	2314A761025-11	2314B761025-11
76.1 x 38	1.60 x 1.25	110	43	2314A761038-11	2314B761038-11
76.1 x 51	1.60 x 1.25	110	43	2314A761051-11	2314B761051-11
76.1 x 63.5	1.60 x 1.50	110	43	2314A761635-11	2314B761635-11
104 x 25	2.00 x 1.25	150	55	2314A104025-11	2314B104025-11
104 x 38	2.00 x 1.25	150	55	2314A104038-11	2314B104038-11
104 x 51	2.00 x 1.25	150	57	2314A104051-11	2314B104051-11
104 x 63.5	2.00 x 1.50	150	58	2314A104635-11	2314B104635-11
104 x 76.1	2.00 x 1.60	150	58	2314A104761-11	2314B104761-11

SMS Concentric Reducer with Straight End



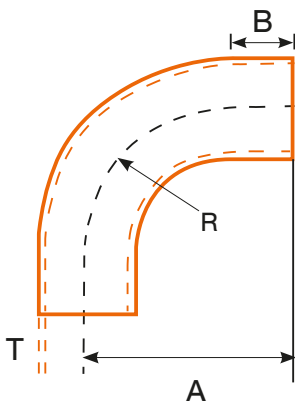
Nominal Size		A	Part Number	
DN	Thickness	mm	304	316L
38 x 25	1.25 x 1.25	39	2311CA038025-11	2311CB038025-11
51 x 25	1.25 x 1.25	57	2311CA051025-11	2311CB051025-11
51 x 38	1.25 x 1.25	39	2311CA051038-11	2311CB051038-11
63.5 x 25	1.50 x 1.25	74	2311CA635025-11	2311CB635025-11
63.5 x 38	1.50 x 1.25	57	2311CA635038-11	2311CB635038-11
63.5 x 51	1.50 x 1.25	39	2311CA635051-11	2311CB635051-11
76.1 x 25	1.60 x 1.25	92	2311CA761025-11	2311CB761025-11
76.1 x 38	1.60 x 1.25	74	2311CA761038-11	2311CB761038-11
76.1 x 51	1.60 x 1.25	57	2311CA761051-11	2311CB761051-11
76.1 x 63.5	1.60 x 1.50	39	2311CA761635-11	2311CB761635-11
101.6 x 51	2.10 x 1.25	91	2311CA101051-11	2311CB101051-11
101.6 x 63.5	2.10 x 1.50	74	2311CA101635-11	2311CB101635-11
101.6 x 76.1	2.10 x 1.60	56	2311CA101761-11	2311CB101761-11
104 x 51	2.00 x 1.25	95	2311CA104051-11	2311CB104051-11
104 x 63.5	2.00 x 1.50	78	2311CA104635-11	2311CB104635-11
104 x 76.1	2.00 x 1.60	60	2311CA104761-11	2311CB104761-11

SMS Eccentric Reducer with Straight End



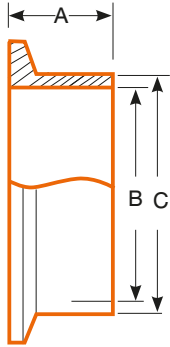
Nominal Size		A	Part Number	
DN	Thickness	mm	304	316L
38 x 25	1.25 x 1.25	46	2311EA038025-11	2311EB038025-11
51 x 25	1.25 x 1.25	68	2311EA051025-11	2311EB051025-11
51 x 38	1.25 x 1.25	47	2311EA051038-11	2311EB051038-11
63.5 x 25	1.50 x 1.25	92	2311EA635025-11	2311EB635025-11
63.5 x 38	1.50 x 1.25	70	2311EA635038-11	2311EB635038-11
63.5 x 51	1.50 x 1.25	44	2311EA635051-11	2311EB635051-11
76.1 x 38	1.60 x 1.25	92	2311EA761038-11	2311EB761038-11
76.1 x 51	1.60 x 1.25	68	2311EA761051-11	2311EB761051-11
76.1 x 63.5	1.60 x 1.25	47	2311EA761635-11	2311EB761635-11
104 x 51	2.00 x 1.25	117	2311EA104051-11	2311EB104051-11
104 x 63.5	2.00 x 1.50	94	2311EA104635-11	2311EB104635-11
104 x 76.1	2.00 x 1.60	74	2311EA104761-11	2311EB104761-11

DIN 11865 Series A 90° Long Elbow WW



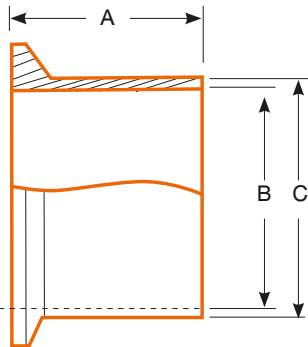
Nominal Size		T	A	B	R	Part Number
DN	mm	mm	mm	mm	mm	316L
10	12	1.0	51	25	26	2707LB012-11
10	13	1.5	51	25	26	2707AB013-11
15	18	1.5	51	25	26	2707LB018-11
15	19	1.5	60	25	35	2707AB019-11
20	23	1.5	65	25	40	2707AB023-11
25	28	1.5	90	40	50	2707LB028-11
25	29	1.5	90	40	50	2707AB029-11
32	35	1.5	95	40	55	2707AB035-11
40	41	1.5	100	40	60	2707AB041-11
50	53	1.5	110	40	70	2707AB053-11
65	70	2.0	120	40	80	2707AB070-11
80	85	2.0	145	55	90	2707AB085-11
100	104	2.0	155	55	100	2707AB104-11

14WMP Short Welding Ferrule



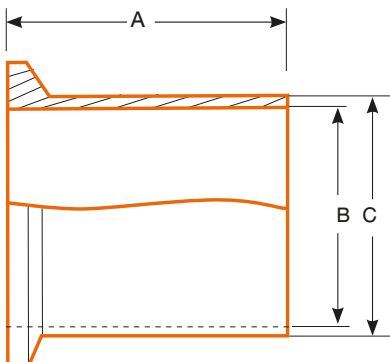
Nominal Size	A	B	C	Part Number	
				304	316L
1/2	12.70	9.40	12.70	2414WMPA05011	2414WMPB05011
3/4	12.70	15.75	19.05	2414WMPA07511	2414WMPB07511
1	12.70	22.10	25.40	2414WMPA10011	2414WMPB10011
1 1/2	12.70	34.80	38.10	2414WMPA15011	2414WMPB15011
2	12.70	47.50	50.80	2414WMPA20011	2414WMPB20011
2 1/2	12.70	60.20	63.50	2414WMPA25011	2414WMPB25011
3	12.70	72.90	76.20	2414WMPA30011	2414WMPB30011
4	15.88	97.38	101.60	2414WMPA40011	2414WMPB40011
6	22.20	146.86	152.40	2414WMPA60011	2414WMPB60011
8	22.20	197.10	203.20	2414WMPA80011	2414WMPB80011
10	22.20	248.46	254.00	2414WMPA100011	2414WMPB100011
12	22.20	298.70	304.80	2414WMPA120011	2414WMPB120011

14MMP Medium Welding Ferrule



Nominal Size	A	B	C	Part Number	
				304	316L
1/2	21.50	9.40	12.70	2414MMPA05011	2414MMPB05011
3/4	21.50	15.75	19.05	2414MMPA07511	2414MMPB07511
1	21.50	22.10	25.40	2414MMPA10011	2414MMPB10011
1 1/2	21.50	34.80	38.10	2414MMPA15011	2414MMPB15011
2	21.50	47.50	50.80	2414MMPA20011	2414MMPB20011
2 1/2	21.50	60.20	63.50	2414MMPA25011	2414MMPB25011
3	21.50	72.90	76.20	2414MMPA30011	2414MMPB30011
4	21.50	97.38	101.60	2414MMPA40011	2414MMPB40011
6	21.50	146.86	152.40	2414MMPA60011	2414MMPB60011
8	21.50	197.10	203.20	2414MMPA80011	2414MMPB80011
10	21.50	248.46	254.00	2414MMPA100011	2414MMPB100011
12	21.50	298.70	304.80	2414MMPA120011	2414MMPB120011

14AMP Long Welding Ferrule

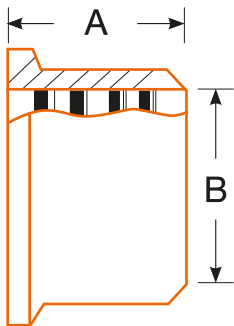


Nominal Size	A	B	C	Part Number	
				304	316L
1/2	28.60	9.40	12.70	2414AMPA05011	2414AMPB05011
3/4	28.60	15.75	19.05	2414AMPA07511	2414AMPB07511
1	28.60	22.10	25.40	2414AMPA10011	2414AMPB10011
1 1/2	28.60	34.80	38.10	2414AMPA15011	2414AMPB15011
2	28.60	47.50	50.80	2414AMPA20011	2414AMPB20011
2 1/2	28.60	60.20	63.50	2414AMPA25011	2414AMPB25011
3	28.60	72.90	76.20	2414AMPA30011	2414AMPB30011
4	28.60	97.38	101.60	2414AMPA40011	2414AMPB40011
6	28.60	146.86	152.40	2414AMPA60028611	2414AMPB60028611
8	28.60	197.10	203.20	2414AMPA80028611	2414AMPB80028611
10	28.60	248.46	254.00	2414AMPA100028611	2414AMPB100028611
12	28.60	298.70	304.80	2414AMPA120028611	2414AMPB120028611
6	38.10	146.86	152.40	2414AMPA60011	2414AMPB60011
8	38.10	197.10	203.20	2414AMPA80011	2414AMPB80011
10	38.10	248.46	254.00	2414AMPA100011	2414AMPB100011
12	38.10	298.70	304.80	2414AMPA120011	2414AMPB120011

14RMP

Roll-On Ferrule

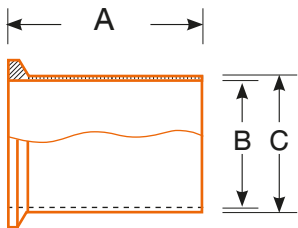
Nominal Size	A	B	Part Number	
			304	316L
1	19.05	25.53	2414RMPA100	2414RMPB100
1 1/2	28.58	38.23	2414RMPA150	2414RMPB150
2	33.32	50.93	2414RMPA200	2414RMPB200
2 1/2	34.93	63.63	2414RMPA250	2414RMPB250
3	36.50	76.33	2414RMPA300	2414RMPB300
4	38.10	101.73	2414RMPA400	2414RMPB400
6	50.80	152.53	2414RMPA600	2414RMPB600



14WLMP

Light Tank Welding Ferrule

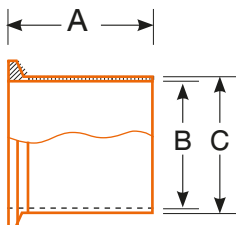
Nominal Size	A	B	C	Part Number	
				304	316L
1	76.20	22.10	25.40	2414WLMPA100-11	2414WLMPB100-11
1 1/2	76.20	34.80	38.10	2414WLMPA150-11	2414WLMPB150-11
2	76.20	47.50	50.80	2414WLMPA200-11	2414WLMPB200-11
2 1/2	76.20	60.20	63.50	2414WLMPA250-11	2414WLMPB250-11
3	101.60	72.90	76.20	2414WLMPA300-11	2414WLMPB300-11
4	101.60	97.38	101.60	2414WLMPA400-11	2414WLMPB400-11
6	152.40	146.86	152.40	2414WLMPA600-11	2414WLMPB600-11
8	152.40	197.10	203.20	2414WLMPA800-11	2414WLMPB800-11
10	152.40	248.46	254.00	2414WLMPA1000-11	2414WLMPB1000-11
12	152.40	298.70	304.80	2414WLMPA1200-11	2414WLMPB1200-11



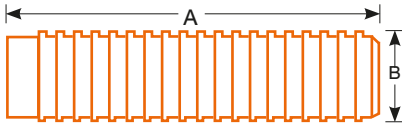
14MPW

Heavy Tank Welding Ferrule

Nominal Size	A	B	C	Part Number	
				304	316L
1/2	41.28	8.15	12.75	2414MPWA050	2414MPWB050
3/4	41.28	14.58	19.05	2414MPWA075	2414MPWB075
1	41.28	22.10	29.46	2414MPWA100	2414MPWB100
1 1/2	41.28	34.80	42.57	2414MPWA150	2414MPWB150
2	44.45	47.50	55.68	2414MPWA200	2414MPWB200
2 1/2	44.45	60.20	68.78	2414MPWA250	2414MPWB250
3	46.05	72.90	81.89	2414MPWA300	2414MPWB300
4	53.98	97.38	108.10	2414MPWA400	2414MPWB400
6	63.50	146.25	157.28	2414MPWA600	2414MPWB600
8	63.50	197.05	208.08	2414MPWA800	2414MPWB800

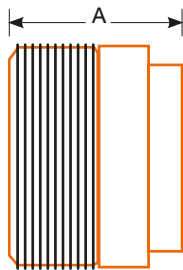


14WHRL Long Weld Hose Adapter



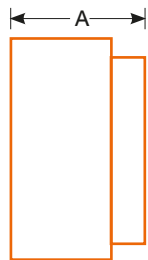
Nominal Size	A	B	Nominal Wall	Part Number
Inch	mm	mm	mm	316L
1	76.20	26.16	2.95	2414WHRLB10011
1 1/2	114.30	38.86	2.95	2414WHRLB15011
2	114.30	51.56	2.95	2414WHRLB20011
2 1/2	127.00	64.26	2.95	2414WHRLB25011
3	127.00	76.96	2.95	2414WHRLB30011
4	123.83	102.36	2.95	2414WHRLB40011

19WB Male NPT x Weld Adapter



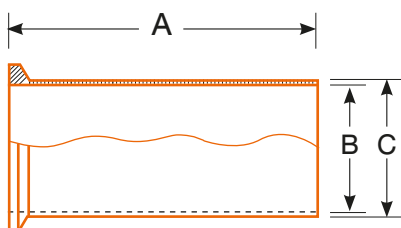
Nominal Size	A	Nominal Wall	Part Number	
Inch	mm	mm	304	316L
1/2	41.28	1.65	2419WBA050	2419WBB050
3/4	41.28	1.65	2419WBA075	2419WBB075
1	44.45	1.65	2419WBA100	2419WBB100
1 1/2	44.45	1.65	2419WBA150	2419WBB150
2	46.02	1.65	2419WBA200	2419WBB200
2 1/2	58.72	1.65	2419WBA250	2419WBB250
3	63.50	1.65	2419WBA300	2419WBB300
4	65.07	2.11	2419WBA400	2419WBB400

22WB Female NPT x Weld Adapter



Nominal Size	A	Nominal Wall	Part Number	
Inch	mm	mm	304	316L
1/2	31.75	1.65	2422WBA050	2422WBB050
3/4	41.28	1.65	2422WBA075	2422WBB075
1	44.45	1.65	2422WBA100	2422WBB100
1 1/2	44.45	1.65	2422WBA150	2422WBB150
2	46.02	1.65	2422WBA200	2422WBB200
2 1/2	58.72	1.65	2422WBA250	2422WBB250
3	63.50	1.65	2422WBA300	2422WBB300
4	63.50	2.11	2422WBA400	2422WBB400

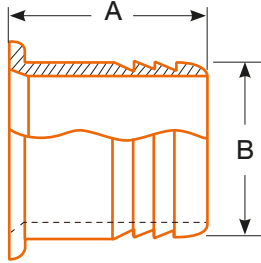
14MPHT Tygon Hose Adapter



Nominal Size	A	B	C	Part Number	
Inch	mm	mm	mm	304	316L
1/2	101.60	9.40	12.70	2414MPHTA050	2414MPHTB050
3/4	101.60	15.75	19.05	2414MPHTA075	2414MPHTB075
1	114.30	22.10	25.40	2414MPHTA100	2414MPHTB100
1 1/2	114.30	34.80	38.10	2414MPHTA150	2414MPHTB150
2	114.30	47.50	50.80	2414MPHTA200	2414MPHTB200
2 1/2	114.30	60.20	63.50	2414MPHTA250	2414MPHTB250
3	114.30	72.90	76.20	2414MPHTA300	2414MPHTB300
4	117.48	97.38	101.60	2414MPHTA400	2414MPHTB400
6	152.40	146.86	152.40	2414MPHTA600	2414MPHTB600

14MPHR

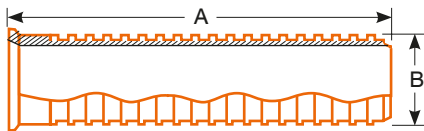
Rubber Hose Adapter



Tube OD	Hose Size	A	B	Part Number	
Inch	Inch	mm	mm	304	316L
1/2	3/8	38.10	9.53	2414MPHRA050038	2414MPHRB050038
1/2	1/2	38.10	12.70	2414MPHRA050	2414MPHRB050
3/4	1/4	38.10	6.35	2414MPHRA075014	2414MPHRB075014
3/4	3/8	38.10	9.53	2414MPHRA075038	2414MPHRB075038
3/4	1/2	38.10	12.70	2414MPHRA075050	2414MPHRB075050
3/4	3/4	38.10	19.05	2414MPHRA075	2414MPHRB075
1	3/8	38.10	9.53	2414MPHRA100038	2414MPHRB100038
1	1/2	38.10	12.70	2414MPHRA100050	2414MPHRB100050
1	3/4	42.88	19.05	2414MPHRA100075	2414MPHRB100075
1	1	42.88	25.40	2414MPHRA100	2414MPHRB100
1 1/2	1/2	38.10	12.70	2414MPHRA150050	2414MPHRB150050
1 1/2	3/4	38.10	19.05	2414MPHRA150075	2414MPHRB150075
1 1/2	1	42.85	25.40	2414MPHRA150100	2414MPHRB150100
1 1/2	1 1/2	42.85	38.10	2414MPHRA150	2414MPHRB150
2	1 1/2	58.72	38.10	2414MPHRA200150	2414MPHRB200150
2	2	58.72	50.80	2414MPHRA200	2414MPHRB200
2 1/2	2 1/2	59.54	63.50	2414MPHRA250	2414MPHRB250
3	3	78.59	76.20	2414MPHRA300	2414MPHRB300
4	4	86.51	101.60	2414MPHRA400	2414MPHRB400
6	6	86.51	152.40	2414MPHRA600	2414MPHRB600
8	8	86.51	203.20	2414MPHRA800	2414MPHRB800

14MPHRL

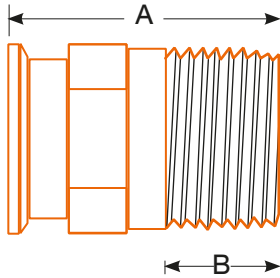
Brewery Rubber Hose Adapter



Tube OD	A	B	Part Number
Inch	mm	mm	304
1	88.90	26.54	2414MPHRLB100100
1 1/2	127.00	39.24	2414MPHRLB150150
2	127.00	51.94	2414MPHRLB200200
2 1/2	139.70	64.64	2414MPHRLB250250
3	139.70	77.34	2414MPHRLB300300
4	139.70	102.74	2414MPHRLB400400

21MP

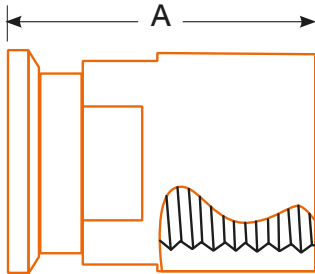
Male NPT x Clamp Adapter



Tube OD	NPT Size	A	B	Part Number	
				304	316L
1/2	3/8	50.80	15.24	2421MPA050038	2421MPB050038
1/2	1/2	41.28	19.86	2421MPA050050	2421MPB050050
1/2	3/4	50.80	20.17	2421MPA050075	2421MPB050075
3/4	1/2	50.80	19.86	2421MPA075050	2421MPB075050
3/4	3/4	45.39	20.17	2421MPA075075	2421MPB075075
3/4	1	57.15	25.02	2421MPA075100	2421MPB075100
1	1/2	55.55	19.86	2421MPA100050	2421MPB100050
1	3/4	55.55	20.17	2421MPA100075	2421MPB100075
1	1	57.15	25.02	2421MPA100100	2421MPB100100
1	1 1/2	61.93	26.04	2421MPA100150	2421MPB100150
1	2	66.68	26.87	2421MPA100200	2421MPB100200
1 1/2	1/2	55.55	19.86	2421MPA150050	2421MPB150050
1 1/2	3/4	55.55	20.17	2421MPA150075	2421MPB150075
1 1/2	1	61.90	25.02	2421MPA150100	2421MPB150100
1 1/2	1 1/4	61.93	25.63	2421MPA150125	2421MPB150125
1 1/2	1 1/2	57.15	26.04	2421MPA150150	2421MPB150150
1 1/2	2	66.68	26.87	2421MPA150200	2421MPB150200
1 1/2	2 1/2	83.34	39.90	2421MPA150250	2421MPB150250
2	1/2	55.58	19.86	2421MPA200050	2421MPB200050
2	3/4	55.58	20.17	2421MPA200075	2421MPB200075
2	1	62.71	25.02	2421MPA200100	2421MPB200100
2	1 1/2	66.68	25.63	2421MPA200150	2421MPB200150
2	2	67.01	26.87	2421MPA200200	2421MPB200200
2	2 1/2	79.38	39.90	2421MPA200250	2421MPB200250
2	3	88.90	41.50	2421MPA200300	2421MPB200300
2	4	88.90	44.04	2421MPA200400	2421MPB200400
2 1/2	1/2	70.64	19.86	2421MPA250050	2421MPB250050
2 1/2	1	70.64	19.86	2421MPA250100	2421MPB250100
2 1/2	1 1/2	70.64	26.04	2421MPA250150	2421MPB250150
2 1/2	2	70.64	26.87	2421MPA250200	2421MPB250200
2 1/2	2 1/2	73.03	39.90	2421MPA250250	2421MPB250250
2 1/2	3	93.73	41.50	2421MPA250300	2421MPB250300
3	1	76.20	25.02	2421MPA300100	2421MPB300100
3	1 1/2	76.20	25.63	2421MPA300150	2421MPB300150
3	2	76.20	26.87	2421MPA300200	2421MPB300200
3	2 1/2	76.20	39.90	2421MPA300250	2421MPB300250
3	3	77.98	41.50	2421MPA300300	2421MPB300300
3	4	88.90	44.04	2421MPA300400	2421MPB300400
4	3	96.85	41.50	2421MPA400300	2421MPB400300
4	4	80.14	44.04	2421MPA400400	2421MPB400400

22MP

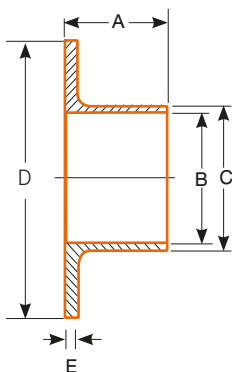
Female NPT x Clamp Adapter



Tube OD	NPT Size	A	Part Number	
			304	316L
Inch	Inch	mm		
1/2	3/8	38.10	2422MPA050038	2422MPB050038
1/2	1/2	38.10	2422MPA050050	2422MPB050050
1/2	3/4	38.10	2422MPA050075	2422MPB050075
3/4	1/2	41.28	2422MPA075050	2422MPB075050
3/4	3/4	41.28	2422MPA075075	2422MPB075075
3/4	1	41.28	2422MPA075100	2422MPB075100
1	1/2	41.28	2422MPA100050	2422MPB100050
1	3/4	41.28	2422MPA100075	2422MPB100075
1	1	41.28	2422MPA100100	2422MPB100100
1	1 1/2	41.28	2422MPA100150	2422MPB100150
1	2	63.50	2422MPA100200	2422MPB100200
1 1/2	1/2	41.28	2422MPA150050	2422MPB150050
1 1/2	3/4	41.28	2422MPA150075	2422MPB150075
1 1/2	1	57.15	2422MPA150100	2422MPB150100
1 1/2	1 1/4	57.15	2422MPA150125	2422MPB150125
1 1/2	1 1/2	57.15	2422MPA150150	2422MPB150150
1 1/2	2	63.50	2422MPA150200	2422MPB150200
1 1/2	2 1/2	63.50	2422MPA150250	2422MPB150250
1 1/2	3	63.50	2422MPA150300	2422MPB150300
2	1/2	42.85	2422MPA200050	2422MPB200050
2	3/4	42.85	2422MPA200075	2422MPB200075
2	1	42.85	2422MPA200100	2422MPB200100
2	1 1/2	59.54	2422MPA200150	2422MPB200150
2	2	61.11	2422MPA200200	2422MPB200200
2	2 1/2	61.11	2422MPA200250	2422MPB200250
2	3	61.11	2422MPA200300	2422MPB200300
2	4	61.11	2422MPA200400	2422MPB200400
2 1/2	3/4	33.35	2422MPA250075	2422MPB250075
2 1/2	1	33.35	2422MPA250100	2422MPB250100
2 1/2	1 1/2	42.06	2422MPA250150	2422MPB250150
2 1/2	2	53.16	2422MPA250200	2422MPB250200
2 1/2	2 1/2	55.55	2422MPA250250	2422MPB250250
2 1/2	3	55.55	2422MPA250300	2422MPB250300
3	1	55.55	2422MPA300100	2422MPB300100
3	1 1/2	55.55	2422MPA300150	2422MPB300150
3	2	55.55	2422MPA300200	2422MPB300200
3	2 1/2	55.55	2422MPA300250	2422MPB300250
3	3	55.55	2422MPA300300	2422MPB300300
4	3	55.55	2422MPA400300	2422MPB400300
4	4	92.76	2422MPA400400	2422MPB400400

14VB

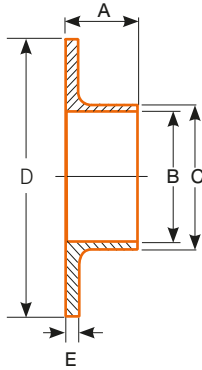
Lap Joint Stub End with Grooves



Nominal Size	A	B	C	D	E	Part Number
						316L
Inch	mm	mm	mm	mm	mm	
1/2	50.80	9.40	12.70	42.92	2.49	2214VBB050-F1
3/4	50.80	15.75	19.05	42.92	2.49	2214VBB075-F1
1	50.80	22.10	25.40	50.80	3.30	2214VBB100-F1
1 1/2	50.80	34.80	38.10	73.15	3.30	2214VBB150-F1
2	63.50	47.50	50.80	91.94	3.30	2214VBB200-F1
2 1/2	63.50	60.20	63.50	104.64	3.30	2214VBB250-F1
3	63.50	72.90	76.20	127.00	4.21	2214VBB300-F1
4	63.50	97.40	101.60	157.22	4.21	2214VBB400-F1
6	76.20	146.86	152.40	215.90	5.53	2214VBB600-F1

14VBS

Short Lap Joint Stub End with Grooves

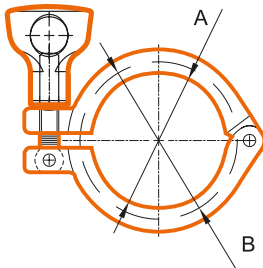


Nominal Size	A	B	C	D	E	Part Number
Inch	mm	mm	mm	mm	mm	316L
1/2	12.70	9.40	12.70	42.92	2.49	2214VBSB050-F1
3/4	12.70	15.75	19.05	42.92	2.49	2214VBSB075-F1
1	12.70	22.10	25.40	50.80	3.30	2214VBSB100-F1
1 1/2	12.70	34.80	38.10	73.15	3.30	2214VBSB150-F1
2	12.70	47.50	50.80	91.94	3.30	2214VBSB200-F1
2 1/2	12.70	60.20	63.50	104.64	3.30	2214VBSB250-F1
3	12.70	72.90	76.20	127.00	4.21	2214VBSB300-F1
4	12.70	97.40	101.60	157.22	4.21	2214VBSB400-F1
6	12.70	146.86	152.40	215.90	5.53	2214VBSB600-F1

13GH

Single Pin Heavy Duty Clamp

#14 Wing Nut



Nominal Size	A	B	Part Number
Inch	mm	mm	304
1/2 - 3/4	20.00	28.20	2433GHA075W4-99
1 - 1 1/2	44.40	53.60	2433GHA150W4-99
2	57.80	67.00	2433GHA200W4-99
2 1/2	71.40	80.60	2433GHA250W4-99
3	84.00	94.20	2433GHA300W4-99
4	110.00	122.20	2433GHA400W4-99
6	155.40	170.40	2433GHA600W4-99
8	205.00	220.00	2433GHA800W4-99
10	286.00	271.00	2433GHA1000W4-99
12	337.00	322.00	2433GHA1200W4-99

Wing-Nut

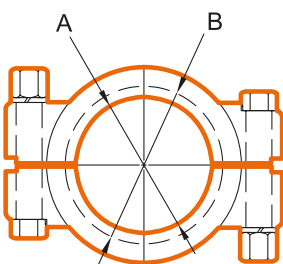
For Clamp



Part Number	#11	#12	#13	#14	#15
	W1	W2	W3	W4	W5

13MHP

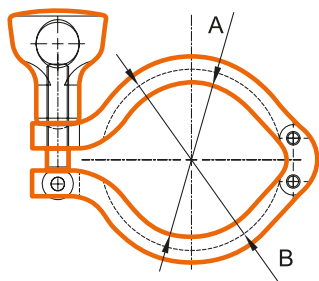
High Pressure Clamp



Nominal Size	A	B	Part Number
Inch	mm	mm	304
1/2 - 3/4	20.00	28.00	2433MHPA075-99
1 - 1 1/2	43.32	52.00	2433MHPA150-99
2	56.44	65.50	2433MHPA200-99
2 1/2	69.54	79.00	2433MHPA250-99
3	77.56	92.50	2433MHPA300-99
4	108.86	120.50	2433MHPA400-99
6	158.00	170.00	2433MHPA600-99
8	222.50	237.50	2433MHPA800-99
10	258.20	272.80	2433MHPA1000-99
12	309.00	327.60	2433MHPA1200-99

13MHHM

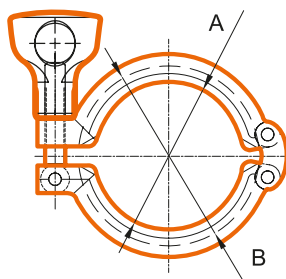
Double Pin Heavy Duty Clamp
#14 Wing Nut



Nominal Size	A	B	Part Number
Inch	mm	mm	304
1/2 - 3/4	20.00	28.00	2433DPA075W4-99
1 - 1 1/2	43.60	53.60	2433DPA150W4-99
2	57.00	67.00	2433DPA200W4-99
2 1/2	70.60	80.60	2433DPA250W4-99
3	84.00	94.00	2433DPA300W4-99
4	112.00	122.00	2433DPA400W4-99
6	155.00	170.00	2433DPA600W4-99
8	205.00	220.80	2433DPA800W4-99

13SF

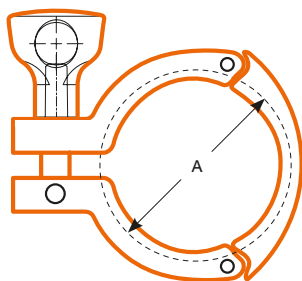
Double Pin Heavy Duty Clamp
#14 Wing Nut



Nominal Size	A	B	Part Number
Inch	mm	mm	304
1/2 - 3/4	20.00	28.00	2433SFA075W4-99
1 - 1 1/2	45.00	58.60	2433SFA150W4-99
2	59.00	72.00	2433SFA200W4-99
2 1/2	67.00	84.00	2433SFA250W4-99
3	85.00	98.00	2433SFA300W4-99
4	114.00	127.00	2433SFA400W4-99

13MHHS

Three Segment Clamp
#14 Wing Nut

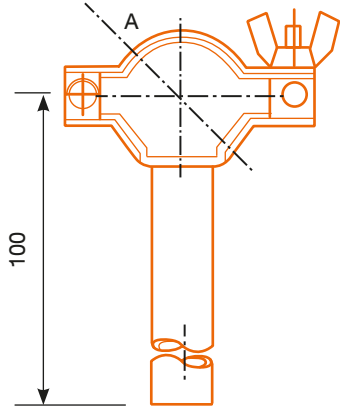


Nominal Size	A	Part Number
Inch	mm	304
1 - 1 1/2	54.00	2433TSA150W4-99
2	67.50	2433TSA200W4-99
2 1/2	80.90	2433TSA250W4-99
3	84.40	2433TSA300W4-99
4	122.40	2433TSA400W4-99

Recommended Max. PSI Service Ratings for Clamps

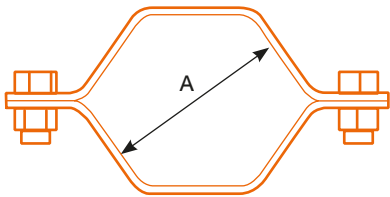
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	@20°C	@120°C	@20°C	@120°C	@20°C	@120°C	@20°C	@120°C
1/2- 3/4	1500	1200					1500	1200
1- 1 1/2	500	300	500	250	600	300	1500	1200
2	450	250	450	250	550	275	1000	800
2 1/2	400	200	400	200	450	225	1000	800
3	350	175	350	150	350	160	1000	800
4	200	125	200	125	250	150	1000	800
6	150	75					300	200
8	100	50						
10	40	30						
12	30	25						

TH-1 Tube Hanger w/ Leg



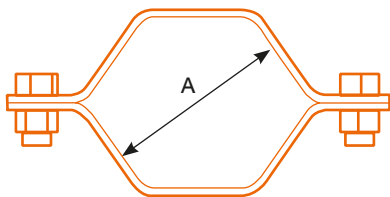
Nominal Size		A	Part Number
Inch		mm	304
1		25.4	24TH1A100
1 1/2		38.1	24TH1A150
2		50.8	24TH1A200
2 1/2		63.5	24TH1A250
3		76.2	24TH1A300
4		101.6	24TH1A400

TH-2 SMS Hex Tube Hanger w/o Leg



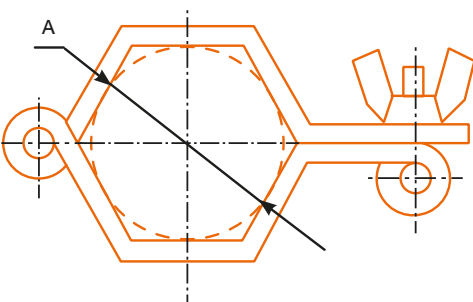
Nominal Size		A	Part Number
Inch		mm	304
25		25	24TH2TA100
38		38	24TH2TA150
51		51	24TH2TA200
63		63.5	24TH2TA250
76		76.1	24TH2TA300
104		104	24TH2TA400

TH-2 ISO Hex Tube Hanger w/o Leg



Nominal Size		A	Part Number
Inch		mm	304
21.3		21.3	24TH2TA0213
26.9		26.9	24TH2TA0269
33.7		33.7	24TH2TA0337
42.4		42.4	24TH2TA0424
48.3		48.3	24TH2TA0483
60.3		60.3	24TH2TA0603
88.9		88.9	24TH2TA0889
114.3		114.3	24TH2TA1143

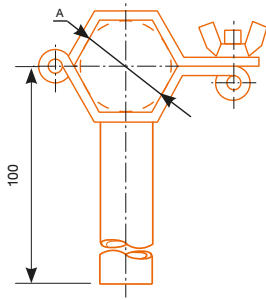
TH-3 Type A Hex Hanger w/o Leg



Nominal Size		A	Part Number
Inch		mm	304
25		25	24TH3A100
38		38	24TH3A150
51		51	24TH3A200
63.5		63.5	24TH3A250
76		76	24TH3A300
101.6		101.6	24TH3A100

TH-3

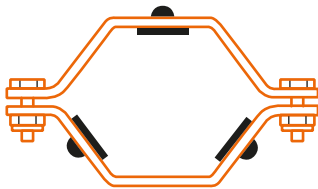
Type D Hex Hanger w/ Leg



Nominal Size		A	Part Number
Inch		mm	304
1/2		12.5	24TH3DA050
3/4		19	24TH3DA075
1		25	24TH3DA100
1 1/2		38	24TH3DA150
2		51	24TH3DA200
2 1/2		63.5	24TH3DA250
3		76	24TH3DA300
4		101.6	24TH3DA400

TH-4

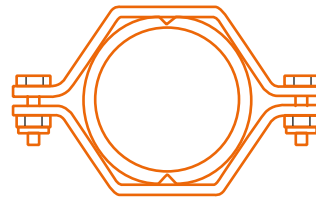
Hex Tube Hanger w/ Grommets



Nominal Size	Part Number
Inch	304
1/2	24TH4A050G
3/4	24TH4A075G
1	24TH4A100G
1 1/2	24TH4A150G
2	24TH4A200G
2 1/2	24TH4A250G
3	24TH4A300G
4	24TH4A400G
6	24TH4A600G
8	24TH4A800G
10	24TH4A1000G

TH-4

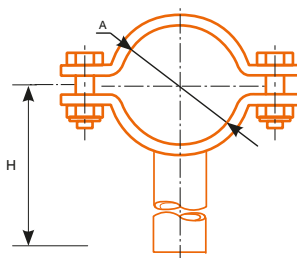
Hex Tube Hanger w/ PVC Sleeve



Nominal Size	Part Number
Inch	304
1/2	24TH4A050P
3/4	24TH4A075P
1	24TH4A100P
1 1/2	24TH4A150P
2	24TH4A200P
2 1/2	24TH4A250P
3	24TH4A300P
4	24TH4A400P
6	24TH4A600P

TH-5

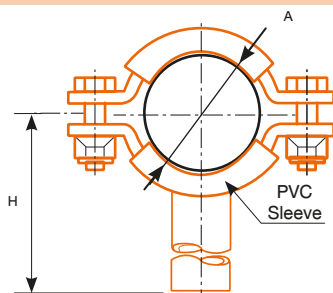
Type A Round Hanger w/ Leg



Nominal Size	A	H	Part Number
Inch	mm	mm	304
1/2	12.5	90	24TH5GHA050
3/4	19	90	24TH5GHA075
1	25.4	90	24TH5GHA100
1 1/2	38.1	90	24TH5GHA150
2	50.8	90	24TH5GHA200
2 1/2	63.5	90	24TH5GHA250
3	76.2	90	24TH5GHA300
4	101.6	90	24TH5GHA400
6	152.4	130	24TH5A600

TH-6B

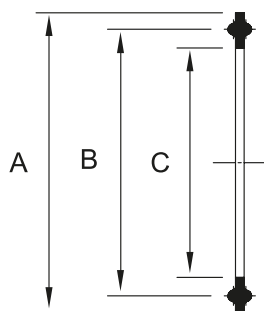
Round Hanger w/ PVC Sleeve and Leg



Nominal Size	A	H	Part Number
Inch	mm	mm	304
1	25.4	90	24TH6BA100P
1 1/2	38.1	90	24TH6BA150P
2	50.8	90	24TH6BA200P
2 1/2	63.5	90	24TH6BA250P
3	76.2	90	24TH6BA300P
4	101.6	90	24TH6BA400P
6	152.4	130	24TH6A600P

13PG

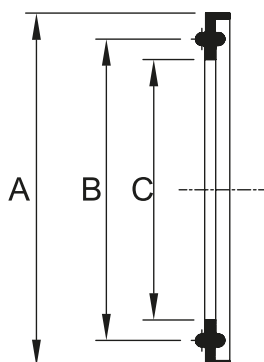
Ferrule Gasket Plain Type



Nominal Size	A	B	C	Part Number					
				Inch	mm	mm	mm	EPDM(Black/White)	SILICONE
1/2	21.80	-	9.65		2413PGE050Q	2413PGS050Q	2413PGT050Q	2413PGV050QW	2413PGN050Q
3/4	21.80	-	15.75		2413PGE075Q	2413PGS075Q	2413PGT075Q	2413PGV075QW	2413PGN075Q
1	50.39	43.64	22.70		2413PGE100Q	2413PGS100Q	2413PGT100Q	2413PGV100QW	2413PGN100Q
1 1/2	50.39	43.64	35.56		2413PGE150Q	2413PGS150Q	2413PGT150Q	2413PGV150QW	2413PGN150Q
2	63.88	56.34	48.26		2413PGE200Q	2413PGS200Q	2413PGT200Q	2413PGV200QW	2413PGN200Q
2 1/2	77.47	70.64	60.96		2413PGE250Q	2413PGS250Q	2413PGT250Q	2413PGV250QW	2413PGN250Q
3	90.91	83.34	73.66		2413PGE300Q	2413PGS300Q	2413PGT300Q	2413PGV300QW	2413PGN300Q
4	118.92	110.34	98.27		2413PGE400Q	2413PGS400Q	2413PGT400Q	2413PGV400QW	2413PGN400Q
6	165.28	156.40	147.75		2413PGE600Q	2413PGS600Q	2413PGT600Q	2413PGV600QW	2413PGN600Q
8	216.00	207.20	198.60		2413PGE800Q	2413PGS800Q	2413PGT800Q	2413PGV800QW	2413PGN800Q

13FG

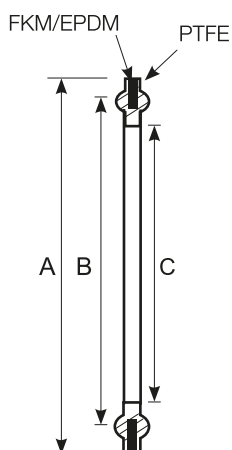
Ferrule Gasket Flanged Type



Nominal Size	A	B	C	Part Number			
				Inch	mm	mm	mm
1	52.70	43.50	22.80		2413FGE100Q	2413FGS100Q	2413FGV100QW
1 1/2	52.70	43.50	35.80		2413FGE150Q	2413FGS150Q	2413FGV150QW
2	66.20	56.50	48.80		2413FGE200Q	2413FGS200Q	2413FGV200QW
2 1/2	79.70	70.50	60.50		2413FGE250Q	2413FGS250Q	2413FGV250QW
3	93.20	83.50	73.10		2413FGE300Q	2413FGS300Q	2413FGV300QW
4	121.20	110.00	97.80		2413FGE400Q	2413FGS400Q	2413FGV400QW
6	169.10	156.40	148.00		2413FGE600Q	2413FGS600Q	2413FGV600QW
10	270.70	258.00	249.00		2413FGE1000Q	2413FGS1000Q	2413FGV1000QW
12	321.50	308.80	300.00		2413FGE1200Q	2413FGS1200Q	2413FGV1200QW

13PGTE 13PGTV

Envelope Ferrule Gasket Plain Type

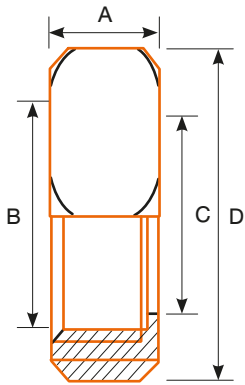


Nominal Size	A	B	C	Part Number		
				Inch	mm	mm
1	21.80	-	9.65		2413PGTE050W	2413PGTV050W
1 1/2	21.80	-	15.75		2413PGTE075W	2413PGTV075W
2	50.42	43.64	22.86		2413PGTE100W	2413PGTV100W
2 1/2	50.42	43.64	35.56		2413PGTE150W	2413PGTV150W
3	63.50	56.34	48.26		2413PGTE200W	2413PGTV200W
4	76.84	70.64	60.96		2413PGTE250W	2413PGTV250W
6	90.17	83.34	73.66		2413PGTE300W	2413PGTV300W
10	118.75	110.34	98.27		2413PGTE400W	2413PGTV400W
12	169.37	156.36	147.75		2413PGTE600W	2413PGTV600W
8	220.19	207.26	197.49		2413PGTE800W	2413PGTV800W
10	270.87	257.56	248.18		2413PGTE1000W	2413PGTV1000W
12	321.54	308.48	297.82		2413PGTE1200W	2413PGTV1200W

13H

Hexagonal Nut

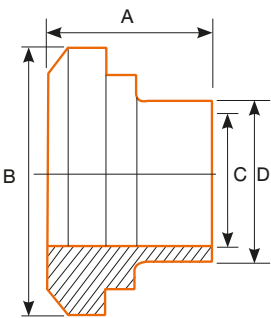
Nominal Size	A	B	C	D	Part Number
Inch	mm	ACME	mm	mm	304
1	23.0	34.34*8T	30.3	46.0	2434HA100
1 1/2	24.6	47.86*8T	43.4	61.1	2434HA150
2	27.0	61.37*8T	56.5	76.2	2434HA200
2 1/2	30.2	74.88*8T	69.6	91.3	2434HA250
3	35.5	86.40*8T	82.7	106.4	2434HA300
4	38.1	115.42*6T	108.9	137.6	2434HA400



14A

Long Welding Liner

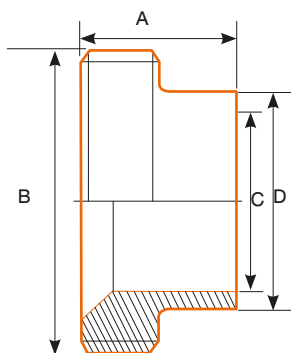
Nominal Size	A	B	C	D	Part Number	
Inch	mm	mm	mm	mm	304	316L
1	34.9	33.3	22.2	25.7	2414AA100	2414AB100
1 1/2	38.1	46.8	34.9	38.4	2414AA150	2414AB150
2	38.1	60.3	47.5	51.1	2414AA200	2414AB200
2 1/2	44.5	73.8	60.2	63.8	2414AA250	2414AB250
3	44.5	87.3	72.9	76.5	2414AA300	2414AB300
4	44.5	114.3	97.4	101.9	2414AA400	2414AB400



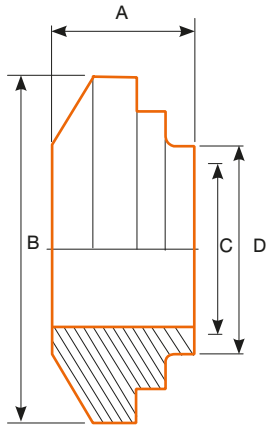
15A

Long Welding Male

Nominal Size	A	B	C	D	Part Number	
Inch	mm	ACME	mm	mm	304	316L
1	34.9	37.13*8T	22.2	25.7	2415AA100	2415AB100
1 1/2	38.1	50.65*8T	34.9	38.4	2415AA150	2415AB150
2	38.1	64.16*8T	47.5	51.1	2415AA200	2415AB200
2 1/2	44.5	77.67*8T	60.2	63.8	2415AA250	2415AB250
3	44.5	91.19*8T	72.9	76.5	2415AA300	2415AB300
4	44.5	119.25*6T	97.4	101.9	2415AA400	2415AB400

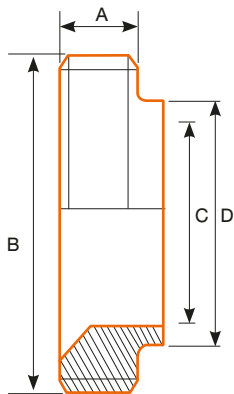


14PRF Short Welding Liner



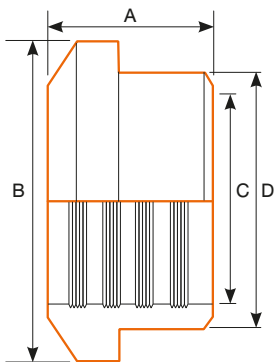
Nominal Size	A	B	C	D	Part Number	
					304	316L
1	18.3	33.3	22.2	25.7	2414PRFA100	2414PRFB100
1 1/2	18.3	46.8	34.9	38.4	2414PRFA150	2414PRFB150
2	19.1	60.3	47.5	51.1	2414PRFA200	2414PRFB200
2 1/2	22.3	73.8	60.2	63.8	2414PRFA250	2414PRFB250
3	23.1	87.3	72.9	76.5	2414PRFA300	2414PRFB300
4	26.2	114.3	97.4	101.9	2414PRFA400	2414PRFB400

15TRF Short Welding Male



Nominal Size	A	B	C	D	Part Number	
					304	316L
1	18.3	37.13*8T	22.2	25.7	2415TRFA100	2415TRFB100
1 1/2	18.3	50.65*8T	34.9	38.4	2415TRFA150	2415TRFB150
2	19.1	64.16*8T	47.5	51.1	2415TRFA200	2415TRFB200
2 1/2	22.3	77.67*8T	60.2	63.8	2415TRFA250	2415TRFB250
3	23.1	91.19*8T	72.9	76.5	2415TRFA300	2415TRFB300
4	26.2	119.25*6T	97.4	101.9	2415TRFA400	2415TRFB400

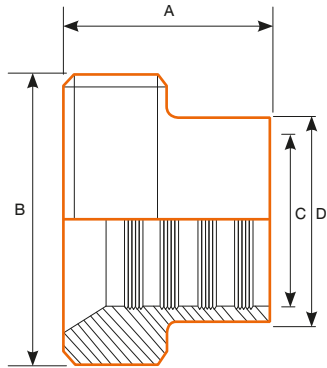
14R Expanding Liner



Nominal Size	A	B	C	D	Part Number	
					304	316L
1	19.1	33.3	25.5	29.5	2414RA100	2414RB100
1 1/2	28.6	46.8	38.2	42.6	2414RA150	2414RB150
2	33.3	60.3	50.9	55.7	2414RA200	2414RB200
2 1/2	34.9	73.8	63.6	68.8	2414RA250	2414RB250
3	36.5	87.3	76.3	81.9	2414RA300	2414RB300
4	38.1	114.3	101.7	108.1	2414RA400	2414RB400

15R

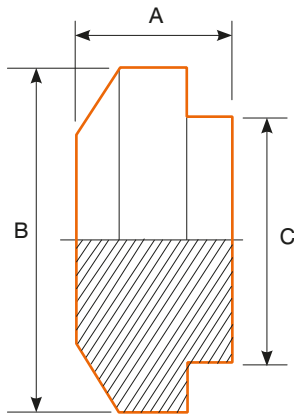
Expanding Male



Nominal Size	A	B	C	D	Part Number	
	Inch	mm	ACME	mm	304	316L
1	20.6	37.13*8T	25.5	29.5	2415RA100	2415RB100
1 1/2	28.6	50.65*8T	38.2	42.6	2415RA150	2415RB150
2	34.9	64.16*8T	50.9	55.7	2415RA200	2415RB200
2 1/2	38.1	77.67*8T	63.6	68.8	2415RA250	2415RB250
3	41.3	91.19*8T	76.3	81.9	2415RA300	2415RB300
4	41.3	119.25*6T	101.7	108.1	2415RA400	2415RB400

16A

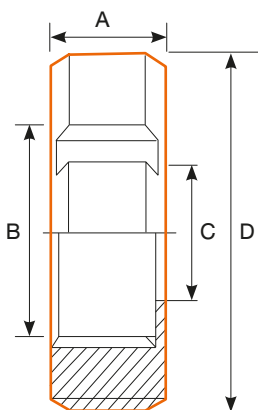
Blank Cap



Nominal Size	A	B	C	Part Number	
	Inch	mm	mm	304	316L
1	11.9	33.3	29.5	2416AA100	2416AB100
1 1/2	14.3	46.8	42.6	2416AA160	2416AB160
2	15.9	60.3	55.7	2416AA200	2416AB200
2 1/2	16.7	73.8	68.8	2416AA250	2416AB250
3	18.3	87.3	81.9	2416AA300	2416AB300
4	20.6	114.3	108.1	2416AA400	2416AB400

DIN-13R

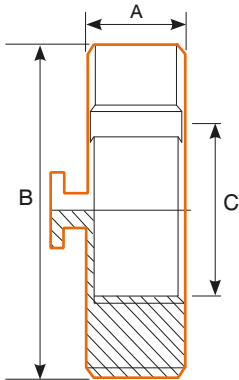
Round Nut (4 Slots)



Nominal Size	A	B	C	D	Part Number	
	Imperial	DN	mm	RD		mm
1	10	18	Rd28*1/8	19	38	2734RA010
	15	18	Rd34*1/8	25	44	2734RA015
	20	21	Rd44*1/6	31	54	2734RA020
	25	21	Rd52*1/6	36	63	2734RA025
1 1/2	32	21	Rd58*1/6	42	70	2734RA032
	40	21	Rd65*1/6	49	78	2734RA040
2	50	22	Rd78*1/6	62	92	2734RA050
	2 1/2	65	25	Rd95*1/6	80	112
3	80	30	Rd110*1/4	94	127	2734RA080
	90	30	Rd120*1/4	104	138	2734RA090
4	100	31	Rd130*1/4	115	148	2734RA100
	125	35	Rd160*1/4	138	178	2734RA125
	150	40	Rd190*1/4	164	210	2734RA150

DIN-13RB

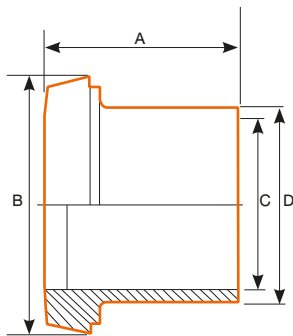
Blank Round Nut (4 Slots)



Nominal Size		A	B	C	Part Number
Imperial	DN	mm	mm	RD	304
	10	18	38	Rd28*1/8	2734RBA010
	15	18	44	Rd34*1/8	2734RBA015
	20	21	54	Rd44*1/6	2734RBA020
1	25	21	63	Rd52*1/6	2734RBA025
	32	21	70	Rd58*1/6	2734RBA032
1 1/2	40	21	78	Rd65*1/6	2734RBA040
2	50	22	92	Rd78*1/6	2734RBA050
2 1/2	65	25	112	Rd95*1/6	2734RBA065
3	80	30	127	Rd110*1/4	2734RBA080
	90	30	138	Rd120*1/4	2734RBA090
4	100	31	148	Rd130*1/4	2734RBA100
	125	35	178	Rd160*1/4	2734RBA125
	150	40	210	Rd190*1/4	2734RBA150

DIN-14

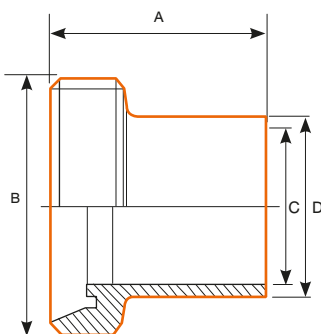
Welding Liner (Imperial)



Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	mm	mm	mm	304	316L
1	25	22	44	22.2	25.4	2734LA100I	2734LB100I
1 1/2	40	26	56	34.9	38.1	2734LA150I	2734LB150I
2	50	28	68	47.6	51	2734LA200	2734LB200
2 1/2	65	32	86	60.3	63.5	2734LA250	2734LB250
3	80	37	100	73	76.2	2734LA300	2734LB300
4	100	44	121	97.6	101.6	2734LA400	2734LB400

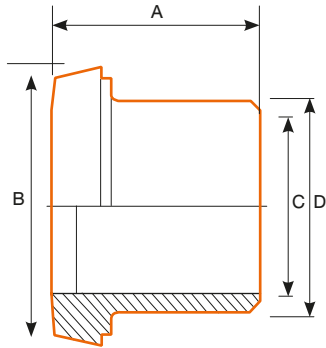
DIN-15

Welding Male (Imperial)



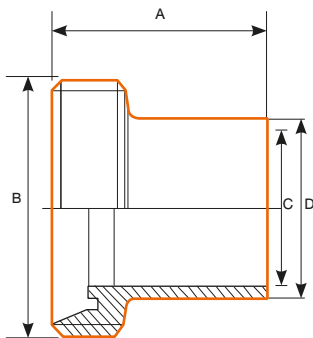
Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	RD	mm	mm	304	316L
1	25	29	Rd52*1/6	22.2	25.4	2734MA100I	2734MB100I
1 1/2	40	33	Rd65*1/6	34.9	38.1	2734MA150I	2734MB150I
2	50	35	Rd78*1/6	47.6	51	2734MA200	2734MB200
2 1/2	65	40	Rd95*1/6	60.3	63.5	2734MA250	2734MB250
3	80	45	Rd110*1/4	73	76.2	2734MA300	2734MB300
4	100	54	Rd130*1/4	97.6	101.6	2734MA400	2734MB400

DIN-14 Welding Liner



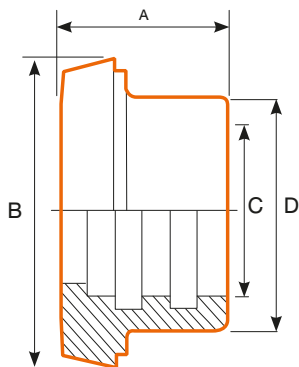
Nominal Size	A	B	C	D	Part Number	
DN	mm	mm	mm	mm	304	316L
10	17	22	10	15	2734LA010	2734LB010
15	17	28	16	21	2734LA015	2734LB015
20	18	36	20	25	2734LA020	2734LB020
25	22	44	26	31	2734LA025	2734LB025
32	25	50	32	37	2734LA032	2734LB032
40	26	56	38	43	2734LA040	2734LB040
50	28	68	50	55	2734LA050	2734LB050
65	32	86	66	72	2734LA065	2734LB065
80	37	100	81	87	2734LA080	2734LB080
90	35	111	89	95	2734LA090	2734LB090
100	44	120	100	106	2734LA100	2734LB100
125	34	149	125	132	2734LA125	2734LB125
150	37	175	150	157	2734LA150	2734LB150

DIN-15 Welding Male



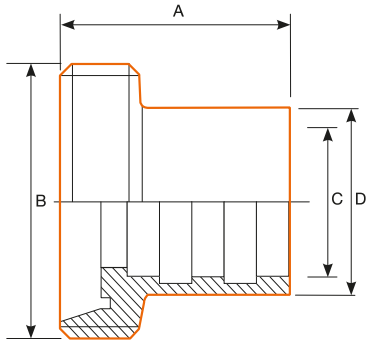
Nominal Size	A	B	C	D	Part Number	
DN	mm	RD	mm	mm	304	316L
10	21	Rd28*1/8	10	15	2734MA010	2734MB010
15	21	Rd34*1/8	16	21	2734MA015	2734MB015
20	24	Rd44*1/6	20	25	2734MA020	2734MB020
25	29	Rd52*1/6	26	31	2734MA025	2734MB025
32	32	Rd58*1/6	32	37	2734MA032	2734MB032
40	33	Rd65*1/6	38	43	2734MA040	2734MB040
50	35	Rd78*1/6	50	55	2734MA050	2734MB050
65	40	Rd95*1/6	66	72	2734MA065	2734MB065
80	45	Rd110*1/4	81	87	2734MA080	2734MB080
90	45	Rd120*1/4	89	95	2734MA090	2734MB090
100	54	Rd130*1/4	100	106	2734MA100	2734MB100
125	46	Rd160*1/4	125	132	2734MA125	2734MB125
150	50	Rd190*1/4	150	157	2734MA150	2734MB150

DIN-14R Expanding Liner



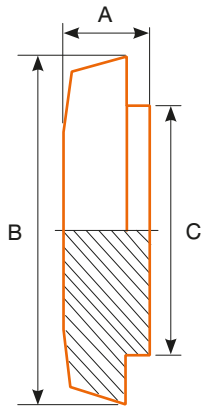
Nominal Size	A	B	C	D	Part Number	
DN	mm	mm	mm	mm	304	316L
10	17	22	12.2	18	2714RA010	2714RB010
15	17	28	18.2	24	2714RA015	2714RB015
20	18	36	22.2	30	2714RA020	2714RB020
25	22	44	28.2	35	2714RA025	2714RB025
32	25	50	34.2	41	2714RA032	2714RB032
40	26	56	40.2	48	2714RA040	2714RB040
50	28	68	52.2	61	2714RA050	2714RB050
65	32	86	70.3	79	2714RA065	2714RB065
80	37	100	85.3	93	2714RA080	2714RB080
100	44	120	104.3	114	2714RA100	2714RB100
125	34	149	129.3	137	2714RA125	2714RB125
150	37	175	154.3	163	2714RA150	2714RB150

DIN-15R Expanding Male



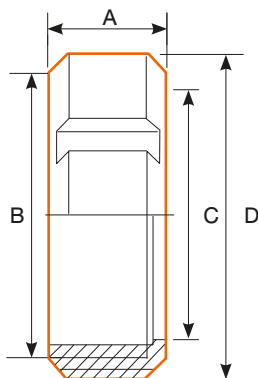
Nominal Size		A	B	C	D	Part Number	
DN	mm	mm	RD	mm	mm	304	316L
10	21		Rd28*1/8	12.2	18	2715RA010	2715RB010
15	21		Rd34*1/8	18.2	24	2715RA015	2715RB015
20	24		Rd44*1/6	22.2	30	2715RA020	2715RB020
25	29		Rd52*1/6	28.2	35	2715RA025	2715RB025
32	32		Rd58*1/6	34.2	41	2715RA032	2715RB032
40	33		Rd65*1/6	40.2	48	2715RA040	2715RB040
50	35		Rd78*1/6	52.2	61	2715RA050	2715RB050
65	40		Rd95*1/6	70.3	79	2715RA065	2715RB065
80	45		Rd110*1/4	85.3	93	2715RA080	2715RB080
100	54		Rd130*1/4	104.3	114	2715RA100	2715RB100
125	46		Rd160*1/4	129.3	137	2715RA125	2715RB125
150	50		Rd190*1/4	154.3	163	2715RA150	2715RB150

DIN-14B Blank Cap



Nominal Size		A	B	C	Part Number	
Imperial	DN	mm	mm	mm	304	316L
	10	11	22	18	2734BA010	2734BB010
	15	17	28	24	2734BA015	2734BB015
	20	21	36	30	2734BA020	2734BB020
1	25	27	44	35	2734BA025	2734BB025
	32	33	50	41	2734BA032	2734BB032
1 1/2	40	39	56	48	2734BA040	2734BB040
2	50	51	68	61	2734BA050	2734BB050
2 1/2	65	67	86	79	2734BA065	2734BB065
3	80	82	100	93	2734BA080	2734BB080
4	100	101	120	114	2734BA100	2734BB100
	125	126	149	137	2734BA125	2734BB125
	150	151	175	163	2734BA150	2734BB150

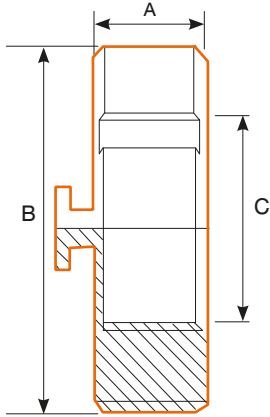
SMS-13R Round Nut (6 Slots)



Nominal Size		A	B	C	D	Part Number
Inch	DN	mm	RD	mm	mm	304
1	25	19	Rd40*1/6	32.5	51	2334RA025
1 1/2	38	23	Rd60*1/6	48.5	74	2334RA038
2	51	24	Rd70*1/6	61	84	2334RA051
2 1/2	63.5	28	Rd85*1/6	74	100	2334RA063
3	76	30	Rd98*1/6	87	114	2334RA076
4	101.6	31	Rd125*1/4	113	138	2334RA101

SMS-13RB

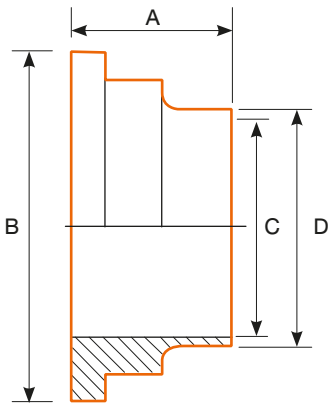
Blank Round Nut (6 Slots)



Nominal Size		A	B	C	Part Number
Inch	DN	mm	mm	RD	304
1	25	19	51	Rd40*1/6	2334RBA025
1 1/2	38	23	74	Rd60*1/6	2334RBA038
2	51	24	84	Rd70*1/6	2334RBA051
2 1/2	63.5	28	100	Rd85*1/6	2334RBA063
3	76	30	114	Rd98*1/6	2334RBA076
4	101.6	31	138	Rd125*1/4	2334RBA101

SMS-14

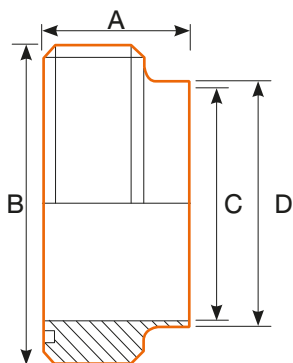
Welding Liner



Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	mm	mm	mm	304	316L
1	25	15.5	35.5	22.5	25	2334LA025	2334LB025
1 1/2	38	16	55	35.5	38	2334LA038	2334LB038
2	51	17	65	48.5	51	2334LA051	2334LB051
2 1/2	63.5	17	80	60.5	63.5	2334LA063	2334LB063
3	76	19	93	72.9	76.1	2334LA076	2334LB076
4	101.6	19	118	97.6	101.6	2334LA101	2334LB101
	104	19	118	100	104	2334LA104	2334LB104

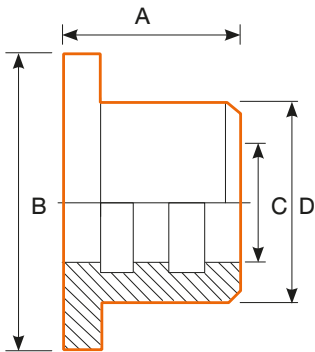
SMS-15

Welding Male



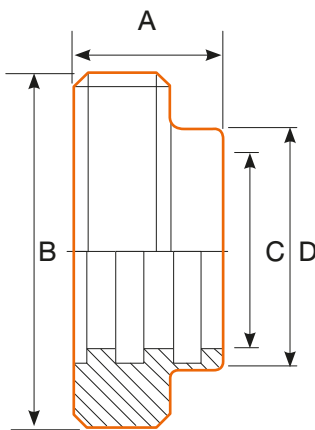
Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	RD	mm	mm	304	316L
1	25	19	Rd40*1/6	22.5	25	2334MA025	2334MB025
1 1/2	38	23	Rd60*1/6	35.5	38	2334MA038	2334MB038
2	51	23	Rd70*1/6	48.5	51	2334MA051	2334MB051
2 1/2	63.5	27	Rd85*1/6	60.5	63.5	2334MA063	2334MB063
3	76	27	Rd98*1/6	72.9	76.1	2334MA076	2334MB076
4	101.6	30	Rd125*1/4	97.6	101.6	2334MA101	2334MB101
	104	30	Rd125*1/4	100	104	2334MA104	2334MB104

SMS-14R Expanding Liner



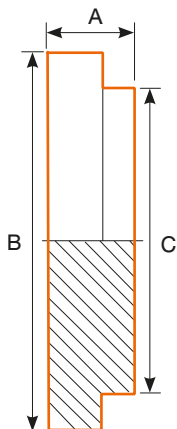
Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	mm	mm	mm	304	316L
1	25	17	35.5	25.8	32	2314RA025	2314RB025
1 1/2	38	20	55	38.8	48	2314RA038	2314RB038
2	51	20	65	51.8	60.4	2314RA051	2314RB051
2 1/2	63.5	25	80	64.3	73.5	2314RA635	2314RB635
3	76	30	93	77	86.5	2314RA761	2314RB761
4	101.6	27	118	102.6	112.5	2314RA101	2314RB101

SMS-15R Expanding Male



Nominal Size		A	B	C	D	Part Number	
Inch	DN	mm	RD	mm	mm	304	316L
1	25	20	Rd40*1/6	25.8	32	2315RA025	2315RB025
1 1/2	38	23	Rd60*1/6	38.8	47.9	2315RA038	2315RB038
2	51	25	Rd70*1/6	51.8	50.4	2315RA051	2315RB051
2 1/2	63.5	30	Rd85*1/6	64.3	73.5	2315RA635	2315RB635
3	76	30	Rd98*1/6	77	86.5	2315RA761	2315RB761
4	101.6	30	Rd125*1/4	102.6	112.5	2315RA101	2315RB101

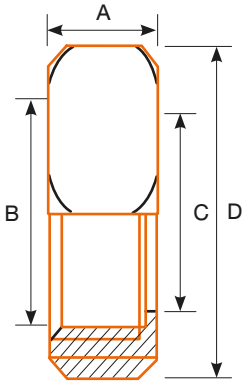
SMS-14B Blank Cap



Nominal Size		A	B	C	Part Number	
Inch	DN	mm	mm	mm	304	316L
1	25	7.5	35.5	32	2334BA025	2334BB025
1 1/2	38	8	55	47.9	2334BA038	2334BB038
2	51	9	65	60.4	2334BA051	2334BB051
2 1/2	63.5	9	80	73.5	2334BA635	2334BB635
3	76	11	93	86.5	2334BA761	2334BB761
4	101.6	11	118	112.5	2334BA101	2334BB101

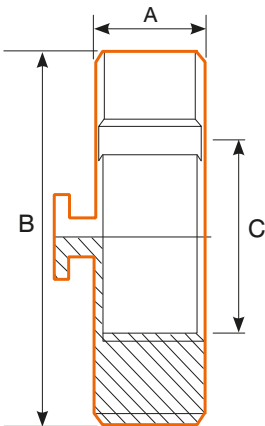
RJT-13H Hexagonal Nut

Nominal Size	A	B	C	D	Part Number
Inch	mm	WHIT.	mm	mm	304
1	22.2	42.6*1/8	33.3	50.8	3034HA100
1 1/2	22.2	55.3*1/8	46	65.0	3034HA150
2	22.2	68.3*1/6	58.7	79.3	3034HA200
2 1/2	22.2	80.9*1/6	71.4	92.0	3034HA250
3	22.2	93.6*1/6	84.1	104.7	3034HA300
4	22.2	119.1*1/6	109.5	130.0	3034HA400



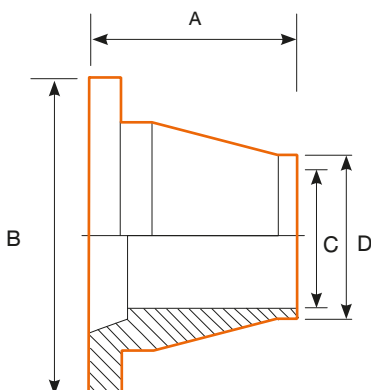
RJT-13HB Blank Hexagonal Nut

Nominal Size	A	B	C	Part Number
Inch	mm	mm	WHIT.	304
1	24	50.8	42.6*1/8	3034HBA100
1 1/2	24	65	55.3*1/8	3034HBA150
2	25	79.3	68.3*1/6	3034HBA200
2 1/2	26	92	80.9*1/6	3034HBA250
3	26	104.7	93.6*1/6	3034HBA300
4	25	130	119.1*1/6	3034HBA400

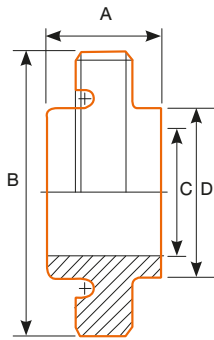


RJT-14 Wedging Liner

Nominal Size	A	B	C	D	Part Number	
Inch	mm	mm	mm	mm	304	316L
1	19.5	41.3	22.2	25.65	3034LA100	3034LB100
1 1/2	19.5	54	34.9	38.35	3034LA150	3034LB150
2	19.5	66.7	47.6	51.05	3034LA200	3034LB200
2 1/2	19.5	79.4	60.3	63.75	3034LA250	3034LB250
3	19.5	92.1	73	76.45	3034LA300	3034LB300
4	19.5	117.5	97.6	101.85	3034LA400	3034LB400

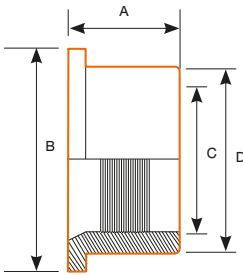


RJT-15 Welding Male



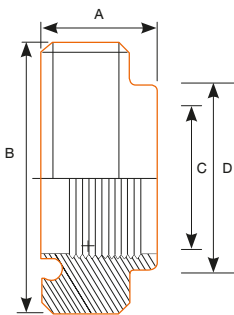
Nominal Size	A	B	C	D	Part Number	
					304	316L
1	27	45.72*1/8	22.2	25.65	3034MA100	3034MB100
1 1/2	27	58.42*1/8	34.9	38.35	3034MA150	3034MB150
2	27	72.72*1/6	47.6	51.05	3034MA200	3034MB200
2 1/2	27	85.42*1/6	60.3	63.75	3034MA250	3034MB250
3	27	98.12*1/6	73	76.45	3034MA300	3034MB300
4	27	123.52*1/6	97.6	101.85	3034MA400	3034MB400

RJT-14R Expanding Liner



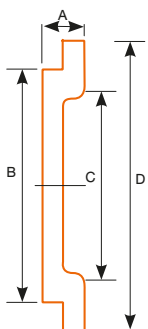
Nominal Size	A	B	C	D	Part Number	
					304	316L
1	20	41.3	25.5	32.5	3014RA100	3014RB100
1 1/2	24	54	38.2	45.2	3014RA150	3014RB150
2	28	66.7	50.9	57.9	3014RA200	3014RB200
2 1/2	32	79.4	63.6	70.6	3014RA250	3014RB250
3	32	92.1	76.3	83.3	3014RA300	3014RB300
4	32	117.5	101.7	108.7	3014RA400	3014RB400

RJT-15R Expanding Male



Nominal Size	A	B	C	D	Part Number	
					304	316L
1	20	45.72*1/8	25.5	32.5	3015RA100	3015RB100
1 1/2	24	58.42*1/8	38.2	45.2	3015RA150	3015RB150
2	28	72.72*1/6	50.9	57.9	3015RA200	3015RB200
2 1/2	32	85.42*1/6	63.6	70.6	3015RA250	3015RB250
3	32	98.12*1/6	76.3	83.3	3015RA300	3015RB300
4	32	123.52*1/6	101.7	108.7	3015RA400	3015RB400

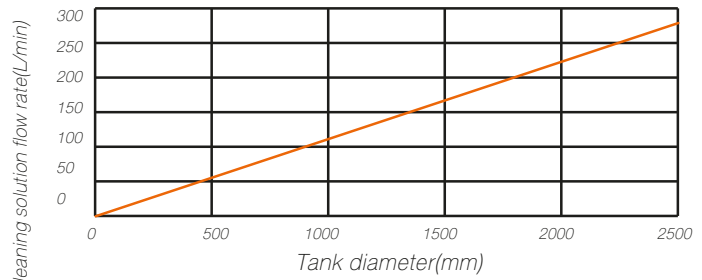
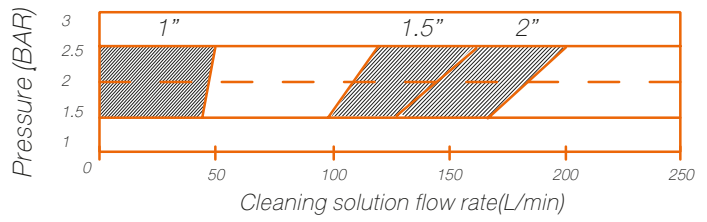
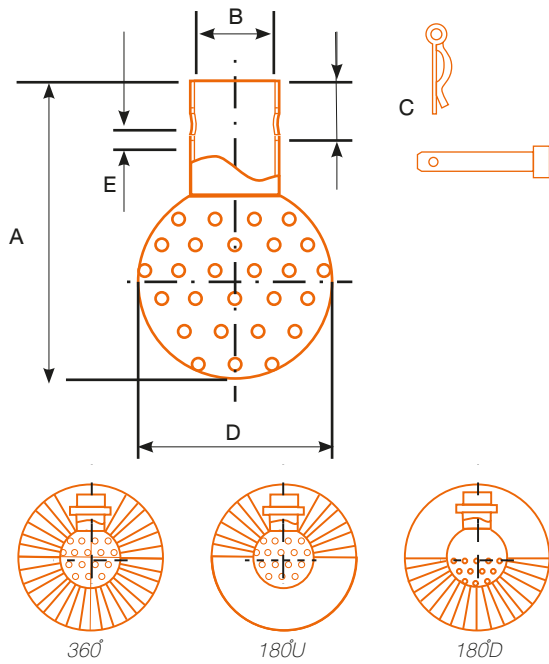
RJT-14B Blank Cap



Nominal Size	A	B	C	D	Part Number	
					304	316L
1	8.2	32.4	27.8	41.3	3034BA100	3034BB100
1 1/2	8.2	45.1	40.5	54	3034BA150	3034BB150
2	8.2	57.8	53.2	66.7	3034BA200	3034BB200
2 1/2	8.2	70.5	65.9	79.4	3034BA250	3034BB250
3	8.2	83.1	78.6	92.1	3034BA300	3034BB300
4	8.2	108.6	104.0	117.5	3034BA400	3034BB400

Spray Balls

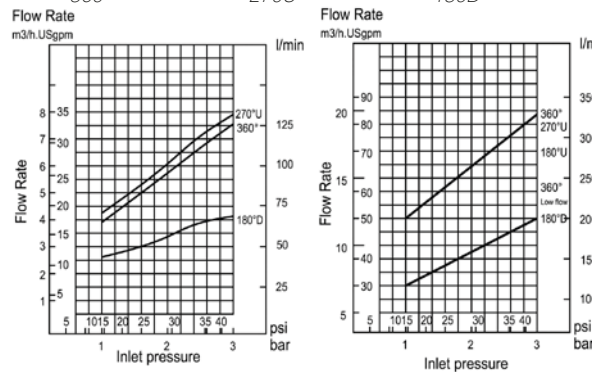
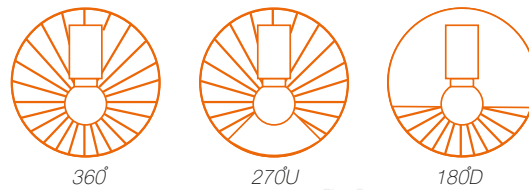
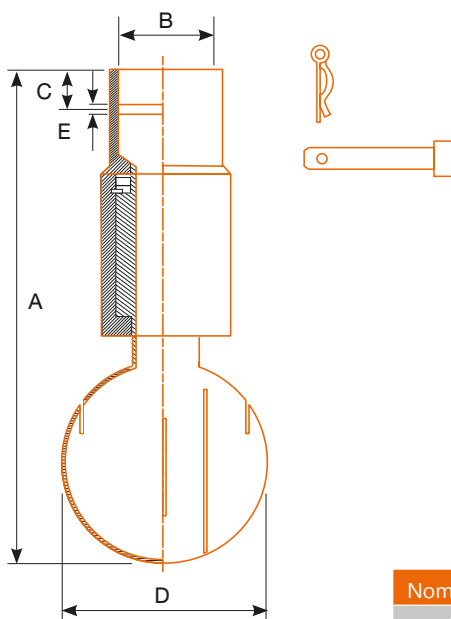
Fixed 360° Weld End Spray Ball



2 mm holes
 Typically use in food and beverage for cleaning storage tanks
 Stationary : Designed to be mounted to a tube or pipe
 Various spray patterns available
 Other dimensions, connection types and pin types available upon request

Nominal Size	A	B	C	D	E	Part Number
Inch	mm	mm	mm	mm	mm	316
1	90	26	14.8	64	6	2449B100-11
1 1/2	116	38.5	14.8	91	6	2449B15091-11
2	121	51.5	19.8	91	6	2449B20091-11

Rotary 360° Clip-on Locking Pin Spray Ball



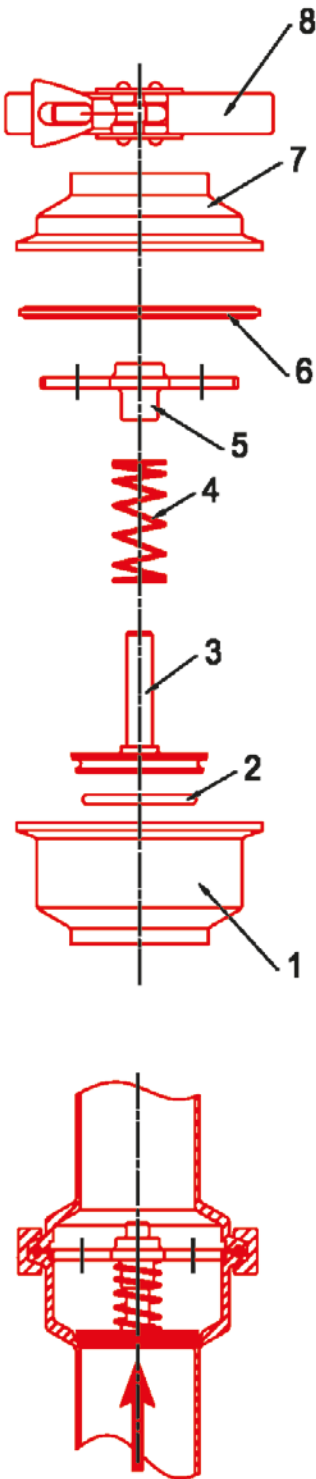
Nominal Size	A	B	C	D	E	Part Number
Inch	mm	mm	mm	mm	mm	316
1	143	26	7	53	6	2449RCB100-15
1 1/2	169	38.5	11.5	63	6	2449RCB150-15

Working pressure: 1-3 bar
 Recommended pressure: 1.5-2 bar
 Max. working temperature: 95°C
 Max. ambient temperature: 140°C
 Other connection types and pin types available upon request

Valves & Sight Glasses

Check Valve Non-return Valve

Weld Type



Flow direction

Technical data

Max. product pressure : 10 bar
 Min. product pressure : 0.06 bar
 Working temperature : -10°C~140°C (EPDM)
 -50°C~200°C (Silicone)
 -20°C~210°C (VITON®)

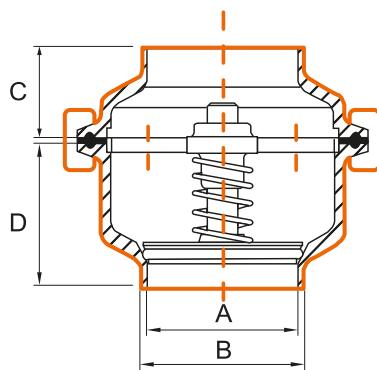
Material

Product wetted stainless steel parts : SS304 or SS316L
 Finish : Semi-bright
 Other stainless steel parts : SS304
 Seal : Silicone, EPDM or VITON®
 Clamp : SS304

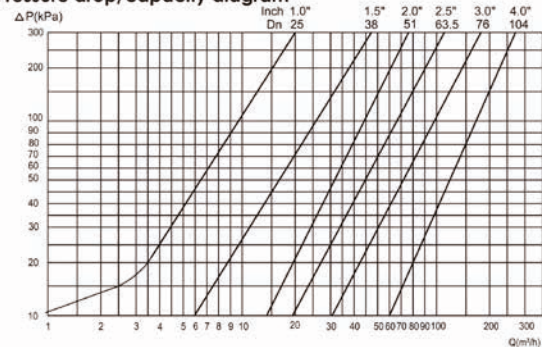
Ordering information

Size
 Connection type
 Material grade
 Gasket and O-Ring material

ITEM	PARTS	MATERIAL	QTY
1	Lower Body	SS304/SS316L	1
2	O-Ring	Silicone/EPDM/VITON®	1
3	Disc	SS304/SS316L	1
4	Spring	SS304/SS316L	1
5	Plate	SS304/SS316L	1
6	Gasket	Silicone/EPDM/VITON®	1
7	Upper Body	SS304/SS316L	1
8	Clamp	SS304	1



Pressure drop/capacity diagram

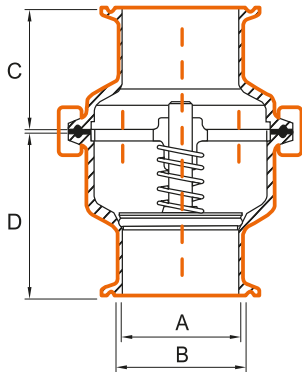


Medium: Water (20°C)
 Measurement: In accordance with VDI 2173

Nominal Size	A	B	C	D	Part Number	
					304/Silicone	316L/Silicone
1/2	9.5	12.7	30	45	2442WA050QS	2442WB050QS
3/4	15.8	19.05	30	45	2442WA075QS	2442WB075QS
1	22.1	25.4	23.5	35	2442WA100QS	2442WB100QS
1 1/2	34.8	38.1	28.5	45	2442WA150QS	2442WB150QS
2	47.5	50.8	28.5	45	2442WA200QS	2442WB200QS
2 1/2	60.2	63.5	28.5	45	2442WA250QS	2442WB250QS
3	72.9	76.2	28.5	45	2442WA300QS	2442WB300QS
4	97.6	101.6	42	75	2442WA400QS	2442WB400QS

Check Valve

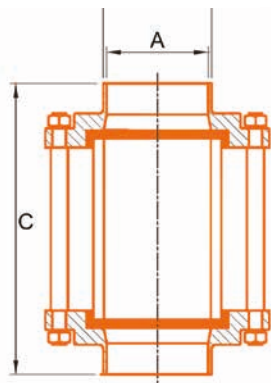
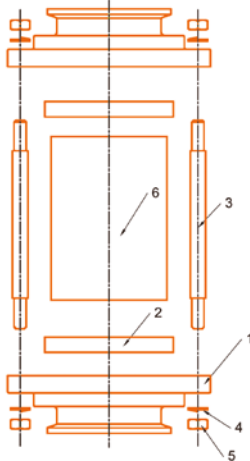
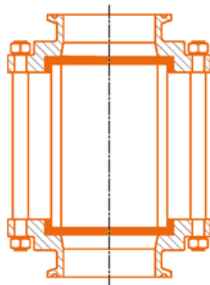
Clamp Type



Nominal Size	A	B	C	D	Part Number	
Inch	mm	mm	mm	mm	304/Silicone	316L/Silicone
1/2	9.5	12.7	35	50	2442CA050QS	2442CB050QS
3/4	15.8	19.05	35	50	2442CA075QS	2442CB075QS
1	22.1	25.4	44.5	56	2442CA100QS	2442CB100QS
1 1/2	34.8	38.1	49.5	66	2442CA150QS	2442CB150QS
2	47.5	50.8	49.5	66	2442CA200QS	2442CB200QS
2 1/2	60.2	63.5	49.5	66	2442CA250QS	2442CB250QS
3	72.9	76.2	49.5	66	2442CA300QS	2442CB300QS
4	97.6	101.6	63	96	2442CA400QS	2442CB400QS

Sight Glass

Weld Type



Material

Product wetted stainless steel parts: SS304 or SS316L

Finish: Semi-bright

Seal: Silicone, EPDM or VITON®

Ordering information

Size

Connection type

Material grade

Gasket and O-Ring material

Internal pressure strength of PYREX® borosilicate glass tube

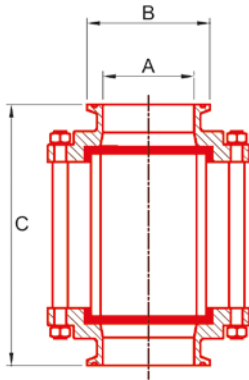
Size	1"	1.5"	2"	2.5"	3"	4"
Max. Pressure (Bar)	13	10	12	9	8	6

ITEM	PARTS	MATERIAL	QTY
1	Body	SS304/SS316L	2
2	Seal	Silicone/EPDM/VITON®	2
3	Screw Bolt	SS304	1"-3"=4pcs/ 4"=6pcs
4	Spring Washer	SS304	1"-3"=8pcs/ 4"=12pcs
5	M6 Nut	SS304	1"-3"=8pcs/ 4"=12pcs
6	Clear Tempered Glass	PYREX® Borosilicate Glass	1

Nominal Size	A	B	C	Part Number	
Inch	mm	mm	mm	304/EPDM	316L/EPDM
1	22.1	25.4	129	2447WA100QE	2447WB100QE
1 1/2	34.8	38.1	129	2447WA150QE	2447WB150QE
2	47.5	50.8	132.5	2447WA200QE	2447WB200QE
2 1/2	60.2	63.5	136.5	2447WA250QE	2447WB250QE
3	72.9	76.2	136.5	2447WA300QE	2447WB300QE
4	97.4	101.6	148.5	2447WA400QE	2447WB400QE

Sight Glass

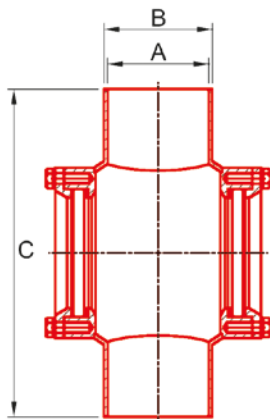
Clamp Type



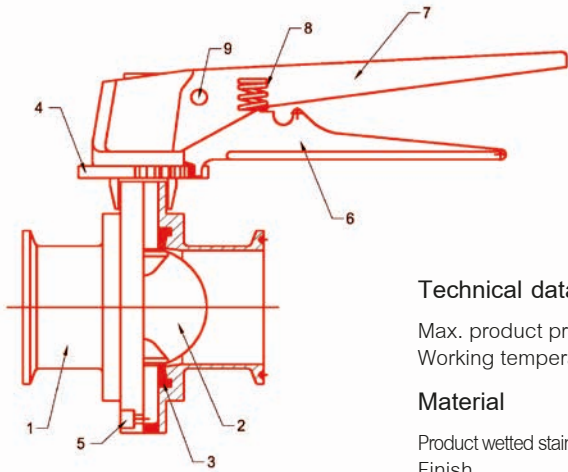
Nominal Size	A	B	C	Part Number	
				304/EPDM	316L/EPDM
1	22.1	50.4	153.9	2447CA100QE	2447CB100QE
1 1/2	34.8	50.4	153.9	2447CA150QE	2447CB150QE
2	47.5	63.9	157.9	2447CA200QE	2447CB200QE
2 1/2	60.2	77.4	161.9	2447CA250QE	2447CB250QE
3	72.9	90.9	161.9	2447CA300QE	2447CB300QE
4	97.4	118.9	180.3	2447CA400QE	2447CB400QE

Sight Glass

Ball Type Weld Ends



Nominal Size	A	B	C	Part Number	
				304/EPDM	316L/EPDM
1	22.1	25.4	120.0	2447BWA100QE	2447BWB100QE
1 1/2	34.8	38.1	120.0	2447BWA150QE	2447BWB150QE
2	47.5	50.8	154.0	2447BWA200QE	2447BWB200QE
2 1/2	60.2	63.5	200.0	2447BWA250QE	2447BWB250QE
3	72.9	76.2	210.0	2447BWA300QE	2447BWB300QE
4	97.4	101.6	240.0	2447BWA400QE	2447BWB400QE



Butterfly Valve

Trigger Handle Type

Technical data

Max. product pressure : 10 bar
Working temperature : -10°C~140°C (EPDM)

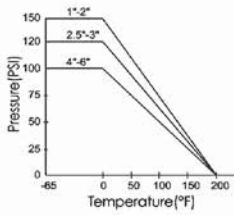
Material

Product wetted stainless steel parts : SS304 or SS316L
Finish : Semi-bright
Other stainless steel parts : SS304
Seal : Silicone, EPDM or VITON®

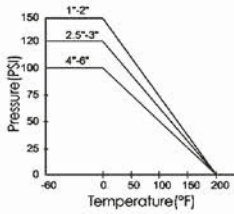
Ordering information

Valve type
Valve size
Connection type
Material grade
Seal material
Handle type
Actuation type

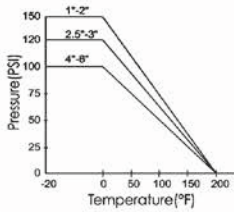
EPDM SEAT TEMPERATURE CHART



SILICONE SEAT TEMPERATURE CHART



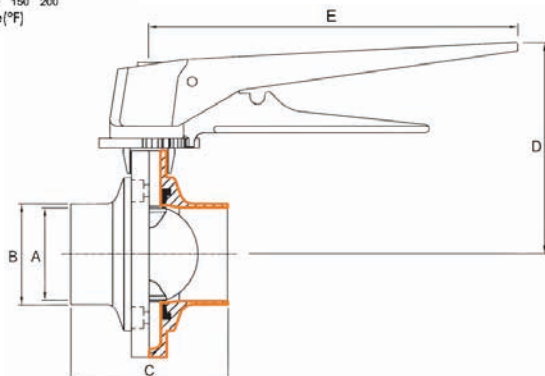
VITON SEAT TEMPERATURE CHART



ITEM	PARTS	MATERIAL	QTY
1	Notch plate	SS304/SS316L	1
2	Disc	SS304/SS316L	1
3	Seal	Silicone/EPDM/VITON®	1
4	Notch plate	SS304	2
5	Screw (M6x12)	SS304	1
6	Trigger	SS304	1
7	Handle	Nylon/SS304	1
8	Spring	SS304	1
9	Pin	SS304	4

Open/Shut Torque

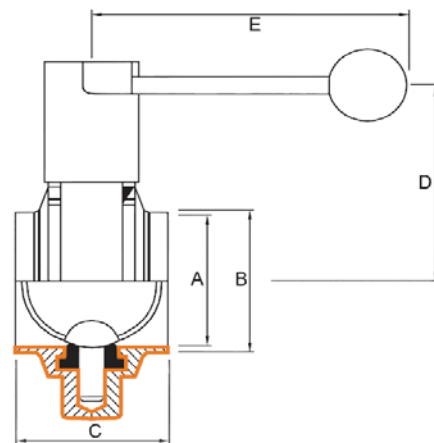
Nominal Size	Max. Torque
Inch	Nm
1	15
1 1/2	15
2	20
2 1/2	25
3	30
4	35



Nominal Size	A	B	C	D	E
Inch	mm	mm	mm	mm	mm
1	22.1	25.4	52	90	158
1 1/2	34.8	38.1	52	95	158
2	47.5	50.8	52	102	158
2 1/2	60.2	63.5	56	111	158
3	72.9	76.2	60	116.5	158
4	97.4	101.6	72	135.5	158

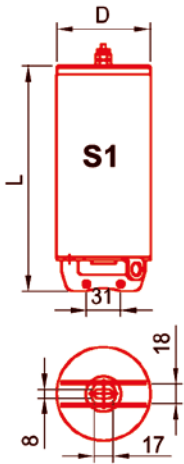
Butterfly Valve

Pull Handle Type



Nominal Size	A	B	C	D	E
Inch	mm	mm	mm	mm	mm
1	22.1	25.4	52	66	130
1 1/2	34.8	38.1	52	68.5	130
2	47.5	50.8	52	76.5	138
2 1/2	60.2	63.5	56	84.5	138
3	72.9	76.2	60	91	160
4	97.4	101.6	72	135.5	160

Butterfly Valve Actuator



Technical data

S1/S3 shut-off time: 1.5 seconds

S1/S3 weight: 3.85 KGS.

S104 shut-off time: 1.7 seconds

S104 weight: 4.7 KGS.

S1/S104 can be connected with M12 screw proximity switch (PNP or NPN)

S3 can be connected with either M12 screw proximity switch (PNP or NPN) or control box.

Max. air pressure: 7 bar

Min. air pressure for NC and NO: 5 bar

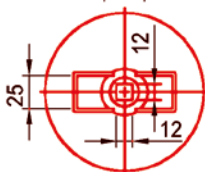
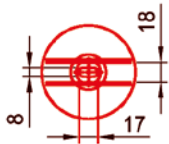
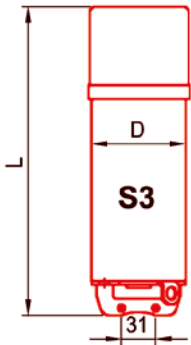
Working temperature: -25°C~90°C

Material

Actuator body: SS304

Piston: POM

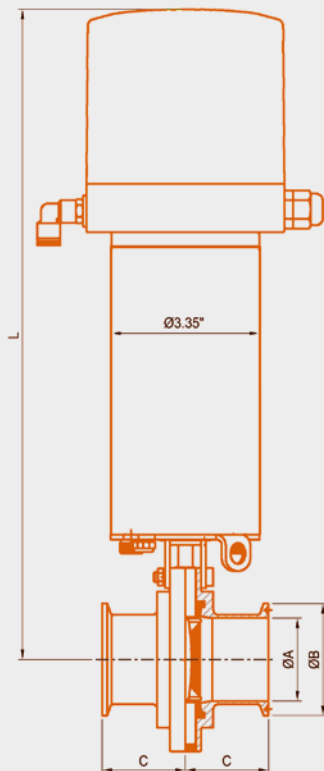
Seal: NBR



Model	For Butterfly Valve	D	L	Part Number
No.	Size	mm	mm	
S1	1"-3"	85	205	2445A100Q
S3	1"-3"	85	274	2445A300Q
S104	4"	120	335	2445A400G

S3 Pneumatic Butterfly Valve with Control Box Set

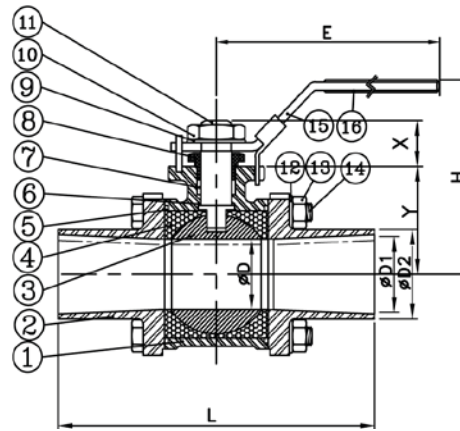
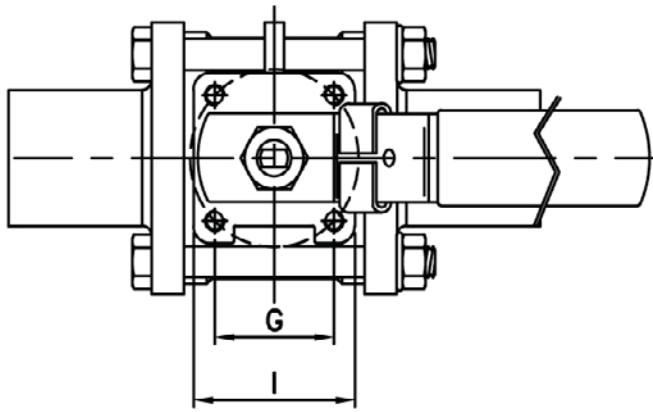
Air/Spring actuator with single or double action



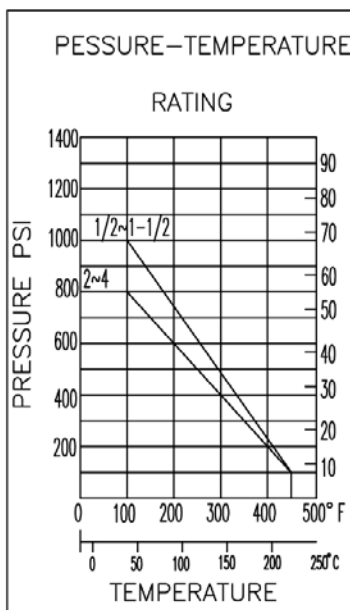
Nominal Size	A	B	C	L
Inch	mm	mm	mm	mm
S1	22	50	44	357
S3	35	50	44	360
S104	47	64	47	370
S3	60	77	49	373
S104	72	91	52	380

Ball Valve

Food, beverage and chemical use



DN	SIZE Inch	ISO-5211	D	L	H	E	D1	D2	G	I	X	Y	Torque/Nm	
10	3/8	F03	36	10	124	57	134	10	12	25.5	37	14	23.5	4.5
15	1/2	F03	36	15	180	65	134	18.1	21.3	25.5	37	18	29	4.5
20	3/4	F03	36	20	180	68	134	23.7	26.9	25.5	37	19	33	7
25	1	F04	42	25	192	71	134	30.1	33.7	29.7	42	19.5	37.5	11
32	1 1/4	F04	42	32	205	79	134	38.4	42.4	35.4	50	19.5	43	26
40	1 1/2	F05	50	40	230	86	195	44.3	48.3	35.4	50	27.5	48.5	26
50	2	F05	50	50	243	93	195	55.3	60.3	35.4	50	25.5	58.5	34
65	2 1/2	F07	70	65	294	140	262	70.1	76.1	49.5	72	37	79.5	40
80	3	F07	70	80	320	155	262	83	86	49.5	72	42	83.5	54
100	4	F10	102	100	346	180	290	108.1	114.3	72.1	95	49.5	110.5	176

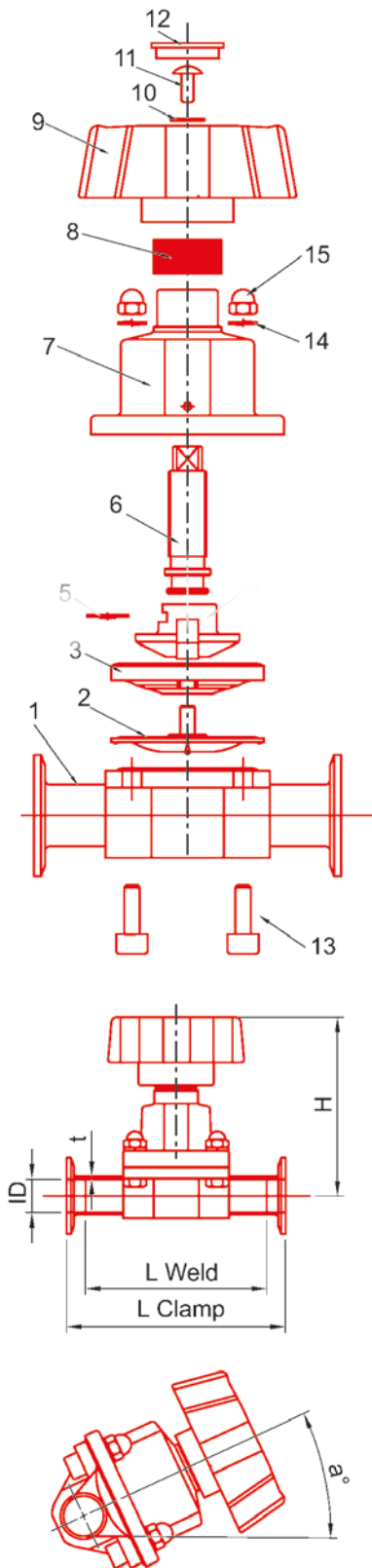


ITEM	PARTS	MATERIAL	QTY
1	BODY	AISI 304/316	1
2	CAP	AISI 304/316	2
3	BALL	AISI 304/316	1
4	SEAT	PTFE/RTFE	2
5	BODY SEAT	PTFE	2
6	THRUST WASHER	PTFE	1
7	STEM PACKING	PTFE	1
8	GLAND NUT	AISI304	1
9	STEM WASHER	AISI304	1
10	STEM NUT	AISI304	1
11	STEM	AISI304/316	1
12	BOLT WASHER	AISI304	4,8,12
13	NUT	AISI304	4,8,12
14	BOLT	AISI304	4,6
15	HANDLE	AISI304	1
16	PLASTIC COVER	PLASTIC	1

Ordering information

- Valve size
- Connection type
- Material grade: 304(CF8) or 316(CF8M)
- Seat material: PTFE or RTFE(Reinforced PTFE)
- Seat type: Encapsulated or Non-encapsulated
- Actuation: Manual, Double Acting, Spring Return or Electric.

Manual Diaphragm Valve (PTFE+EPDM)



ITEM	PARTS	MATERIAL	QTY
1	Body	SS316L	1
2	Seal	PTFE	1
3	Seal	EPDM	1
4	Seat	SS304	1
5	Ring	POM	1
6	Shaft	SS304	1
7	Bonnet	SS304	1
8	Positioning Ring	PE	1
9	Handle Wheel	NYLON	1
10	Ring	SS304	1
11	Screw	SS304	1
12	Cover	NYLON	1
13	Screw	SS304	4
14	Spring Ring	SS304	4
15	Nut	SS304	4

Max. product pressure : 10 bar
Working temperature : -10°C~140°C

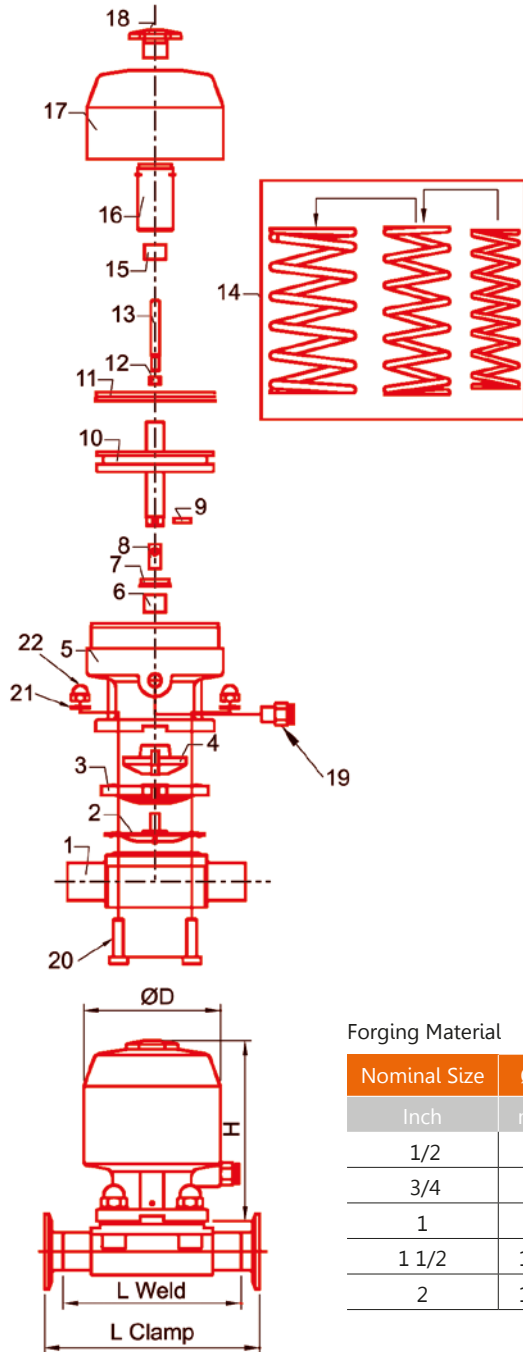
Forging Material

Nominal Size	ID	t	H	L Weld	L Clamp	a°	Part Number	Part Number
Inch	mm	mm	mm	mm	mm		Weld End	Clamp End
1/2	9.5	1.65	75	83	108	41°	2250WMB050QTE	2250CMB050QTE
3/4	15.8	1.65	75	83	108	33°	2250WMB075QTE	2250CMB075QTE
1	22.1	1.65	116	120	127	25°	2250WMB100QTE	2250CMB100QTE
1 1/2	34.8	1.65	136	153	159	24°	2250WMB150QTE	2250CMB150QTE
2	47.5	1.65	136	173	190	30°	2250WMB200QTE	2250CMB200QTE

Casting Material

Nominal Size	ID	H	L Clamp	Part Number
Inch	mm	mm	mm	Clamp End
1/2	9.4	72.2	68.6	2250CMB050GTE
3/4	15.7	75.5	85	2250CMB075GTE
1	22.4	126	145.4	2250CMB100GTE
1 1/2	35	142.4	178.4	2250CMB150GTE
2	47.8	183.8	198.4	2250CMB200GTE

Pneumatic Diaphragm Valve (PTFE+EPDM)



ITEM	PARTS	MATERIAL	QTY
1	Body	SS316L	1
2	Seal	PTFE	1
3	Seal	EPDM	1
4	Seat	SS304	1
5	Bonnet	SS304	1
6	Bush	PEEK	1
7	U Ring	NBR	1
8	Tube Nut	SS304	1
9	Pin	SS304	1
10	Piston	SS304	1
11	U Ring	NBR	1
12	M5 Nut	SS304	1
13	Stem	SS304	1
14	Spring	SS304	3
15	Bush	PEEK	1
16	Stem	SS304	1
17	Cover	SS304	1
18	Nut	SS304	1
19	Air Connection 1/8 Gas	Cu	1
20	Screw	SS304	4
21	Spring Ring	SS304	4
22	M8 Nut	SS304	4

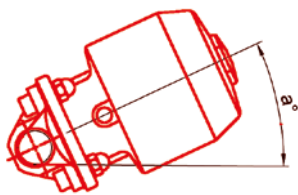
Max. product pressure : 10 bar
 Working temperature : -10°C~140°C
 Operating air pressure : 4 bar

Forging Material

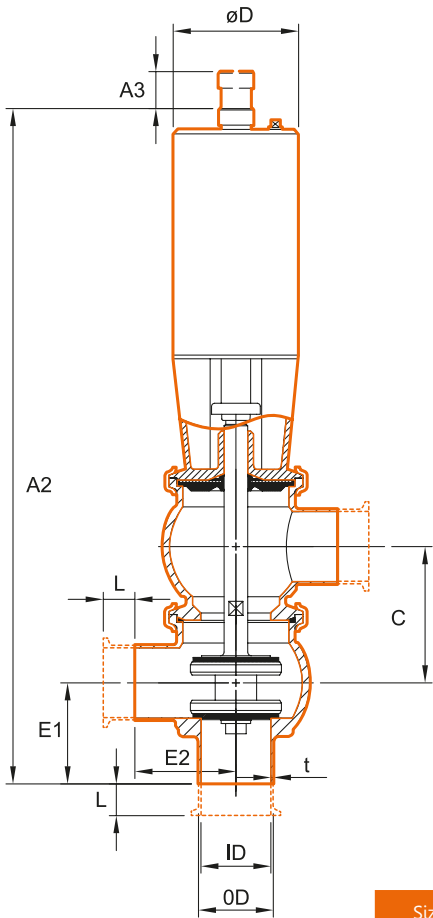
Nominal Size	ØD	H	L Weld	L Clamp	a°	Part Number	Part Number
Inch	mm	mm	mm	mm		Weld End	Clamp End
1/2	60	77	83	108	41°	2250WPB050QTE	2250CPB050QTE
3/4	60	100	83	108	33°	2250WPB075QTE	2250CPB075QTE
1	90	130	120	127	25°	2250WPB100QTE	2250CPB100QTE
1 1/2	114	168	153	159	24°	2250WPB150QTE	2250CPB150QTE
2	144	200	173	190	30°	2250WPB200QTE	2250CPB200QTE

Casting Material

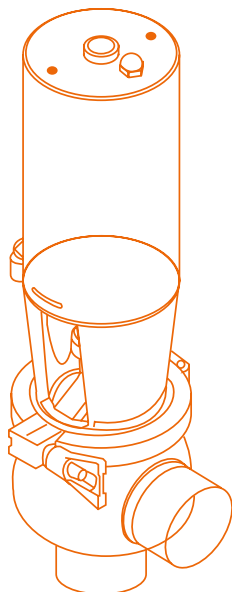
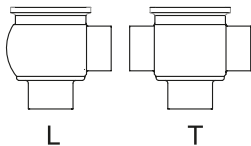
Nominal Size	ØD	H	L Clamp	Part Number
Inch	mm	mm	mm	Clamp End
1/2	54	88	68.6	2250CPB050GTE
1	86	163	145.4	2250CPB100GTE



Pneumatic Seat Valve



Valve body combination



Caution, opening/closing time:

- Opening/closing time will be affected by the following:
 - The air supply (air pressure).
 - The length and dimensions of the air hose.
 - Number of valves connected to same air hose.
 - Use of single solenoid valve for serial connected air actuator functions.
 - Product pressure

Air connections

- Compressed air: R1/8"(BSP), internal thread.

Technical data

- Max. product pressure (depending on valve specifications): 1000kpa(10bar)
- Min. product pressure : full vacuum.
- Temperature range: 10°C to + 140°C(EPDM)
- Air pressure: 5 to 7 bar.

Marterials

- Product wetted steel parts: Stainless steel AISI 316L.
- Finish : Semi bright.
- Other steel parts: Stainless steel AISI 304.
- Plug stem: AISI 316L. with hard chrome planted stem surface.
- Product wetted seals: EPDM rubber.

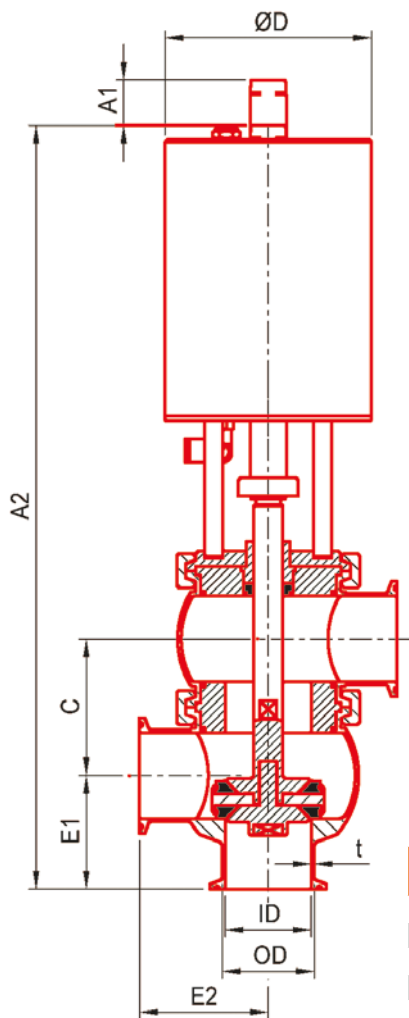
Ordering

- Please state the following when ordering
 - Size.
 - Connections if not welding ends.
 - Valve body combination.
 - Actuator function, NC, NO, or A/A.
 - Options.

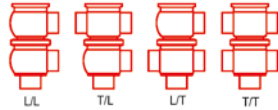
Size	ID mm	OD mm	A0 mm	A1 mm	ØD mm	E1(Weld/Clamp) mm	E2(Weld/Clamp) mm	t mm
1.0"	22.1	25.4	256	14	73	49	53	1.65
1.5"	34.7	38.1	336	20	87	59	69.5	1.65
2.0"	47.5	50.8	346	25	114	70	70	1.65
2.5"	60.2	63.5	365	25	114	82	82	1.65
3.0"	72.9	76.1	451	30	139.8	88.5	79	1.65
4.0"	97.6	101.6	487	30	139.8	118	118	2

NO	PART NAME	QTY	MATERIAL
1	Stem	1	SS316L
2	Valve body-lower	1	SS316L
3	Seal ring	1	EPDM
4	Cylinder	1	SS304
5	O-Ring	1	NBR
6	Bracket	1	SS304
7	Lip	1	SS316L
7-1	O-Ring	1	NBR
7-2	Seal ring	1	EPDM
7-3	Bush	1	POM
8	Stop ring	1	PE
9	Piston	1	SS304
10	O-Ring	1	NBR
11	O-Ring	1	NBR
12	Lock wire clip	1	SS304
13	Clip complete	1	SS420
14	Air outlet filter	1	Copper
15	O-Ring	1	NBR
16	Air connection	1	Copper
17	Clamp	1	SS304
18	Screws/Washer	1	SS316L
19	Spring assembly	1	SS304

Pneumatic Seat Valve



Valve body combination



Caution, opening/closing time:

- Opening/closing time will be affected by the following:
 - The air supply (air pressure).
 - The length and dimensions of the air hose.
 - Number of valves connected to same air hose.
 - Use of single solenoid valve for serial connected air actuator functions.
 - Product pressure

Air connections

- Compressed air: R1/8"(BSP), internal thread.

Technical data

- Max. product pressure (depending on valve specifications): 1000kpa(10bar)
- Min. product pressure : full vacuum.
- Temperature range: 10°C to + 140°C(EPDM)
- Air pressure: 5 to 7 bar.

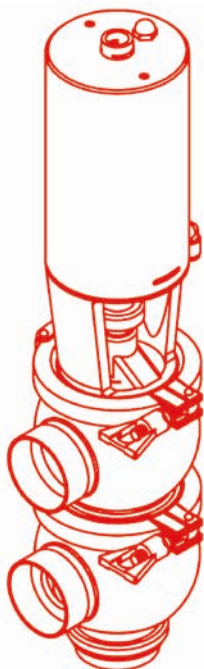
Marterials

- Product wetted steel parts: Stainless steel AISI 316L.
- Finish : Semi bright.
- Other steel parts: Stainless steel AISI 304.
- Plug stem: AISI 316L. with hard chrome planted stem surface.
- Product wetted seals: EPDM rubber.

Ordering

- Please state the following when ordering
 - Size.
 - Connections if not welding ends.
 - Valve body combination.
 - Actuator function, NC, NO, or A/A.
 - Options.

Size	ID mm	OD mm	A1 mm	A2 mm	ØD mm	C mm	E1(Weld/Clamp) mm	E2(Weld/Clamp) mm	t mm
1.0"	22.1	25.4	14	314	73	58	49	53	1.65
1.5"	34.7	38.1	20	411	87	63	59	69.5	1.65
2.0"	47.5	50.8	25	440	114	75	70	70	1.65
2.5"	60.2	63.5	25	460	114	86.5	82	82	1.65
3.0"	72.9	76.1	30	534	139.8	99	88.5	79	1.65
4.0"	97.6	101.6	30	630	139.8	138	118	118	2



NO	PART NAME	QTY	MATERIAL
1	Stem	1	SS316L
2	Valve body-lower	1	SS316L
3	Seal ring	1	EPDM
4	Cylinder	1	SS304
5	O-Ring	1	NBR
6	Bracket	1	SS304
7	Lip	1	SS316L
7-1	O-Ring	1	NBR
7-2	Seal ring	1	EPDM
7-3	Bush	1	POM
8	Stop ring	1	PE
9	Piston	1	SS304
10	O-Ring	1	NBR
11	O-Ring	1	NBR
12	Lock wire clip	1	SS304
13	Clip complete	1	SS420
14	Air outlet filter	1	Copper
15	O-Ring	1	NBR
16	Air connection	1	Copper
17	Clamp	1	SS304
18	Screws/Washer	1	SS316L
19	Spring assembly	1	SS304

ISSUE DATE: May 14, 2010

CERTIFICATE AUTHORIZATION NUMBER: 1540



THIS IS TO CERTIFY THAT

GHWA Industries Co. Ltd

SV City Tower 1, 20th Floor, 896/34 Rama 3 Road, Bangpongpan, Bangkok 10120 , Thailand

is hereby authorized to continue to apply the
3-A Symbol to the models of equipment, conforming to 3-A Sanitary Standards for:

Number 63-03
63-03 (Sanitary Fittings)

set forth below

Both CIP and COP Models: 242SA,B,C or Dxxx-yz; 242WCLA,B,C or Dxxx-yz; 242KSA,B,C or Dxxx-yz; 242WKA,B,C or Dxxx-yz; 242WULA,B,C or Dxxx-yz; 247WA,B,C or Dxxx-yz; 247WWWA,B,C or Dxxx-yz; 249WA,B,C or Dxxx-yz; 249WWWWA,B,C or Dxxx-yz; 247WTA,B,C or Dxxx-yz; 247WWWTA,B,C or Dxxx-yz; 247RWA,B,C or Dxxx-yz; 247RWWWA,B,C or Dxxx-yz; 247RWTA,B,C or Dxxx-yz; 247RWWWTA,B,C or Dxxx-yz; 2431WA,B,C or Dxxx-yz; 2432WA,B,C or Dxxx-yz; 2431A,B,C or Dxxx-yz; 2432A,B,C or Dxxx-yz; 242CMPLA,B,C or Dxxx-yz; 242CMPA,B,C or Dxxx-yz; 242KMPLA,B,C or Dxxx-yz; 242KMPA,B,C or Dxxx-yz; 247MPA,B,C or Dxxx-yz; 247MPSA,B,C or Dxxx-yz; 249MPA,B,C or Dxxx-yz; 247RMPA,B,C or Dxxx-yz; 247RMPSA,B,C or Dxxx-yz; 2431MPA,B,C or Dxxx-yz; 2432MPA,B,C or Dxxx-yz; 2414AMPA,B,C or Dxxx-yz; 2414WMPA,B,C or Dxxx-yz; 2414MMPA,B,C or Dxxx-yz; 2416WA,B,C or Dxxx-yz; 2416AMPA,B,C or Dxxx-yz; 2414PRFA,B,C or Dxxx; 2414AA,B,C or Dxxx; 2414WLA,B,C or Dxxx; 2414WA,B,C or Dxxx; 2415TRFA,B,C or Dxxx; 2415AA,B,C or Dxxx; 2415WLA,B,C or Dxxx; 2415WA,B,C or Dxxx; 2416AA,B,C or Dxxx; 247WWTA,B,C or Dxxx-yz; 247WTTA,B,C or Dxxx-yz; 247WTWA,B,C or Dxxx-yz; 247TTWA,B,C or Dxxx-yz; 242TA,B,C or Dxxx-yz; 242KTA,B,C or Dxxx-yz; 242FPA,B,C or Dxxx-yz; 242KPA,B,C or Dxxx-yz; 242FMP14A,B,C or Dxxx-yz; 2417MP14A,B,C or Dxxx; 2417MP15A,B,C or Dxxx; 243115FA,B,C or Dxxx-yz; 2431TTA,B,C or Dxxx-yz; 2431TPA,B,C or Dxxx-yz; 2414C31A,B,C or Dxxx-yz; 2428WAA,B,C or Dxxx-yz; 2428WA,B,C or Dxxx-yz; 2428AMPA,B,C or Dxxx-yz; 2428BMPA,B,C or Dxxx-yz; 2207A,B,C or Dxxx-yz; 2208A,B,C or Dxxx-yz; 2209A,B,C or Dxxx-yz; 2210A,B,C or Dxxx-yz; 2211CA,B,C or Dxxx-yz; 2211EA,B,C or Dxxx-yz; 2222AA,B,C or Dxxx-yz; 2222BA,B,C or Dxxx-yz; 2222CA,B,C or Dxxx-yz;

Where y and z are: 1, 2, 3, 4, or 5.

VALID THROUGH: **December 31, 2016**

Timothy R. Rugh
Executive Director
3-A Sanitary Standards, Inc.

ISSUE DATE: May 08, 2015

CERTIFICATE AUTHORIZATION NUMBER: 1817



THIS IS TO CERTIFY THAT

GHWA Industries Co. Ltd

SV City Tower 1, 20th Floor, 896/34 Rama 3 Road, Bangpongpan, Bangkok 10120 , Thailand

is hereby authorized to continue to apply the
3-A Symbol to the models of equipment, conforming to 3-A Sanitary Standards for:

Number 33-02
33-02 (Metal Tubing)

set forth below

Both CIP and COP Models: 2401A or Bxxxxyy-z1, where z is: 1, 2, 3, 4, or 5; 2201Bxxxxyy-F1 or 4.

VALID THROUGH: **December 31, 2016**

Timothy R. Rugh
Executive Director
3-A Sanitary Standards, Inc.

The issuance of this authorization for the use of the 3-A Symbol is based upon the voluntary authorization, by the applicant for it, that the equipment listed above complies fully with the 3-A Sanitary Standards designated. Legal responsibility for compliance is solely that of the holder of this Certificate of Authorization, and 3-A Sanitary Standards, Inc. does not warrant that the holder of an authorization at all times complies with the provisions of the said 3-A Sanitary Standard. This in no way affects the responsibility of 3-A Sanitary Standards, Inc. to take appropriate action in such cases in which evidence of nonconformance had been established.

NEXT TPV INSPECTION/REPORT DUE: **May 2020**



Certificate of Registration

This is to certify that

G HWA Industries Co., Ltd.

52 Moo 7, Tambol Nongchumpon, Amphur Khaoyoi,
Phetchaburi, 76140 Thailand

and at the sites listed on the attached Appendix

operates a quality management system which has been assessed as conforming to

ISO 9001:2008

for the scope of activities

Manufacture of stainless steel fittings.

Certificate No: **CI/8643** Issue Date: **11 December 2013**

Valid until **14 November 2016** subject to adherence to the agreed ongoing audit programme, successful endorsement of certification following each audit and compliance with CI Regulations
Date of original issue: 15 November 2010

Signed for and on behalf of

Authorised Signatory



063



Certification International (UK) Ltd., Delta 200, Delta Business Park, Great Western Way, Swindon, Wiltshire, SN5 7XP, United Kingdom



ACE INA Overseas Insurance
Company Limited
399 Interchange 21 Building,
Level 26-30, Sukhumvit Road,
Klongtoey Nua, Wattana
Bangkok 10110 Thailand

+66 (0) 2611 4040 *main*
+66 (0) 2611 4310 *fax*
www.acegroup.com/th

COVER NOTE NO. PC141/2015

We are pleased to confirm **ACE INA Overseas Insurance Company Limited** is holding covered in respect of the following:-

INSURANCE TYPE	: PRODUCT LIABILITY INSURANCE
INSURED	: G HWA Industries Co., Ltd.
ADDRESS	: 896/34 Rama 3 Road, Bangpongpan, Yannawa, Bangkok 10120
BUSINESS DESCRIPTION	: Manufacturer of stainless steel products.
INSURED PRODUCTS	: Hygienic Stainless Steel tube fitting components and Sanitary Values. (Excluding any products involving on parts of medical equipment, critical parts or safety parts of automotive)
ESTIMATE TURNOVER	: THB 418,000,000.00 or USD 11,802,900 (Approx.) Breakdown as follows:
	<ul style="list-style-type: none"> • USA/ Canada (20%) • Europe (39%) • Thailand (18%) • Rest of the World (23%)
COVERAGE	: Against the Name Insured's liability in respect of goods or products manufactured, sold, handled, distributed or disposed of by the names insured (Claim-Made Basis)
RETROACTIVE DATE	: From 12 September 2014
PERIOD OF INSURANCE	: From : 12 September 2015 To : 12 September 2016 (Thailand's time)
POLICY LIMIT <i>(Costs & expenses inclusive)</i>	: USD 300,000.00 any one occurrence and in aggregate
TERRITORY	: Worldwide including USA/ Canada
JURISDICTION	: Worldwide including USA/ Canada

INDUSTRY TERMS AND DEFINITIONS

annealing: a treatment process for steel for reducing hardness, improving machinability, facilitating cold working, or producing a desired mechanical, physical, or other property.

arc gap: for orbital GTAW, the nominal distance, measured prior to welding, from the tip of the electrode to the surface of the weld joint or insert.

arc strike: a discontinuity consisting of any localized remelted metal, heat-affected metal, or change in the surface profile of any part of a weld or base metal resulting from an arc, generated by the passage of electrical current between the surface of the weld or base material and a current source, such as a welding electrode, magnetic particle prod, or electropolishing electrode.

ASME: American Society of Mechanical Engineers

ASTM: American Society for the Testing & Materials

ASTM-A 249: Specification titled “Seamless and Welded Austenitic Stainless Steel Tubing for General Service”. This specification covers a variety of grades of austenitic stainless steel tubing.

ASTM-A 269: Specification titled “Welded Austenitic Steel Boiler, Superheater, Heat-Exchanger, and Condenser Tubes”. This specification covers a variety of grades of austenitic stainless steel tubing.

ASTM-A 270: Specification titled “Welded Austenitic Stainless Steel Tubing” for use in the pharmaceutical industries and need to withstand secondary cold forming operations. This specification covers a variety of grades of austenitic stainless steel tubing.

autogenous weld: a weld made by fusion of the base material without the addition of filler. (See also gas tungsten-arc welding.)

automatic welding: welding with equipment that performs the welding operation without adjustment of the controls by a welding operator. The equipment may or may not perform the loading and unloading of the work. (See also machine welding.)

bioburden: the number of viable contaminating organisms per product unit.

biofilm: a film of microorganisms or cell components adhering to surfaces submerged in or subjected to fluid environments.

biopharmaceuticals: pharmaceuticals manufactured by biotechnology methods, with the products having biological sources, usually involving live organisms or their active components. Biopharmaceuticals generally include recombinant proteins, (monoclonal) antibodies, vaccines, blood/plasma-derived products, nonrecombinant culture-derived proteins, and cultured cells and tissues.

bioprocess: technique or operation used in the manufacture and/or purification of biopharmaceuticals or other biological materials, such as products derived from microbial fermentation (e.g., yeast, mold, bacteria), cell culture (e.g., insect, mammalian, plant), tissue culture, blood, or milk fractionation.

bioprocessing equipment: equipment, systems, or facilities used in the creation of products utilizing living organisms.

blind weld: a weld joint by design that cannot feasibly be visually inspected internally.

blistering (metallic): a localized delamination within the metal that has an appearance of chipped or flaked-off areas. Per SEMI F019-0304, section 4.2.1.

break: a discontinuity in the face of a fitting.

buffing: a metal finishing process for smoothing the surface using a grease-suspended abrasive.

burr: excess material protruding from the edge typically resulting from operations such as cutting or facing.

butt joint: a joint between two members lying approximately in the same plane.

cavitation: a condition of liquid flow where, after vaporization of the liquid, the subsequent collapse of vapor bubbles can produce surface damage.

CFOS: Cleaned for Oxygen Service.

cGMPs: current Good Manufacturing Practices. Current design and operating practices developed by the pharmaceutical industry to meet FDA requirements as published in the Code of Federal Regulations, Chapter 1, Title 21, Parts 210 and 211.

clean-in-place (CIP): cleaning of process contact surfaces of a system or component without disassembly beyond the removal of single-use components.

clean steam: steam free from boiler additives that may be purified, filtered, or separated. Usually used for incidental heating in pharmaceutical applications.

closed head: for orbital GTAW, a welding head that encapsulates the entire circumference of the tube/pipe during welding and that contains the shielding gas.

cloudiness: the appearance of a milky white hue across some portion of a surface resulting from the electropolish process.

cluster of pits: two or more pits, the closest distance between each being less than the diameter of any one pit.

cluster porosity: porosity that occurs in clumps or clusters.

concavity: a condition in which the surface of a welded joint is depressed relative to the surface of the tube or pipe. Concavity is measured as a maximum distance from the outside or inside diameter surface of a welded joint along a line perpendicular to a line joining the weld toes.

convexity: a condition in which the surface of a welded joint is extended relative to the surface of the tube or pipe. Convexity is measured as a maximum distance from the outside or inside diameter surface of a welded joint along a line perpendicular to a line joining the weld toes.

corrosion: a chemical or electrochemical interaction between a metal and its environment, which results in changes in the property of the metal. This may lead to impairment of the function of the metal, the environment, and/or the technical system involved.

cracks: fracture-type discontinuities characterized by a sharp tip and high ratio of length and width to opening displacement. A crack may not be detected with a stylus. A linear crack will produce a liquid penetrant indication during liquid penetration inspection, X-ray, or ultrasound.

crater: a depression at the termination of a weld bead.

crater cracks: cracks that form in the crater, or end, of the weld bead.

creep: a time-dependent permanent deformation that occurs under stress levels below the yield stress.

dead leg: an area of entrapment in a vessel or piping run that could lead to contamination of the product.

defects: discontinuities that by nature or accumulated effect (for example, total crack length) render a part or product unable to meet minimum applicable acceptable standards or specifications. This term designates reject ability. (See also discontinuity.)

deionized water: a grade of purified water produced by the exchange of cations for hydrogen ions and anions for hydroxyl ions.

dent: a large, smooth-bottomed depression whose diameter or width is greater than its depth and that will not produce an indication.

descaling: the removal of heavy, tightly adherent oxide films resulting from hot-forming, heat-treatment, welding, and other high-temperature operations such as in steam systems.

discoloration: any change in surface color from that of the base metal. Usually associated with oxidation occurring on the weld and heat-affected zone on the outside diameter and inside diameter of the weld joint as a result of heating the metal during welding. Colors may range from pale bluish-gray to deep blue, and from pale straw color to a black crusty coating.

discontinuity: interruption of the typical structure of a weldment, such as a lack of homogeneity in the mechanical, metallurgical, or physical characteristics of the material or weldment. A discontinuity is not necessarily a defect.

downslope: that part of an automatic orbital weld sequence during which the welding current is gradually reduced prior to extinguishing of the welding arc. The downslope portion of a welded joint is seen as a tapering of the end of the weld bead with a reduction of penetration from the beginning to the end of the downslope so that the final weld bead is small with minimal penetration.

duplex stainless steel: a group of stainless steels whose chemical composition is designed to produce a room temperature microstructure that is a mixture of austenite and ferrite.

electropolishing: a controlled electrochemical process utilizing acid electrolyte, DC current, anode, and cathode to smooth the surface by removal of metal.

end grain effect: a surface discontinuity of small diameter (or linear) cavities located perpendicular to the rolling direction of the material and appearing after electropolishing.

etching: the process of removing a layer of metal from its surface using a chemical and/or electrolytic process.

excessive penetration: weld penetration that exceeds the acceptance limit for inside diameter convexity. (See also convexity.)

FAT: First Article Testing. Is a formal method of providing a reported measurement for a given manufacturing process. The method consists of measuring the properties and geometry of an initial sample item against given specifications, for example a drawing.

finishing marks: any surface texture or pattern resulting from cutting, machining, forming, grinding, polishing, and/or other finishing methods.

fixture marks: an area on an electropolished component where the electrical connection was made for the processing

of the component.

flash electropolish: an electrochemical process done for a very short duration of time with a low current density, which neither significantly alters the surface of the material nor meets the acceptance criteria as set forth in Table H-3.3-1 in Nonmandatory Appendix H of ASME BPE Standard.

flushing (rinsing): the flowing of water over the process contact surfaces of system components for the removal of particulates or water-soluble contaminants.

full penetration: a weld joint is said to be fully penetrated when the depth of the weld extends from its face into the weld joint so that the joint is fully fused. For a tube to-tube weld, no unfused portions of the weld joint shall be visible on the inside diameter of a fully penetrated weld.

fusion: the melting together of filler metal and base metal, or of base metal only, that results in coalescence.

fusion welding: welding in which the base material is used together without the addition of filler material to the weld. (See also gas tungsten-arc welding.)

gasket: static seal made from deformable material compressed between two mating surfaces.

gas tungsten-arc welding (GTAW): an arc welding process that produces coalescence of metals by heating them with an arc between a tungsten (nonconsumable) electrode and the work. Shielding is obtained from a gas or gas mixture. (This process is sometimes called TIG welding, a nonpreferred term.) GTAW may be performed by adding filler material to the weld, or by a fusion process in which no filler is added.

GMP facility: a facility designed, constructed, and operated in accordance with cGMP guidelines established by the FDA.

haze: a localized diminished surface brightness, commonly produced by gassing or air pockets, during electropolishing.

heat-affected zone: that portion of the base metal or polymer that has not been melted, but whose microstructure or mechanical properties have been altered by the heat of welding or cutting.

heat number: an alphanumeric identification of a stated tonnage of metal obtained from a continuous melting in a furnace.

heat tint: coloration of a metal surface through oxidation by heating. (See also discoloration.)

higher alloy: a metal containing various alloying constituents formulated to provide enhanced corrosion resistance and possibly improved mechanical properties beyond those that are typically observed in UNS S31603 stainless steel.

hydrotest: a pressure test of piping, pressure vessels, or pressure-containing parts, usually performed by pressurizing the internal volume with water at a pressure determined by the applicable code.

hygienic: of or pertaining to equipment and piping systems that by design, materials of construction, and operation provide for the maintenance of cleanliness so that products produced by these systems will not adversely affect human or animal health.

hygienic clamp joint: a tube outside diameter union consisting of two neutered ferrules having flat faces with a concentric groove and mating gasket that is secured with a clamp, providing a non-protruding, recessless process contact surface.

hygienic joint: a tube outside diameter union providing a non-protruding, recessless process contact surface.

inclusions: particles of foreign material in a metallic or polymer matrix.

incomplete fusion (or lack of fusion): a weld discontinuity in which fusion did not occur between weld metal and faces or between adjoining weld beads. Also, in welding of tubing, when the weld fully penetrates the wall thickness but misses the joint, leaving some portion of the inner (inside diameter) weld joint with unfused edges.

incomplete penetration (or lack of penetration): a groove weld in which the weld metal does not extend completely through the joint thickness.

joint penetration: the depth that a weld extends from its face into a joint, exclusive of reinforcement.

lack of fusion after reflow: a discontinuity in welding of tubing where, after a reflow or second weld pass has been made, the original joint has still not been consumed, leaving the weld joint with unfused edges on the inner surface.

lamellar tears: terrace-like fractures in the base metal with a basic orientation parallel to the wrought surface; caused by the high stress in the thickness direction that results from welding.

laminations: elongated defects in a finished metal product, resulting from the rolling of a welded or other part containing a blowhole. Actually, the blowhole is stretched out in the direction of rolling.

linear porosity: porosity that occurs in a linear pattern. Linear porosity generally occurs in the root pass from inadequate joint penetration.

liquid penetrant indication: refer to ASME BPVC, Section V, Article 6, para. T-600, for testing an anomaly or an indication.

luster: the state or quality of shining by reflecting light. (See also variance in luster.)

machine welding: welding with equipment that performs the welding operation under the constant observation and control of a welding operator. The equipment may or may not perform the loading and unloading of the works. (See also automatic welding.)

manual welding: welding in which the entire welding operation is performed and controlled by hand. material manufacturer: an organization responsible for the production of products meeting the requirements of the material specification(s).

Material Test Report (mill test report or MTR): a document in which the results of tests, examinations, repairs, or treatments required by the material specification to be reported are recorded. This document includes those of any supplementary requirements or other requirements stated in the order for the material. This document may be combined with a Certificate of Compliance as a single document. When preparing a Material Test Report, a material manufacturer may transcribe data produced by other organizations, provided he accepts responsibility for the accuracy and authenticity of the data.

micron (1 f.L) or micrometer (1 f.Lm): one-millionth of a meter.

miter: two or more straight sections of tube matched and joined in a plane bisecting the angle of junction so as to produce a change of direction.

nick: a surface void anomaly caused by material removal or compression from the surface, whose bottom surface is usually irregular.

nominal outside diameter: a numerical identification of outside diameter to which tolerances apply.

nominal wall thickness: a numerical identification of wall thickness to which tolerances apply.

off angle: a measurement of face-to-face squareness.

off plane: a measurement of the offset between part centerlines or two planes.

open head: for orbital GTAW, a welding head that is open to the atmosphere external to the tube /pipe being welded and that does not enclose the shielding gas, which is still provided through the torch.

orange peel: large-featured, roughened type of surface visible to the unaided eye whose surface appearance pattern is like that of an orange peel.

orbital welding: automatic or machine welding of tubes or pipe in-place with the electrode rotating (or orbiting) around the work. Orbital welding can be done with the addition of filler material or as a fusion process without the addition of filler.

O-ring: ring seal of circular cross section.

overlap: the protrusion of weld metal beyond the weld toes or weld root. Also, in an orbital weld, that amount by which the end of the weld bead overlaps the beginning of the weld bead (not including the downslope) on a single-pass weld.

oxidation: a common form of electrochemical reaction that is the combining of oxygen with various elements and compounds.

oxide island: a concentration of nonmetallic impurities (often oxides or nitrides) that may form in the weld pool and solidify on the underbead or weld top surface.

oxide layer: an area usually located in the heat-affected zone of the weldment where an oxidation reaction has taken place.

passivation: removal of exogenous iron or iron from the surface of stainless steels and higher alloys by means of a chemical dissolution, most typically by a treatment with an acid solution that will remove the surface contamination and enhance the formation of the passive layer.

passive layer: a chromium-enriched oxide layer on a stainless steel surface that improves the corrosion resistance of the base metal.

passivity: the state in which a stainless steel exhibits a very low corrosion rate. The loss (or minimizing) of chemical reactivity exhibited by certain metals and alloys under special environmental conditions.

pickling: a chemical process for cleaning and descaling stainless steel and other alloy parts, equipment, and systems.

pit: a small surface void resulting from a localized loss of base material.

pitch: to cause to be set at a particular angle or slope. Degree of slope or elevation.

POU: Point of Use. A valved branch in a recirculating utility system (typically a water system).

porosity: cavity-type discontinuities formed by gas entrapment during solidification.

process component: a component that contacts the product or process fluid. Process components include, but are not limited to, piping, fittings, gaskets, vessels, valves, pumps, filter housings, and instruments.

Process contact surface: a surface under design operating conditions that is in contact with, or has the potential to be in contact with, raw materials, in-process materials, APIs, clean utilities (e.g., WFI, CIP, pure steam, process gases), or components (e.g., stoppers) and where there is a potential for the surface to affect product safety, quality, identity, strength, or purity.

product contact surface: a process contact surface that is in contact with, or has the potential to be in contact with, a product where product is defined by the owner/user. Examples of product contact surfaces may include the interior surfaces of bioreactors, transfer tubing, chromatography columns, vessels, and recirculating segments of CIP systems.

profilometer: an instrument for the measurement of the degree of surface roughness.

progressive polishing: a mechanical grinding procedure where a coarse grit material is used first and the successive operations use a finer and finer grit until the desired surface roughness is achieved.

pure steam: steam that is produced by a steam generator that, when condensed, meets requirements for water-for-injection (WFI).

purified water (PW): a classification of water according to compendial standards.

Ra: log of the arithmetic mean of the surface profile.

Ra max.: the highest value of a series of Ra readings.

reflow: a second weld pass made to correct a lack of fusion or missed joint.

reinforcement: see convexity.

rouge: a general term used to describe a variety of discolorations in high-purity stainless steel biopharmaceutical systems. It is composed of metallic (primarily iron) oxides and/or hydroxides. Three types of rouge have been categorized. Class I rouge: a rouge that is predominantly particulate in nature that tends to migrate downstream from its origination point and can deposit on process contact surfaces. It is generally orange to red-orange in color. These particles can be wiped off a surface and are evident on a wipe. Surface composition under the rouge remains unchanged.

Class II rouge: a localized form of active corrosion. It occurs in a spectrum of colors (orange, red, blue, purple, gray, black). It can be the result of chloride or other halide attack on the surface of the stainless steel.

Class III rouge: a surface oxidation condition occurring in high-temperature environments such as pure steam systems. The system's color transitions to gold, to blue, to various shades of black, as the layer thickens. This surface oxidation initiates as a stable layer and is rarely particulate in nature. It is an extremely stable form of magnetite (iron sesquioxide, Fe₃O₄).

sanitary (hygienic) weld: generally considered to be a groove weld in a square butt joint made by the GTAW (or plasma) process as a fusion weld without the addition of filler material. A sanitary weld must be completely penetrated on the weld I.D., with little or no discoloration due to oxidation, and be otherwise without defects that would interfere with maintenance in a clean and sterile condition.

scratch: an elongated mark or groove cut in the surface by mechanical means, not associated with the predominant surface texture pattern.

slag: a non-metallic product resulting from the mutual dissolution of flux and non-metallic impurities in some welding and brazing operations.

slope: an incline or deviation from the horizontal. A tube or pipe installed in the horizontal plane is said to slope if one end is positioned higher than the other.

splatter: the metal particles expelled during welding that do not form part of a weld.

spot electropolishing: a localized electrochemical process that is capable of producing the correct Cr to Fe ratios on the surface of a material and meeting the requirements of Table H-3.3-1 in Nonmandatory Appendix H.

square cut: a tube end cut perpendicular to the tangent plane.

squareness: face-to-face perpendicularity.

steam-in-place (SIP): the use of steam to sanitize or sterilize a piece of equipment without the use of an autoclave.

superaustenitic stainless steel: a subgroup of austenitic stainless steels having elevated levels of nickel, chromium, and molybdenum compared with standard austenitic stainless steels (e.g., UNS S31603) and that may have other additions (e.g., nitrogen and/or copper) to increase strength and resistance to pitting corrosion and stress corrosion cracking in the presence of chlorides.

super duplex stainless steel: those duplex stainless steels whose chemical composition is designed to result in a pitting resistance equivalent number (PREN) of at least 40.

surface finish: all surfaces as defined by Part SF of the current ASME BPE Standard and/or the owner/user or manufacturer and expressed in Ra inches or meters.

surface inclusion: particles of foreign material in a metallic matrix. The particles are usually compounds such as oxides, sulfides, or silicates, but may be a substance foreign to and essentially insoluble in the matrix.

surface residual: a foreign substance that adheres to a surface by chemical reaction, adhesion, adsorption, or ionic bonding (e.g., corrosion, rouging, and staining).

tungsten inclusions: tungsten particles transferred into the weld deposit by occasional touching of the tungsten electrode used in the gas tungsten-arc process to the work or to the molten weld metal. These inclusions are often considered defects that must be removed and the weld repaired prior to final acceptance. Tungsten inclusions may be invisible to the unaided eye, but are readily identified in a radiograph.

undercut: a groove melted into the base metal adjacent to the weld toe or weld root and left unfilled by weld metal.

underfill: a depression on the weld face or root surface extending below the adjacent surface of the base metal. (See also concavity.)

uniformly scattered porosity: porosity that is distributed in a weldment in a uniform pattern.

variance in luster: the appearance of a different shine or reflectivity resulting from the examination or inspection technique or from the preconditioning or conditioning of the electropolished surface.

waviness: undulations or rippling of the surfaces.

weld whitening: a difference in appearance of grain structure between weld metal and base metal after electropolishing.

WFI: water-for-injection, a classification of water according to compendial standards.

Limited Warranty

G HWA Industries Co., Ltd. products are warranted to be free from defects in material and workmanship for a period of one year from the date of shipment. Any product that proves to be defective shall be repaired or replaced such defective products at the option of G HWA, providing it has been used in an approved installation and maintained in strict accordance with recognized standard industry practice, and that has not been subject to extraordinary service, such as encountered under severe corrosive or abrasive conditions.

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