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Steel & O'Brien Manufacturing

QUALITY BPE FITTINGS, TUBING AND MORE



BPE BIO-PHARM FITTINGS CATALOG 2016

From concept, design and prototype, to large scale quantities, let Steel & O'Brien Mfg. turn your vision into reality.



Member of:



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About Us

Steel & O'Brien is a domestic manufacturer of sanitary stainless steel fittings for the food processing, pharmaceutical and various other industries, located in Western New York.

Founded in 1990, S&O is family owned and operated specializing in quick turn around, custom fittings and very competitive pricing.

Our new 205,000 square foot facility, maintains over twenty-five million dollars in finished goods inventory as well as over one million dollars in raw materials inventory.

Introduction

Steel & O'Brien Manufacturing offers a full line of ASME-BPE compliant fittings for the Pharmaceutical and Biotech Industries. Ranging in sizes from 1/2" - 6" with weld and clamp end connections, in 316L material.

Traceability - All fittings are marked according to the latest ASME-BPE specifications. Permanently marking each fitting allows for full traceability back to the original stainless steel used to make the part. All Material Test Reports are available upon request or on our website. (www.steelobrien.com).

Quality - Every BPE fitting is inspected by a highly trained staff to the latest ASME-BPE specifications.

Packing - To prevent damage and contamination all BPE fittings are capped and bagged in transparent bags.

Boroscopying - Ability to inspect and record welds with an inside diameter of .370 and larger. With a reach of up to 76" from access port. Our high resolution boroscope gives Steel and O'Brien the ability to inspect for ASME-BPE weld discoloration acceptance.



Introduction

Polishing - Polishing is an important component for BPE fittings. Polish offerings are shown below and comply to the latest ASME-BPE requirements

SURFACE FINISH CODE	BPE Designation	Inside Surface		Outside Surface
		Ra Max.		Polish Method
		μ -in.	μ m	
PU	SF0			Unpolished
PC	SF1	20	0.51	Mechanical Polish
PL	SF1	20	0.51	Mechanical Polish
PD	SF4	15	0.38	Mechanical Polish & Electropolish
PM	SF4	15	0.38	Mechanical Polish & Electropolish

Special Fabrications

Steel & O'Brien Mfg. provides custom fabrications in stainless steel as well as other alloys including Hastelloy, AL6XN, Titanium, Monel and Inconel.

Our experienced team of engineers, machinists, welders, and polishers can take your design from drawing to finished part while meeting and often exceeding customer specifications. Industry leading delivery times keeps your project on time.

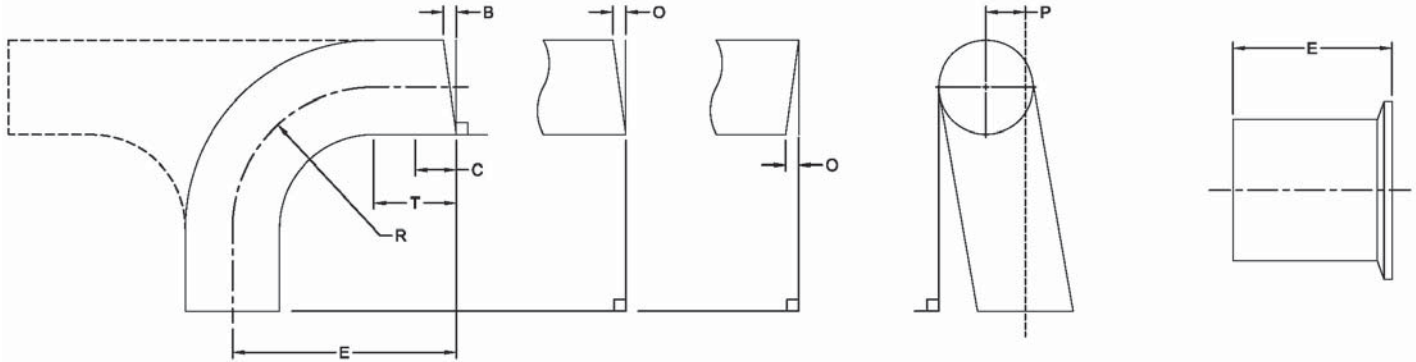
Give us a call for a prompt quote on your custom fabrication needs.



BPE FITTINGS

DIMENSIONS & TOLERANCES

As specified in ASME BPE Part DT-3-1

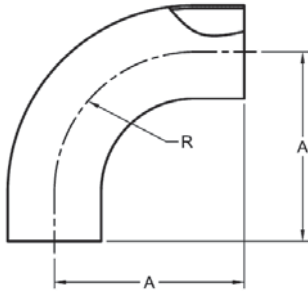


Nominal Size	O.D.		Wall Thickness (Mechanical Polish)		Wall Thickness (Electropolish)		Squareness Face to Tangent, B (max.)		Off Angle O (max.)		Equivalent Angle (O) (max.)	Off Plane, P (max.)		Centerline Radius (CLR), R	
	in.	mm.	in.	mm.	in.	mm.	in.	mm.	in.	mm.		in.	mm.	in.	mm.
1/4	±0.005	±0.13	+0.003/-0.004	+0.08/-0.10	+0.003/-0.006	+0.08/-0.15	0.005	0.13	0.009	0.23	2.1	0.030	0.76	0.563	14.30
3/8	±0.005	±0.13	+0.003/-0.004	+0.08/-0.10	+0.003/-0.006	+0.08/-0.15	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/-0.010	+0.13/-0.25	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/-0.010	+0.13/-0.25	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	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.025	0.64	1.4	0.030	0.76	1.500	38.10
1-1/2	±0.008	±0.20	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.034	0.86	1.3	0.050	1.27	2.250	57.15
2	±0.008	±0.20	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	0.008	0.20	0.043	1.09	1.2	0.050	1.27	3.000	76.20
2-1/2	±0.010	±0.25	+0.005/-0.008	+0.13/-0.20	+0.005/-0.010	+0.13/-0.25	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	+0.005/-0.010	+0.13/-0.25	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	+0.38/-0.38	+0.008/-0.012	+0.20/-0.30	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/-0.20	+0.015/-0.017	+0.38/-0.43	0.030	0.76	0.135	3.43	1.3	0.060	1.52	9.000	228.60

General Notes:

- 1) Tolerances for "E" end-to-end and center-to-end = .050 in (1.27mm)
- 2) Tolerance for centerline radius (CLR) = ±10% of the nominal O.D. Dimension

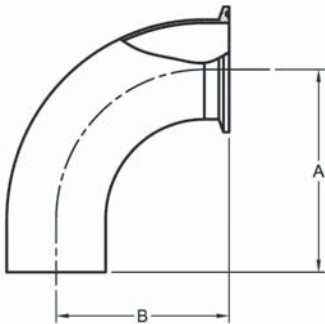
S2S - 90 DEGREE ELBOW, TANGENT WELD ENDS



PART NUMBER	SIZE	A	R
S2S-.50	1/2	3.000	1.125
S2S-.75	3/4	3.000	1.125
S2S-1	1	3.000	1.500
S2S-15	1-1/2	3.750	2.250
S2S-2	2	4.750	3.000
S2S-25	2-1/2	5.500	3.750
S2S-3	3	6.250	4.500
S2S-4	4	8.000	6.000
S2S-6	6	11.500	9.000

BPE TABLE DT-4.1.1-1

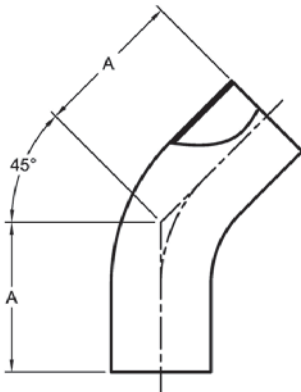
S2CKW - 90 DEGREE ELBOW, TANGENT WELD END X CLAMP



PART NUMBER	SIZE	A	B
S2CKW-.50	1/2	3.000	1.625
S2CKW-.75	3/4	3.000	1.625
S2CKW-1	1	3.000	2.000
S2CKW-15	1-1/2	3.750	2.750
S2CKW-2	2	4.750	3.500
S2CKW-25	2-1/2	5.500	4.250
S2CKW-3	3	6.250	5.000
S2CKW-4	4	8.000	6.625
S2CKW-6	6	11.500	10.500

BPE TABLE DT-4.1.1-2

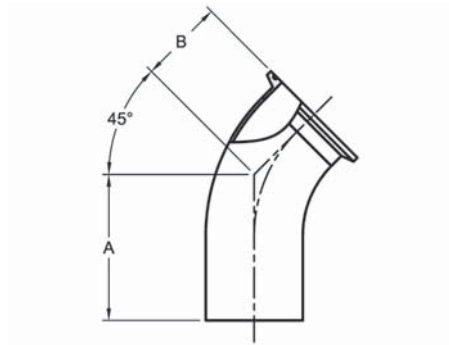
S2KS - 45 DEGREE ELBOW, TANGENT WELD ENDS



PART NUMBER	SIZE	A
S2KS-.50	1/2	2.250
S2KS-.75	3/4	2.250
S2KS-1	1	2.250
S2KS-15	1-1/2	2.500
S2KS-2	2	3.000
S2KS-25	2-1/2	3.375
S2KS-3	3	3.625
S2KS-4	4	4.500
S2KS-6	6	6.250

BPE TABLE DT-4.1.1-4

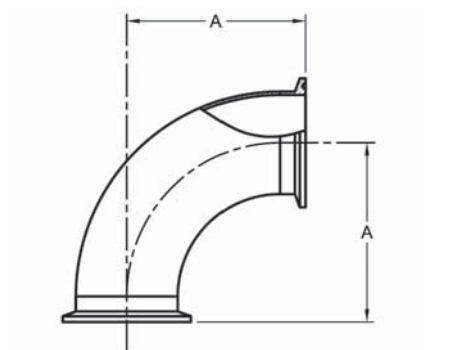
S2KKW - 45 DEGREE ELBOW, TANGENT WELD END X CLAMP



PART NUMBER	SIZE	A	B
S2KKW-.50	1/2	2.250	1.000
S2KKW-.75	3/4	2.250	1.000
S2KKW-1	1	2.250	1.125
S2KKW-15	1-1/2	2.500	1.438
S2KKW-2	2	3.000	1.750
S2KKW-25	2-1/2	3.375	2.063
S2KKW-3	3	3.625	2.375
S2KKW-4	4	4.500	3.125
S2KKW-6	6	6.250	5.250

BPE TABLE DT-4.1.1-5

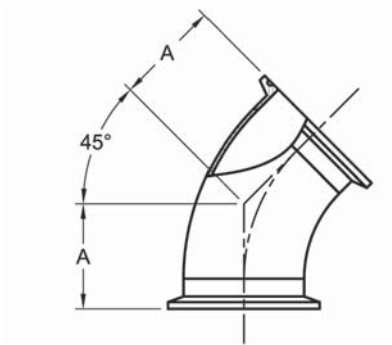
S2CMP - 90 DEGREE ELBOW, CLAMP ENDS



PART NUMBER	SIZE	A
S2CMP-.50	1/2	1.625
S2CMP-.75	3/4	1.625
S2CMP-1	1	2.000
S2CMP-15	1-1/2	2.750
S2CMP-2	2	3.500
S2CMP-25	2-1/2	4.250
S2CMP-3	3	5.000
S2CMP-4	4	6.625
S2CMP-6	6	10.500

BPE TABLE DT-4.1.1-3

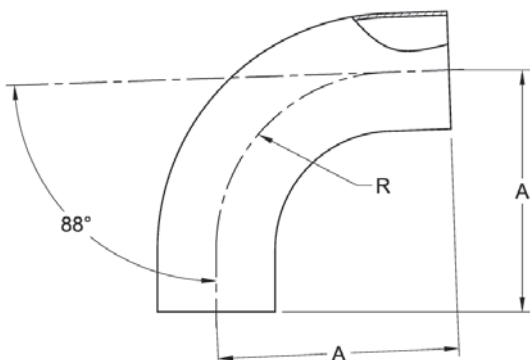
S2KMP - 45 DEGREE ELBOW, CLAMP ENDS



PART NUMBER	SIZE	A
S2KMP-.50	1/2	1.000
S2KMP-.75	3/4	1.000
S2KMP-1	1	1.125
S2KMP-15	1-1/2	1.438
S2KMP-2	2	1.750
S2KMP-25	2-1/2	2.063
S2KMP-3	3	2.375
S2KMP-4	4	3.125
S2KMP-6	6	5.250

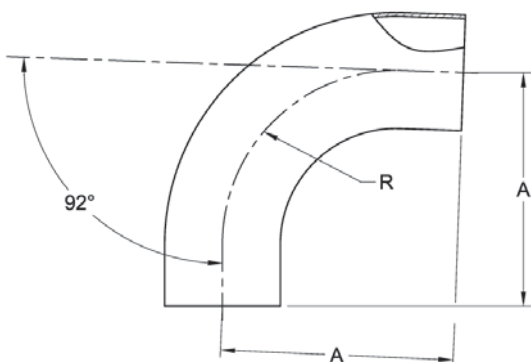
BPE TABLE DT-4.1.1-6

S2S88 - 88 DEGREE ELBOW TANGENT WELD ENDS



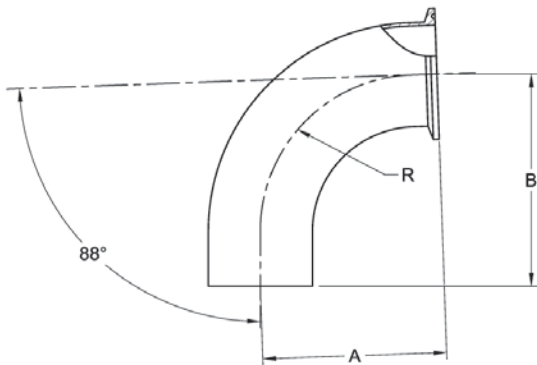
PART NUMBER	SIZE	A	R
S2S88-.50	1/2	3.065	1.125
S2S88-.75	3/4	3.065	1.125
S2S88-1	1	3.051	1.500
S2S88-15	1-1/2	3.801	2.250
S2S88-2	2	4.809	3.000
S2S88-25	2-1/2	5.559	3.750
S2S88-3	3	6.308	4.500
S2S88-4	4	8.066	6.000

S2S92 - 92 DEGREE ELBOW TANGENT WELD ENDS



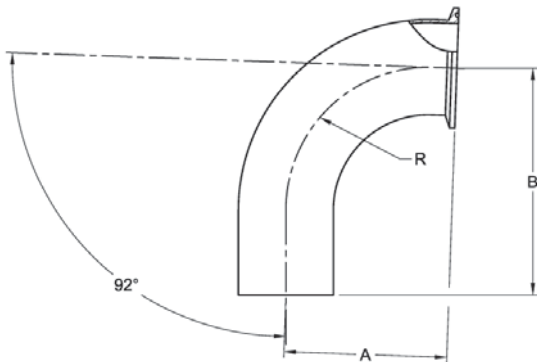
PART NUMBER	SIZE	A	R
S2S92-.50	1/2	2.921	1.125
S2S92-.75	3/4	2.934	1.125
S2S92-1	1	2.947	1.500
S2S92-15	1-1/2	3.696	2.250
S2S92-2	2	4.687	3.000
S2S92-25	2-1/2	5.432	3.750
S2S92-3	3	6.181	4.500
S2S92-4	4	7.919	6.000

S2CKW88 - 88 DEGREE ELBOW, TANGENT WELD END X CLAMP END



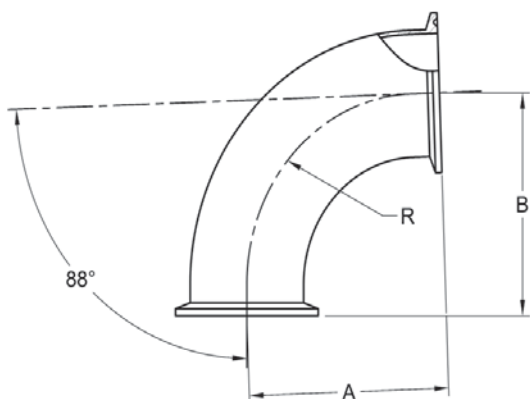
PART NUMBER	SIZE	A	B	R
S2CKW88-.50	1/2	1.690	3.017	1.125
S2CKW88-.75	3/4	1.725	3.015	1.125
S2CKW88-1	1	2.051	3.017	1.500
S2CKW88-1.5	1-1/2	2.806	3.764	2.250
S2CKW88-2	2	3.559	4.766	3.000
S2CKW88-2.5	2-1/2	4.309	5.515	3.750
S2CKW88-3	3	5.058	6.265	4.500
S2CKW88-4	4	6.691	8.018	6.000

S2CKW92 - 92 DEGREE ELBOW, TANGENT WELD END X CLAMP END



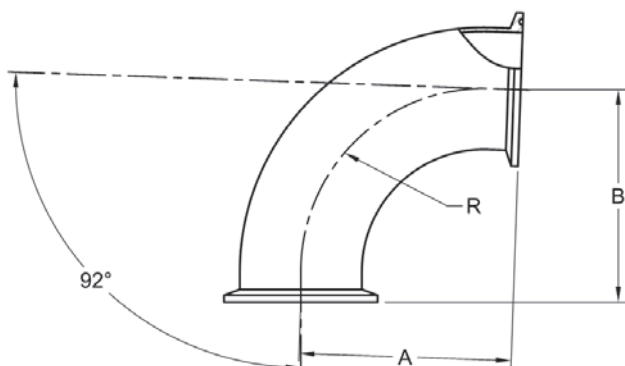
PART NUMBER	SIZE	A	B	R
S2CKW92-.50	1/2	1.511	2.983	1.125
S2CKW92-.75	3/4	1.564	2.982	1.125
S2CKW92-1	1	1.877	2.983	1.500
S2CKW92-1.5	1-1/2	2.696	3.731	2.250
S2CKW92-2	2	3.298	4.734	3.000
S2CKW92-2.5	2-1/2	4.012	5.486	3.750
S2CKW92-3	3	4.727	6.250	4.500
S2CKW92-4	4	6.272	7.981	6.000

S2CMP88 - 88 DEGREE ELBOW CLAMP ENDS



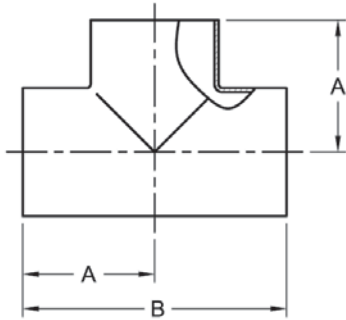
PART NUMBER	SIZE	A	B	R
S2CMP88-.50	1/2	1.642	1.642	1.125
S2CMP88-.75	3/4	1.647	1.647	1.125
S2CMP88-1	1	2.017	2.017	1.500
S2CMP88-1.5	1-1/2	2.771	2.771	2.250
S2CMP88-2	2	3.516	3.516	3.000
S2CMP88-2.5	2-1/2	4.265	4.265	3.750
S2CMP88-3	3	5.015	5.015	4.500
S2CMP88-4	4	6.644	6.644	6.000

S2CMP92 - 92 DEGREE ELBOW CLAMP ENDS



PART NUMBER	SIZE	A	B	R
S2CMP92-.50	1/2	1.559	1.608	1.125
S2CMP92-.75	3/4	1.667	1.607	1.125
S2CMP92-1	1	1.912	1.983	1.500
S2CMP92-1.5	1-1/2	2.724	2.733	2.250
S2CMP92-2	2	3.341	3.481	3.000
S2CMP92-2.5	2-1/2	4.056	4.233	3.750
S2CMP92-3	3	4.770	4.983	4.500
S2CMP92-4	4	6.320	6.606	6.000

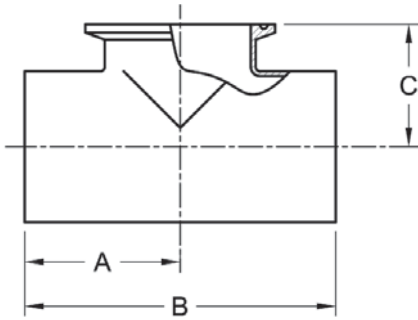
S7WWW - TEE, TANGENT WELD ENDS



PART NUMBER	SIZE	A	B
S7WWW-.50	1/2	1.875	3.750
S7WWW-.75	3/4	2.000	4.000
S7WWW-1	1	2.125	4.250
S7WWW-15	1-1/2	2.375	4.750
S7WWW-2	2	2.875	5.750
S7WWW-25	2-1/2	3.125	6.250
S7WWW-3	3	3.375	6.750
S7WWW-4	4	4.125	8.250
S7WWW-6	6	5.625	11.250

BPE TABLE DT-4.1.2-1

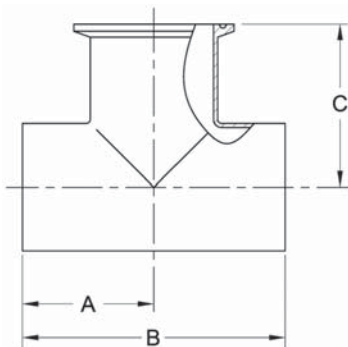
S7SWWK - TEE, TANGENT WELD ENDS x SHORT CLAMP OUTLET



PART NUMBER	SIZE	A	B	C
S7SWWK-.50	1/2	1.875	3.750	1.000
S7SWWK-.75	3/4	2.000	4.000	1.125
S7SWWK-1	1	2.125	4.250	1.125
S7SWWK-15	1-1/2	2.375	4.750	1.375
S7SWWK-2	2	2.875	5.750	1.625
S7SWWK-25	2-1/2	3.125	6.250	1.875
S7SWWK-3	3	3.375	6.750	2.125
S7SWWK-4	4	4.125	8.250	2.750
S7SWWK-6	6	5.625	11.250	4.625

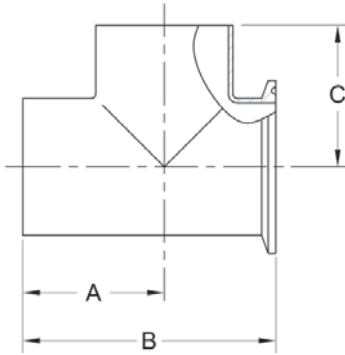
BPE TABLE DT-4.1.2-2

S7WWK - TEE, TANGENT WELD ENDS x CLAMP OUTLET



PART NUMBER	SIZE	A	B	C
S7WWK-.50	1/2	1.875	3.750	2.375
S7WWK-.75	3/4	2.000	4.000	2.500
S7WWK-1	1	2.125	4.250	2.625
S7WWK-15	1-1/2	2.375	4.750	2.875
S7WWK-2	2	2.875	5.750	3.375
S7WWK-25	2-1/2	3.125	6.250	3.625
S7WWK-3	3	3.375	6.750	3.875
S7WWK-4	4	4.125	8.250	4.750
S7WWK-6	6	5.625	11.250	6.375

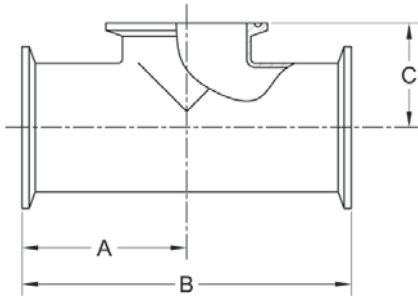
S7WSKW - TEE, TANGENT WELD ENDS x CLAMP SHORT RUN



PART NUMBER	SIZE	A	B	C
S7WSKW-.50	1/2	1.875	2.750	1.875
S7WSKW-.75	3/4	2.000	3.000	2.000
S7WSKW-1	1	2.125	3.250	2.125
S7WSKW-15	1-1/2	2.375	3.750	2.375
S7WSKW-2	2	2.875	4.500	2.875
S7WSKW-25	2-1/2	3.125	5.000	3.125
S7WSKW-3	3	3.375	5.500	3.375
S7WSKW-4	4	4.125	6.875	4.125
S7WSKW-6	6	5.625	4.625	5.625

BPE TABLE DT-4.1.2-3

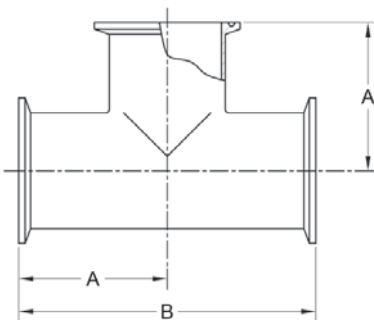
S7MPS - TEE, CLAMP ENDS x SHORT CLAMP OUTLET



PART NUMBER	SIZE	A	B	C
S7MPS-.50	1/2	2.250	4.500	1.000
S7MPS-.75	3/4	2.375	4.750	1.125
S7MPS-1	1	2.625	5.250	1.125
S7MPS-15	1-1/2	2.875	5.750	1.375
S7MPS-2	2	3.375	6.750	1.625
S7MPS-25	2-1/2	3.625	7.750	1.875
S7MPS-3	3	3.875	7.750	2.125
S7MPS-4	4	4.750	9.500	2.750
S7MPS-6	6	7.125	14.250	4.625

BPE TABLE DT-4.1.2-5

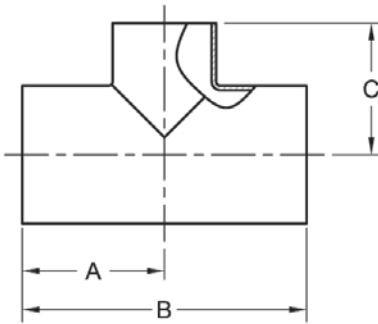
S7MP - TEE, CLAMP ENDS



PART NUMBER	SIZE	A	B
S7MP-.50	1/2	2.250	4.500
S7MP-.75	3/4	2.375	4.750
S7MP-1	1	2.625	5.250
S7MP-15	1-1/2	2.875	5.750
S7MP-2	2	3.375	6.750
S7MP-25	2-1/2	3.625	7.250
S7MP-3	3	3.875	7.750
S7MP-4	4	4.750	9.500
S7MP-6	6	7.125	14.250

BPE TABLE DT-4.1.2-4

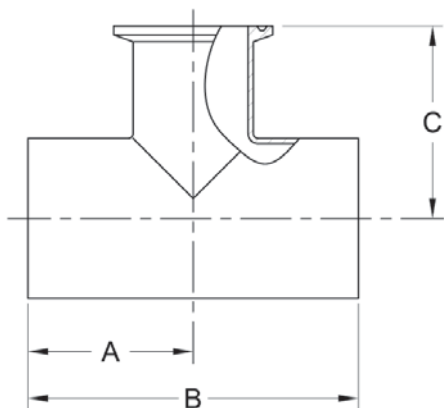
S7RWWW - REDUCING TEE, TANGENT WELD ENDS



PART NUMBER	SIZE	A	B	C
S7RWWW-.75X.50	3/4 X 1/2	2.000	4.000	2.000
S7RWWW-1X.50	1 X 1/2	2.125	4.250	2.125
S7RWWW-1X.75	1 X 3/4	2.125	4.250	2.125
S7RWWW-15X.50	1-1/2 X 1/2	2.375	4.750	2.375
S7RWWW-15X.75	1-1/2 X 3/4	2.375	4.750	2.375
S7RWWW-15X1	1-1/2 X 1	2.375	4.750	2.375
S7RWWW-2X.50	2 X 1/2	2.875	5.750	2.625
S7RWWW-2X.75	2 X 3/4	2.875	5.750	2.625
S7RWWW-2X1	2 X 1	2.875	5.750	2.625
S7RWWW-2X15	2 X 1-1/2	2.875	5.750	2.625
S7RWWW-25X.50	2-1/2 X 1/2	3.125	6.250	2.875
S7RWWW-25X.75	2-1/2 X 3/4	3.125	6.250	2.875
S7RWWW-25X1	2-1/2 X 1	3.125	6.250	2.875
S7RWWW-25X15	2-1/2 X 1-1/2	3.125	6.250	2.875
S7RWWW-25X2	2-1/2 X 2	3.125	6.250	2.875
S7RWWW-3X.50	3 X 1/2	3.375	6.750	3.125
S7RWWW-3X.75	3 X 3/4	3.375	6.750	3.125
S7RWWW-3X1	3 X 1	3.375	6.750	3.125
S7RWWW-3X15	3 X 1-1/2	3.375	6.750	3.125
S7RWWW-3X2	3 X 2	3.375	6.750	3.125
S7RWWW-3X25	3 X 2-1/2	3.375	6.750	3.125
S7RWWW-4X.50	4 X 1/2	4.125	8.250	3.625
S7RWWW-4X.75	4 X 3/4	4.125	8.250	3.625
S7RWWW-4X1	4 X 1	4.125	8.250	3.625
S7RWWW-4X15	4 X 1-1/2	4.125	8.250	3.625
S7RWWW-4X2	4 X 2	4.125	8.250	3.875
S7RWWW-4X25	4 X 2-1/2	4.125	8.250	3.875
S7RWWW-4X3	4 X 3	4.125	8.250	3.875
S7RWWW-6X3	6 X 3	5.625	11.250	4.875
S7RWWW-6X4	6 X 4	5.625	11.250	5.125

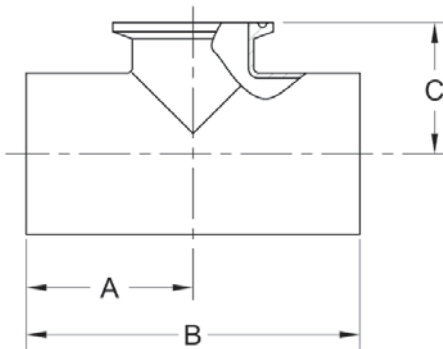
BPE TABLE DT-4.1.2-6

S7RWWK - REDUCING TEE, TANGENT WELD ENDS x CLAMP END BRANCH



PART NUMBER	SIZE	A	B	C
S7RWWK-.75X.50	3/4 X 1/2	2.000	4.000	2.500
S7RWWK-1X.50	1 X 1/2	2.125	4.250	2.625
S7RWWK-1X.75	1 X 3/4	2.125	4.250	2.625
S7RWWK-1.5X.50	1-1/2 X 1/2	2.375	4.750	2.875
S7RWWK-1.5X.75	1-1/2 X 3/4	2.375	4.750	2.875
S7RWWK-1.5X1	1-1/2 X 1	2.375	4.750	2.875
S7RWWK-2X.50	2 X 1/2	2.875	5.750	3.125
S7RWWK-2X.75	2 X 3/4	2.875	5.750	3.125
S7RWWK-2X1	2 X 1	2.875	5.750	3.125
S7RWWK-2X1.5	2 X 1-1/2	2.875	5.750	3.125
S7RWWK-2.5X.50	2-1/2 X 1/2	3.125	6.250	3.375
S7RWWK-2.5X.75	2-1/2 X 3/4	3.125	6.250	3.375
S7RWWK-2.5X1	2-1/2 X 1	3.125	6.250	3.375
S7RWWK-2.5X1.5	2-1/2 X 1-1/2	3.125	6.250	3.375
S7RWWK-2.5X2	2-1/2 X 2	3.125	6.250	3.375
S7RWWK-3X.50	3 X 1/2	3.375	6.750	3.625
S7RWWK-3X.75	3 X 3/4	3.375	6.750	3.625
S7RWWK-3X1	3 X 1	3.375	6.750	3.625
S7RWWK-3X1.5	3 X 1-1/2	3.375	6.750	3.625
S7RWWK-3X2	3 X 2	3.375	6.750	3.625
S7RWWK-3X2.5	3 X 2-1/2	3.375	6.750	3.625
S7RWWK-4X.50	4 X 1/2	4.125	8.250	4.125
S7RWWK-4X.75	4 X 3/4	4.125	8.250	4.125
S7RWWK-4X1	4 X 1	4.125	8.250	4.125
S7RWWK-4X1.5	4 X 1-1/2	4.125	8.250	4.125
S7RWWK-4X2	4 X 2	4.125	8.250	4.375
S7RWWK-4X2.5	4 X 2-1/2	4.125	8.250	4.375
S7RWWK-4X3	4 X 3	4.125	8.250	4.375
S7RWWK-6X3	6 X 3	5.625	11.250	5.375
S7RWWK-6X4	6 X 4	5.625	11.250	5.750

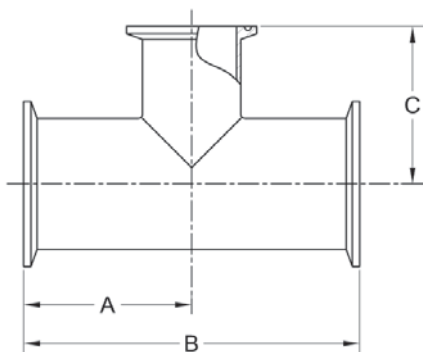
S7RSWWK - REDUCING TEE, TANGENT WELD ENDS x SHORT CLAMP BRANCH



PART NUMBER	SIZE	A	B	C
S7RSWWK-.75X.50	3/4 X 1/2	2.000	4.000	1.000
S7RSWWK-1X.50	1 X 1/2	2.125	4.250	1.125
S7RSWWK-1X.75	1 X 3/4	2.125	4.250	1.125
S7RSWWK-1.5X.50	1-1/2 X 1/2	2.375	4.750	1.375
S7RSWWK-1.5X.75	1-1/2 X 3/4	2.375	4.750	1.375
S7RSWWK-1.5X1	1-1/2 X 1	2.375	4.750	1.375
S7RSWWK-2X.50	2 X 1/2	2.875	5.750	1.625
S7RSWWK-2X.75	2 X 3/4	2.875	5.750	1.625
S7RSWWK-2X1	2 X 1	2.875	5.750	1.625
S7RSWWK-2X1.5	2 X 1-1/2	2.875	5.750	1.625
S7RSWWK-2.5X.50	2-1/2 X 1/2	3.125	6.250	1.875
S7RSWWK-2.5X.75	2-1/2 X 3/4	3.125	6.250	1.875
S7RSWWK-2.5X1	2-1/2 X 1	3.125	6.250	1.875
S7RSWWK-2.5X1.5	2-1/2 X 1-1/2	3.125	6.250	1.875
S7RSWWK-2.5X2	2-1/2 X 2	3.125	6.250	1.875
S7RSWWK-3X.50	3 X 1/2	3.375	6.750	2.125
S7RSWWK-3X.75	3 X 3/4	3.375	6.750	2.125
S7RSWWK-3X1	3 X 1	3.375	6.750	2.125
S7RSWWK-3X1.5	3 X 1-1/2	3.375	6.750	2.125
S7RSWWK-3X2	3 X 2	3.375	6.750	2.125
S7RSWWK-3X2.5	3 X 2-1/2	3.375	6.750	2.125
S7RSWWK-4X.50	4 X 1/2	4.125	8.250	2.625
S7RSWWK-4X.75	4 X 3/4	4.125	8.250	2.625
S7RSWWK-4X1	4 X 1	4.125	8.250	2.625
S7RSWWK-4X1.5	4 X 1-1/2	4.125	8.250	2.625
S7RSWWK-4X2	4 X 2	4.125	8.250	2.625
S7RSWWK-4X2.5	4 X 2-1/2	4.125	8.250	2.625
S7RSWWK-4X3	4 X 3	4.125	8.250	2.625
S7RSWWK-6X3	6 X 3	5.625	11.250	3.625
S7RSWWK-6X4	6 X 4	5.625	11.250	3.750

BPE TABLE DT-4.1.2-7

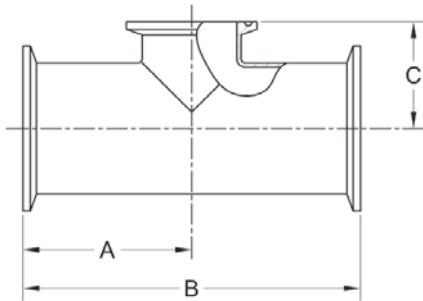
S7RMP - REDUCING TEE, CLAMP ENDS



PART NUMBER	SIZE	A	B	C
S7RMP-.75X.50	3/4 X 1/2	2.500	5.000	2.500
S7RMP-1X.50	1 X 1/2	2.625	5.250	2.625
S7RMP-1X.75	1 X 3/4	2.625	5.250	2.625
S7RMP-15X.50	1-1/2 X 1/2	2.875	5.750	2.875
S7RMP-15X.75	1-1/2 X 3/4	2.875	5.750	2.875
S7RMP-15X1	1-1/2 X 1	2.875	5.750	2.875
S7RMP-2X.50	2 X 1/2	3.375	6.750	3.125
S7RMP-2X.75	2 X 3/4	3.375	6.750	3.125
S7RMP-2X1	2 X 1	3.375	6.750	3.125
S7RMP-2X15	2 X 1-1/2	3.375	6.750	3.125
S7RMP-25X.50	2-1/2 X 1/2	3.625	7.250	3.375
S7RMP-25X.75	2-1/2 X 3/4	3.625	7.250	3.375
S7RMP-25X1	2-1/2 X 1	3.625	7.250	3.375
S7RMP-25X15	2-1/2 X 1-1/2	3.625	7.250	3.375
S7RMP-25X2	2-1/2 X 2	3.625	7.250	3.375
S7RMP-3X.50	3 X 1/2	3.875	7.750	3.625
S7RMP-3X.75	3 X 3/4	3.875	7.750	3.625
S7RMP-3X1	3 X 1	3.875	7.750	3.625
S7RMP-3X15	3 X 1-1/2	3.875	7.750	3.625
S7RMP-3X2	3 X 2	3.875	7.750	3.625
S7RMP-3X25	3 X 2-1/2	3.875	7.750	3.625
S7RMP-4X.50	4 X 1/2	4.750	9.500	4.125
S7RMP-4X.75	4 X 3/4	4.750	9.500	4.125
S7RMP-4X1	4 X 1	4.750	9.500	4.125
S7RMP-4X15	4 X 1-1/2	4.750	9.500	4.125
S7RMP-4X2	4 X 2	4.750	9.500	4.375
S7RMP-4X25	4 X 2-1/2	4.750	9.500	4.375
S7RMP-4X3	4 X 3	4.750	9.500	4.375
S7RMP-6X3	6 X 3	7.125	14.250	5.375
S7RMP-6X4	6 X 4	7.125	14.250	5.750

BPE TABLE DT-4.1.2-8

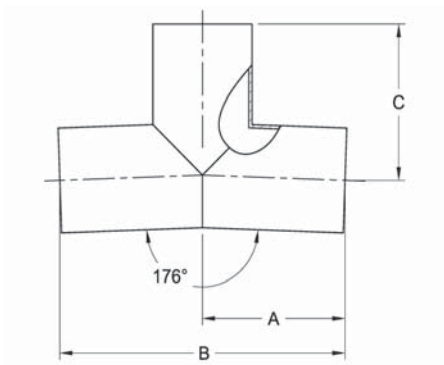
S7RMPS - REDUCING TEE, SHORT OUTLET CLAMP ENDS



PART NUMBER	SIZE	A	B	C
S7RMPS-.75X.50	3/4 X 1/2	2.500	5.000	1.000
S7RMPS-1X.50	1 X 1/2	2.625	5.250	1.125
S7RMPS-1X.75	1 X 3/4	2.625	5.250	1.125
S7RMPS-15X.50	1-1/2 X 1/2	2.875	5.750	1.375
S7RMPS-15X.75	1-1/2 X 3/4	2.875	5.750	1.375
S7RMPS-15X1	1-1/2 X 1	2.875	5.750	1.375
S7RMPS-2X.50	2 X 1/2	3.375	6.750	1.625
S7RMPS-2X.75	2 X 3/4	3.375	6.750	1.625
S7RMPS-2X1	2 X 1	3.375	6.750	1.625
S7RMPS-2X15	2 X 1-1/2	3.375	6.750	1.625
S7RMPS-25X.50	2-1/2 X 1/2	3.625	7.250	1.875
S7RMPS-25X.75	2-1/2 X 3/4	3.625	7.250	1.875
S7RMPS-25X1	2-1/2 X 1	3.625	7.250	1.875
S7RMPS-25X15	2-1/2 X 1-1/2	3.625	7.250	1.875
S7RMPS-25X2	2-1/2 X 2	3.625	7.250	1.875
S7RMPS-3X.50	3 X 1/2	3.875	7.750	2.125
S7RMPS-3X.75	3 X 3/4	3.875	7.750	2.125
S7RMPS-3X1	3 X 1	3.875	7.750	2.125
S7RMPS-3X15	3 X 1-1/2	3.875	7.750	2.125
S7RMPS-3X2	3 X 2	3.875	7.750	2.125
S7RMPS-3X25	3 X 2-1/2	3.875	7.750	2.125
S7RMPS-4X.50	4 X 1/2	4.750	9.500	2.625
S7RMPS-4X.75	4 X 3/4	4.750	9.500	2.625
S7RMPS-4X1	4 X 1	4.750	9.500	2.625
S7RMPS-4X15	4 X 1-1/2	4.750	9.500	2.625
S7RMPS-4X2	4 X 2	4.750	9.500	2.625
S7RMPS-4X25	4 X 2-1/2	4.750	9.500	2.625
S7RMPS-4X3	4 X 3	4.750	9.500	2.625
S7RMPS-6X3	6 X 3	7.125	14.250	3.625
S7RMPS-6X4	6 X 4	7.125	14.250	3.750

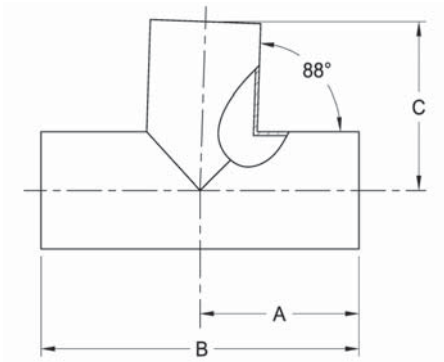
BPE TABLE DT-4.1.2-9

S7WWW176 - 176 DEGREE TEE, TANGENT WELD ENDS



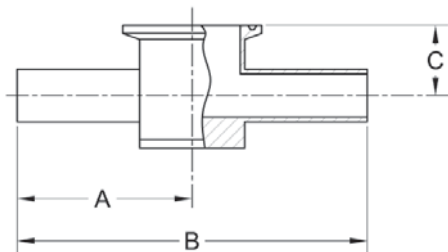
PART NUMBER	SIZE	A	B	C
S7WWW176-.50	1/2	1.874	3.748	1.940
S7WWW176-.75	3/4	1.999	3.998	2.070
S7WWW176-1	1	2.124	4.247	2.199
S7WWW176-1.5	1-1/2	2.374	4.747	2.458
S7WWW176-2	2	2.873	5.746	2.967
S7WWW176-2.5	2-1/2	3.123	6.246	3.234
S7WWW176-3	3	3.373	6.746	3.493
S7WWW176-4	4	4.123	8.245	4.269

S7WWW88 - 88 DEGREE TEE, TANGENT WELD ENDS



PART NUMBER	SIZE	A	B	C
S7WWW88-.50	1/2	1.875	3.750	1.874
S7WWW88-.75	3/4	2.000	4.000	1.999
S7WWW88-1	1	2.125	4.250	2.124
S7WWW88-1.5	1-1/2	2.375	4.750	2.374
S7WWW88-2	2	2.875	5.750	2.873
S7WWW88-2.5	2-1/2	3.125	6.250	3.123
S7WWW88-3	3	3.375	6.750	3.373
S7WWW88-4	4	4.125	8.250	4.122

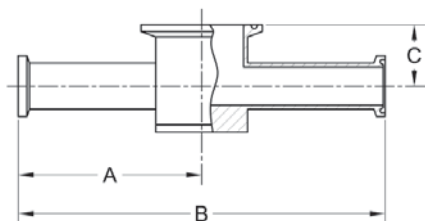
S7IWWKS - INSTRUMENT TEE, WELD ENDS x CLAMP END



PART NUMBER	SIZE	A	B	C
S7IWWKS-.50X15	1/2 x 1-1/2	2.500	5.000	.875
S7IWWKS-.75X15	3/4 x 1-1/2	2.500	5.000	1.000
S7IWWKS-1X15	1 x 1-1/2	2.500	5.000	1.125
S7IWWKS-.50X2	1/2 x 2	2.750	5.500	1.000
S7IWWKS-.75X2	3/4 x 2	2.750	5.500	1.125
S7IWWKS-1X2	1 x 2	2.750	5.500	1.250
S7IWWKS-15X2	1-1/2 x 2	2.750	5.500	1.500

BPE TABLE DT-4.1.2-10

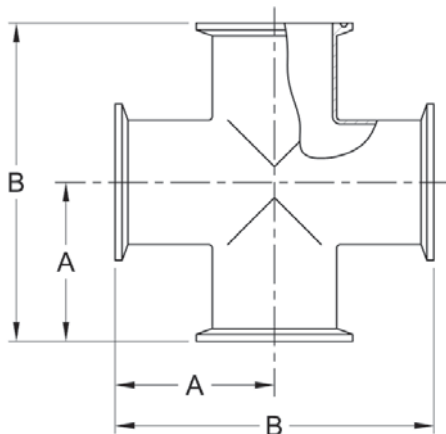
S7IMPS - INSTRUMENT TEE, CLAMP ENDS



PART NUMBER	SIZE	A	B	C
S7IMPS-.50X15	1/2 x 1-1/2	3.000	6.000	.875
S7IMPS-.75X15	3/4 x 1-1/2	3.000	6.000	1.000
S7IMPS-1X15	1 x 1-1/2	3.000	6.000	1.125
S7IMPS-.50X2	1/2 x 2	3.250	6.500	1.000
S7IMPS-.75X2	3/4 x 2	3.250	6.500	1.125
S7IMPS-1X2	1 x 2	3.250	6.500	1.250
S7IMPS-15X2	1-1/2 x 2	3.250	6.500	1.500

BPE TABLE DT-4.1.2-11

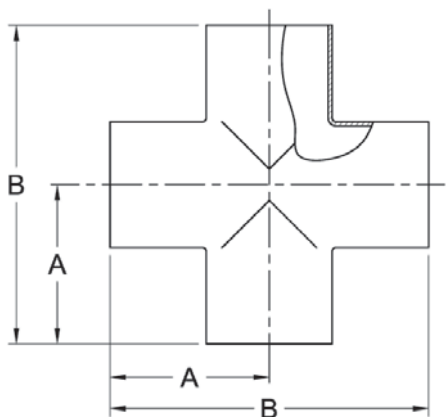
S9MP - CROSS, CLAMP ENDS



PART NUMBER	SIZE	A	B
S9MP-.50	1/2	2.250	4.500
S9MP-.75	3/4	2.375	4.750
S9MP-1	1	2.625	5.250
S9MP-15	1-1/2	2.875	5.750
S9MP-2	2	3.375	6.750
S9MP-25	2-1/2	3.625	7.250
S9MP-3	3	3.875	7.750
S9MP-4	4	4.750	9.500

BPE TABLE DT-4.1.2-4

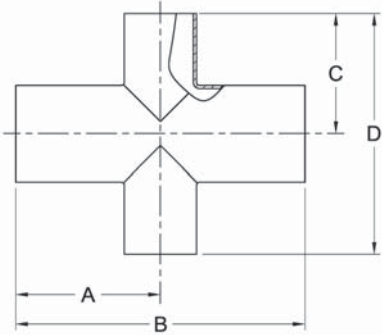
S9WWW - CROSS, TANGENT WELD ENDS



PART NUMBER	SIZE	A	B
S9WWW-.50	1/2	1.875	3.750
S9WWW-.75	3/4	2.000	4.000
S9WWW-1	1	2.125	4.250
S9WWW-15	1-1/2	2.375	4.750
S9WWW-2	2	2.875	5.750
S9WWW-25	2-1/2	3.125	6.250
S9WWW-3	3	3.375	6.750
S9WWW-4	4	4.125	8.250

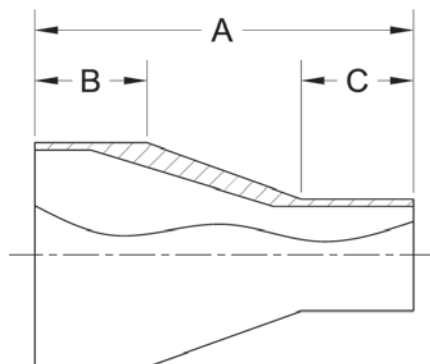
BPE TABLE DT-4.1.2-1

S9RWWW - REDUCING CROSS, TANGENT WELD ENDS



PART NUMBER	SIZE	A	B	C	D
S9RWWW-.75X.50	3/4 X 1/2	2.000	4.000	2.000	4.000
S9RWWW-1X.50	1 X 1/2	2.125	4.250	2.125	4.250
S9RWWW-1X.75	1 X 3/4	2.125	4.250	2.125	4.250
S9RWWW-1.5X.50	1-1/2 X 1/2	2.375	4.750	2.375	4.750
S9RWWW-1.5X.75	1-1/2 X 3/4	2.375	4.750	2.375	4.750
S9RWWW-1.5X1	1-1/2 X 1	2.375	4.750	2.375	4.750
S9RWWW-2X.50	2 X 1/2	2.875	5.750	2.625	5.250
S9RWWW-2X.75	2 X 3/4	2.875	5.750	2.625	5.250
S9RWWW-2X1	2 X 1	2.875	5.750	2.625	5.250
S9RWWW-2X1.5	2 X 1-1/2	2.875	5.750	2.625	5.250
S9RWWW-2.5X1	2-1/2 X 1	3.125	6.250	2.875	5.750
S9RWWW-2.5X1.5	2-1/2 X 1-1/2	3.125	6.250	2.875	5.750
S9RWWW-2.5X2	2-1/2 X 2	3.125	6.250	2.875	5.750
S9RWWW-3X1	3 X 1	3.375	6.750	3.125	6.250
S9RWWW-3X1.5	3 X 1-1/2	3.375	6.750	3.125	6.250
S9RWWW-3X2	3 X 2	3.375	6.750	3.125	6.250
S9RWWW-3X2.5	3 X 2-1/2	3.375	6.750	3.125	6.250
S9RWWW-4X1	4 X 1	4.125	8.250	3.625	7.250
S9RWWW-4X1.5	4 X 1-1/2	4.125	8.250	3.625	7.250
S9RWWW-4X2	4 X 2	4.125	8.250	3.875	7.750
S9RWWW-4X2.5	4 X 2-1/2	4.125	8.250	3.875	7.750
S9RWWW-4X3	4 X 3	4.125	8.250	3.875	7.750
S9RWWW-6X3	6 X 3	5.625	11.250	4.875	9.750
S9RWWW-6X4	6 X 4	5.625	11.250	5.125	10.250

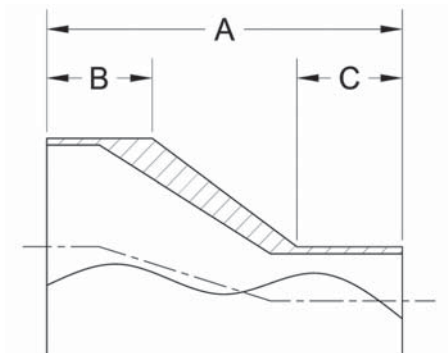
S31S - SHORT CONCENTRIC REDUCER, WELD ENDS



PART NUMBER	SIZE	A	B (min.)	C (min.)
S31S-.75X.50	3/4 X 1/2	2.125	1.000	1.000
S31S-1X.50	1 X 1/2	2.500	1.000	1.000
S31S-1X.75	1 X 3/4	2.125	1.000	1.000
S31S-15X.75	1-1/2 X 3/4	3.000	1.000	1.000
S31S-15X1	1-1/2 X 1	2.500	1.000	1.000
S31S-2X1	2 X 1	3.375	1.000	1.000
S31S-2X15	2 X 1-1/2	2.500	1.000	1.000
S31S-25X15	2-1/2 X 1-1/2	3.375	1.000	1.000
S31S-25X2	2-1/2 X 2	2.500	1.000	1.000
S31S-3X15	3 X 1-1/2	4.250	1.500	1.000
S31S-3X2	3 X 2	3.375	1.500	1.000
S31S-3X25	3 X 2-1/2	2.625	1.500	1.000
S31S-4X2	4 X 2	5.125	1.500	1.000
S31S-4X25	4 X 2-1/2	4.250	1.500	1.000
S31S-4X3	4 X 3	3.875	1.500	1.500
S31S-6X3	6 X 3	7.250	2.000	1.500
S31S-6X4	6 X 4	5.625	2.000	1.500

BPE TABLE DT-4.1.3-1

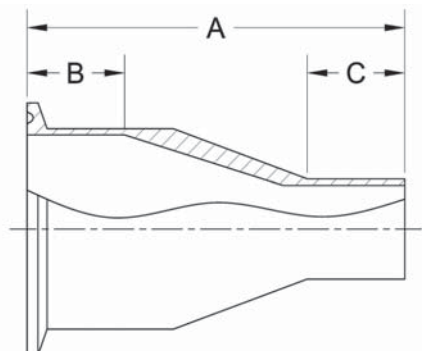
S32S - SHORT ECCENTRIC REDUCER, WELD ENDS



PART NUMBER	SIZE	A	B (min.)	C (min.)
S32S-.75X.50	3/4 X 1/2	2.125	1.000	1.000
S32S-1X.50	1 X 1/2	2.500	1.000	1.000
S32S-1X.75	1 X 3/4	2.125	1.000	1.000
S32S-1.5X.75	1-1/2 X 3/4	3.000	1.000	1.000
S32S-1.5X1	1-1/2 X 1	2.500	1.000	1.000
S32S-2X1	2 X 1	3.375	1.000	1.000
S32S-2X1.5	2 X 1-1/2	2.500	1.000	1.000
S32S-2.5X1.5	2-1/2 X 1-1/2	3.375	1.000	1.000
S32S-2.5X2	2-1/2 X 2	2.500	1.000	1.000
S32S-3X1.5	3 X 1-1/2	4.250	1.500	1.000
S32S-3X2	3 X 2	3.375	1.500	1.000
S32S-3X2.5	3 X 2-1/2	2.625	1.500	1.000
S32S-4X2	4 X 2	5.125	1.500	1.000
S32S-4X2.5	4 X 2-1/2	4.250	1.500	1.000
S32S-4X3	4 X 3	3.875	1.500	1.500
S32S-6X3	6 X 3	7.250	2.000	1.500
S32S-6X4	6 X 4	5.625	2.000	1.500

BPE TABLE DT-4.1.3-1

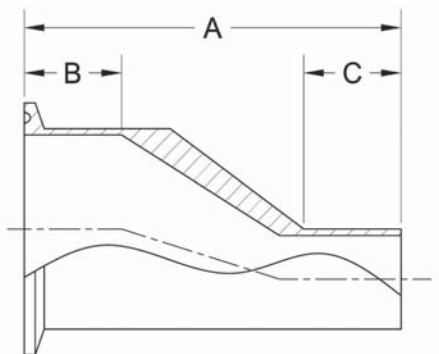
S31SK - SHORT CONCENTRIC REDUCER, CLAMP x WELD END



PART NUMBER	SIZE	A	B (I.D.) (min.)	C (min.)
S31SK-.75X.50	3/4 X 1/2	2.625	.375	1.000
S31SK-1X.50	1 X 1/2	3.000	.375	1.000
S31SK-1X.75	1 X 3/4	2.625	.375	1.000
S31SK-1.5X.75	1-1/2 X 3/4	3.500	.375	1.000
S31SK-1.5X1	1-1/2 X 1	3.000	.375	1.000
S31SK-2X1	2 X 1	3.875	.375	1.000
S31SK-2X1.5	2 X 1-1/2	3.000	.375	1.000
S31SK-2.5X1.5	2-1/2 X 1-1/2	3.875	.375	1.000
S31SK-2.5X2	2-1/2 X 2	3.000	.375	1.000
S31SK-3X1.5	3 X 1-1/2	4.750	.375	1.000
S31SK-3X2	3 X 2	3.875	.375	1.000
S31SK-3X2.5	3 X 2-1/2	3.125	.375	1.000
S31SK-4X2	4 X 2	5.750	.375	1.000
S31SK-4X2.5	4 X 2-1/2	4.875	.375	1.000
S31SK-4X3	4 X 3	4.500	.375	1.500
S31SK-6X3	6 X 3	8.000	.375	1.500
S31SK-6X4	6 X 4	6.375	.375	1.500

BPE TABLE DT-4.1.3-2

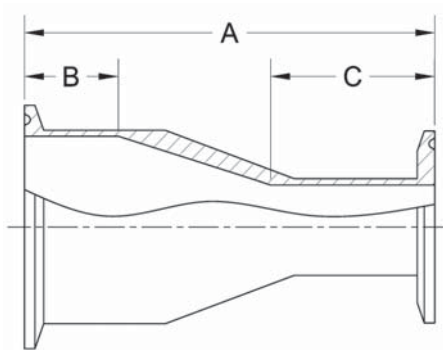
S32SK - SHORT ECCENTRIC REDUCER, CLAMP x WELD END



PART NUMBER	SIZE	A	B (I.D.) (min.)	C (min.)
S32SK-.75X.50	3/4 X 1/2	2.625	.375	1.000
S32SK-1X.50	1 X 1/2	3.000	.375	1.000
S32SK-1X.75	1 X 3/4	2.625	.375	1.000
S32SK-15X.75	1-1/2 X 3/4	3.500	.375	1.000
S32SK-15X1	1-1/2 X 1	3.000	.375	1.000
S32SK-2X1	2 X 1	3.875	.375	1.000
S32SK-2X15	2 X 1-1/2	3.000	.375	1.000
S32SK-25X15	2-1/2 X 1-1/2	3.875	.375	1.000
S32SK-25X2	2-1/2 X 2	3.000	.375	1.000
S32SK-3X15	3 X 1-1/2	4.750	.375	1.000
S32SK-3X2	3 X 2	3.875	.375	1.000
S32SK-3X25	3 X 2-1/2	3.125	.375	1.000
S32SK-4X2	4 X 2	5.750	.375	1.000
S32SK-4X25	4 X 2-1/2	4.875	.375	1.000
S32SK-4X3	4 X 3	4.500	.375	1.500
S32SK-6X3	6 X 3	8.000	.375	1.500
S32SK-6X4	6 X 4	6.375	.375	1.500

BPE TABLE DT-4.1.3-2

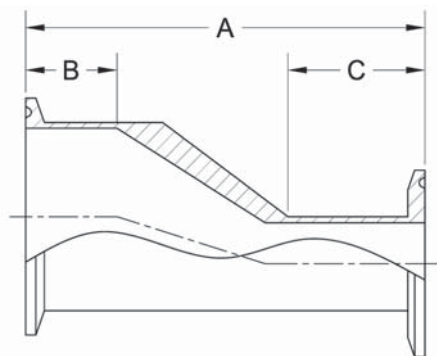
S31S-14MP - SHORT CONCENTRIC REDUCER, CLAMP x CLAMP



PART NUMBER	SIZE	A	B (I.D.) (min.)	C (I.D.) (min.)
S31S-14MP-.75X.50	3/4 X 1/2	3.125	.375	1.125
S31S-14MP-1X.50	1 X 1/2	3.500	.375	1.125
S31S-14MP-1X.75	1 X 3/4	3.125	.375	1.125
S31S-14MP-1.5X.75	1-1/2 X 3/4	4.000	.375	1.125
S31S-14MP-1.5X1	1-1/2 X 1	3.500	.375	1.125
S31S-14MP-2X1	2 X 1	4.375	.375	1.125
S31S-14MP-2X1.5	2 X 1-1/2	3.500	.375	1.125
S31S-14MP-2.5X1.5	2-1/2 X 1-1/2	4.375	.375	1.125
S31S-14MP-2.5X2	2-1/2 X 2	3.500	.375	1.125
S31S-14MP-3X1.5	3 X 1-1/2	5.250	.375	1.125
S31S-14MP-3X2	3 X 2	4.375	.375	1.125
S31S-14MP-3X2.5	3 X 2-1/2	3.625	.375	1.125
S31S-14MP-4X2	4 X 2	6.250	.375	1.125
S31S-14MP-4X2.5	4 X 2-1/2	5.375	.375	1.125
S31S-14MP-4X3	4 X 3	5.000	.375	1.625
S31S-14MP-6X3	6 X 3	8.500	.375	1.625
S31S-14MP-6X4	6 X 4	7.000	.375	1.625

BPE TABLE DT-4.1.3-3

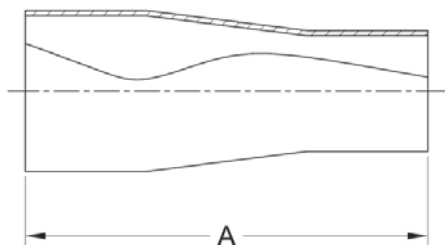
S32S-14MP - SHORT ECCENTRIC REDUCER, CLAMP x CLAMP



PART NUMBER	SIZE	A	B (I.D.) (min.)	C (I.D.) (min.)
S32S-14MP-.75X.50	3/4 X 1/2	3.125	.375	1.125
S32S-14MP-1X.50	1 X 1/2	3.500	.375	1.125
S32S-14MP-1X.75	1 X 3/4	3.125	.375	1.125
S32S-14MP-1.5X.75	1-1/2 X 3/4	4.000	.375	1.125
S32S-14MP-1.5X1	1-1/2 X 1	3.500	.375	1.125
S32S-14MP-2X1	2 X 1	4.375	.375	1.125
S32S-14MP-2X1.5	2 X 1-1/2	3.500	.375	1.125
S32S-14MP-2.5X1.5	2-1/2 X 1-1/2	4.375	.375	1.125
S32S-14MP-2.5X2	2-1/2 X 2	3.500	.375	1.125
S32S-14MP-3X1.5	3 X 1-1/2	5.250	.375	1.125
S32S-14MP-3X2	3 X 2	4.375	.375	1.125
S32S-14MP-3X2.5	3 X 2-1/2	3.625	.375	1.125
S32S-14MP-4X2	4 X 2	6.250	.375	1.125
S32S-14MP-4X2.5	4 X 2-1/2	5.375	.375	1.125
S32S-14MP-4X3	4 X 3	5.000	.375	1.625
S32S-14MP-6X3	6 X 3	8.500	.375	1.625
S32S-14MP-6X4	6 X 4	7.000	.375	1.625

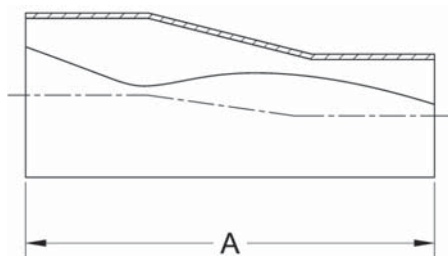
BPE TABLE DT-4.1.3-3

S31 - CONCENTRIC REDUCER, TANGENT WELD ENDS



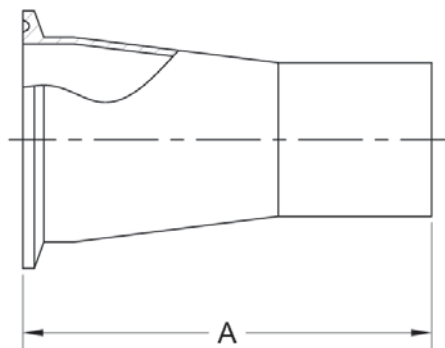
PART NUMBER	SIZE	A
S31-.75X.50	3/4 X 1/2	4.000
S31-1X.50	1 X 1/2	4.500
S31-1X.75	1 X 3/4	4.000
S31-15X.50	1-1/2 X 1/2	5.500
S31-15X.75	1-1/2 X 3/4	5.000
S31-15X1	1-1/2 X 1	5.000
S31-2X.50	2 X 1/2	7.750
S31-2X.75	2 X 3/4	7.250
S31-2X1	2 X 1	7.250
S31-2X15	2 X 1-1/2	5.250
S31-25X.50	2-1/2 X 1/2	9.750
S31-25X.75	2-1/2 X 3/4	9.250
S31-25X1	2-1/2 X 1	9.250
S31-25X15	2-1/2 X 1-1/2	7.250
S31-25X2	2-1/2 X 2	5.500
S31-3X.50	3 X 1/2	12.750
S31-3X.75	3 X 3/4	11.250
S31-3X1	3 X 1	11.250
S31-3X15	3 X 1-1/2	9.250
S31-3X2	3 X 2	7.500
S31-3X25	3 X 2-1/2	5.500
S31-4X1	4 X 1	15.500
S31-4X15	4 X 1-1/2	13.500
S31-4X2	4 X 2	11.750
S31-4X25	4 X 2-1/2	9.750
S31-4X3	4 X 3	7.750
S31-6X3	6 X 3	10.000
S31-6X4	6 X 4	10.000

S32 - ECCENTRIC REDUCER, TANGENT WELD ENDS



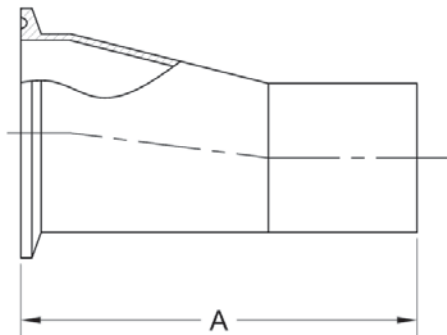
PART NUMBER	SIZE	A
S32-.75X.50	3/4 X 1/2	4.000
S32-1X.50	1 X 1/2	4.500
S32-1X.75	1 X 3/4	4.000
S32-15X.50	1-1/2 X 1/2	5.500
S32-15X.75	1-1/2 X 3/4	5.000
S32-15X1	1-1/2 X 1	5.000
S32-2X.50	2 X 1/2	7.750
S32-2X.75	2 X 3/4	7.250
S32-2X1	2 X 1	7.250
S32-2X15	2 X 1-1/2	5.250
S32-25X.50	2-1/2 X 1/2	9.750
S32-25X.75	2-1/2 X 3/4	9.250
S32-25X1	2-1/2 X 1	9.250
S32-25X15	2-1/2 X 1-1/2	7.250
S32-25X2	2-1/2 X 2	5.500
S32-3X.50	3 X 1/2	11.750
S32-3X.75	3 X 3/4	11.250
S32-3X1	3 X 1	11.250
S32-3X15	3 X 1-1/2	9.250
S32-3X2	3 X 2	7.500
S32-3X25	3 X 2-1/2	5.500
S32-4X1	4 X 1	15.500
S32-4X15	4 X 1-1/2	13.500
S32-4X2	4 X 2	11.750
S32-4X25	4 X 2-1/2	9.750
S32-4X3	4 X 3	7.750
S32-6X3	6 X 3	9.750
S32-6X4	6 X 4	10.000

S31K - CONCENTRIC REDUCER, CLAMP x TANGENT WELD END



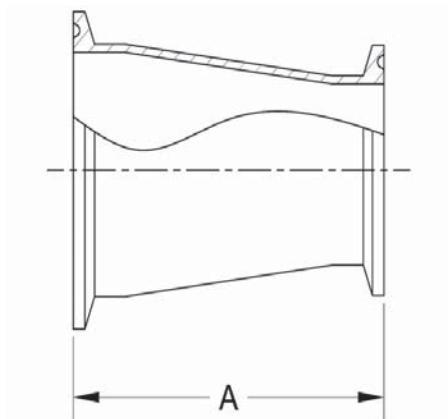
PART NUMBER	SIZE	A
S31K-.75X.50	3/4 X 1/2	3.000
S31K-1X.50	1 X 1/2	3.500
S31K-1X.75	1 X 3/4	3.000
S31K-1.5X.50	1-1/2 X 1/2	4.500
S31K-1.5X.75	1-1/2 X 3/4	4.000
S31K-1.5X1	1-1/2 X 1	4.000
S31K-2X.50	2 X 1/2	6.500
S31K-2X.75	2 X 3/4	6.000
S31K-2X1	2 X 1	6.000
S31K-2X1.5	2 X 1-1/2	4.000
S31K-2.5X.50	2-1/2 X 1/2	8.500
S31K-2.5X.75	2-1/2 X 3/4	9.000
S31K-2.5X1	2-1/2 X 1	8.000
S31K-2.5X1.5	2-1/2 X 1-1/2	6.000
S31K-2.5X2	2-1/2 X 2	4.250
S31K-3X.50	3 X 1/2	12.000
S31K-3X.75	3 X 3/4	11.000
S31K-3X1	3 X 1	10.000
S31K-3X1.5	3 X 1-1/2	8.000
S31K-3X2	3 X 2	6.250
S31K-3X2.5	3 X 2-1/2	4.250
S31K-4X1	4 X 1	14.125
S31K-4X1.5	4 X 1-1/2	12.125
S31K-4X2	4 X 2	10.375
S31K-4X2.5	4 X 2-1/2	8.375
S31K-4X3	4 X 3	6.375
S31K-6X3	6 X 3	9.000
S31K-6X4	6 X 4	9.000

S32K - ECCENTRIC REDUCER, CLAMP x TANGENT WELD END



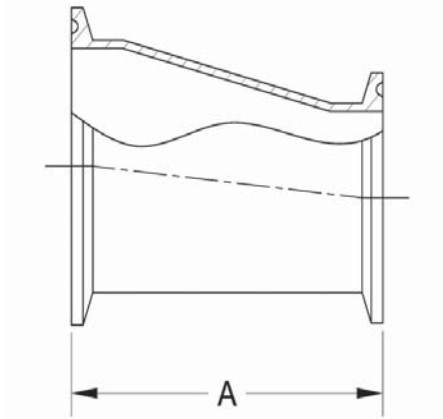
PART NUMBER	SIZE	A
S32K-.75X.50	3/4 X 1/2	3.000
S32K-1X.50	1 X 1/2	3.500
S32K-1X.75	1 X 3/4	3.000
S32K-1.5X.50	1-1/2 X 1/2	4.500
S32K-1.5X.75	1-1/2 X 3/4	4.000
S32K-1.5X1	1-1/2 X 1	4.000
S32K-2X.50	2 X 1/2	6.500
S32K-2X.75	2 X 3/4	6.000
S32K-2X1	2 X 1	6.000
S32K-2X1.5	2 X 1-1/2	4.000
S32K-2.5X.50	2-1/2 X 1/2	9.500
S32K-2.5X.75	2-1/2 X 3/4	9.000
S32K-2.5X1	2-1/2 X 1	8.000
S32K-2.5X1.5	2-1/2 X 1-1/2	6.000
S32K-2.5X2	2-1/2 X 2	4.250
S32K-3X.50	3 X 1/2	12.000
S32K-3X.75	3 X 3/4	11.000
S32K-3X1	3 X 1	10.000
S32K-3X1.5	3 X 1-1/2	8.000
S32K-3X2	3 X 2	6.250
S32K-3X2.5	3 X 2-1/2	4.250
S32K-4X1	4 X 1	14.125
S32K-4X1.5	4 X 1-1/2	12.125
S32K-4X2	4 X 2	10.375
S32K-4X2.5	4 X 2-1/2	8.375
S32K-4X3	4 X 3	6.375
S32K-6X3	6 X 3	8.750
S32K-6X4	6 X 4	9.000

S31-14MP - CONCENTRIC REDUCER, CLAMP ENDS



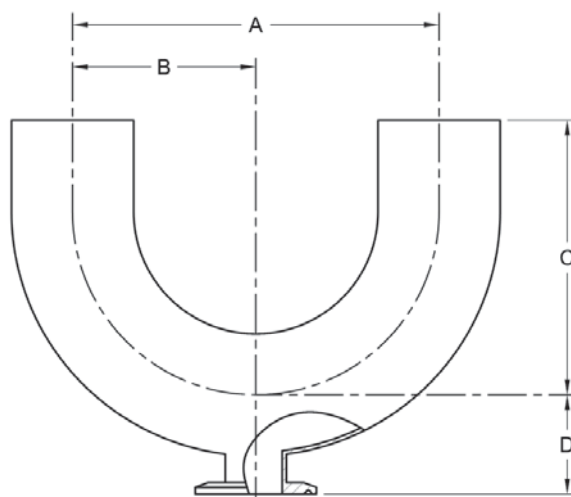
PART NUMBER	SIZE	A
S31-14MP-.75X.50	3/4 X 1/2	2.000
S31-14MP-1X.50	1 X 1/2	2.500
S31-14MP-1X.75	1 X 3/4	2.000
S31-14MP-15X.50	1-1/2 X 1/2	3.500
S31-14MP-15X.75	1-1/2 X 3/4	3.000
S31-14MP-15X1	1-1/2 X 1	3.000
S31-14MP-2X.50	2 X 1/2	7.000
S31-14MP-2X.75	2 X 3/4	6.000
S31-14MP-2X1	2 X 1	5.000
S31-14MP-2X15	2 X 1-1/2	3.000
S31-14MP-25X.50	2-1/2 X 1/2	9.000
S31-14MP-25X.75	2-1/2 X 3/4	8.000
S31-14MP-25X1	2-1/2 X 1	7.000
S31-14MP-25X15	2-1/2 X 1-1/2	5.000
S31-14MP-25X2	2-1/2 X 2	3.000
S31-14MP-3X.50	3 X 1/2	11.000
S31-14MP-3X.75	3 X 3/4	10.000
S31-14MP-3X1	3 X 1	9.000
S31-14MP-3X15	3 X 1-1/2	7.000
S31-14MP-3X2	3 X 2	5.000
S31-14MP-3X25	3 X 2-1/2	3.000
S31-14MP-4X1	4 X 1	13.125
S31-14MP-4X15	4 X 1-1/2	11.125
S31-14MP-4X2	4 X 2	9.125
S31-14MP-4X25	4 X 2-1/2	7.125
S31-14MP-4X3	4 X 3	5.125
S31-14MP-6X3	6 X 3	7.625
S31-14MP-6X4	6 X 4	7.625

S32-14MP - ECCENTRIC REDUCER, CLAMP ENDS



PART NUMBER	SIZE	A
S32-14MP-.75X.50	3/4 X 1/2	2.000
S32-14MP-1X.50	1 X 1/2	2.500
S32-14MP-1X.75	1 X 3/4	2.000
S32-14MP-15X.50	1-1/2 X 1/2	3.500
S32-14MP-15X.75	1-1/2 X 3/4	3.000
S32-14MP-15X1	1-1/2 X 1	3.000
S32-14MP-2X.50	2 X 1/2	7.000
S32-14MP-2X.75	2 X 3/4	6.000
S32-14MP-2X1	2 X 1	5.000
S32-14MP-2X15	2 X 1-1/2	3.000
S32-14MP-25X.50	2-1/2 X 1/2	9.000
S32-14MP-25X.75	2-1/2 X 3/4	8.000
S32-14MP-25X1	2-1/2 X 1	7.000
S32-14MP-25X15	2-1/2 X 1-1/2	5.000
S32-14MP-25X2	2-1/2 X 2	3.000
S32-14MP-3X.50	3 X 1/2	11.000
S32-14MP-3X.75	3 X 3/4	10.000
S32-14MP-3X1	3 X 1	9.000
S32-14MP-3X15	3 X 1-1/2	7.000
S32-14MP-3X2	3 X 2	5.000
S32-14MP-3X25	3 X 2-1/2	3.000
S32-14MP-4X1	4 X 1	13.125
S32-14MP-4X15	4 X 1-1/2	11.125
S32-14MP-4X2	4 X 2	9.125
S32-14MP-4X25	4 X 2-1/2	7.125
S32-14MP-4X3	4 X 3	5.125
S32-14MP-6X3	6 X 3	7.500
S32-14MP-6X4	6 X 4	7.625

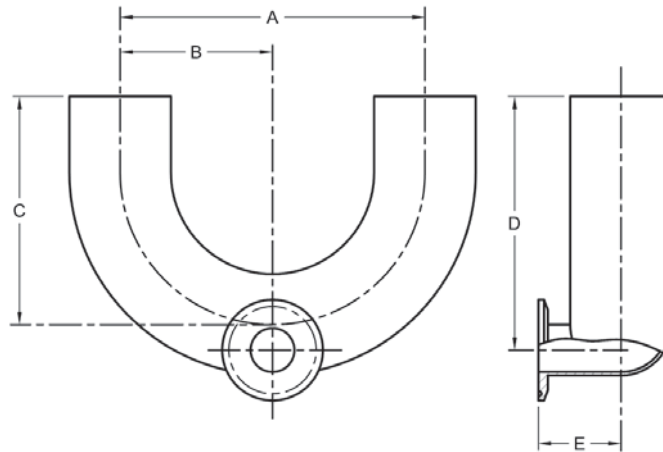
S2UBWWK - BOTTOM OUTLET USE POINT



PART NUMBER	SIZE	A	B	C	D
S2UBWWK-.75X.50	3/4 X 1/2	4.500	2.250	3.750	.875
S2UBWWK-1X.50	1 X 1/2	3.000	1.500	3.000	1.125
S2UBWWK-1X.75	1 X 3/4	3.000	1.500	3.000	1.125
S2UBWWK-15X.50	1-1/2 X 1/2	4.500	2.250	4.500	1.375
S2UBWWK-15X.75	1-1/2 X 3/4	4.500	2.250	4.500	1.375
S2UBWWK-15X1	1-1/2 X 1	4.500	2.250	4.500	1.375
S2UBWWK-2X.50	2 X 1/2	6.000	3.000	5.000	1.625
S2UBWWK-2X.75	2 X 3/4	6.000	3.000	5.000	1.625
S2UBWWK-2X1	2 X 1	6.000	3.000	5.000	1.625
S2UBWWK-2X15	2 X 1-1/2	6.000	3.000	5.000	1.625
S2UBWWK-25X.50	2-1/2 X 1/2	7.500	3.750	5.750	1.875
S2UBWWK-25X.75	2-1/2 X 3/4	7.500	3.750	5.750	1.875
S2UBWWK-25X1	2-1/2 X 1	7.500	3.750	5.750	1.875
S2UBWWK-25X15	2-1/2 X 1-1/2	7.500	3.750	5.750	1.875
S2UBWWK-25X2	2-1/2 X 2	7.500	3.750	5.750	1.875
S2UBWWK-3X.50	3 X 1/2	9.000	4.500	6.500	2.125
S2UBWWK-3X.75	3 X 3/4	9.000	4.500	6.500	2.125
S2UBWWK-3X1	3 X 1	9.000	4.500	6.500	2.125
S2UBWWK-3X15	3 X 1-1/2	9.000	4.500	6.500	2.125
S2UBWWK-3X2	3 X 2	9.000	4.500	6.500	2.125
S2UBWWK-3X25	3 X 2-1/2	9.000	4.500	6.500	2.125
S2UBWWK-4X.50	4 X 1/2	12.000	6.000	8.500	2.625
S2UBWWK-4X.75	4 X 3/4	12.000	6.000	8.500	2.625
S2UBWWK-4X1	4 X 1	12.000	6.000	8.500	2.625
S2UBWWK-4X15	4 X 1-1/2	12.000	6.000	8.500	2.625
S2UBWWK-4X2	4 X 2	12.000	6.000	8.500	2.625
S2UBWWK-4X25	4 X 2-1/2	12.000	6.000	8.500	2.625
S2UBWWK-4X3	4 X 3	12.000	6.000	8.500	2.625

ALSO AVAILABLE WITH BUTT-WELDED OUTLET

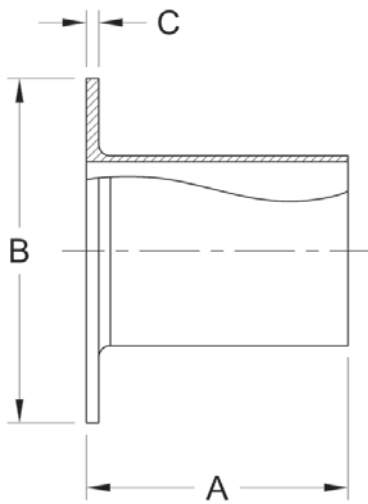
S2USWWK - SIDE OUTLET USE POINT



PART NUMBER	SIZE	A	B	C	D	E
S2USWWK-.75X.50	3/4 X 1/2	4.500	2.250	3.750	3.875	.875
S2USWWK-1X.50	1 X 1/2	3.000	1.500	3.000	3.250	1.125
S2USWWK-1X.75	1 X 3/4	3.000	1.500	3.000	3.125	1.125
S2USWWK-15X.50	1-1/2 X 1/2	4.500	2.250	4.500	5.000	1.375
S2USWWK-15X.75	1-1/2 X 3/4	4.500	2.250	4.500	4.875	1.375
S2USWWK-15X1	1-1/2 X 1	4.500	2.250	4.500	4.750	1.375
S2USWWK-2X.50	2 X 1/2	6.000	3.000	5.000	5.750	1.625
S2USWWK-2X.75	2 X 3/4	6.000	3.000	5.000	5.625	1.625
S2USWWK-2X1	2 X 1	6.000	3.000	5.000	5.500	1.625
S2USWWK-2X15	2 X 1-1/2	6.000	3.000	5.000	5.250	1.625
S2USWWK-25X.50	2-1/2 X 1/2	7.500	3.750	5.750	6.750	1.875
S2USWWK-25X.75	2-1/2 X 3/4	7.500	3.750	5.750	6.625	1.875
S2USWWK-25X1	2-1/2 X 1	7.500	3.750	5.750	6.500	1.875
S2USWWK-25X15	2-1/2 X 1-1/2	7.500	3.750	5.750	6.250	1.875
S2USWWK-25X2	2-1/2 X 2	7.500	3.750	5.750	6.000	1.875
S2USWWK-3X.50	3 X 1/2	9.000	4.500	6.500	7.750	2.125
S2USWWK-3X.75	3 X 3/4	9.000	4.500	6.500	7.625	2.125
S2USWWK-3X1	3 X 1	9.000	4.500	6.500	7.500	2.125
S2USWWK-3X15	3 X 1-1/2	9.000	4.500	6.500	7.250	2.125
S2USWWK-3X2	3 X 2	9.000	4.500	6.500	7.000	2.125
S2USWWK-3X25	3 X 2-1/2	9.000	4.500	6.500	6.750	2.125
S2USWWK-4X.50	4 X 1/2	12.000	6.000	8.500	10.250	2.625
S2USWWK-4X.75	4 X 3/4	12.000	6.000	8.500	10.125	2.625
S2USWWK-4X1	4 X 1	12.000	6.000	8.500	10.000	2.625
S2USWWK-4X15	4 X 1-1/2	12.000	6.000	8.500	9.750	2.625
S2USWWK-4X2	4 X 2	12.000	6.000	8.500	9.500	2.625
S2USWWK-4X25	4 X 2-1/2	12.000	6.000	8.500	9.250	2.625
S2USWWK-4X3	4 X 3	12.000	6.000	8.500	9.000	2.625

ALSO AVAILABLE WITH BUTT-WELDED OUTLET

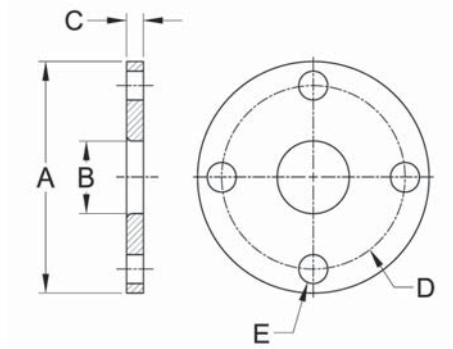
S14WA - STUB END - TYPE A



PART NUMBER	SIZE	A	B	C
S14WA-.50	1/2	2.750	1.500	.130
S14WA-.75	3/4	2.750	1.500	.130
S14WA-1	1	2.750	2.000	.130
S14WA-15	1-1/2	2.750	2.875	.130
S14WA-2	2	2.750	3.625	.130
S14WA-25	2-1/2	2.750	4.125	.130
S14WA-3	3	2.750	5.000	.166
S14WA-4	4	2.750	6.187	.166
S14WA-6	6	3.000	8.500	.218

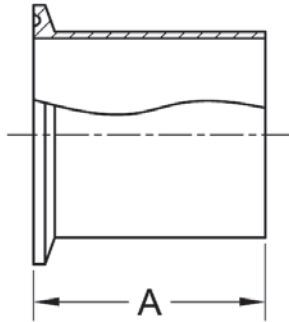
STUB END FACE IS SERRATED

38SL - SLIP ON FLANGE



PART NUMBER	SIZE	A	B	C	D	E
DAK00500	1/2	3.500	.570	.375	2.375	(4) - .625
DAK00750	3/4	3.875	.813	.375	2.750	(4) - .625
DAK01000	1	4.250	1.063	.375	3.125	(4) - .625
DAK01500	1-1/2	5.000	1.563	.375	3.875	(4) - .625
DAK02000	2	6.000	2.063	.438	4.750	(4) - .750
DAK02500	2-1/2	7.000	2.563	.438	5.500	(4) - .750
DAK03000	3	7.500	3.063	.500	6.000	(4) - .750
DAK04000	4	9.000	4.063	.500	7.500	(8) - .750
DAK06000	6	11.000	6.062	.562	9.500	(8) - .875

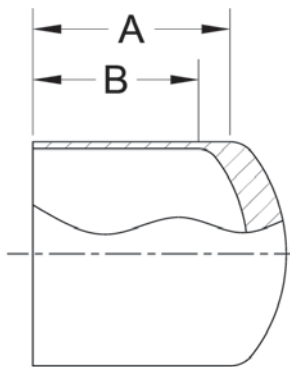
STL14AM7 - LONG WELD FERRULE



PART NUMBER	SIZE	A
STL14AM7-.50	1/2	1.750
STL14AM7-.75	3/4	1.750
STL14AM7-1A	1 (TYPE A)	1.750
STL14AM7-1	1	1.750
STL14AM7-15	1-1/2	1.750
STL14AM7-2	2	2.250
STL14AM7-25	2-1/2	2.250
STL14AM7-3	3	2.250
STL14AM7-4	4	2.250
STL14AM7-6	6	3.000

BPE TABLE DT-4.1.4-1

S16W - LONG TANGENT WELD CAP



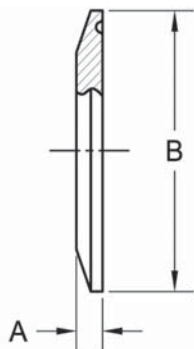
PART NUMBER	SIZE	A
S16W-.50	1/2	1.500
S16W-.75	3/4	1.500
S16W-1	1	1.629
S16W-15	1-1/2	1.660
S16W-2	2	1.762
S16W-25	2-1/2	1.505
S16W-3	3	1.750
S16W-4	4	2.000
S16W-6	6	2.500

BPE TABLE DT-4.1.5-1

"A" DIMENSION IS STRAIGHT TANGENT LENGTH

"B" MINIMUM I.D. STRAIGHT LENGTH = .375 ALL SIZES

S16AMP - CLAMP CAP



PART NUMBER	SIZE	A	B
S16AMP-.50	1/2" & 3/4"	.187	.984
S16AMP-1	1" & 1-1/2"	.250	1.984
S16AMP-2	2"	.250	2.516
S16AMP-25	2-1/2"	.250	3.047
S16AMP-3	3"	.250	3.579
S16AMP-4	4"	.312	4.682
S16AMP-6	6"	.437	6.570

BPE TABLE DT-4.1.5-2



ASTM-A270 BPE TUBING

- Tubing is made from 316L material and is 100% boroscoped.
- Mechanically polished on both I.D. and O.D. (20Ra I.D., 30Ra O.D.)
Surface finish measured per ASME/ANSI B46.1
- Tubing is tested beyond the requirements of ASTM A269 and A270 by mechanically testing to ASME SA249 specifications.
- Tubing is bright annealed in line to 1900°F
- High purity tubing is also available which can include cleaned for gas/oxygen service, thermocouple cleaning or nitric acid cleaning with a deionized water rinse.
- High purity tubing is cleaned and packaged in a Class 100 Cleanroom.

Tubing Tolerances

PART NUMBER	OD SIZE (IN.)	WALL (IN.)	OD TOLERANCE	WALL TOLERANCE	LENGTH TOLERANCE	BOX QTY. (FT.)
SAN00507	.500	.065	+0.005 / -.005	.065 ± 10%	+ .125 / -.000	300
SAN00757	.750	.065	+0.005 / -.005	.065 ± 10%	+ .125 / -.000	300
SAN01007	1.000	.065	+0.005 / -.005	.065 ± 10%	+ .125 / -.000	300
SAN01507	1.500	.065	+0.008 / -.008	.065 ± 10%	+ .125 / -.000	300
SAN02007	2.000	.065	+0.008 / -.008	.065 ± 10%	+ .125 / -.000	300
SAN02507	2.500	.065	+0.010 / -.010	.065 ± 10%	+ .125 / -.000	200
SAN03007	3.000	.065	+0.010 / -.010	.065 ± 10%	+ .125 / -.000	200
SAN04007	4.000	.083	+0.015 / -.015	.083 ± 10%	+ .125 / -.000	100
SAN06007	6.000	.109	+0.030 / -.030	.109 ± 10%	+ .188 / -.000	20

- Tubing available in numerous sizes and wall thicknesses not listed including rectangular shapes, call for details and pricing.
- Surcharges apply at time of shipment.

Chemical Composition - 316L (%)

(C) Carbon, max	(Mn) Manganese, max	(N) Nitrogen, max	(S) Sulfur	(Ni) Nickel	(Cr) Chromium	(Mo) Molybdenum
.030	2.00	.10	.005 - .017	10.0 - 14.0	16.0 - 18.0	2.0 - 3.0

STEEL & O'BRIEN	ALFA-LAVAL	SPX	VNE	DIXON
S2S	B2S	S2S	TE2S	T2S
S2CKW	B2CMW	S2CKW	TE2C	T2CM
S2KS	B2KS	S2KS	TE2KS	T2KS
S2KKW	B2KMW	S2KKW	TE2KC	T2KM
S2CMP	B2CMP	S2CMP	TEG2C	T2CMP
S2KMP	B2KMP	S2KMP	TEG2K	T2KMP
S7WWW	B7WWW	S7WWW	TE7WWW	T7WWW
S7SWWK	B7WWMS	S7SWWK	TE7WWCS	T7WWMS
S7WWK	B7WWM	S7WWK	TE7WWC	T7WWM
S7WSKW	B7WMSW	S7WSKW	TE7WCSW	
S7MPS	B7MPS	S7MPS	TEG7S	T7MPS
S7MP	B7MP	S7MP	TEG7	T7MP
S7RWWW	B7RWWW	S7RWWW	TE7RWWW	T7RWWW
S7RWK	B7RWWM	S7RWK	TE7RWWC	T7WWM
S7RSWWK	B7RWMS	S7RSWWK	TE7RWCS	T7RWMS
S7RMP	B7RMP	S7RMP	TEG7R	T7RMP
S7RMPS	B7RMPS	S7RMPS	TEG7RS	T7RMPS
S7IWWKS	B7IWWMS	S7RSGT	TE7IWWCS	T7IWWMS
S7IMPS	B7IMPS	S7RSGTMP	TEG7IS	T7IMPS
S9MP	B9MP	S9MP	TEG9	
S9WWW	B9WWW	S9WWW	TE9WWW	
S9RWWW	B9RWWW	S9RWWW	TE9RWWW	
S31S			TE31SWW	
S32S			TE32SWW	
S31SK			TE31SCW	
S32SK			TE32SCW	
S31S-14MP			TEG31SCC	
S32S-14MP			TEG32SCC	
S31	B31	S31	TE31WW	T31W
S32	B32	S32	TE32WW	T32W
S31K	B31M	S31K	TE31CW	T31M
S32K	B32M	S32K	TE32CW	T32M
S31-14MP	B31-14MP	S31-14MP	TEG31CC	T3114MP
S32-14MP	B32-14MP	S32-14MP	TEG32CC	T3214MP
S2UBWWK	B2UMPBOA	S2UBWWK	TE2UBWWW	
S2USWWK	B2UMPSOA	S2USWWK	TE2USWWC	
STL14AM7	BS14AM	S14AWF	TEG14AM7	TL14AM7
S16W	B16W	S16AWF	TE16W	T16W
S16AMP	16AMP	S16AMP	TEG16A	T16AMP
S14WA		S14WA	TE14WA	T14VB



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Our Quality Policy

Steel & O'Brien Manufacturing is committed to understanding the needs of our customers and meeting or exceeding those requirements through careful attention to detail and through the continuous improvement of our processes.

We are dedicated to delivering defect-free products on-time at the most competitive cost possible through an effective Quality Management System based on sound Quality Objectives while complying with all relevant national and international requirements.

PLEASE NOTE:

Reasonable care has been taken in preparing this catalog. Steel & O'Brien Manufacturing, Inc. reserves the right to make changes or corrections to any of the product information, including dimensions, listed herein without notice.

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