

# The Piping Group

 Douglas Barwick   Douglas Brothers



One Company, Three Businesses, Your Complete Solution!

## Product and Service Catalogue





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## Welcome to The DB Piping Group

The DB Piping Group is comprised of three businesses that are focused on serving customers in the stainless steel piping and fabrication industries. ABE, Douglas Barwick and Douglas Brothers have come together to provide customers with more comprehensive stainless steel piping and fabricating products and improved levels of services and quality. These businesses will focus on different segments of the industry allowing customers to find the best partner regardless of the business need.

Douglas Barwick's business focuses on engineered projects, spooling and end-user requirements for pipe and fittings. With an experienced work force they are able to manage both small and large scale contracts.

Douglas Brothers provides engineered fabrication for multiple products. Their skilled team of estimators, assemblers and welders can focus on specific engineered needs from tanks to aerators to piping segments to specialized designs.

ABE is a highly efficient lean manufacturer that focuses on selling loose pipe and fittings to distribution and manufacturers. With advanced manufacturing and a global supply chain they can provide customers with a complete and highly competitive package.

### Products

The DB Piping Group stands at the North American forefront in terms of standards, diversity and product range.

Items listed in this standard products catalogue are commonly kept in stock in grades 304L & 316L and in the thicknesses common to the North American market.

The DB Piping Group's expertise extends far beyond standard products. It also includes the fabrication of piping products that meet our customers special needs in terms of size, thickness and special alloys such as 317L, 904L, 254SMO, Duplex, Monel, Inconel, etc.

Specifications include ASTM A312, A403, A778 and A774 with larger diameter pipe manufactured in single random 20 ft lengths.

Our pipe and fittings are acid pickled to conform with specification ASTM A380.

Upon request our stainless steel products may include NSF 61-G and 372 certification.

### Drawing

Douglas Barwick Inc. can provide isometric drawings per customer's specifications at a low cost, using both CADPIPE and AUTOCAD software. This service allows our customer better planning of priorities and improves production lead-time. Shop sketches are also prepared for every spool assembly, facilitating assembly operations and eliminating most errors that could otherwise take place.

### Spooling / Fabrication

Douglas Barwick Inc. and Douglas Brothers both offers shop spooling of pipelines in accordance with drawings and specifications. This is, by far, more economical than field assembly and assures a timely supply and quality of workmanship. When our companies supply spooling, several additional cost savings are achieved:

- Scrap reduction.
- Site inventory control
- Re-stocking charges & transportation of surplus material in both directions.

We also offer our expertise in the following areas:

- ASME B31.1 & B31.3
- ASME pressure vessel.
- Cotton ball finish.
- Capacity for major projects.
- Storage tanks.
- Custom made pieces manufactured to our customer's specifications.

### Quality Assurance

All DB Piping Group companies value product quality and customer satisfaction. Our technicians design quality assurance procedures and ensure that they are rigorously applied.

All three business have on site quality personnel that ensures that inspections of both material and workmanship are carried out in accordance with the required quality assurance programs.

## Summary of specification.

Our O.D. (Outside Diameter) pipes and fittings in austenitic stainless steel are manufactured as per specification ASTM A778 for pipe and ASTM A 774 for fittings.

With our high-tech equipment, pipe and fittings offer an excellent price/quality ratio. Pipe and fittings in inventory of this class are manufactured from ASTM A 240-304L & 316L base material. Other alloys are available upon request.

Pipes and fittings manufactured as per ASTM A 778 & ASTM A 774 specifications are commonly used in pulp and paper mills, water treatment plants and other industries where corrosion resistance is not essential [See Note (1)].

Longitudinal seams are welded as per our qualified welding procedures using automatic or semi-automatic state of the art plasma welding torches in a single or double set-up. This welding procedure reduces greatly the effects of carbides precipitation in the heated affected zone.

Pipe and fittings can be supplied in a wide range of diameters and wall thicknesses.

For each lot of pipe, a tension, reverse and forward bend test is performed.

Welded elbows can be supplied as smooth flow or mitred construction; reducers are supplied as bell or conical; tees, crosses and laterals are supplied as nozzle-welded.

Dimensions and tolerances of fabricated fittings are in the technical section, see Page 7-6. Special fittings can be supplied to customer design and size when required.

Only visual examination is performed on fittings.

Pipe and fittings are also pickled and passivated as per ASTM A-380 to maintain corrosion resistance and to prevent surface discoloration from free iron oxidation.

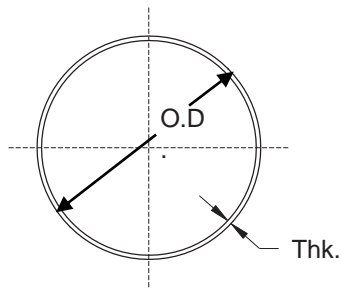
Base metal analysis is traceable to the original mill certificates.

As per ASTM A-778 & A-774, tolerance of nominal thickness permissible shall be  $\pm 12.5\%$

Pipe and fittings are normally furnished in square cut ends but can also be provided with beveled ends.

### Note

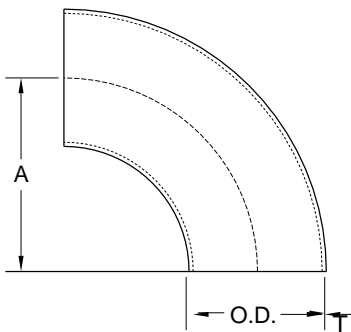
1. For heat treated pipe and fittings, please refer to section 4.0 of NPS ASME/ASTM SA/A-312 and ASME/ASTM A-403.



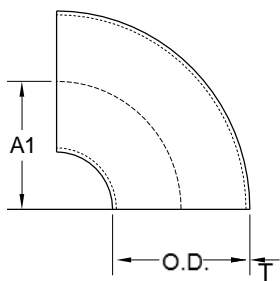
O.D. Inside Diameter		Thickness and Weight									
		14 gauge 0.078 in / 2.0mm		11 gauge 0.125 in / 3.2 mm		10 gauge 0.140 in / 3.6 mm		3/16" th. 0.1875 in / 4.7 mm		1/4" th. 0.25 in / 6.3 mm	
Inches	mm	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m
1 1/2	38	1.3	2.0	2.2	3.3						
2	51	1.8	2.6	2.9	4.3						
2 1/2	64	2.2	3.3	3.6	5.3						
3	76	2.6	3.9	4.3	6.4						
4	102	3.5	5.2	5.6	8.4						
5	127	4.3	6.4	7.0	10.4						
6	152	5.2	7.7	8.4	12.5						
8	203	6.9	10.2	11.1	16.5						
10	254			13.8	20.6						
12	305			16.6	24.7						
14	356			19.3	28.7	21.6	32.2				
16	406			22.0	32.8	24.7	36.7	33.1	49.3		
18	457			24.8	36.9	27.7	41.3	37.2	55.3		
20	508			27.5	40.9	30.8	45.8	41.3	61.4	55.3	82.4
24	610			33.0	49.1			49.5	73.6	66.3	98.6
30	762			41.2	61.3			61.7	91.9	82.7	123.0
36	914			49.4	73.5			74.0	110.1	99.1	147.4
42	1067			57.6	85.7			86.3	128.4	115.5	171.8
48	1219			65.8	97.9			98.5	146.6	131.9	196.3

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section..
- d. Other diameter and thickness available upon request



90° Elbow Long Radius



90° Elbow Short Radius

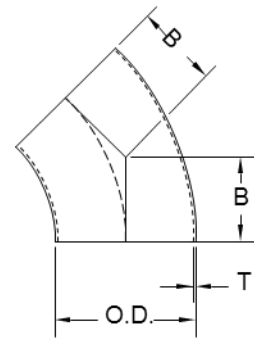
O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow, Long Radius				90° Elbow, Short Radius			
		Gauge			A		Weight		A1		Weight	
In	mm		In	mm	In	mm	lb	kg	In	mm	lb	kg
1 1/2	38	14	0.078	2.0	2.250	57	0.4	0.2				
		11	0.125	3.2			0.7	0.3				
2	51	14	0.078	2.0	3.000	76	0.7	0.3				
		11	0.125	3.2			1.1	0.5				
2 1/2	64	14	0.078	2.0	3.750	95	1.1	0.5				
		11	0.125	3.2			1.8	0.8				
3	76	14	0.078	2.0	4.500	114	1.5	0.7				
		11	0.125	3.2			2.5	1.1				
4	102	14	0.078	2.0	6.000	152	2.7	1.2				
		11	0.125	3.2			4.4	2.0				
5	127	14	0.078	2.0	7.500	191	4.3	1.9				
		11	0.125	3.2			6.9	3.1				
6	152	14	0.078	2.0	9.000	229	6.1	2.8				
		11	0.125	3.2			9.9	4.5				
8	203	14	0.078	2.0	12.000	305	10.8	4.9	8.000	203	-----	-----
		11	0.125	3.2			17.4	7.9			11.6	5.3
10	254	11	0.125	3.2	15.000	381	27.2	12.3	10.000	254	18.1	8.2
		12	305	11			0.125	3.2			18.000	457
14	356	11	0.125	3.2	21.000	533	53.1	24.1	14.000	356	-----	-----
		3/16"	0.188	4.8			79.9	36.3			53.3	24.2
16	406	11	0.125	3.2	24.000	610	69.2	31.4	16.000	406	-----	-----
		3/16"	0.188	4.8			104.2	47.3			69.5	31.5
18	457	11	0.125	3.2	27.000	686	87.5	39.7	18.000	457	-----	-----
		3/16"	0.188	4.8			131.8	59.8			87.8	39.8
20	508	1/4"	0.250	6.4	30.000	762	176.3	80.0	20.000	508	117.5	53.3
		11	0.125	3.2			108.0	49.0			-----	-----
24	610	3/16"	0.188	4.8	36.000	914	162.5	73.7	24.000	610	108.3	49.1
		1/4"	0.250	6.4			217.3	98.6			144.9	65.7
30	762	3/16"	0.188	4.8	45.000	1143	233.6	106.0	30.000	762	-----	-----
		1/4"	0.250	6.4			312.3	141.7			208.2	94.5
		3/16"	0.188	4.8			364.5	165.3			-----	-----
		1/4"	0.250	6.4			487.0	220.9			324.7	147.3

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.

# O.D. 45° Elbows ASTM A774

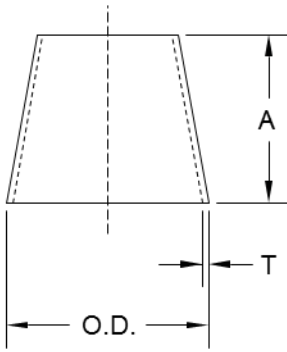
O.D. Outside Diameter		T [Nominal Thickness]			45° Elbow				S/R 45° Elbow			
					B		Weight		B		Weight	
In	mm	Gauge	In	mm	In	mm	lb	kg	In	mm	Lb	kg
1 1/2	38	14	0.078	2.0	1.120	28	0.2	0.1				
		11	0.125	3.2			0.3	0.1				
2	51	14	0.078	2.0	1.375	35	0.3	0.2				
		11	0.125	3.2			0.6	0.3				
2 1/2	64	14	0.078	2.0	1.750	44	0.5	0.2				
		11	0.125	3.2			0.9	0.4				
3	76	14	0.078	2.0	2.000	51	0.8	0.4				
		11	0.125	3.2			1.3	0.6				
4	102	14	0.078	2.0	2.500	64	1.4	0.6				
		11	0.125	3.2			2.2	1.0				
5	127	14	0.078	2.0	3.120	79	2.1	1.0				
		11	0.125	3.2			3.4	1.6				
6	152	14	0.078	2.0	3.750	95	3.1	1.4				
		11	0.125	3.2			4.9	2.2				
8	203	14	0.078	2.0	5.000	127	5.4	2.5	4.000	102	~	~
		11	0.125	3.2			8.7	4.0			5.8	2.7
10	254	11	0.125	3.2	6.250	159	13.6	6.2	5.000	127	9.1	4.1
12	305	11	0.125	3.2	7.500	191	19.5	8.9	6.000	153	13	5.9
14	356	11	0.125	3.2	8.750	222	26.5	12.0	7.000	178	~	~
		3/16"	0.188	4.8			40.0	18.1			20.0	9.1
16	406	11	0.125	3.2	10.000	254	34.6	15.7	8.000	203	17.3	7.9
		10	0.140	3.6			38.8	17.6			19.4	8.8
		3/16"	0.188	4.8			52.1	23.6			26.1	11.8
18	457	11	0.125	3.2	11.250	286	43.8	19.9	9.000	229	21.9	10.0
		3/16"	0.188	4.8			65.9	29.9			33.0	15.0
		1/4"	0.250	6.4			88.1	40.0			44.1	20.0
20	508	11	0.125	3.2	12.500	318	54.0	24.5	10.000	254	~	~
		3/16"	0.188	4.8			81.3	36.9			54.2	19.9
		1/4"	0.250	6.4			108.7	49.3			72.5	32.9
24	610	3/16"	0.188	4.8	15.000	381	116.8	53.0	12.000	305	116.8	53.0
		1/4"	0.250	6.4			156.2	70.8			156.2	70.8
30	762	3/16"	0.188	4.8	18.625	473	182.3	82.7	15.000	361	159.7	72.4
		1/4"	0.250	6.4			243.5	110.5			198.9	90.2



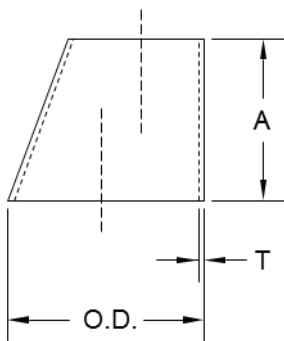
### General Notes:

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.





Concentric Reducer



Eccentric Reducer

O.D. Outside Diameter		T [Nominal Thickness]			A		Weight	
In	mm	Gauge	Po	mm	In	mm	lb	kg
1 1/2	38	14	0.078	2.0	2.500	064	0.5	0.2
		11	0.125	3.2			0.8	0.4
2	51	14	0.078	2.0	3.000	076	0.7	0.3
		11	0.125	3.2			1.2	0.5
2 1/2	64	14	0.078	2.0	3.500	089	1.0	0.5
		11	0.125	3.2			1.6	0.7
3	76	14	0.078	2.0	3.500	089	1.3	0.6
		11	0.125	3.2			2.1	1.0
4	102	14	0.078	2.0	4.000	102	2.0	0.9
		11	0.125	3.2			3.3	1.5
5	127	14	0.078	2.0	5.000	127	2.9	1.3
		11	0.125	3.2			4.7	2.1
6	152	14	0.078	2.0	5.500	140	3.9	1.8
		11	0.125	3.2			6.3	2.8
8	203	14	0.078	2.0	6.000	152	6.3	2.9
		11	0.125	3.2			10.2	4.6
10	254	11	0.125	3.2	7.000	178	13.8	6.3
		12	0.125	3.2			8.000	203
14	356	11	0.125	3.2	13.000	330	25.7	11.7
		10	0.140	3.6			28.9	13.1
		11	0.125	3.2			33.1	15.0
16	406	10	0.140	3.6	14.000	357	37.1	16.8
		3/16	0.188	4.8			49.8	22.6
		11	0.125	3.2			39.2	17.8
18	457	10	0.140	3.6	15.000	381	44.0	19.9
		3/16	0.188	4.8			59.0	26.8
		11	0.125	3.2			45.8	20.8
20	508	10	0.140	3.6	20.000	508	51.4	23.3
		3/16	0.188	4.8			69.0	31.3
		1/4	0.250	6.4			92.2	41.8
		11	0.125	3.2			65.9	29.9
24	610	10	0.140	3.6	20.000	508	73.9	33.5
		3/16	0.188	4.8			99.2	45.0
		1/4	0.250	6.4			132.6	60.1
		11	0.125	3.2			65.9	29.9
30	762	3/16	0.188	4.8	24.000	610	154.7	70.2
		1/4	0.250	6.4			206.7	93.8
36	914	3/16	0.188	4.8	24.000	610	222.5	100.9
		1/4	0.250	6.4			297.2	134.8
42	1067	3/16	0.188	4.8	24.000	610	302.7	137.3
		1/4	0.250	6.4			404.2	183.3
48	1219	3/16	0.188	4.8	28.000	711	395.1	179.2
		1/4	0.250	6.4			527.5	239.3

**General Notes:**

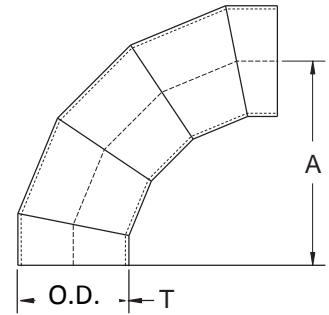
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.



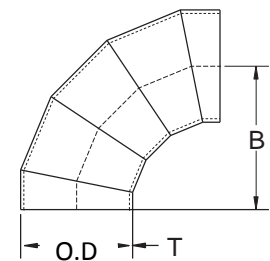
O.D. Outside Diameter		T	90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
In	mm	Gauge	lb	kg	lb	kg	lb	kg
1 1/2	38	14	1.1	0.5	0.7	0.3	0.5	0.2
		11	1.8	0.8	1.2	0.5	0.8	0.4
2	51	14	1.5	0.7	1.1	0.5	0.7	0.3
		11	2.5	1.1	1.7	0.8	1.2	0.5
3	64	14	2.0	0.9	1.5	0.7	1.1	0.5
		11	3.3	1.5	2.4	1.1	1.7	0.8
3	76	14	2.7	1.2	1.9	0.9	1.3	0.6
		11	4.4	2.0	3.1	1.4	2.1	0.9
4	102	14	4.2	1.9	3.0	1.4	2.2	1.0
		11	6.7	3.1	4.9	2.2	3.6	1.6
5	127	14	5.9	2.7	4.3	2.0	3.1	1.4
		11	9.5	4.3	7.0	3.2	5.0	2.3
6	152	14	7.9	3.6	5.5	2.5	4.1	1.9
		11	12.8	5.8	8.9	4.0	6.7	3.0
8	203	14	12.8	5.8	8.2	3.7	6.1	2.8
		11	20.6	9.4	13.3	6.0	9.8	4.4
10	254	11	30.3	13.7	20.2	9.2	14.4	6.5
		12	305	41.7	18.9	26.4	12.0	19.9
14	356	11	55.0	25.0	35.8	16.3	23.2	10.5
		10	61.7	28.0	40.2	18.2	26.0	11.8
		11	70.1	31.8	43.8	19.9	28.2	12.8
16	406	10	78.6	35.7	49.1	22.3	31.6	14.3
		3/16	105.6	47.9	66.0	29.9	42.5	19.3
18	457	11	87.0	39.5	54.2	24.6	33.7	15.3
		10	97.6	44.3	60.8	27.6	37.8	17.1
20	508	3/16	131.0	59.4	81.6	37.0	50.7	23.0
		11	105.8	48.0	65.6	29.8	41.8	19.0
		10	118.5	53.8	73.6	33.4	46.9	21.3
24	610	3/16	159.1	72.2	98.8	44.8	62.9	28.5
		1/4	212.8	96.5	132.1	59.9	84.2	38.2
		11	148.6	67.4	96.2	43.6	58.1	26.3
		10	166.6	75.6	107.8	48.9	65.1	29.5
30	762	3/16	223.5	101.4	144.6	65.6	87.3	39.6
		1/4	298.8	135.6	193.4	87.7	116.7	52.9
		3/16	340.5	154.5	205.1	93.1	128.6	58.4
36	914	1/4	455.0	206.4	274.1	124.3	173.5	78.0
		3/16	482.0	218.6	275.4	124.9	173.7	78.0
42	1067	1/4	643.8	292.0	367.9	166.9	235.5	107.0
		3/16	647.9	293.9	355.5	161.3	229.7	103.9
48	1219	1/4	865.2	392.5	474.7	215.3	298.2	135.1
		3/16	838.3	380.3	445.4	202.0	279.5	126.1
		1/4	1119.2	507.7	594.6	269.7	350.6	159.8

# O.D. Mitred Elbows ASTM A 774

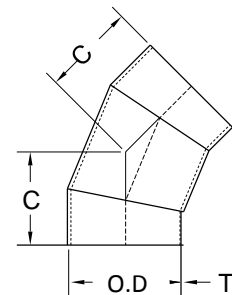
O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
		Gauge	In	mm	A		B		C	
In	mm				In	mm	In	mm	In	mm
1 1/2	38	14	0.078	2.0	2.250	057	1.500	038	1.000	025
		11	0.125	3.2						
2	51	14	0.078	2.0	3.000	076	2.000	051	1.250	032
		11	0.125	3.2						
2 1/2	64	14	0.078	2.0	3.750	095	2.500	064	1.500	038
		11	0.125	3.2						
3	76	14	0.078	2.0	4.500	114	3.000	076	1.875	048
		11	0.125	3.2						
4	102	14	0.078	2.0	6.000	152	4.000	102	2.500	064
		11	0.125	3.2						
5	127	14	0.078	2.0	7.500	191	5.000	127	3.125	079
		11	0.125	3.2						
6	152	14	0.078	2.0	9.000	227	6.000	152	3.750	096
		11	0.125	3.2						
8	203	14	0.078	2.0	12.000	305	8.000	203	5.000	127
		11	0.125	3.2						
10	254	11	0.125	3.2	15.000	381	10.000	254	6.250	159
12	305	11	0.125	3.2	18.000	457	12.000	305	7.500	191
14	356	11	0.125	3.2	21.000	533	14.000	356	8.750	222
		10	0.140	3.6						
16	406	11	0.125	3.2	24.000	610	16.000	406	10.000	254
		10	0.140	3.6						
18	457	3/16	0.188	4.8						
		11	0.125	3.2	27.000	686	18.000	457	11.250	286
20	508	10	0.140	3.6						
		3/16	0.188	4.8						
24	610	1/4	0.250	6.4						
		11	0.125	3.2	36.000	914	24.000	610	15.000	381
30	762	10	0.140	3.6						
		3/16	0.188	4.8						
36	914	1/4	0.250	6.4						
		3/16	0.188	4.8	45.000	1143	30.000	762	18.750	476
42	1067	1/4	0.250	6.4						
		3/16	0.188	4.8	54.000	1372	36.000	914	22.500	572
48	1219	1/4	0.250	6.4						
		3/16	0.188	4.8	63.000	1600	42.000	1067	26.000	660
48	1219	3/16	0.188	4.8	72.000	1826	48.000	1219	30.000	762
		1/4	0.250	6.4						



90° Mitred Elbow Long Radius



90° Mitred Elbow Short Radius

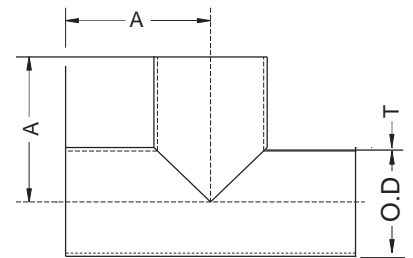


45° Mitred Elbow

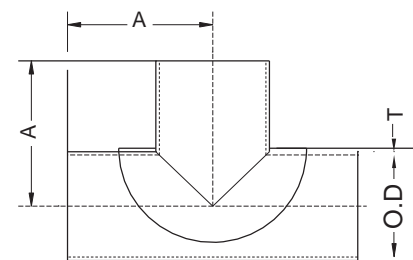
**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

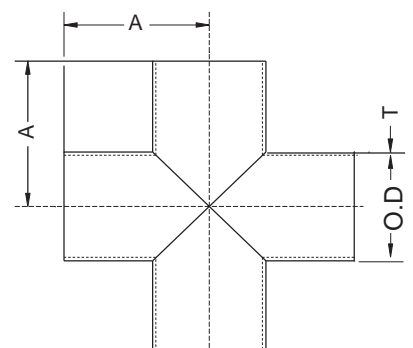
O.D.		T			A		Weight			
Outside Diameter		[Nominal Thickness]					Tee		Cross	
In	mm	Gauge	In	mm	In	mm	lb	kg	lb	kg
3	76	14	0.078	2.0	3.375	76	2.0	0.9	2.7	1.2
		11	0.125	3.2			3.5	1.6	4.7	2.1
4	102	14	0.078	2.0	4.125	105	3.0	1.4	4.0	1.8
		11	0.125	3.2			4.5	2.0	6.0	2.7
5	127	14	0.078	2.0	4.875	124	4.5	2.0	6.0	2.7
		11	0.125	3.2			6.8	3.1	9.0	4.1
6	152	14	0.078	2.0	5.625	143	6.0	2.7	8.0	3.6
		11	0.125	3.2			9.0	4.1	12.0	5.4
8	203	14	0.078	2.0	7.000	178	9.0	4.1	12.0	5.4
		11	0.125	3.2			15.0	6.8	20.0	9.1
10	254	11	0.125	3.2	8.500	216	22.0	10.0	29.3	13.3
12	305	11	0.125	3.2	10.000	254	30.0	13.6	39.9	18.1
14	356	11	0.125	3.2	11.000	279	40.0	18.2	53.2	24.2
		10	0.140	3.6			43.0	19.5	57.2	26.0
16	406	11	0.125	3.2	12.000	305	51.0	23.2	67.8	30.8
		10	0.140	3.6			76.0	35.0	101.1	45.9
18	457	11	0.125	3.2	13.500	343	63.0	28.6	83.8	38.1
		10	0.140	3.6			68.0	30.8	90.4	41.1
20	508	3/16	0.188	4.8	15.000	381	95.0	43.1	126.4	57.4
		1/4	0.250	6.4			150.0	68.0	199.5	90.7
24	610	11	0.125	3.2	17.000	432	75.0	34.0	99.8	45.3
		10	0.140	3.6			80.0	36.3	106.4	48.4
30	762	3/16	0.188	4.8	22.000	559	112.0	50.8	149.0	67.7
		1/4	0.250	6.4			150.0	68.0	199.5	90.7
36	914	11	0.125	3.2	28.000	711	100.0	45.4	133.0	60.5
		10	0.140	3.6			107.0	48.5	142.3	64.7
42	1067	3/16	0.188	4.8	31.000	787	150.0	68.0	199.5	90.7
		1/4	0.250	6.4			200.0	90.7	266.0	120.9
48	1219	3/16	0.188	4.8	34.000	864	240.0	108.9	319.2	145.1
		1/4	0.250	6.4			325.0	147.4	432.3	196.5
36	914	3/16	0.188	4.8	28.000	711	288.0	130.9	383.0	174.1
		1/4	0.250	6.4			390.0	177.3	518.7	235.8
42	1067	3/16	0.188	4.8	31.000	787	336.0	152.7	446.9	203.1
		1/4	0.250	6.4			455.0	206.8	605.2	275.1
48	1219	3/16	0.188	4.8	34.000	864	384.0	174.6	510.7	232.1
		1/4	0.250	6.4			520.0	236.4	691.6	314.4



Tee



Tee with reinforcement



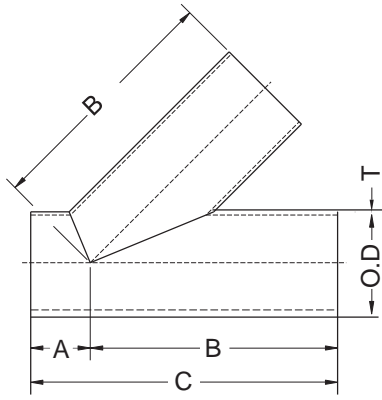
Cross [Note (1)]

**General Notes:**

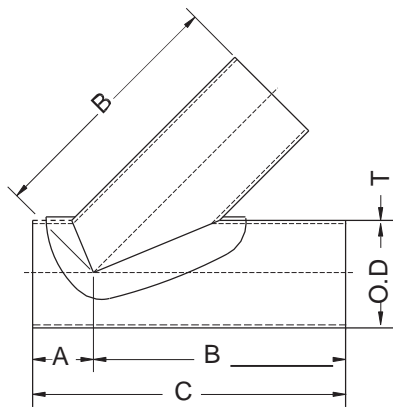
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

**Note:**

- 1. The addition of reinforcement may be necessary. Upon request, the verification can be performed by our quality department, please contact a technical representative for more information.



45° Lateral



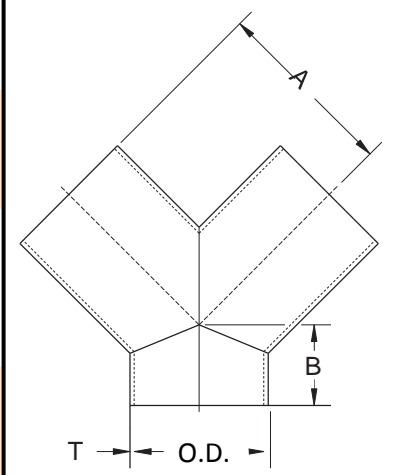
45° Lateral  
with reinforcement

O.D.		T			A		B		C		Weight	
Outside Diameter		[Nominal Thickness]										
In	mm	Gauge	In	mm	In	mm	In	mm	In	mm	lb	kg
3	76	14	0.078	2.0	3.000	76	10.00	254	13.000	330	4.3	2.0
		11	0.125	3.2							6.8	3.1
4	102	14	0.078	2.0	3.000	76	12.00	305	15.000	381	6.6	3.0
		11	0.125	3.2							10.5	4.8
5	127	14	0.078	2.0	3.500	89	13.50	343	17.000	432	9.2	4.2
		11	0.125	3.2							14.5	6.6
6	152	14	0.078	2.0	3.500	89	14.50	368	18.000	457	11.5	5.2
		11	0.125	3.2							18.3	8.3
8	203	14	0.078	2.0	4.500	114	17.50	445	22.000	559	18.3	8.3
		11	0.125	3.2							29.1	13.2
10	254	11	0.125	3.2	5.000	127	20.50	521	25.500	648	25.3	11.5
12	305	11	0.125	3.2	5.500	140	24.50	622	30.000	762	34.5	15.7
14	356	11	0.125	3.2	6.000	152	27.00	686	33.000	838	42.4	19.3
		10	0.140	3.6							55.4	25.2
16	406	11	0.125	3.2	6.500	165	30.00	762	36.500	927	66.0	30.0
		10	0.140	3.6							73.8	33.5
		3/16	0.188	4.8							98.6	44.8
18	457	11	0.125	3.2	7.000	187	32.00	813	39.000	1000	81.4	37.0
		10	0.140	3.6							91.1	41.4
		3/16	0.188	4.8							122.0	55.5
20	508	11	0.125	3.2	8.000	203	35.00	889	43.000	1092	92.2	41.9
		10	0.140	3.6							111.5	50.7
		3/16	0.188	4.8							148.9	67.7
24	610	1/4	0.250	6.4	9.000	229	40.50	1029	49.500	1258	197.9	90.0
		11	0.125	3.2							127.5	58.0
		10	0.140	3.6							161.3	73.3
30	762	3/16	0.188	4.8	10.000	254	49.00	1245	59.000	1499	215.6	98.0
		3/16	0.250	6.4							250.3	113.8
		1/4	0.250	6.4							305.6	138.9
36	914	3/16	0.188	4.8	10.000	254	49.00	1245	59.000	1499	406.6	184.8
		3/16	0.250	6.4							489.4	222.5
		1/4	0.250	6.4							651.4	296.1
42	1067	3/16	0.188	4.8	26.000	660	69.00	1753	95.000	2413	628.5	285.7
		1/4	0.250	6.4							836.8	380.4
48	1219	3/16	0.188	4.8	27.000	686	77.00	1956	104.000	2642	775.9	352.7
		1/4	0.250	6.4							1033.	469.6

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

O.D. Outside Diameter		T [Nominal Thickness]			A		B		Weight	
In	mm	Gauge	In	mm	In	mm	In	mm	lb	kg
3	76	14	0.078	2	5.5	140	3	76	2.7	1.2
		11	0.125	3.2					4.7	2.1
4	102	14	0.078	2	6.5	165	3	76	4.0	1.8
		11	0.125	3.2					6.0	2.7
5	127	14	0.078	2	7.5	191	3.5	89	6.0	2.7
		11	0.125	3.2					9.0	4.1
6	152	14	0.078	2	8	203	3.5	89	8.0	3.6
		11	0.125	3.2					12.0	5.4
8	203	14	0.078	2	9	229	4.5	114	12.0	5.4
		11	0.125	3.2					20.0	9.1
10	254	11	0.125	3.2	11	279	5	127	29.3	13.3
12	305	11	0.125	3.2	12	305	5.5	140	39.9	18.1
14	356	11	0.125	3.2	14	356	6	152	53.2	24.2
		10	0.14	3.6					57.2	26
		11	0.125	3.2					67.8	30.8
16	406	10	0.14	3.6	15	381	6.5	165	73.2	33.3
		3/16	0.188	4.8					101.1	45.9
		11	0.125	3.2					83.8	38.1
18	457	10	0.14	3.6	16.5	419	7	178	90.4	41.1
		3/16	0.188	4.8					126.4	57.4
		11	0.125	3.2					99.8	45.3
20	508	10	0.14	3.6	18	457	8	203	106.4	48.4
		3/16	0.188	4.8					149.0	67.7
		1/4	0.25	6.4					199.5	90.7
		11	0.125	3.2					133.0	60.5
24	610	10	0.14	3.6	22	559	9	229	142.3	64.7
		3/16	0.188	4.8					199.5	90.7
		1/4	0.25	6.4					266.0	120.9
		3/16	0.188	4.8					319.2	145.1
30	762	1/4	0.25	6.4	25	635	10	254	432.3	196.5
		3/16	0.188	4.8					383.0	174.1
36	914	1/4	0.25	6.4	28	711	24	610	518.7	235.8
		3/16	0.188	4.8					446.9	203.1
42	1067	1/4	0.25	6.4	31	787	26	660	605.2	275.1
		3/16	0.188	4.8					510.7	232.1
48	1219	1/4	0.25	6.4	34	864	27	686	691.6	314.4

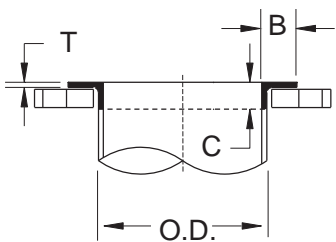


**General Notes:**

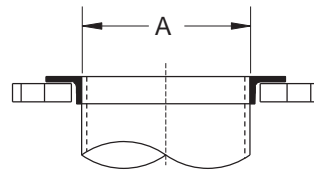
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.
- e. The addition of reinforcement may be necessary. Upon request, the verification can be performed by our quality department. Please contact a technical representative for more information.

# O.D. Angle Collars ASTM A774

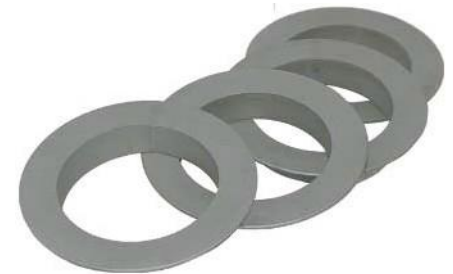
O.D. Outside Diameter		A	Angle Dimension B-C-T		Weight	
In	mm		In	mm.	lb	kg
3	76	Outside of pipe diameter + 1/16" (1.8 mm)	3/4 x 3/4 x 1/8	19 x 19 x 3.2	0.5	0.2
4	102		1 x 1 x 1/8	25 x 25 x 3.2	0.8	0.4
5	127		1 x 1 x 1/8	25 x 25 x 3.2	1.0	0.5
6	152		1 x 1 x 1/8	25 x 25 x 3.2	1.3	0.6
			1 x 1 x 3/16	25 x 25 x 4.8	1.8	0.8
8	203		1 1/4 x 1 1/4 x 1/8	32 x 32 x 3.2	2.1	1.0
			1 1/4 x 1 1/4 x 3/16	32 x 32 x 4.8	3.2	1.4
10	254		1 1/2 x 1 1/2 x 1/8	38 x 38 x 3.2	2.6	1.2
			1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	4.0	1.8
12	305		1 1/2 x 1 1/2 x 1/8	38 x 38 x 3.2	3.9	1.8
			1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	5.7	2.6
14	356		1 1/2 x 1 1/2 x 1/8	38 x 38 x 3.2	4.5	2.0
			1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	6.6	3.0
16	406		1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	7.5	3.4
			1 1/2 x 1 1/2 x 1/4	38 x 38 x 6.3	9.8	4.4
18	457		Outside of pipe diameter + 1/8" (3.2 mm)	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	8.5
		1 1/2 x 1 1/2 x 1/4		38 x 38 x 6.3	11.0	5.0
20	508	1 1/2 x 1 1/2 x 3/16		38 x 38 x 4.8	9.4	4.3
		1 1/2 x 1 1/2 x 1/4		38 x 38 x 6.3	12.3	5.6
24	610	2 x 2 x 3/16		51 x 51 x 4.8	15.3	7.0
		2 x 2 x 1/4		51 x 51 x 6.3	20.0	9.1
30	762	2 x 2 x 1/4		51 x 51 x 6.3	25.1	11.4
		2 x 2 x 3/8		51 x 51 x 9.5	36.9	16.7
36	914	2 x 2 x 1/4		64 x 64 x 6.3	38.6	17.5
		2 x 2 x 3/8		64 x 64 x 9.5	65.0	29.5
42	1067	2 1/2 x 2 1/2 x 1/4		64 x 64 x 6.3	45.1	20.4
		2 1/2 x 2 1/2 x 3/8		64 x 64 x 9.5	75.9	34.4
48	1219	2 1/2 x 2 1/2 x 1/4	64 x 64 x 6.3	51.5	23.4	
		2 1/2 x 2 1/2 x 3/8	64 x 64 x 9.5	86.7	39.3	



**Butt Weld Angle Collars**  
 For using with Backing Flanges  
 See P. 2-15



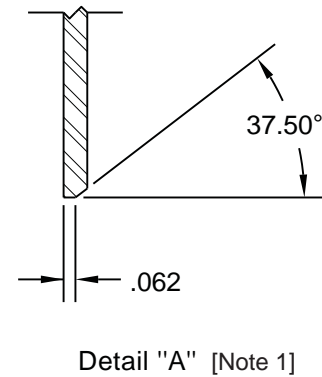
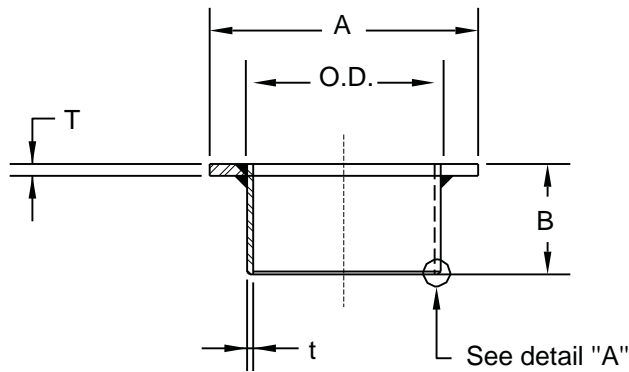
**Slip-on Angle Collars**  
 For using with Slip-on Backing Flange  
 See P. 2-16



**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L, Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

O.D. Outside Diameter		t [Nominal Thickness]		T	A		B		Weight	
In	mm	In	mm.		In	mm	In	mm	lb	kg
6	152	0.125	3.2	"T" Not less than "t"	8.500	216	3.500	89	3.4	1.5
8	203	0.125	3.2		10.625	270	4.000	102	5.0	2.3
10	254	0.125	3.2		12.750	324	5.000	127	7.5	3.4
12	305	0.125	3.2		15.000	381	6.000	152	10.5	4.8
14	356	0.140	3.6		16.250	413	6.000	152	12.9	5.9
16	406	0.187	4.7		18.500	470	6.000	152	19.5	8.8
18	457	0.187	4.7		21.000	533	6.000	152	22.8	10.3
20	508	0.250	6.4		23.000	584	6.000	152	33.5	15.2
24	610	0.250	6.4		27.500	699	6.000	152	40.9	18.6
30	762	0.312	7.9		33.750	857	6.000	152	65.4	29.7
36	914	0.312	7.9		40.250	1022	6.000	152	96.5	43.8



**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. [T] not less than [t].
- c. The two faces are machined, the contact face is machined between 125 and 250 microinches (AARH)
- d. Solution Annealing on request.
- e. Other diameter, thicknesses and sizes available upon request.

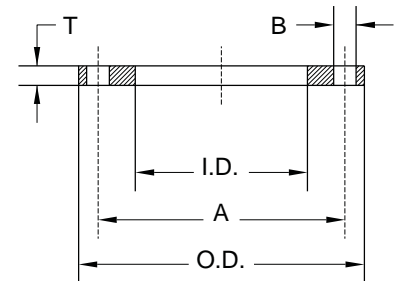
**Note:**

- 1. Bevel for thickness (t) > 1/8" (3mm)



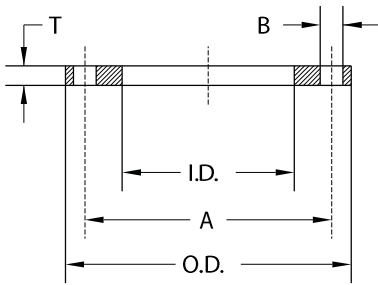
# O.D. Backing Flanges

Nominal Diameter	O.D.	I.D.	A	# of holes	B	T	Weight
In mm	In mm	In mm	In mm		In mm	In mm	lb kg
1 1/2 38	5.000 127	1.750 44	3.875 98	4	0.625 16	0.750 19	3.6 1.6
2 51	6.000 152	2.250 57	4.750 121	4	0.750 19	0.750 19	4.7 2.1
2 1/2 64	7.000 178	2.750 70	5.500 140	4	0.750 19	0.750 19	6.2 2.8
3 76	7.500 191	3.375 86	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	4.375 111	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	5.375 137	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	6.375 162	9.500 241	8	0.875 22	0.750 19	12.3 5.6
8 203	13.500 343	8.375 213	11.750 298	8	0.875 22	0.750 19	17.7 8.0
10 254	16.000 406	10.500 267	14.250 362	12	1.000 25	1.000 25	30.2 13.7
12 305	19.000 483	12.500 318	17.000 432	12	1.000 25	1.000 25	43.5 19.7
14 356	21.000 533	14.500 368	18.750 476	12	1.125 29	1.125 29	55.0 24.9
16 406	23.500 597	16.500 419	21.250 540	16	1.125 29	1.125 29	66.0 29.9
18 457	25.000 635	18.500 470	22.750 578	16	1.250 32	1.250 32	81.4 36.9
20 508	27.500 699	20.500 521	25.000 635	20	1.250 32	1.250 32	86.3 39.1
24 610	32.000 813	24.500 622	29.500 749	20	1.375 35	1.375 35	121.0 54.9
30 762	38.750 984	30.625 778	36.000 914	28	1.375 35	1.625 41	176.0 79.8
36 914	46.000 1168	36.625 930	42.750 1086	32	1.625 41	1.625 41	237.0 107.5
42 1067	53.000 1346	42.625 1083	49.500 1257	36	1.625 41	1.750 44	337.0 152.9
48 1219	59.500 1511	48.625 1235	56.000 1422	44	1.625 41	2.000 51	455.0 206.4



**General Notes:**

- a. Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- b. Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- c. Suggested Maximum Working Pressure : See technical section.
- d. Other diameter and thickness available upon request.



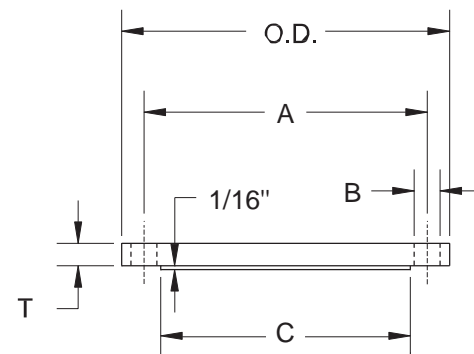
Nominal Diameter	O.D.	I.D.	A	# of holes	B	T	Weight
In mm	In mm	In mm	In mm		In mm	In mm	lb kg
3 76	7.500 191	3.688 94	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	4.688 119	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	5.688 144	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	6.688 170	9.500 241	8	0.875 22	0.750 19	12.3 5.6
8 203	13.500 343	6.880 175	11.750 298	8	0.875 22	0.750 19	17.7 8.0
10 254	16.000 406	10.813 275	14.250 362	12	1.000 25	1.000 25	30.2 13.7
12 305	19.000 483	12.812 275	17.000 432	12	1.000 25	1.000 25	43.5 19.7
14 356	21.000 533	14.813 376	18.750 476	12	1.125 29	1.125 29	55.0 24.9
16 406	23.500 597	16.938 430	21.250 540	16	1.125 29	1.125 29	66.0 29.9
18 457	25.000 635	19.000 483	22.750 578	16	1.250 32	1.250 32	81.4 36.9
20 508	27.500 699	21.000 533	25.000 635	20	1.250 32	1.250 32	86.3 39.1
24 610	32.000 813	25.000 635	29.500 749	20	1.375 35	1.375 35	121.0 54.9
30 762	38.750 984	31.250 794	36.000 914	28	1.375 35	1.625 41	176.0 79.8
36 914	46.000 1168	37.250 946	42.750 1086	32	1.625 41	1.625 41	237.0 107.5
42 1067	53.000 1346	43.250 1099	49.500 1257	36	1.625 41	1.750 44	337.0 152.9
48 1219	59.500 1511	49.250 1251	56.000 1422	44	1.625 41	2.000 51	455.0 206.4

**General Notes:**

- Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

# Blind Flanges

Nominal Diameter	O.D.	A	# of holes	B	C	T	Weight
In Mm	In mm	In mm		In mm	In mm	In mm	lb kg
1 1/2	5.000	3.875	4	0.625	3.000	0.750	4.3
38	127	98		16	76	19	2.0
2	6.000	4.750	4	0.750	3.500	0.750	6.2
51	152	121		19	89	19	2.8
2 1/2	7.000	5.500	4	0.750	4.500	0.750	8.5
64	178	140		19	114	19	3.9
3	7.500	6.000	4	0.750	5.000	0.750	9.8
76	191	152		19	127	19	4.4
4	9.000	7.500	8	0.750	6.500	0.750	14.0
102	229	191		19	165	19	6.4
5	10.000	8.500	8	0.875	7.375	0.750	17.6
127	254	216		22	187	19	8.0
6	11.000	9.500	8	0.875	8.375	0.750	21.0
152	279	241		22	213	19	9.5
8	13.500	11.750	8	0.875	10.625	0.750	32.2
203	343	298		22	270	19	14.6
10	16.000	14.250	12	1.000	13.000	1.000	58.0
254	406	362		25	330	25	26.3
12	19.000	17.000	12	1.000	15.625	1.000	83.1
305	483	432		25	397	25	37.7
14	21.000	18.750	12	1.125	17.250	1.125	113.0
356	533	476		29	438	29	51.3
16	23.500	21.250	16	1.125	19.750	1.125	142.0
406	597	540		29	502	29	64.4
18	25.000	22.750	16	1.250	21.125	1.250	179.0
457	635	578		32	537	32	81.2
20	27.500	25.000	20	1.250	23.375	1.250	217.5
508	699	635		32	594	32	98.7
24	32.000	29.500	20	1.375	27.750	1.375	323.0
610	813	749		35	705	35	146.5
30	38.750	36.000	28	1.375	34.250	1.500	530.0
762	984	914		35	870	38	240.4
36	46.000	42.750	32	1.625	40.750	1.500	755.0
914	1168	1086		41	1035	38	342.5
42	53.000	49.500	36	1.625	46.750	1.500	906.0
1067	1346	1257		41	1187	38	411.0
48	59.500	56.000	44	1.625	52.750	1.750	1334.0
1219	1511	1422		41	1340	44	605.1



### General Notes:

- Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

## Summary of specifications

Our NPS<sup>(1)</sup> (Nominal Pipe Size) pipes and fittings in austenitic stainless steel are manufactured as per specification ASTM A 778 for pipe and ASTM A 774 for fittings.

With our high-tech equipment, pipe and fittings offer an excellent price/quality ratio. Pipe and fittings in inventory of this class are manufactured from ASTM A 240 304L & 316L base material. Other alloys are available upon request.

Pipes and fittings manufactured as per ASTM A 778 & ASTM A 774 specifications are commonly used in pulp and paper mills, water treatment plants and other industries where corrosion resistance is not essential<sup>(2)</sup>.

Longitudinal seams are welded as per our qualified welding procedures using automatic or semi-automatic state of the art plasma welding torches in a single or double set-up. This welding procedure reduces greatly the effects of carbide reprecipitation in the heated affected zone.

Pipe and fittings can be supplied in a wide range of diameters and wall thicknesses.

For each lot of pipe, a tension, reverse, forward bend test is performed.

Welded elbows can be supplied as smooth flow or mitered construction; tees, crosses and laterals are supplied as nozzle-welded. Reducers are supplied as bell or conical.

Dimensions and tolerances of fabricated fittings are in the technical section, see (P.7-6). Special fittings can be supplied to customer design and size when required.

Only visual examination is performed on fitting.

Pipe and fittings are also pickled and passivated as per ASTM A 380 to maintain corrosion resistance and to prevent surface discoloration from free iron oxidation.

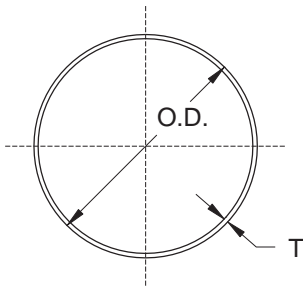
Base metal analysis is traceable to the original mill certificates.

As per ASTM A 778 & A 774, tolerance of nominal thickness permissible shall be  $\pm 12.5\%$

Pipe and fittings are normally furnished in square cut ends but can also be provided with beveled ends.

### Notes:

1. See also section 4.0 for NPS ASTM A 312 & ASTM A 403.
2. For pipe and fitting heat treatment please refer to section 4.0 NPS ASTM A 312 & A 403.

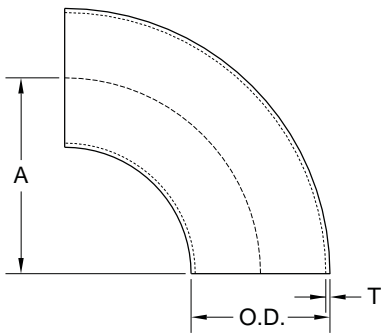


NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			Weight	
In	mm	In	mm	Ga / Sch	In	mm	lb / ft	kg / m
3/4	19	1.050	27	Sch 5S	0.065	1.7	0.7	1.1
				Sch 10S	0.083	2.1	0.9	1.4
1	25	1.320	34	Sch 5S	0.065	1.7	0.9	1.4
				Sch 10S	0.109	2.8	1.4	2.3
1 1/4	32	1.660	42	Sch 5S	0.065	1.7	1.1	1.8
				Sch 10S	0.109	2.8	1.8	3.0
1 1/2	38	1.900	48	Sch 5S	0.065	1.7	1.3	2.1
				Sch 10S	0.109	2.8	2.1	3.4
2	51	2.375	60	Sch 5S	0.065	1.7	1.6	2.6
				Sch 10S	0.109	2.8	2.7	4.3
2 1/2	64	2.875	73	Sch 5S	0.083	2.1	2.5	4.1
				Sch 10S	0.120	3.0	3.6	5.8
3	76	3.500	89	14	0.078	2.0	2.9	4.7
				11	0.125	3.2	4.6	7.4
				Sch 5S	0.083	2.1	3.1	5.0
				Sch 10S	0.120	3.0	4.4	7.1
4	102	4.500	114	14	0.078	2.0	3.8	6.0
				11	0.125	3.2	6.0	9.6
				Sch 5S	0.083	2.1	4.0	6.4
				Sch 10S	0.120	3.0	5.7	9.2
5	127	5.563	141	14	0.078	2.0	4.7	7.5
				11	0.125	3.2	7.4	11.9
				Sch 5S	0.109	2.8	6.5	10.4
				Sch 10S	0.134	3.4	8.0	12.8
6	152	6.625	168	14	0.078	2.0	5.6	9.0
				11	0.125	3.2	8.9	14.2
				Sch 5S	0.109	2.8	7.8	12.4
				Sch 10S	0.134	3.4	9.5	15.2
8	203	8.625	219	14	0.078	2.0	7.3	11.7
				11	0.125	3.2	11.6	18.6
				Sch 5S	0.109	2.8	10.1	16.3
				Sch 10S	0.148	3.8	13.7	22.0
10	254	10.750	273	11	0.125	3.2	14.5	23.3
				Sch 5S	0.134	3.4	15.6	24.9
				Sch 10S	0.165	4.2	19.1	30.6

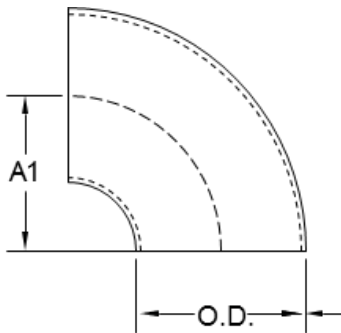
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			Weight	
In	mm	In	mm	Ga / Sch	In	mm	lb / ft	kg / m
12	305	12.750	324	11	0.125	3.2	17.3	27.7
				Sch 5S	0.156	4.0	21.5	34.4
14	356	14.000	356	Sch 10S	0.180	4.6	24.7	39.7
				11	0.125	3.2	19.0	30.4
16	406	16.000	406	10	0.140	3.6	21.2	34.0
				Sch 5S	0.156	4.0	23.6	37.9
				Sch 10S	0.188	4.8	28.4	45.5
				11	0.125	3.2	21.7	34.8
18	457	18.000	457	10	0.140	3.6	24.3	38.9
				Sch 5S	0.165	4.2	28.6	45.8
				Sch 10S	0.188	4.8	32.5	52.1
				11	0.125	3.2	24.4	39.2
20	508	20.000	508	10	0.140	3.6	27.3	43.8
				Sch 5S	0.165	4.2	32.2	51.6
				Sch 10S	0.188	4.8	36.6	58.7
				1/4"	0.250	6.4	54.0	86.5
24	610	24.000	610	Sch 5S	0.188	4.8	40.6	65.1
				Sch 10S	0.218	5.5	47.1	75.6
				10	0.140	3.6	36.5	58.5
				3/16"	0.188	4.8	48.8	78.3
30	762	30.000	762	Sch 5S	0.218	5.5	56.7	90.9
				Sch 10S	0.250	6.4	64.9	104.1
				3/16"	0.188	4.8	61.1	98.0
				Sch 5S	0.250	6.4	81.3	130.4
36	914	36.000	914	Sch 10S	0.312	7.9	101.3	162.3
				3/16"	0.188	4.8	73.4	117.7
				1/4"	0.250	6.4	97.7	156.6
				5/16"	0.312	7.9	121.7	195.2
42	1067	42.000	1067	3/16"	0.188	4.8	85.7	137.4
				1/4"	0.250	6.4	114.1	182.9
				5/16"	0.312	7.9	142.2	228.0
				3/16"	0.188	4.8	98.0	157.1
48	1219	48.000	1219	1/4"	0.250	6.4	130.5	209.2
				5/16"	0.312	7.9	162.7	260.8

**Notes:**

1. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
2. Suggested Maximum Working Pressure : See technical section.
3. Fabrication Tolerance: See technical section..
4. Other diameter and thickness available upon request including Sch40s and Sch80s



90° Elbow  
(Long Radius)



90° Elbow  
(Short Radius)

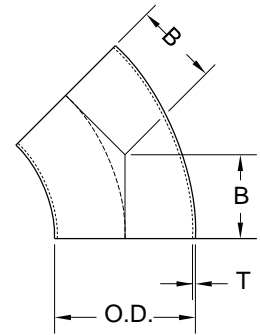
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius				90° Elbow Short Radius			
				Ga / Sch			A		Weight		A1		Weight	
In	mm	In	mm		In	mm	In	mm	lb	kg	In	mm	lb	kg
3	76	3.500	89	14	0.078	2.0	4.500	114	1.7	0.8				
				11	0.125	3.2			2.7	1.2				
				Sch 5S	0.083	2.1			1.8	0.8				
				Sch 10S	0.120	3.0			2.6	1.2				
4	102	4.500	114	14	0.078	2.0	6.000	152	3.0	1.3				
				11	0.125	3.2			4.7	2.1				
				Sch 5S	0.083	2.1			3.1	1.4				
				Sch 10S	0.120	3.0			4.5	2.0				
5	127	5.563	141	14	0.078	2.0	7.500	191	4.6	2.1				
				11	0.125	3.2			7.3	3.3				
				Sch 5S	0.109	2.8			6.4	2.9				
				Sch 10S	0.134	3.4			7.8	3.5				
6	152	6.625	168	14	0.078	2.0	9.000	229	6.6	3.0				
				11	0.125	3.2			10.5	4.7				
				Sch 5S	0.109	2.8			9.1	4.1				
				Sch 10S	0.134	3.4			11.2	5.1				
8	203	8.625	219	14	0.078	2.0	12.000	305	11.4	5.2	8.000	203	-----	-----
				11	0.125	3.2			18.2	8.3			-----	-----
				Sch 5S	0.109	2.8			15.9	7.2			10.6	4.8
				Sch 10S	0.148	3.8			21.5	9.8			14.4	6.5
10	254	10.750	273	11	0.125	3.2	15.000	381	28.5	12.9	10.000	254	-----	-----
				Sch 5S	0.134	3.4			30.5	13.9			20.4	9.2
				Sch 10S	0.165	4.2			37.5	17.0			25.0	11.3
				11	0.125	3.2			40.7	18.4			33.7	15.3
12	305	12.750	324	Sch 5S	0.156	4.0	18.000	457	50.6	23.0	12.000	305	-----	-----
				Sch 10S	0.180	4.6			58.3	26.4			38.9	17.6
				11	0.125	3.2			64.9	29.4			43.3	19.6
				Sch 5S	0.156	4.0			78.0	35.4			52.0	23.6
14	356	14.000	356	Sch 10S	0.188	4.8	21.000	533	88.2	40.0	14.000	356	-----	-----
				11	0.125	3.2			102.1	46.3			68.1	30.9
				10	0.140	3.6			76.3	34.6			59.8	27.1
				Sch 5S	0.165	4.2			89.7	40.7			68.1	30.9
16	406	16.000	406	Sch 10S	0.188	4.8	24.000	610	119.4	54.1	16.000	406	-----	-----
				11	0.125	3.2			129.4	58.7			86.3	39.1
				10	0.140	3.6			96.6	43.8			75.8	34.4
				Sch 5S	0.165	4.2			113.7	51.6			86.3	39.1
18	457	18.000	457	Sch 10S	0.188	4.8	27.000	686	159.5	72.3	18.000	457	-----	-----
				11	0.125	3.2			185.1	84.0			106.3	48.2
				10	0.140	3.6			137.7	62.5			92.5	42.0
				Sch 5S	0.165	4.2			159.5	72.3			123.4	56.0
20	508	20.000	508	Sch 10S	0.218	5.5	30.000	762	212.0	96.2	20.000	508	-----	-----
				1/4"	0.250	6.4			230.0	104.3			-----	-----
				Sch 5S	0.188	4.8			267.1	121.2			178.1	80.8
				Sch 10S	0.218	5.5			305.9	138.8			203.9	92.5
24	610	24.000	610	10	0.140	3.6	36.000	914	272.1	123.8	24.000	610	-----	-----
				3/16"	0.188	4.8			300.0	136.3			-----	-----
				Sch 5S	0.218	5.5			326.7	148.2			178.1	80.8
				Sch 10S	0.250	6.4			360.9	164.1			203.9	92.5
30	762	30.000	762	10	0.140	3.6	45.000	1143	429.2	194.7	30.000	762	-----	-----
				3/16"	0.188	4.8			479.0	217.3			-----	-----
				Sch 5S	0.250	6.4			529.0	239.5			319.3	144.8
				Sch 10S	0.312	7.9			596.5	270.6			397.7	180.4

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Short Radius Elbows are available only in Sch 5S and 10S

# NPS 45° Elbows ASTM A774

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			45° Elbow				S/R 45°			
							B		Weight		B		Weight	
In	mm	In	mm	Ga / Sch	In	mm	In	mm	lb	kg	In	mm	lb	kg
3	76	3.500	89	14	0.078	2.0	1.875	48	0.9	0.4				
				11	0.125	3.2			1.4	0.6				
				Sch 5S	0.083	2.1			0.9	0.4				
				Sch 10S	0.120	3.0			1.3	0.6				
4	102	4.500	114	14	0.078	2.0	2.500	64	1.5	0.7				
				11	0.125	3.2			2.3	1.1				
				Sch 5S	0.083	2.1			1.6	0.7				
				Sch 10S	0.120	3.0			2.3	1.0				
5	127	5.563	141	14	0.078	2.0	3.120	79	2.3	1.0				
				11	0.125	3.2			3.6	1.7				
				Sch 5S	0.109	2.8			3.2	1.4				
				Sch 10S	0.134	3.4			3.9	1.8				
6	152	6.625	168	14	0.078	2.0	3.750	95	3.3	1.5				
				11	0.125	3.2			5.2	2.4				
				Sch 5S	0.109	2.8			4.6	2.1				
				Sch 10S	0.134	3.4			5.6	2.5				
8	203	8.625	219	14	0.078	2.0	5.000	127	5.7	2.6	4.000	102	-----	-----
				11	0.125	3.2			9.1	4.1			-----	-----
				Sch 5S	0.109	2.8			8.0	3.6			5.3	2.4
				Sch 10S	0.148	3.8			10.8	4.9			7.2	3.3
10	254	10.750	273	11	0.125	3.2	6.250	159	14.3	6.5	5.000	127	-----	-----
				Sch 5S	0.134	3.4			15.3	6.9			10.2	4.6
				Sch 10S	0.165	4.2			18.7	8.5			12.5	5.7
12	305	12.750	324	11	0.125	3.2	7.500	191	20.3	9.2	6.000	153	-----	-----
				Sch 5S	0.156	4.0			25.3	11.5			16.9	7.7
				Sch 10S	0.180	4.6			29.1	13.2			19.5	8.8
14	356	14.000	356	11	0.125	3.2	8.750	222	26.1	11.8	7.000	178	-----	-----
				Sch 5S	0.156	4.0			32.5	14.7			21.6	9.8
				Sch 10S	0.188	4.8			39.0	17.7			26.0	11.8
16	406	16.000	406	11	0.125	3.2	10.000	254	34.1	15.5	8.000	203	-----	-----
				10	0.140	3.6			38.1	17.3			-----	-----
				Sch 5S	0.165	4.2			44.9	20.4			29.9	13.6
				Sch 10S	0.188	4.8			51.0	23.2			34.1	15.5
18	457	18.000	457	11	0.125	3.2	11.250	286	43.2	19.6	9.000	229	-----	-----
				10	0.140	3.6			48.3	21.9			-----	-----
				Sch 5S	0.165	4.2			56.9	25.8			37.9	17.2
				Sch 10S	0.188	4.8			64.7	29.3			43.2	19.6
20	508	20.000	508	10	0.140	3.6	12.500	318	59.7	27.1	10.000	254	-----	-----
				1/4"	0.250	6.4			106.0	48.1			-----	-----
				Sch 5S	0.188	4.8			79.7	36.2			37.9	24.1
				Sch 10S	0.218	5.5			92.6	42.0			61.7	28.0
24	610	24.000	610	10	0.140	3.6	15.000	381	86.0	39.0	12.000	305	-----	-----
				3/16"	0.188	4.8			115.0	52.2			-----	-----
				Sch 5S	0.218	5.5			133.6	60.6			89.1	40.4
				Sch 10S	0.250	6.4			152.9	69.4			102.0	46.3
30	762	30.000	762	10	0.140	3.6	18.625	473	134.6	61.1	15.000	361	-----	-----
				3/16"	0.188	4.8			180.0	81.6			-----	-----
				Sch 5S	0.250	6.4			239.5	108.6			159.7	72.4
				Sch 10S	0.312	7.9			298.3	135.3			198.9	90.2



**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.

## NPS Mitred Elbows ASTM A 774 Weight Table

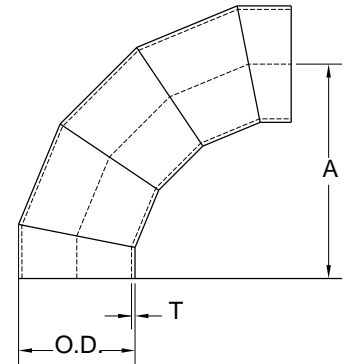


NPS Nominal Pipe Size		T Guage	90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
In	mm		lb	kg	lb	kg	lb	kg
3	76	14	1.7	0.8	1.2	0.5	0.9	0.4
		11	2.8	1.3	1.8	0.8	1.4	0.6
		Sch 5S	1.9	0.8	1.2	0.6	0.9	0.4
		Sch 10S	2.6	1.2	1.8	0.8	1.3	0.6
4	102	14	3	1.4	2	0.9	1.5	0.7
		11	4.8	2.2	3.2	1.4	2.4	1.1
		Sch 5S	3.2	1.4	2.1	1	1.6	0.7
		Sch 10S	4.6	2.1	3	1.4	2.3	1
5	127	14	4.7	2.1	3.1	1.4	2.3	1.1
		11	7.4	3.4	4.9	2.2	3.7	1.7
		Sch 5S	6.5	2.9	4.3	2	3.2	1.5
		Sch 10S	7.9	3.6	5.3	2.4	4	1.8
6	152	14	6.7	3	4.4	2	3.3	1.5
		11	10.6	4.8	7.1	3.2	5.3	2.4
		Sch 5S	9.3	4.2	6.2	2.8	4.6	2.1
		Sch 10S	11.3	5.2	7.6	3.4	5.7	2.6
8	203	14	11.6	5.3	7.7	3.5	5.8	2.6
		11	18.5	8.4	12.3	5.6	9.2	4.2
		Sch 5S	16.1	7.3	10.8	4.9	8.1	3.7
		Sch 10S	21.8	9.9	14.6	6.6	10.9	5
10	254	11	28.9	13.1	19.3	8.7	14.4	6.6
		Sch 5S	30.9	14.1	20.6	9.4	15.5	7
		Sch 10S	38	17.3	25.3	11.5	19	8.6
		11	41.2	18.7	27.5	12.5	20.6	9.3
12	305	Sch 5S	51.3	23.3	34.2	15.5	25.6	11.6
		Sch 10S	59	26.8	39.4	17.9	29.5	13.4
		11	52.8	24	35.2	16	26.4	12
		Sch 5S	65.8	29.9	43.8	19.9	32.9	14.9
14	356	Sch 10S	79.1	35.9	52.7	23.9	39.5	17.9
		11	69	31.4	46	20.9	34.5	15.7
		10	77.3	35.1	51.5	23.4	38.6	17.5
		Sch 5S	90.9	41.3	60.6	27.5	45.5	20.6
16	406	Sch 10S	103.4	47	69	31.3	51.7	23.5
		11	87.5	39.8	58.3	26.4	43.7	19.8
		10	97.9	44.5	65.3	29.6	48.9	22.2
		Sch 5S	115.2	52.4	76.8	34.8	57.6	26.1
18	457	Sch 10S	131.1	59.6	87.4	39.6	65.5	29.7
		10	120.9	55	80.6	36.6	60.5	27.4
		1/4"	214.7	97.6	143.2	64.9	107.4	48.7
		Sch 5S	161.6	73.4	107.7	48.9	80.8	36.6
20	508	Sch 10S	187.6	85.3	125	56.7	93.8	42.5
		10	174.3	79.2	116.2	52.7	87.2	39.5
		3/16"	233	105.9	155.4	70.5	116.5	52.9
		Sch 5S	270.6	123	180.4	81.8	135.3	61.4
24	610	Sch 10S	309.9	140.9	206.6	93.7	154.9	70.3
		3/16"	364.7	165.8	243.1	110.3	182.3	82.7
		Sch 5S	485.2	220.6	323.5	146.7	242.6	110
		Sch 10S	604.3	274.7	402.9	182.7	302.1	137.1
30	762	3/16"	438.1	199.1	292.1	132.5	219	99.4
		Sch 5S	699.7	318	466.5	211.6	349.8	158.7
		Sch 10S	871.7	396.2	581.1	263.6	435.9	197.7
		3/16"	716.1	325.5	477.4	216.5	358	162.4
42	1067	Sch 5S	953.3	433.3	635.5	288.3	476.7	216.2
		Sch 10S	1189.9	540.8	793.2	359.8	594.9	269.9
		3/16"	935.8	425.4	623.9	283	467.9	212.2
		Sch 5S	1246.1	566.4	830.7	376.8	623	282.6
48	1219	Sch 10S	1555.6	707.1	1037	470.4	777.8	352.8

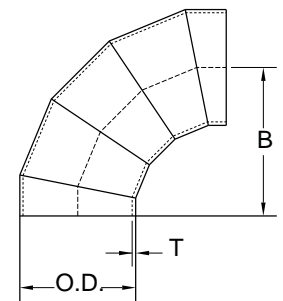


# NPS Mitred Elbows ASTM A 774

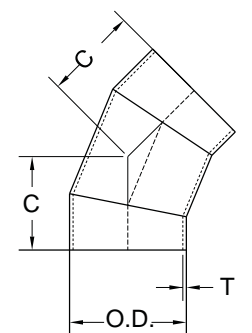
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
In	mm	In	mm	Ga / Sch	In	mm	A		B		C	
In	mm	In	mm		In	mm	In	mm	In	mm	In	mm
3	76	3.500	89	14	0.078	2.0	4.500	114	3.000	76	1.875	48
				11	0.125	3.2						
				Sch 5S	0.083	2.1						
				Sch 10S	0.120	3.0						
4	102	4.500	114	14	0.078	2.0	6.000	152	4.000	102	2.500	64
				11	0.125	3.2						
				Sch 5S	0.083	2.1						
				Sch 10S	0.120	3.0						
5	127	5.563	141	14	0.078	2.0	7.500	191	5.000	127	3.120	79
				11	0.125	3.2						
				Sch 5S	0.109	2.8						
				Sch 10S	0.134	3.4						
6	152	6.625	168	14	0.078	2.0	9.000	229	6.000	152	3.750	95
				11	0.125	3.2						
				Sch 5S	0.109	2.8						
				Sch 10S	0.134	3.4						
8	203	8.625	219	14	0.078	2.0	12.000	305	8.000	203	5.000	127
				11	0.125	3.2						
				Sch 5S	0.109	2.8						
				Sch 10S	0.148	3.8						
10	254	10.750	273	11	0.125	3.2	15.000	381	10.000	254	6.250	159
				Sch 5S	0.134	3.4						
				Sch 10S	0.165	4.2						
12	305	12.750	324	11	0.125	3.2	18.000	457	12.000	305	7.500	191
				Sch 5S	0.156	4.0						
				Sch 10S	0.180	4.6						
14	356	14.000	356	11	0.125	3.2	21.000	533	14.000	356	8.750	222
				Sch 5S	0.156	4.0						
				Sch 10S	0.188	4.8						
16	406	16.000	406	11	0.125	3.2	24.000	610	16.000	406	10.000	254
				10	0.140	3.6						
				Sch 5S	0.165	4.2						
18	457	18.000	457	11	0.125	3.2	27.000	686	18.000	457	11.250	286
				10	0.140	3.6						
				Sch 5S	0.165	4.2						
20	508	20.000	508	10	0.140	3.6	30.000	762	20.000	508	12.500	318
				1/4"	0.250	6.4						
				Sch 5S	0.188	4.8						
24	610	24.000	610	10	0.140	3.6	36.000	914	24.000	610	15.000	381
				3/16"	0.188	4.8						
				Sch 5S	0.218	5.5						
30	762	30.000	762	10	0.140	3.6	45.000	1143	30.000	762	18.750	476
				3/16"	0.188	4.8						
				Sch 5S	0.250	6.4						
36	914	36.000	914	10	0.140	3.6	54.000	1372	36.000	914	22.500	572
				3/16"	0.188	4.8						
				Sch 5S	0.250	6.4						
42	1067	42.000	1067	10	0.140	3.6	63.000	1600	42.000	1067	26.000	660
				3/16"	0.188	4.8						
				Sch 5S	0.250	6.4						
48	1219	48.000	1219	10	0.140	3.6	72.000	1829	48.000	1219	30.000	762
				3/16"	0.188	4.8						
				Sch 5S	0.250	6.4						
				Sch 10S	0.313	7.9						



90° Mitred Elbow  
Long Radius



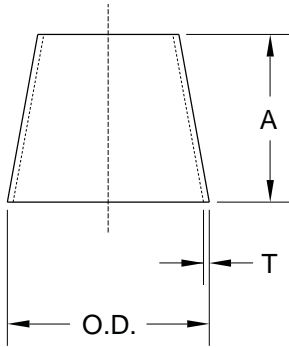
90° Mitred Elbow  
Short Radius



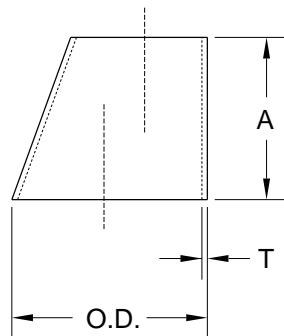
45° Mitred Elbow

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.



Concentric Reducer



Eccentric Reducer

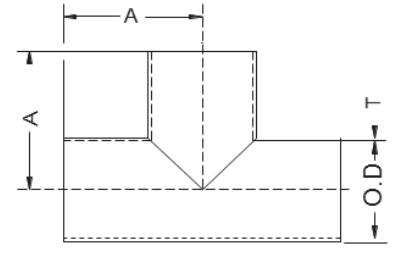
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		Weight	
In	mm	In	mm	Ga / Sch	In	mm	In	mm	lb	Kg
3	76	3.500	89	14	0.078	2.0	3.500	89	0.9	0.4
				11	0.125	3.2			1.3	0.6
				Sch 5S	0.083	2.1			0.9	0.4
4	102	4.500	114	Sch 10S	0.120	3.0	4.000	102	1.3	0.6
				14	0.078	2.0			1.3	0.6
				11	0.125	3.2			2.0	0.9
5	127	5.563	141	Sch 5S	0.083	2.1	5.000	127	1.3	0.6
				Sch 10S	0.120	3.0			1.9	0.9
				14	0.078	2.0			1.9	0.9
6	152	6.625	168	11	0.125	3.2	5.500	140	3.1	1.4
				Sch 5S	0.109	2.8			2.7	1.2
				Sch 10S	0.134	3.4			3.3	1.5
8	203	8.625	219	14	0.078	2.0	6.000	152	2.6	1.2
				11	0.125	3.2			4.1	1.8
				Sch 5S	0.109	2.8			3.6	1.6
10	254	10.750	273	Sch 10S	0.134	3.4	7.000	178	4.4	2.0
				14	0.078	2.0			3.6	1.7
				11	0.125	3.2			5.8	2.6
12	305	12.750	324	Sch 10S	0.148	3.8	8.000	203	6.9	3.1
				11	0.125	3.2			8.5	3.8
				Sch 5S	0.134	3.4			9.1	4.1
14	356	14.000	356	Sch 10S	0.165	4.2	13.000	330	11.1	5.1
				11	0.125	3.2			11.5	5.2
				Sch 5S	0.156	4.0			14.3	6.5
16	406	16.000	406	Sch 10S	0.180	4.6	14.000	356	16.5	7.5
				10	0.125	3.2			20.5	9.3
				Sch 5S	0.140	3.6			23.0	10.4
18	457	18.000	457	Sch 10S	0.156	4.0	15.000	381	25.6	11.6
				10	0.140	3.6			30.8	14.0
				Sch 5S	0.188	4.8			25.3	11.5
20	508	20.000	508	Sch 10S	0.165	4.2	20.000	508	28.3	12.8
				11	0.125	3.2			33.3	15.1
				Sch 5S	0.188	4.8			37.9	17.2
24	610	24.000	610	Sch 10S	0.188	4.8	24.000	610	40.2	18.2
				10	0.140	3.6			45.8	20.8
				Sch 5S	0.165	4.2			50.7	23.0
30	762	30.000	762	Sch 10S	0.188	4.8	28.000	711	67.7	30.7
				10	0.140	3.6			78.6	35.6
				Sch 5S	0.218	5.5			60.9	27.6
36	914	36.000	914	Sch 10S	0.218	5.5	24.000	610	81.4	36.9
				3/16"	0.188	4.8			94.5	42.9
				Sch 5S	0.250	6.4			108.2	49.1
42	1067	42.000	1067	Sch 10S	0.250	6.4	24.000	610	122.2	55.4
				3/16"	0.188	4.8			162.6	73.8
				Sch 5S	0.312	7.9			202.5	91.9
48	1219	48.000	1219	Sch 10S	0.312	7.9	28.000	711	146.8	66.6
				3/16"	0.188	4.8			195.4	88.6
				Sch 5S	0.312	7.9			243.5	110.4
54	1397	54.000	1397	1/4"	0.250	6.4	28.000	711	171.4	77.8
				5/16"	0.313	7.9			228.2	103.5
				3/16"	0.188	4.8			284.8	129.2
60	1524	60.000	1524	1/4"	0.250	6.4	28.000	711	228.7	103.7
				5/16"	0.313	7.9			304.5	138.1
				3/16"	0.188	4.8			380.2	172.4

**General Notes:**

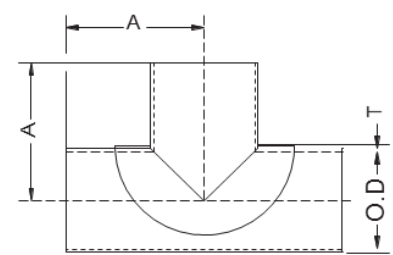
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

# NPS Tees & Crosses ASTM A774

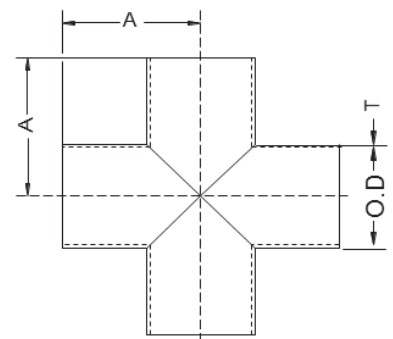
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		Weight			
In	mm	In	mm	Ga/Sch	In	mm	In	mm	Tee		Cross	
									lb	kg	lb	kg
3	76	3.500	89	14	0.078	2.0	3.375	86	2.5	1.1	3.3	1.5
				11	0.125	3.2			3.9	1.8	5.2	2.4
				Sch 5S	0.083	2.1			2.6	1.2	3.5	1.6
				Sch 10S	0.120	3.0			3.7	1.7	5.0	2.3
4	102	4.500	114	14	0.078	2.0	4.125	105	3.9	1.8	5.2	2.4
				11	0.125	3.2			6.2	2.8	8.2	3.7
				Sch 5S	0.083	2.1			4.1	1.9	5.5	2.5
				Sch 10S	0.120	3.0			5.9	2.7	7.9	3.6
5	127	5.563	141	14	0.078	2.0	4.875	124	5.7	2.6	7.6	3.4
				11	0.125	3.2			9.1	4.1	12.1	5.5
				Sch 5S	0.109	2.8			7.9	3.6	10.6	4.8
				Sch 10S	0.134	3.4			9.7	4.4	12.9	5.9
6	152	6.625	168	14	0.078	2.0	5.625	143	7.9	3.6	10.5	4.7
				11	0.125	3.2			12.5	5.7	16.7	7.6
				Sch 5S	0.109	2.8			10.9	5.0	14.6	6.6
				Sch 10S	0.134	3.4			13.4	6.1	17.8	8.1
8	203	8.625	219	14	0.078	2.0	7.000	178	12.8	5.8	17.0	7.7
				11	0.125	3.2			20.3	9.2	27.1	12.3
				Sch 5S	0.109	2.8			17.8	8.1	23.7	10.7
				Sch 10S	0.148	3.8			24.0	10.9	32.0	14.5
10	254	10.750	273	11	0.125	3.2	8.500	216	30.9	14.0	41.1	18.7
				Sch 5S	0.134	3.4			33.0	15.0	44.1	20.0
				Sch 10S	0.165	4.2			40.6	18.4	54.1	24.5
				11	0.125	3.2			43.1	19.6	57.5	26.1
12	305	12.750	324	Sch 5S	0.156	4.0	10.000	254	53.7	24.4	71.6	32.5
				Sch 10S	0.180	4.6			61.8	28.1	82.5	37.4
				11	0.125	3.2			52.1	23.7	69.5	31.5
				Sch 5S	0.156	4.0			64.9	29.5	86.6	39.3
14	356	14.000	356	Sch 10S	0.188	4.8	11.000	279	78.1	35.4	104.1	47.2
				11	0.125	3.2			65.1	29.5	86.8	39.4
				10	0.140	3.6			72.8	33.0	97.1	44.0
				Sch 5S	0.165	4.2			85.7	38.9	114.3	51.8
16	406	16.000	406	Sch 10S	0.188	4.8	12.000	305	97.5	44.2	130.0	59.0
				11	0.125	3.2			82.4	37.4	109.9	49.9
				10	0.140	3.6			92.3	41.8	123.0	55.8
				Sch 5S	0.165	4.2			108.6	49.3	144.8	65.7
18	457	18.000	457	Sch 10S	0.188	4.8	13.500	343	123.6	56.0	164.7	74.7
				10	0.140	3.6			114.0	51.7	152.0	68.9
				1/4"	0.250	6.4			202.4	91.8	269.9	122.4
				Sch 5S	0.188	4.8			152.3	69.1	203.1	92.1
20	508	20.000	508	Sch 10S	0.218	5.5	15.000	381	176.8	80.2	235.7	106.9
				10	0.140	3.6			155.2	70.4	206.9	93.9
				3/16"	0.188	4.8			207.5	94.1	276.6	125.5
				Sch 5S	0.218	5.5			240.9	109.3	321.2	145.7
24	610	24.000	610	Sch 10S	0.250	6.4	17.000	432	275.9	125.1	367.8	166.9
				10	0.140	3.6			155.2	70.4	206.9	93.9
				3/16"	0.188	4.8			336.1	152.5	448.2	203.3
				Sch 5S	0.250	6.4			447.2	202.9	596.3	270.5
30	762	30.000	762	Sch 10S	0.312	7.9	22.000	559	557.0	252.6	742.6	336.9
				10	0.140	3.6			155.2	70.4	206.9	93.9
				3/16"	0.188	4.8			486.4	220.6	648.5	294.1
				Sch 5S	0.250	6.4			647.3	293.6	863.1	391.5
36	914	36.000	914	Sch 10S	0.312	7.9	26.500	673	806.5	365.8	1075.3	487.8
				10	0.140	3.6			600.0	272.2	800.0	362.9
				3/16"	0.188	4.8			798.8	362.3	1065.0	483.1
				1/4"	0.250	6.4			995.4	451.5	1327.2	602.0
42	1067	42.000	1067	3/16"	0.188	4.8	30.000	711	808.6	366.8	1078.1	489.0
				1/4"	0.250	6.4			1076.7	488.4	1435.6	651.2
				5/16"	0.312	7.9			1342.0	608.7	1789.3	811.6
				3/16"	0.188	4.8			1076.7	488.4	1435.6	651.2



Tee



Tee with reinforcement



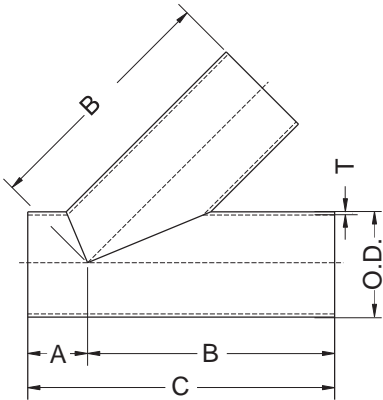
Cross [Note (1)]

**General Notes:**

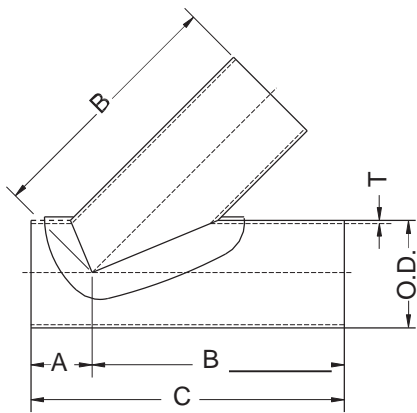
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

**Note:**

- 1. The addition of reinforcement may be necessary. Upon request, the verification can be performed by our quality department. Please contact a technical representative for more information.



45° Lateral



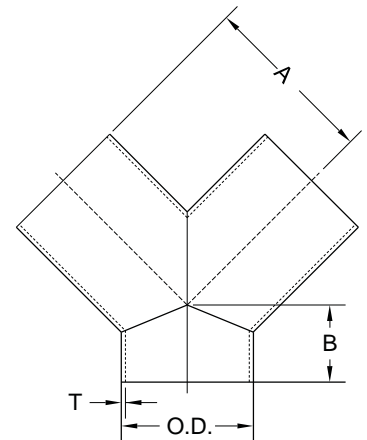
45° Lateral with reinforcement

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		B		C		Weight	
In	mm	In	mm	Ga / Sch	In	mm	In	mm	In	mm	In	mm	lb	kg
3	76	3.500	89	14	0.078	2.0	3.000	76	10.000	254	13.000	330	5.6	2.5
				11	0.125	3.2							8.8	4.0
				Sch 5S	0.083	2.1							5.9	2.7
				Sch 10S	0.120	3.0							8.5	3.9
4	102	4.500	114	14	0.078	2.0	3.000	76	12.000	305	15.000	381	8.5	3.8
				11	0.125	3.2							13.5	6.1
				Sch 5S	0.083	2.1							9.0	4.1
				Sch 10S	0.120	3.0							12.9	5.9
5	127	5.563	141	14	0.078	2.0	3.500	89	13.500	343	17.000	432	11.9	5.4
				11	0.125	3.2							18.9	8.6
				Sch 5S	0.109	2.8							16.5	7.5
				Sch 10S	0.134	3.4							20.2	9.2
6	152	6.625	168	14	0.078	2.0	3.500	89	14.500	368	18.000	457	15.1	6.9
				11	0.125	3.2							24.1	10.9
				Sch 5S	0.109	2.8							21.0	9.5
				Sch 10S	0.134	3.4							25.8	11.7
8	203	8.625	219	14	0.078	2.0	4.500	114	17.500	445	22.000	559	24.0	10.9
				11	0.125	3.2							38.2	17.3
				Sch 5S	0.109	2.8							33.4	15.2
				Sch 10S	0.148	3.8							45.1	20.5
10	254	10.750	273	11	0.125	3.2	5.000	127	20.500	521	25.500	648	55.7	25.2
				Sch 5S	0.134	3.4							59.6	27.0
				Sch 10S	0.165	4.2							73.2	33.2
				11	0.125	3.2							78.4	35.5
12	305	12.750	324	Sch 5S	0.156	4.0	5.500	140	24.500	622	30.000	762	97.6	44.2
				Sch 10S	0.180	4.6							112.3	51.0
				11	0.125	3.2							94.8	43.0
				Sch 5S	0.156	4.0							118.1	53.5
14	356	14.000	356	Sch 10S	0.188	4.8	6.000	152	27.000	686	33.000	838	141.9	64.4
				11	0.125	3.2							120.2	54.5
				10	0.140	3.6							134.5	61.0
				Sch 5S	0.165	4.2							158.3	71.8
16	406	16.000	406	Sch 10S	0.188	4.8	6.500	165	30.000	762	36.500	927	180.1	81.7
				11	0.125	3.2							144.5	65.6
				10	0.140	3.6							161.7	73.4
				Sch 5S	0.165	4.2							190.4	86.3
18	457	18.000	457	Sch 10S	0.188	4.8	7.000	178	32.000	813	39.000	991	216.6	98.3
				10	0.140	3.6							197.6	89.6
				Sch 5S	0.165	4.2							264.0	119.7
				1/4"	0.250	6.4							306.5	139.0
20	508	20.000	508	10	0.140	3.6	8.000	203	35.000	889	43.000	1092	273.9	124.2
				Sch 5S	0.188	4.8							366.1	166.1
				Sch 10S	0.218	5.5							425.1	192.8
				10	0.140	3.6							486.8	220.8
24	610	24.000	610	3/16"	0.188	4.8	9.000	229	40.500	1029	49.500	1257	550.0	249.5
				Sch 5S	0.218	5.5							731.8	331.9
				Sch 10S	0.250	6.4							911.4	413.4
				3/16"	0.188	4.8							880.9	399.6
30	762	30.000	762	Sch 5S	0.250	6.4	10.000	254	49.000	1245	59.000	1499	1172.5	531.9
				Sch 10S	0.312	7.9							1460.8	662.6
				3/16"	0.188	4.8							1171.4	531.3
				1/4"	0.250	6.4							1559.5	707.4
36	914	36.000	914	5/16"	0.312	7.9	26.000	660	69.000	1753	95.000	2413	1943.4	881.5
				3/16"	0.188	4.8							1478.3	670.6
				Sch 5S	0.250	6.4							1968.5	892.9
				Sch 10S	0.312	7.9							2453.5	1112.9

**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		B		Weight					
In	mm	In	mm	Ga / Sch	In	mm	In	mm	In	mm	lb	kg				
3	76	3.500	89	14	0.078	2.0	5.500	140	3.000	76	3.4	1.5				
				11	0.125	3.2					5.4	2.4				
				Sch 5S	0.083	2.1					3.6	1.6				
				Sch 10S	0.120	3.0					5.2	2.3				
4	102	4.500	114	14	0.078	2.0	6.500	165	3.000	76	5.0	2.3				
				11	0.125	3.2					8.0	3.6				
				Sch 5S	0.083	2.1					5.3	2.4				
				Sch 10S	0.120	3.0					7.7	3.5				
5	127	5.563	141	14	0.078	2.0	7.500	191	3.500	89	7.2	3.3				
				11	0.125	3.2					11.5	5.2				
				Sch 5S	0.109	2.8					10.0	4.5				
				Sch 10S	0.134	3.4					12.3	5.6				
6	152	6.625	168	14	0.078	2.0	8.000	203	3.500	89	9.1	4.1				
				11	0.125	3.2					14.4	6.5				
				Sch 5S	0.109	2.8					12.6	5.7				
				Sch 10S	0.134	3.4					15.5	7.0				
8	203	8.625	219	14	0.078	2.0	9.000	229	4.500	114	13.7	6.2				
				11	0.125	3.2					21.8	9.9				
				Sch 5S	0.109	2.8					19.0	8.6				
				Sch 10S	0.148	3.8					25.7	11.7				
10	254	10.750	273	11	0.125	3.2	11.000	279	5.000	127	32.7	14.8				
				Sch 5S	0.134	3.4					35.0	15.9				
				Sch 10S	0.165	4.2					43.0	19.5				
				11	0.125	3.2					12.000	305	5.500	140	42.4	19.2
12	305	12.750	324	Sch 5S	0.156	4.0	12.000	305	5.500	140	52.8	24.0				
				Sch 10S	0.180	4.6					60.8	27.6				
				11	0.125	3.2					14.000	356	6.000	152	53.7	24.4
				Sch 5S	0.156	4.0					66.9	30.3				
14	356	14.000	356	Sch 10S	0.188	4.8	14.000	356	6.000	152	80.4	36.5				
				11	0.125	3.2					15.000	381	6.500	165	66.0	29.9
				Sch 5S	0.140	3.6					73.8	33.5				
				Sch 10S	0.165	4.2					86.9	39.4				
16	406	16.000	406	11	0.125	3.2	15.000	381	6.500	165	98.9	44.8				
				10	0.140	3.6					91.1	41.3				
				Sch 5S	0.165	4.2					107.2	48.6				
				Sch 10S	0.188	4.8					122.0	55.4				
18	457	18.000	457	11	0.125	3.2	16.500	419	7.000	178	81.4	36.9				
				10	0.140	3.6					91.1	41.3				
				Sch 5S	0.165	4.2					107.2	48.6				
				Sch 10S	0.188	4.8					122.0	55.4				
20	508	20.000	508	10	0.140	3.6	18.000	457	8.000	203	111.5	50.6				
				1/4"	0.250	6.4					197.9	89.8				
				Sch 5S	0.188	4.8					148.9	67.5				
				Sch 10S	0.218	5.5					172.9	78.4				
24	610	24.000	610	10	0.140	3.6	22.000	559	9.000	229	161.3	73.2				
				3/16"	0.188	4.8					215.6	97.8				
				Sch 5S	0.218	5.5					250.3	113.6				
				Sch 10S	0.250	6.4					286.7	130.0				
30	762	30.000	762	3/16"	0.188	4.8	25.000	635	10.000	254	305.6	138.6				
				Sch 5S	0.250	6.4					406.6	184.4				
				Sch 10S	0.312	7.9					506.3	229.7				
				3/16"	0.188	4.8					28.000	711	24.000	610	489.4	222.0
36	914	36.000	914	Sch 5S	0.250	6.4	28.000	711	24.000	610	651.4	295.5				
				Sch 10S	0.312	7.9					811.6	368.1				
				3/16"	0.188	4.8					31.000	787	26.000	660	628.5	285.1
				1/4"	0.250	6.4					836.8	379.6				
42	1067	42.000	1067	5/16"	0.312	7.9	31.000	787	26.000	660	1042.8	473.0				
				3/16"	0.188	4.8					775.9	352.0				
				1/4"	0.250	6.4					1033.2	468.7				
				5/16"	0.312	7.9					1287.8	584.1				

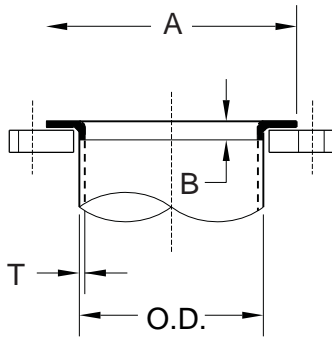


**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.
- e. The addition of reinforcement may be necessary. Upon request, the verification can be performed by our quality department. Please contact a technical representative for more information.



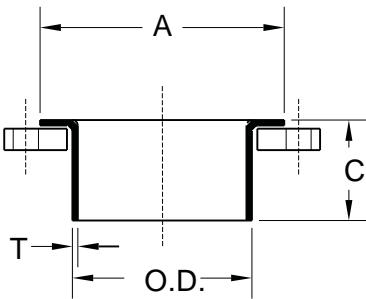
Pressed Collars



NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		B		Weight	
In	mm	In	mm	in	mm	mm	In	mm	In	mm	lb	kg
1 1/2	38	1.900	48	1/8"	0.125	3.2	2.875	73	0.625	16	0.2	0.1
2	51	2.375	60	1/8"	0.125	3.2	3.500	89	0.625	16	0.3	0.1
2 1/2	64	2.875	73	1/8"	0.125	3.2	4.500	114	0.625	16	0.4	0.2
3	76	3.500	89	1/8"	0.125	3.2	5.000	127	0.625	16	0.6	0.3
4	102	4.500	114	1/8"	0.125	3.2	6.500	165	0.625	16	0.9	0.4
5	127	5.563	141	1/8"	0.125	3.2	7.500	191	0.625	16	1.0	0.5
6	152	6.625	168	1/8"	0.125	3.2	8.500	216	0.625	16	1.3	0.6
8	203	8.625	219	1/8"	0.125	3.2	10.750	273	0.625	16	1.9	0.9
10	254	10.750	273	1/8"	0.125	3.2	13.000	330	0.625	16	2.5	1.1
12	305	12.750	324	1/8"	0.125	3.2	15.000	381	0.625	16	3.5	1.6



Long Neck Collars  
Type "C"



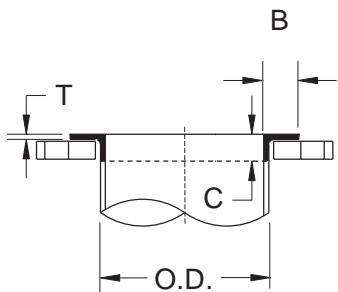
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		C		Weight	
In	mm	In	mm	Sch	In	mm	In	mm	In	mm	lb	kg
2	51	2.500	64	10S	0.109	2.8	3.625	92	2.500	64	0.9	0.4
3	76	3.500	89	10S	0.120	3.0	5.000	127	2.500	64	1.3	0.6
4	102	4.500	114	10S	0.120	3.0	6.188	157	3.000	76	2.0	0.9
6	152	6.625	168	10S	0.134	3.4	8.500	216	3.500	89	3.8	1.7
8	203	8.625	219	10S	0.134	3.4	10.750	273	4.000	102	5.8	2.6
10	254	10.750	273	10S	0.148	3.8	13.000	330	5.000	127	9.9	4.5

**General Notes:**

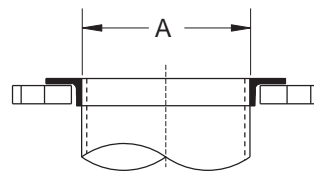
- a. Material: Stainless Steel 304L, 316L, 317L. Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.

# NPS Angle Collars ASTM A774

NPS Nominal Pipe Size		O.D. Outside Diameter		A		Angle Dimensions B-C-T		Weight	
In	mm	In	mm	In	mm	In	mm.	lb	kg
3	76	3.500	89	3.563	90	3/4 x 3/4 x 1/8	19 x 19 x 3.2	0.5	0.2
4	102	4.500	114	4.563	116	1 x 1 x 1/8	25 x 25 x 3.2	0.9	0.4
5	127	5.563	141	5.625	143	1 x 1 x 1/8	25 x 25 x 3.2	1.2	0.5
6	152	6.625	168	6.688	170	1 x 1 x 1/8 1 x 1 x 3/16	25 x 25 x 3.2 25 x 25 x 4.8	1.4 2.0	0.6 0.9
8	203	8.625	219	8.750	222	1 1/4 x 1 1/4 x 1/8 1 1/4 x 1 1/4 x 3/16	32 x 32 x 3.2 32 x 32 x 4.8	2.3 3.4	1.0 1.5
10	254	10.750	273	10.875	276	1 1/4 x 1 1/4 x 1/8 1 1/4 x 1 1/4 x 3/16	32 x 32 x 3.2 32 x 32 x 4.8	2.8 4.2	1.3 1.9
12	305	12.750	324	12.875	327	1 1/2 x 1 1/2 x 1/8 1 1/2 x 1 1/2 x 3/16	38 x 38 x 3.2 38 x 38 x 4.8	4.1 6.0	1.9 2.7
14	356	14.000	356	14.094	358	1 1/2 x 1 1/2 x 1/8 1 1/2 x 1 1/2 x 3/16	38 x 38 x 3.2 38 x 38 x 4.8	4.5 6.6	2.0 3.0
16	406	16.000	406	16.125	410	1 1/2 x 1 1/2 x 3/16 1 1/2 x 1 1/2 x 1/4	38 x 38 x 4.8 38 x 38 x 6.3	7.5 9.7	3.4 4.4
18	457	18.000	457	18.125	460	1 1/2 x 1 1/2 x 3/16 1 1/2 x 1 1/2 x 1/4	38 x 38 x 4.8 38 x 38 x 6.3	8.5 11.0	3.8 5.0
20	508	20.000	508	20.125	511	1 1/2 x 1 1/2 x 3/16 1 1/2 x 1 1/2 x 1/4	38 x 38 x 4.8 38 x 38 x 6.3	9.4 12.2	4.3 5.5
24	610	24.000	610	24.125	613	2 x 2 x 3/16 2 x 2 x 1/4	51 x 51 x 4.8 51 x 51 x 6.3	15.3 19.9	6.9 9.0
30	762	30.000	762	30.125	765	2 x 2 x 1/4 2 x 2 x 3/8	51 x 51 x 6.3 51 x 51 x 9.5	24.9 36.6	11.3 16.6
36	914	36.000	914	36.125	918	2 x 2 x 1/4 2 x 2 x 3/8	51 x 51 x 6.3 51 x 51 x 9.5	38.5 64.6	17.5 29.3
42	1067	42.000	1067	42.125	1070	2 1/2 x 2 1/2 x 1/4 2 1/2 x 2 1/2 x 3/8	64 x 64 x 6.3 64 x 64 x 9.5	44.9 75.4	20.4 34.2
48	1219	48.000	1219	48.125	1222	2 1/2 x 2 1/2 x 1/4 2 1/2 x 2 1/2 x 3/8	64 x 64 x 6.3 64 x 64 x 9.5	51.4 86.3	23.3 39.1



**Butt Weld Angle Collars**  
 (Use with Backing Flanges)  
 P. 3-14

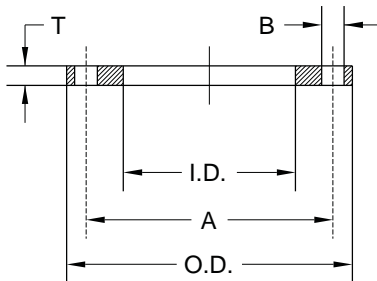


**Slip-on Angle Collars**  
 (Use with Slip-on Backing Flanges)  
 P. 3-15



**General Notes:**

- a. Material: Stainless Steel 304L, 316L, 317L, Other alloys available upon request.
- b. Suggested Maximum Working Pressure : See technical section.
- c. Fabrication Tolerance: See technical section.
- d. Other diameter and thickness available upon request.



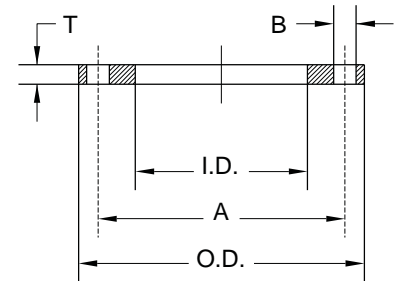
NPS Nominal Pipe Size	O.D.	I.D.	A	# of holes	B	T	Weight
					In mm	In mm	lb kg
1 1/2 38	5.00 127	2.150 55	3.875 98	4	0.625 16	0.750 19	3.6 1.6
2 51	6.000 152	2.625 67	4.750 121	4	0.750 19	0.750 19	4.7 2.1
2 1/2 64	7.000 178	3.125 79	5.500 140	4	0.750 19	0.750 19	6.2 2.8
3 76	7.500 191	3.875 98	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	4.875 124	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	5.938 151	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	7.000 178	9.500 241	8	0.875 22	0.750 19	12.3 5.6
8 203	13.500 343	9.000 229	11.750 298	8	0.875 22	0.750 19	17.7 8.0
10 254	16.000 406	11.250 286	14.250 362	12	1.000 25	1.000 25	30.2 13.7
12 305	19.000 483	13.250 337	17.000 432	12	1.000 25	1.000 25	43.5 19.7
14 356	21.000 533	14.500 368	18.750 476	12	1.125 29	1.125 29	55.0 24.9
16 406	23.500 597	16.500 419	21.250 540	16	1.125 29	1.125 29	66.0 29.9
18 457	25.000 635	18.500 470	22.750 578	16	1.250 32	1.250 32	81.4 36.9
20 508	27.500 699	20.500 521	25.000 635	20	1.250 32	1.250 32	86.3 39.1
24 610	32.000 813	24.500 622	29.500 749	20	1.375 35	1.375 35	121.0 54.9
30 762	38.750 984	30.625 778	36.000 914	28	1.375 35	1.625 41	176.0 79.8
36 914	46.000 1168	36.625 930	42.750 1086	32	1.625 41	1.625 41	237.0 107.5
42 1067	53.000 1346	42.625 1083	49.500 1257	36	1.625 41	1.750 44	337.0 152.9
48 1219	59.500 1511	48.625 1235	56.000 1422	44	1.625 41	2.000 51	455.0 206.4

**General Notes:**

- a. Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- b. Finish: Galvanized to ASTM A 123
- c. Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- d. Suggested Maximum Working Pressure : See technical section.
- e. Other diameter and thickness available upon request.

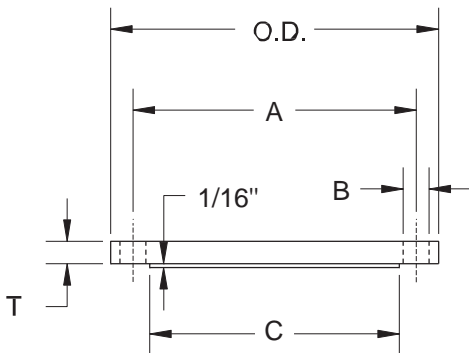


NPS Nominal Pipe Size	O.D.	I.D.	A	# of holes	B	T	Weight
In mm	In mm	In mm	In mm		In mm	In mm	lb kg
3 76	7.500 191	4.188 106	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	5.188 132	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	6.250 159	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	7.313 186	9.500 241	8	0.875 22	0.750 19	12.3 5.6
8 203	13.500 343	9.313 237	11.750 298	8	0.875 22	0.750 19	17.7 8.0
10 254	16.000 406	11.563 294	14.250 362	12	1.000 25	1.000 25	30.2 13.7
12 305	19.000 483	13.563 344	17.000 432	12	1.000 25	1.000 25	43.5 19.7
14 356	21.000 533	14.813 376	18.750 476	12	1.125 29	1.125 29	55.0 24.9
16 406	23.500 597	16.938 430	21.250 540	16	1.125 29	1.125 29	66.0 29.9
18 457	25.000 635	19.000 483	22.750 578	16	1.250 32	1.250 32	81.4 36.9
20 508	27.500 699	21.000 533	25.000 635	20	1.250 32	1.250 32	86.3 39.1
24 610	32.000 813	25.000 635	29.500 749	20	1.375 35	1.375 35	121.0 54.9
30 762	38.750 984	31.250 794	36.000 914	28	1.375 35	1.625 41	176.0 79.8
36 914	46.000 1168	37.250 946	42.750 1086	32	1.625 41	1.625 41	237.0 107.5
42 1067	53.000 1346	43.250 1099	49.500 1257	36	1.625 41	1.750 44	337.0 152.9
48 1219	59.500 1511	49.250 1251	56.000 1422	44	1.625 41	2.000 51	455.0 206.4



**General Notes:**

- a. Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- b. Finish: Galvanized to ASTM A 123
- c. Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- d. Suggested Maximum Working Pressure : See technical section.
- e. Other diameter and thickness available upon request.



Nominal Diameter	O.D.	A	# of holes	B	C	T	Weight
In mm	In mm	In mm		In mm	In mm	In mm	lb kg
1 1/2	5.000	3.875	4	0.625	3.000	0.750	4.3
38	127	98		16	76	19	2.0
2	6.000	4.750	4	0.750	3.500	0.750	6.2
51	152	121		19	89	19	2.8
2 1/2	7.000	5.500	4	0.750	4.500	0.750	8.5
64	178	140		19	114	19	3.9
3	7.500	6.000	4	0.750	5.000	0.750	9.8
76	191	152		19	127	19	4.4
4	9.000	7.500	8	0.750	6.500	0.750	14.0
102	229	191		19	165	19	6.4
5	10.000	8.500	8	0.875	7.375	0.750	17.6
127	254	216		22	187	19	8.0
6	11.000	9.500	8	0.875	8.375	0.750	21.0
152	279	241		22	213	19	9.5
8	13.500	11.750	8	0.875	10.625	0.750	32.2
203	343	298		22	270	19	14.6
10	16.000	14.250	12	1.000	13.000	1.000	58.0
254	406	362		25	330	25	26.3
12	19.000	17.000	12	1.000	15.625	1.000	83.1
305	483	432		25	397	25	37.7
14	21.000	18.750	12	1.125	17.250	1.125	113.0
356	533	476		29	438	29	51.3
16	23.500	21.250	16	1.125	19.750	1.125	142.0
406	597	540		29	502	29	64.4
18	25.000	22.750	16	1.250	21.125	1.250	179.0
457	635	578		32	537	32	81.2
20	27.500	25.000	20	1.250	23.375	1.250	217.5
508	699	635		32	594	32	98.7
24	32.000	29.500	20	1.375	27.750	1.375	323.0
610	813	749		35	705	35	146.5
30	38.750	36.000	28	1.375	34.250	1.500	530.0
762	984	914		35	870	38	240.4
36	46.000	42.750	32	1.625	40.750	1.500	755.0
914	1168	1086		41	1035	38	342.5
42	53.000	49.500	36	1.625	46.750	1.500	906.0
1067	1346	1257		41	1187	38	411.0
48	59.500	56.000	44	1.625	52.750	1.750	1334.0
1219	1511	1422		41	1340	44	605.1

**General Notes:**

- Material: Carbon Steel with chemical composition of ASTM/ASME A283 Grade D or equivalent, or ASTM/ASME A105 available upon request
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 series "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

## Specifications summary

Pipes, fittings and flanges in this section are usually intended for high-temperature and general corrosive operations.

With our cutting edge technology and equipment our pipes and fittings offer an excellent price /quality ratio.

All our pipes and fittings are manufactured, heat treated, inspected, tested, and marked according to the requirements of the respective specifications, thereafter a Manufacturer Test Report is issued for each batch.

The DB Piping group pipes and fittings are made from base materials ASTM A-240-304L & 316L; other alloys are available upon request.

This section includes:

- ASTM A 312 and ASME SA-312 welded pipes [Note (1 and 2)]
- ASTM A 403 and ASME SA-403 fittings Grade WP, Class-S, W, WX and WU (See Table 1 for a brief description of the class)
- ASTM A 182 and ASME SA-182 stainless steel flanges
- ASTM A 105 and ASME SA-105 carbon steel galvanized lap-joint flange

NPS [Nominal Pipe Size] diameter and thickness [Note (4)] of pipes and fittings are governed by ASME B36.19

The maximum allowable operating pressure for pipes shall be calculated according to the pipe equation with or without longitudinal weld (as applicable) of the latest version of the applicable ASME code.

The dimensions of the fittings are governed by ASME B16.9

The fittings are supplied with bevelled ends.

The maximum allowable working pressure for fittings (WP) is equivalent to the one for pipes of the same category (e.g.: Type of construction, diameter, thickness, chemical and mechanical requirements).

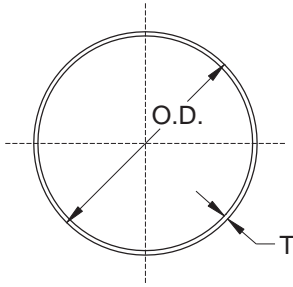
Dimensions and maximum allowable working pressure for flanges can be found inside ASME B16.5

### Notes:

1. ASTM A312 and ASME SA-312 seamless pipes can be provided upon request.
2. ASTM A 269 and ASTM A 409 pipes can be supplied upon request.
3. Non-destructive examination is not performed on class " W" fittings when the welding process is done without filler addition.
4. In accordance with specifications ASTM A 312 / ASME SA-312 and ASTM A 403 / ASME SA-403 allowable tolerance will never be less than 87.5% of the nominal thickness at any measured point.

Grade	Class	Construction	Nondestructif Examination
WP	S	Seamless	None
WP	W	Welded	Radiography or Ultrasonic <sup>(3)</sup>
WP	WX	Welded	Radiography
WP	WU	Welded	Ultrasonic

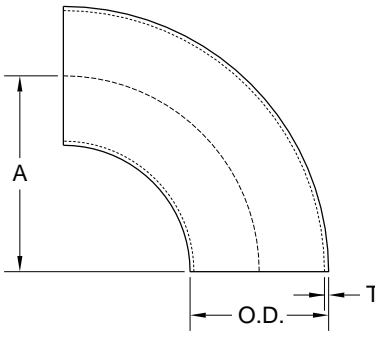
Table 1



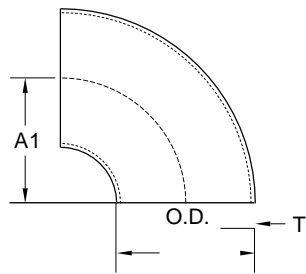
NPS Nominal Pipe Size		O.D. Outside Diameter		Nominal Thickness and Weight											
				Schedule 5S				Schedule 10S				Schedule 40S			
				T		Weight		T		Weight		T		Weight	
In	mm	In	mm	In	mm	lb / ft	kg / m	In	mm	lb / ft	kg / m	In	mm	lb / ft	kg / m
3/4	19	1.050	27	0.065	1.7	0.7	1.0	0.083	2.1	0.9	1.3	0.113	2.9	1.2	1.7
1	25	1.315	33	0.065	1.7	0.9	1.3	0.109	2.8	1.4	2.1	0.133	3.4	1.7	2.6
1 1/4	32	1.660	42	0.065	1.7	1.1	1.7	0.109	2.8	1.8	2.8	0.140	3.6	2.3	3.5
1 1/2	38	1.900	48	0.065	1.7	1.3	1.9	0.109	2.8	2.1	3.2	0.145	3.7	2.8	4.1
2	51	2.375	60	0.065	1.7	1.6	2.4	0.109	2.8	2.7	4.0	0.154	3.9	3.7	5.6
2 1/2	64	2.875	73	0.083	2.1	2.5	3.8	0.120	3.0	3.6	5.4	0.203	5.2	5.9	8.8
3	76	3.500	89	0.083	2.1	3.1	4.6	0.120	3.0	4.4	6.6	0.216	5.5	7.8	11.6
4	102	4.500	114	0.083	2.1	4.0	6.0	0.120	3.0	5.7	8.6	0.237	6.0	11.0	16.5
5	127	5.563	141	0.109	2.8	6.5	9.7	0.134	3.4	8.0	11.9	0.258	6.6	15.0	22.3
6	152	6.625	168	0.109	2.8	7.8	11.6	0.134	3.4	9.5	14.2	0.280	7.1	19.4	29.0
8	203	8.625	219	0.109	2.8	10.1	15.1	0.148	3.8	13.7	20.4	0.322	8.2	29.2	43.6
10	254	10.750	273	0.134	3.4	15.6	23.2	0.165	4.2	19.1	28.5	0.365	9.3	41.4	61.8
12	305	12.750	324	0.156	4.0	21.5	32.0	0.180	4.6	24.7	36.9	0.375	9.5	50.7	75.6
14	356	14.000	356	0.156	4.0	23.6	35.2	0.188	4.8	28.4	42.3	0.375	9.5	55.9	83.3
16	406	16.000	406	0.165	4.2	28.6	42.6	0.188	4.8	32.5	48.5	0.375	9.5	64.1	95.5
18	457	18.000	457	0.165	4.2	32.2	48.0	0.188	4.8	36.6	54.6	0.375	9.5	72.3	107.7
20	508	20.000	508	0.188	4.8	40.6	60.6	0.218	5.5	47.1	70.3	0.375	9.5	80.5	120.0
24	610	24.000	610	0.218	5.5	56.7	84.5	0.250	6.4	64.9	96.8	0.375	9.5	96.9	144.4

**General Notes:**

- a. Nominal diameter and thickness: According to ASME B36.19
- b. Thickness Tolerance: According to A / SA-312 will never be less than 87.5% of the nominal thickness.
- c. Material: Stainless Steel TP-304L and TP-316L. Other alloys are available upon request.
- d. Maximum operating pressure: Must be calculated using the latest version of the applicable ASME code.



90° Elbow (Long Radius)



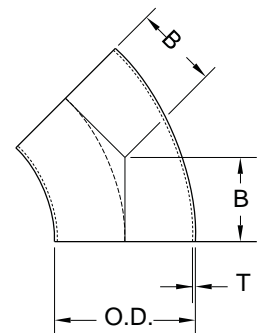
90° Elbow (Short Radius)

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius				90° Elbow Short Radius			
							A		Weight		A1		Weight	
In	mm	In	mm	Ga / Sch	In	mm	In	mm	lb	kg	In	mm	lb	kg
3	76	3.500	89	14	0.078	2.0	4.500	114	1.7	0.8				
				11	0.125	3.2			2.7	1.2				
				Sch 5S	0.083	2.1			1.8	0.8				
				Sch 10S	0.120	3.0			2.6	1.2				
4	102	4.500	114	14	0.078	2.0	6.000	152	3.0	1.3				
				11	0.125	3.2			4.7	2.1				
				Sch 5S	0.083	2.1			3.1	1.4				
				Sch 10S	0.120	3.0			4.5	2.0				
5	127	5.563	141	14	0.078	2.0	7.500	191	4.6	2.1				
				11	0.125	3.2			7.3	3.3				
				Sch 5S	0.109	2.8			6.4	2.9				
				Sch 10S	0.134	3.4			7.8	3.5				
6	152	6.625	168	14	0.078	2.0	9.000	229	6.6	3.0				
				11	0.125	3.2			10.5	4.7				
				Sch 5S	0.109	2.8			9.1	4.1				
				Sch 10S	0.134	3.4			11.2	5.1				
8	203	8.625	219	14	0.078	2.0	12.000	305	11.4	5.2	8.000	203	-----	-----
				11	0.125	3.2			18.2	8.3			-----	-----
				Sch 5S	0.109	2.8			15.9	7.2			10.6	4.8
				Sch 10S	0.148	3.8			21.5	9.8			14.4	6.5
10	254	10.750	273	11	0.125	3.2	15.000	381	28.5	12.9	10.000	254	-----	-----
				Sch 5S	0.134	3.4			30.5	13.9			20.4	9.2
				Sch 10S	0.165	4.2			37.5	17.0			25.0	11.3
12	305	12.750	324	11	0.125	3.2	18.000	457	40.7	18.4	12.000	305	-----	-----
				Sch 5S	0.156	4.0			50.6	23.0			33.7	15.3
				Sch 10S	0.180	4.6			58.3	26.4			38.9	17.6
14	356	14.000	356	11	0.125	3.2	21.000	533	52.1	23.6	14.000	356	-----	-----
				Sch 5S	0.156	4.0			64.9	29.4			43.3	19.6
				Sch 10S	0.188	4.8			78.0	35.4			52.0	23.6
16	406	16.000	406	11	0.125	3.2	24.000	610	68.2	30.9	16.000	406	-----	-----
				10	0.140	3.6			76.3	34.6			-----	-----
				Sch 5S	0.165	4.2			89.7	40.7			59.8	27.1
				Sch 10S	0.188	4.8			102.1	46.3			68.1	30.9
18	457	18.000	457	11	0.125	3.2	27.000	686	86.3	39.2	18.000	457	-----	-----
				10	0.140	3.6			96.6	43.8			-----	-----
				Sch 5S	0.165	4.2			113.7	51.6			75.8	34.4
				Sch 10S	0.188	4.8			129.4	58.7			86.3	39.1
20	508	20.000	508	10	0.140	3.6	30.000	762	119.4	54.1	20.000	508	-----	-----
				1/4"	0.250	6.4			212.0	96.2			-----	-----
				Sch 5S	0.188	4.8			159.5	72.3			106.3	48.2
				Sch 10S	0.218	5.5			185.1	84.0			123.4	56.0
24	610	24.000	610	10	0.140	3.6	36.000	914	172.1	78.1	24.000	610	-----	-----
				3/16"	0.188	4.8			230.0	104.3			-----	-----
				Sch 5S	0.218	5.5			267.1	121.2			178.1	80.8
				Sch 10S	0.250	6.4			305.9	138.8			203.9	92.5
30	762	30.000	762	10	0.140	3.6	45.000	1143	269.2	122.1	30.000	762	-----	-----
				3/16"	0.188	4.8			360.0	163.3			-----	-----
				Sch 5S	0.250	6.4			479.0	217.3			319.3	144.8
				Sch 10S	0.312	7.9			596.5	270.6			397.7	180.4

**General Notes:**

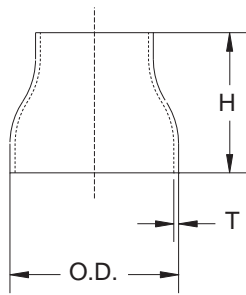
- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19
- d. Dimensions: ASME B16.9
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			B		Weight		S/R 45 Elbows			
In	mm	In	mm	Sch	In	mm	In	mm	lb	kg	B		Weight	
											In	mm	lb	kg
1 1/2	38	1.900	48	5S	0.065	1.7	1.125	29	0.2	0.1				
				10S	0.109	2.8			0.3	0.1				
				40S	0.145	3.7			0.4	0.2				
2	51	2.375	60	5S	0.065	1.7	1.375	35	0.3	0.1				
				10S	0.109	2.8			0.5	0.2				
				40S	0.154	3.9			0.7	0.3				
2 1/2	64	2.875	73	5S	0.083	2.1	1.750	44	0.6	0.3				
				10S	0.120	3.0			0.9	0.4				
				40S	0.203	5.2			1.5	0.7				
3	76	3.500	89	5S	0.083	2.1	2.000	51	0.9	0.4				
				10S	0.120	3.0			1.3	0.6				
				40S	0.216	5.5			2.3	1.0				
4	102	4.500	114	5S	0.083	2.1	2.500	64	1.6	0.7				
				10S	0.120	3.0			2.3	1.0				
				40S	0.237	6.0			4.3	2.0				
5	127	5.563	141	5S	0.109	2.8	3.120	79	3.2	1.4				
				10S	0.134	3.4			3.9	1.8				
				40S	0.258	6.6			7.3	3.3				
6	152	6.625	168	5S	0.109	2.8	3.750	95	4.6	2.1				
				10S	0.134	3.4			5.6	2.5				
				40S	0.280	7.1			11.4	5.2				
8	203	8.625	219	5S	0.109	2.8	5.000	127	8.0	3.6	4.000	102	5.3	2.4
				10S	0.148	3.8			10.8	4.9			7.2	3.3
				40S	0.322	8.2			23.0	10.4			15.3	3.5
10	254	10.750	273	5S	0.134	3.4	6.250	159	15.3	6.9	5.000	127	10.2	4.6
				10S	0.165	4.2			18.7	8.5			12.5	5.7
				40S	0.365	9.3			40.7	18.5			26.1	12.3
12	305	12.750	324	5S	0.156	4.0	7.500	191	25.3	11.5	6.000	153	16.9	7.7
				10S	0.180	4.6			29.1	13.2			19.5	8.8
				40S	0.375	9.5			59.8	27.1			39.9	18.1
14	356	14.000	356	5S	0.156	4.0	8.750	222	32.5	14.7	7.000	178	21.7	9.8
				10S	0.188	4.8			39.0	17.7			26.0	11.8
				40S	0.375	9.5			76.8	34.8			51.2	23.2
16	406	16.000	406	5S	0.165	4.2	10.000	254	44.9	20.4	8.000	203	29.9	13.1
				10S	0.188	4.8			51.0	23.2			34.5	15.5
				40S	0.375	9.5			100.6	45.6			67.1	30.5
18	457	18.000	457	5S	0.165	4.2	11.250	286	56.9	25.8	9.000	229	37.9	17.2
				10S	0.188	4.8			64.7	29.3			43.2	19.6
				40S	0.375	9.5			127.7	57.9			85.2	38.6
20	508	20.000	508	5S	0.188	4.8	12.500	318	80.0	36.3	10.000	305	53.3	24.2
				10S	0.218	5.5			92.6	42.0			61.7	28.0
				40S	0.375	9.5			158.0	71.7			105.3	47.8
24	610	24.000	610	5S	0.218	5.5	15.000	381	133.6	60.6	12.000	361	89.1	40.4
				10S	0.250	6.4			152.9	69.4			102.0	46.3
				40S	0.375	9.5			228.2	104			153.5	69.1

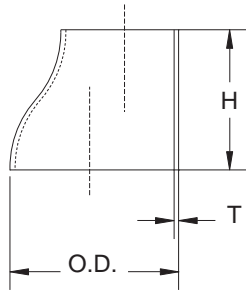


**General Notes:**

- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19.
- d. Dimensions: ASME B16.9.
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12.
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.



Concentric Reducer



Eccentric Reducer

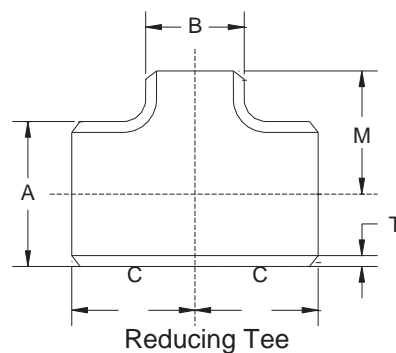
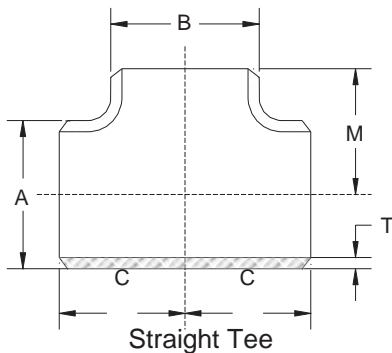
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			H		Weight	
In	mm	In	mm	Sch	In	mm	In	mm	lb	kg
1 1/2	38	1.900	48	5S	0.065	1.7	2.500	64	0.3	0.1
				10S	0.109	2.8			0.4	0.2
				40S	0.145	3.7			0.6	0.3
2	51	2.375	60	5S	0.065	1.7	3.000	76	0.4	0.2
				10S	0.109	2.8			0.7	0.3
				40S	0.145	3.7			0.9	0.4
2 1/2	64	2.875	73	5S	0.083	2.1	3.500	89	0.7	0.3
				10S	0.120	3.0			1.1	0.5
				40S	0.203	5.2			1.7	0.8
3	76	3.500	89	5S	0.083	2.1	3.500	89	0.9	0.4
				10S	0.120	3.0			1.3	0.6
				40S	0.216	5.5			2.3	1.0
4	102	4.500	114	5S	0.083	2.1	4.000	102	1.3	0.6
				10S	0.120	3.0			1.9	0.9
				40S	0.237	6.0			3.7	1.7
5	127	5.563	141	5S	0.109	2.8	5.000	127	2.7	1.2
				10S	0.134	3.4			3.3	1.5
				40S	0.258	6.6			6.2	2.8
6	152	6.625	168	5S	0.109	2.8	5.500	140	3.6	1.6
				10S	0.134	3.4			4.4	2.0
				40S	0.280	7.1			8.9	4.0
8	203	8.625	219	5S	0.109	2.8	6.000	152	5.1	2.3
				10S	0.148	3.8			6.9	3.1
				40S	0.322	8.2			14.6	6.6
10	254	10.750	273	5S	0.134	3.4	7.000	178	9.1	4.1
				10S	0.165	4.2			11.1	5.1
				40S	0.365	9.3			24.2	11.0
12	305	12.750	324	5S	0.156	4.0	8.000	203	14.3	6.5
				10S	0.180	4.6			16.5	7.5
				40S	0.375	9.5			33.8	15.3
14	356	14.000	356	5S	0.156	4.0	13.000	330	40.2	18.2
				10S	0.188	4.8			30.8	14.0
				40S	0.375	9.5			60.5	27.4
16	406	16.000	406	5S	0.165	4.2	14.000	356	33.3	15.1
				10S	0.188	4.8			37.9	17.2
				40S	0.375	9.5			74.7	33.9
18	457	18.000	457	5S	0.165	4.2	15.000	381	40.2	18.2
				10S	0.188	4.8			45.8	20.8
				40S	0.375	9.5			90.3	41.0
20	508	20.000	508	5S	0.188	4.8	20.000	508	67.9	30.8
				10S	0.218	5.5			78.6	35.6
				40S	0.375	9.5			134.1	60.8
24	610	24.000	610	5S	0.218	5.5	20.000	508	94.5	42.9
				10S	0.250	6.4			108.2	49.1
				40S	0.375	9.5			161.4	73.2

**General Notes:**

- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19
- d. Dimensions: ASME B16.9
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.

# NPS Tees ASTM A 403 & ASME SA-403

Run				Outlet				C		M		SCH 10S				SCH 40S			
NPS Nominal Pipe Size		A		NPS Nominal Pipe Size		B						T		Weight		T		Weight	
In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	lb	kg	In	mm	lb	kg
1 1/2	38	1.900	48	1/2	13	0.840	21	2.250	57	2.250	57	0.109	2.8	1.3	0.6	0.145	3.7	2.0	0.9
				3/4	19	1.050	27			2.250	57			1.4	0.6			2.1	1.0
				1	25	1.315	33			2.250	57			1.5	0.7			1.2	0.5
				1 1/4	32	1.660	42			2.250	57			1.5	0.7			2.3	1.0
				1 1/2	38	1.900	48			2.250	57			1.5	0.7			2.3	1.0
2	51	2.375	60	3/4	19	1.050	27	2.500	64	1.750	44	0.109	2.8	1.4	0.6	0.154	3.9	3.3	1.5
				1	25	1.315	33			2.000	51			1.7	0.8			3.5	1.6
				1 1/4	32	1.660	42			2.250	57			1.7	0.8			3.6	1.6
				1 1/2	38	1.900	48			2.375	60			1.8	0.8			3.8	1.7
				2	51	2.375	60			2.500	64			1.8	0.8			3.8	1.7
2 1/2	64	2.875	73	1	25	1.315	33	3.000	76	2.250	57	0.120	3.0	2.5	1.1	0.203	5.2	5.0	2.3
				1 1/4	32	1.660	42			2.500	64			2.6	1.2			5.3	2.4
				1 1/2	38	1.900	48			2.625	67			2.7	1.2			5.5	2.5
				2	51	2.375	60			2.750	70			3.0	1.4			6.0	2.7
				2 1/2	64	2.875	73			3.000	76			3.0	1.4			6.0	2.7
3	76	3.500	89	1 1/4	32	1.660	42	3.375	86	2.750	70	0.120	3.0	3.6	1.6	0.216	5.5	6.3	2.8
				1 1/2	38	1.900	48			2.875	73			3.7	1.7			6.3	2.8
				2	51	2.375	60			3.000	76			3.8	1.7			6.5	2.9
				2 1/2	64	2.875	73			3.250	83			3.9	1.8			6.8	3.1
				3	76	3.500	89			3.375	86			3.9	1.8			7.0	3.2
4	102	4.500	114	1 1/2	38	1.900	48	4.125	105	3.375	86	0.120	3.0	5.4	2.4	0.237	6.0	11.1	5.0
				2	51	2.375	60			3.500	89			5.4	2.5			11.2	5.1
				2 1/2	64	2.875	73			3.750	95			5.5	2.5			11.3	5.1
				3	76	3.500	89			3.875	98			5.6	2.5			11.6	5.3
				4	89	4.500	114			4.125	105			5.7	2.6			12.0	5.4
5	127	5.563	141	2	51	2.375	60	4.875	124	4.125	105	0.134	3.4	10.8	4.9	0.258	6.6	19.0	8.6
				2 1/2	64	2.875	73			4.250	108			11.1	5.0			19.5	8.8
				3	76	3.500	89			4.375	111			11.4	5.2			20.0	9.1
				4	102	4.500	114			4.625	117			12.0	5.4			21.0	9.5
				5	127	5.563	141			4.875	124			12.0	5.4			21.5	9.8
6	152	6.625	168	2 1/2	64	2.875	73	5.625	143	4.750	121	0.134	3.4	15.7	7.1	0.280	7.1	32.0	14.5
				3	76	3.500	89			4.875	124			16.0	7.3			32.5	14.7
				4	102	4.500	114			5.125	130			16.5	7.5			33.5	15.2
				5	127	5.563	141			5.375	137			17.0	7.7			34.5	15.6
				6	152	6.625	168			5.625	143			17.0	7.7			35.0	15.9
8	203	8.625	219	4	102	4.500	114	7.000	178	6.125	156	0.148	3.8	23.9	10.8	0.322	8.2	51.7	23.5
				5	127	5.563	141			6.375	162			24.5	11.1			53.0	24.0
				6	152	6.625	168			6.625	168			25.0	11.3			54.0	24.5
				8	203	8.625	219			7.000	178			25.0	11.3			55.0	24.9





Run				Outlet				C		M		SCH 10S				SCH 40S			
NPS Nominal Pipe Size		A		NPS Nominal Pipe Size		B						T		Weight		T		Weight	
In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	lb	kg	In	mm	lb	kg
10	254	10.750	273	4	102	4.500	114	8.500	216	7.250	184	0.165	4.2	30.1	13.7	0.365	9.3	80.0	36.3
				5	127	5.563	141			7.500	191			32.3	14.7			81.0	36.7
				6	152	6.625	168			7.625	194			36.3	16.5			83.0	37.6
				8	203	8.625	219			8.000	203			37.0	16.8			84.5	38.3
				10	254	10.750	273			8.500	216			37.0	16.8			85.0	38.6
12	305	12.750	324	5	127	5.563	141	10.000	254	8.500	216	0.180	4.6	49.8	22.6	0.375	9.5	110.0	49.9
				6	152	6.625	168			8.625	219			51.7	23.5			114.0	51.7
				8	203	8.625	219			9.000	229			53.0	24.0			117.0	53.1
				10	254	10.750	273			9.500	241			54.0	24.5			119.0	54.0
				12	305	12.750	324			10.000	254			54.0	24.5			120.0	54.4
14	356	14.000	356	6	152	8.625	219	11.000	279	9.375	238	0.188	4.8	51.5	23.4	0.375	9.5	153.0	69.4
				8	203	8.625	219			9.750	248			52.5	23.8			155.0	70.3
				10	254	10.750	273			10.125	257			53.5	24.3			158.0	71.7
				12	305	12.750	324			10.625	270			54.3	24.6			160.0	72.6
				14	356	14.000	356			11.000	279			59.6	27.0			165.0	74.8
16	406	16.000	406	6	152	8.625	219	12.000	305	10.375	264	0.188	4.8	65.1	29.5	0.375	9.5	176.0	79.8
				8	203	8.625	219			10.750	273			67.1	30.4			180.0	81.6
				10	254	10.750	273			11.125	283			69.3	31.4			186.0	84.4
				12	305	12.750	324			11.625	295			71.2	32.3			191.0	86.6
				14	356	14.000	356			12.000	305			72.4	32.8			194.0	88.0
18	457	18.000	457	6	152	8.625	219	12.000	305	12.000	305	0.188	4.8	75.9	34.4	0.375	9.5	199.0	90.3
				8	203	10.750	273			11.750	298			81.5	37.0			196.0	88.9
				10	254	10.750	273			12.125	308			83.5	37.9			222.0	100.7
				12	305	12.750	324			12.625	321			86.5	39.2			230.0	104.3
				14	356	14.000	356			13.000	330			88.7	40.2			236.0	107.0
20	508	20.000	508	6	152	8.625	219	13.500	343	13.000	330	0.188	4.8	90.2	40.9	0.375	9.5	241.0	109.3
				8	203	10.750	273			13.500	343			94.7	43.0			249.0	112.9
				10	254	10.750	273			12.750	324			124.0	56.2			328.0	148.8
				14	356	14.000	356			13.125	333			126.0	57.2			332.0	150.6
				16	406	16.000	406			14.000	356			126.0	57.2			336.0	152.4
24	610	24.000	610	6	152	8.625	219	15.000	381	14.000	356	0.218	5.5	127.0	57.6	0.375	9.5	338.0	153.3
				8	203	10.750	273			14.500	368			128.0	58.1			340.0	154.2
				10	254	10.750	273			15.000	381			130.0	59.0			347.0	157.4
				14	356	14.000	356			15.625	397			191.0	86.6			510.0	231.3
				16	406	16.000	406			16.000	406			192.0	87.1			513.0	232.7
24	610	24.000	610	16	406	16.000	406	17.000	432	16.000	406	0.250	6.4	193.0	87.5	0.375	9.5	516.0	234.1
				18	457	18.000	457			16.500	419			194.0	88.0			519.0	235.4
				20	508	20.000	508			17.000	432			195.0	88.5			522.0	236.8
				24	610	24.000	610			17.000	432			200.0	90.7			528.0	239.5

**General Notes:**

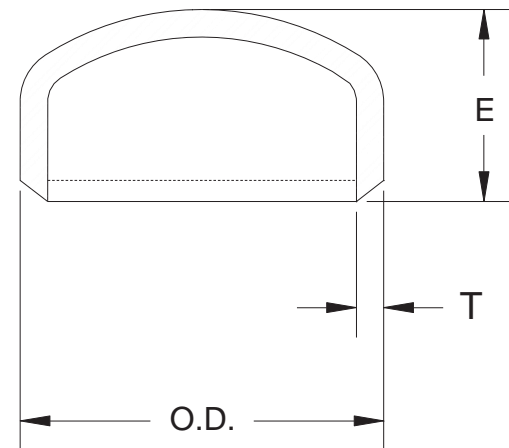
- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19
- d. Dimensions: ASME B16.9
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.



NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			E		Weight	
In	mm	In	mm	Identifi- cation	In	mm	In	mm	lb	kg
1 1/2	38	1.900	48	5S	0.065	1.7	1.50	38	0.2	0.1
				10S	0.109	2.8			0.3	0.1
				40S	0.145	3.7			0.4	0.2
2	51	2.375	60	5S	0.065	1.7	1.50	38	0.2	0.1
				10S	0.109	2.8			0.4	0.2
				40S	0.154	3.9			0.6	0.3
2 1/2	64	2.875	73	5S	0.083	2.1	1.50	38	0.4	0.2
				10S	0.120	3.0			0.5	0.2
				40S	0.203	5.2			0.9	0.4
3	76	3.500	89	5S	0.083	2.1	2.00	51	0.6	0.3
				10S	0.120	3.0			0.8	0.4
				40S	0.216	5.5			1.5	0.7
4	102	4.500	114	5S	0.083	2.1	2.50	64	0.9	0.4
				10S	0.120	3.0			1.3	0.6
				40S	0.237	6.0			2.5	1.1
5	127	5.563	141	5S	0.109	2.8	3.00	76	2.0	0.9
				10S	0.134	3.4			2.4	1.1
				40S	0.258	6.6			4.7	2.1
6	152	6.625	168	5S	0.109	2.8	3.50	89	2.5	1.1
				10S	0.134	3.4			3.1	1.4
				40S	0.280	7.1			6.5	2.9
8	203	8.625	219	5S	0.109	2.8	4.00	102	4.0	1.8
				10S	0.148	3.8			5.5	2.5
				40S	0.322	8.2			11.9	5.4
10	254	10.750	273	5S	0.134	3.4	5.00	127	8.1	3.7
				10S	0.165	4.2			10.0	4.5
				40S	0.365	9.3			22.0	10.0
12	305	12.750	324	5S	0.156	4.0	6.00	152	13.5	6.1
				10S	0.180	4.6			14.7	6.7
				40S	0.375	9.5			30.7	13.9
14	356	14.000	356	5S	0.156	4.0	6.50	165	-----	-----
				10S	0.188	4.8			18.0	8.2
				40S	0.375	9.5			33.0	15.0
16	406	16.000	406	5S	0.165	4.2	7.00	178	-----	-----
				10S	0.188	4.8			23.0	10.4
				40S	0.375	9.5			42.0	19.1
18	457	18.000	457	5S	0.165	4.2	8.00	203	-----	-----
				10S	0.188	4.8			29.0	13.2
				40S	0.375	9.5			55.0	24.9
20	508	20.000	508	5S	0.188	4.8	9.00	229	-----	-----
				10S	0.218	5.5			37.0	16.8
				40S	0.375	9.5			68.0	30.8
24	610	24.000	610	5S	0.218	5.5	10.50	267	-----	-----
				10S	0.250	6.4			58.0	26.3
				40S	0.375	9.5			96.0	1.0

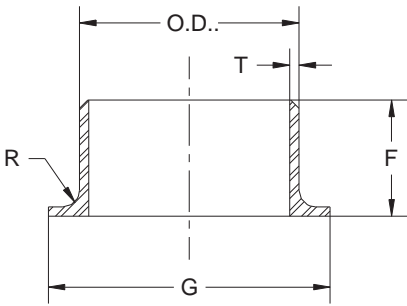


Ellipsoidal Shaped Cap



**General Notes:**

- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19
- d. Dimensions: ASME B16.9
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.



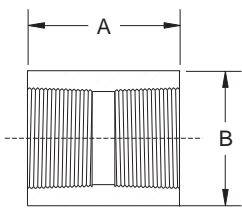
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			F		G		R		Weight	
In	mm	In	mm	Sch.	In	mm	In	mm	In	mm	In	mm	lb	kg
1 1/2	38	1.900	48	10S	0.109	2.8	2.000	51	2.875	73	0.250	6	0.6	0.2
				40S	0.145	3.7							0.9	0.4
2	51	2.375	60	10S	0.109	2.8	2.500	64	3.625	92	0.313	8	0.9	0.4
				40S	0.154	3.9							1.2	0.5
2 1/2	64	2.875	73	10S	0.120	3.0	2.500	64	4.125	105	0.313	8	1.1	0.5
				40S	0.203	5.2							1.8	0.8
3	76	3.500	89	10S	0.120	3.0	2.500	64	5.000	127	0.375	10	1.6	0.7
				40S	0.216	5.5							2.5	1.1
4	102	4.500	114	10S	0.120	3.0	3.000	76	6.188	157	0.438	11	2.5	1.1
				40S	0.237	6.0							4.0	1.8
5	127	5.563	141	10S	0.134	3.4	3.000	76	7.313	186	0.438	11	3.5	1.6
				40S	0.258	6.6							5.6	2.5
6	152	6.625	168	10S	0.134	3.4	3.500	89	8.500	216	0.500	13	4.8	2.2
				40S	0.280	7.1							8.3	3.7
8	203	8.625	219	10S	0.148	3.8	4.000	102	10.625	270	0.500	13	7.7	3.5
				40S	0.322	8.2							13.0	5.9
10	254	10.750	273	10S	0.165	4.2	5.000	127	12.750	324	0.500	13	12.1	5.5
				40S	0.365	9.3							23.0	10.4
12	305	12.750	324	10S	0.180	4.6	6.000	152	15.000	381	0.500	13	18.0	8.2
				40S	0.375	9.5							33.0	15.0
14	356	14.000	356	10S	0.188	4.8	6.000	152	16.250	413	0.500	13	22.3	10.1
				40S	0.375	9.5							37.6	17.1
16	406	16.000	406	10S	0.188	4.8	6.000	152	18.500	470	0.500	13	27.5	12.5
				40S	0.375	9.5							46.3	21.0
18	457	18.000	457	10S	0.188	4.8	6.000	152	21.000	533	0.500	13	35.2	16.0
				40S	0.375	9.5							64.0	29.0
20	508	20.000	508	10S	0.218	5.5	6.000	152	23.000	584	0.500	13	49.8	22.6
				40S	0.375	9.5							74.2	33.7
24	610	24.000	610	10S	0.250	6.4	6.000	152	27.250	692	0.500	13	77.4	35.1
				40S	0.375	9.5							95.0	43.1

**Stub-end illustrated with Galvanized Lap-joint Flange**  
 (See P 4-12 & 4-13 for Lap-joint detail)

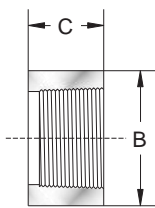
**General Notes:**

- a. Material: Stainless Steel 304L, 316L. Other alloys available on request.
- b. Grade WP - Class W, WX, WU, (Class S on request).
- c. Diameter and thickness: ASME B36.19
- d. Dimensions: ASME B16.9 (Short Pattern)
- e. Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- f. Dimensional Tolerance: ASME B16.9, Table 13.
- g. Bevel: ASME B16.9, Table 12
- h. Allowable Pressure Rating: Must be calculated using the latest version of the applicable ASME code.

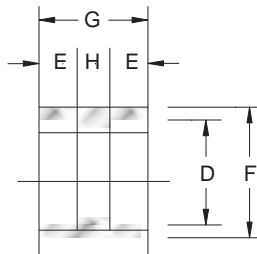
NPS Nominal Pipe Size	A	B	C	D	E	F	G	H	Weight	
									Coupling	Half Coupling
In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	lb kg	lb kg
1/8	1.250	0.750	0.625	0.420	0.375	0.750	1.000	0.250	0.13	0.07
3	32	19	16	11	10	19	25	6	0.1	0.03
1/4	1.375	0.750	0.688	0.555	0.375	0.875	1.000	0.250	0.13	0.07
6	35	19	17	14	10	22	25	6	0.1	0.03
3/8	1.500	0.875	0.750	0.690	0.438	1.000	1.125	0.250	0.31	0.16
10	38	22	19	18	11	25	29	6	0.1	0.1
1/2	1.875	1.125	1.313	0.855	0.500	1.250	1.375	0.375	0.25	0.13
13	48	29	33	22	13	32	35	10	0.1	0.1
3/4	2.000	1.375	1.000	1.065	0.563	1.500	1.500	0.375	0.44	0.22
19	51	35	25	27	14	38	38	10	0.2	0.1
1	2.375	1.750	1.188	1.330	0.625	1.750	1.750	0.500	0.63	0.32
25	60	44	30	34	16	44	44	13	0.3	0.1
1 1/4	2.625	2.25	1.313	1.675	0.688	2.250	1.875	0.500	1.56	0.78
32	67	57	33	43	17	57	48	13	0.7	0.4
1 1/2	3.125	2.500	1.563	1.915	0.750	2.500	2.000	0.500	2.19	1.10
38	79	64	40	49	19	64	51	13	1.0	0.5
2	3.375	3.000	1.688	2.406	0.875	3.000	2.500	0.750	4.50	2.25
51	86	76	43	61	22	76	64	19	2.0	1.0
2 1/2	3.625	3.625	1.813	2.906	0.875	3.625	2.500	0.750	6.25	3.13
64	92	92	46	74	22	92	64	19	2.8	1.4
3	4.250	4.250	2.125	3.535	1.000	4.250	2.750	0.750	6.75	3.38
76	108	108	54	90	25	108	70	19	3.1	1.5
4	4.750	5.500	2.375	4.545	1.125	5.500	3.000	0.750	16.75	8.38
102	121	140	60	115	29	140	76	19	7.6	3.8



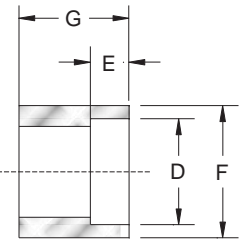
Threaded Coupling



Threaded Half-Coupling

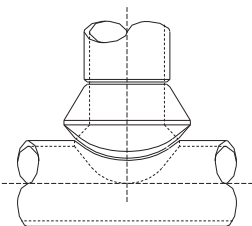


Socket-Welding Coupling

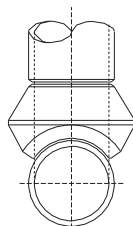


Socket-Welding Half-Coupling

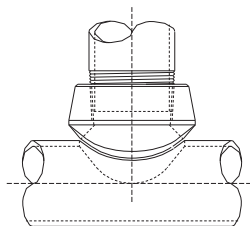
Also available, Integrally Reinforced Forged Branch Outlet Fittings. (A/SA-182, MSS-SP 97)



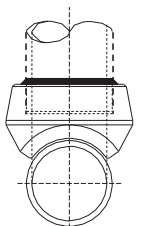
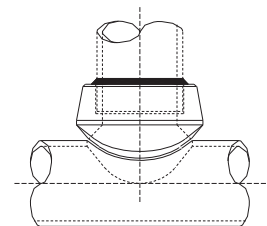
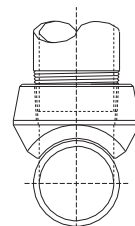
Buttwelding



Threaded

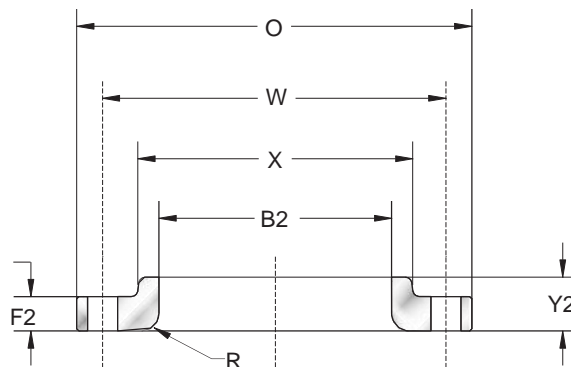


Socket Welding



# NPS Lap-joints ASTM A105 & ASME SA-105 Class 150, Galvanized

NPS Nominal Pipe Size	O	F2	X	Y2	B2	R	W Diameter of Bolt Circle	Diameter of Bolt Holes	Number of Bolts	Weight
In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm		lb kg
1 1/2 38	5.00 127	0.69 18	2.56 65	0.88 22	1.97 50	0.25 6	3.88 99	5/8 16	4	3.0 1.4
2 51	6.00 152	0.75 19	3.06 78	1.00 25	2.46 62	0.31 8	4.75 121	3/4 19	4	5.0 2.3
2 1/2 64	7.00 178	0.88 22	3.56 90	1.12 28	2.97 75	0.31 8	5.50 140	3/4 19	4	7.0 3.2
3 76	7.50 191	0.94 24	4.25 108	1.19 30	3.60 91	0.38 10	6.00 152	3/4 19	4	8.0 3.6
4 102	9.00 229	0.94 24	5.31 135	1.31 33	4.60 117	0.44 11	7.50 191	3/4 19	8	13.0 5.9
5 127	10.00 254	0.94 24	6.44 164	1.44 37	5.69 145	0.44 11	8.50 216	7/8 22	8	15.0 6.8
6 152	11.00 279	1.00 25	7.56 192	1.56 40	6.75 171	0.50 13	9.50 241	7/8 22	8	19.0 8.6
8 203	13.50 343	1.12 28	9.69 246	1.75 44	8.75 222	0.50 13	11.75 298	7/8 22	8	30.0 13.6
10 254	16.00 406	1.19 30	12.00 305	1.94 49	10.92 277	0.50 13	14.25 362	1 25	12	43.0 19.5
12 305	19.00 483	1.25 32	14.38 365	2.19 56	12.92 328	0.50 13	17.00 432	1 25	12	64.0 29.1
14 356	21.00 533	1.38 35	15.75 400	3.12 79	14.18 360	0.50 13	18.75 476	1 1/8 29	12	105.0 47.7
16 406	23.50 597	1.44 37	18.00 457	3.44 87	16.19 411	0.50 13	21.25 540	1 1/8 29	16	140.0 63.6
18 457	25.00 635	1.56 40	19.88 505	3.81 97	18.20 462	0.50 13	22.75 578	1 1/4 32	16	160.0 72.7
20 508	27.50 699	1.69 43	22.00 559	4.06 103	20.25 514	0.50 13	25.00 635	1 1/4 32	20	195.0 88.6
24 610	32.00 813	1.88 48	26.12 663	4.38 111	24.25 616	0.50 13	29.50 749	1 3/8 35	20	275.0 125.0



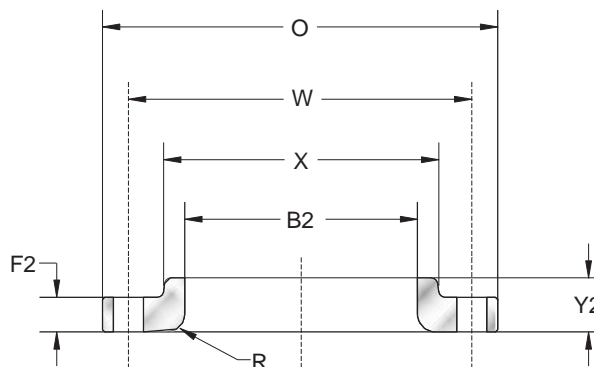
### General Notes:

- Material: Forged Carbon Steel, ASTM A105 and ASME SA-105
- Finish: Galvanized to ASTM A 123
- Dimension: ASME B16.5 Class 150
- Maximum Allowable Working Pressure:  
See ASME B16.5 material group, Table F2-1.1 material group 1.1, or contact our technical representatives.
- Other classes available on request.

NPS Nominal Pipe Size	O	F2	X	Y2	B2	R	W Diameter of Bolt Circle	Diameter of Bolt Holes	Number of Bolts	Weight	
										lb	kg
1 1/2	6.12	0.81	2.75	1.19	1.97	0.25	4.50	7/8	4	6.0	
38	155	21	70	30	50	6	114	22		2.7	
2	6.50	0.88	3.31	1.31	2.46	0.31	5.00	3/4	8	7.0	
51	165	22	84	33	62	8	127	19		3.2	
2 1/2	7.50	1.00	3.94	1.50	2.97	0.31	5.88	7/8	8	10.0	
64	191	25	100	38	75	8	149	22		4.5	
3	8.25	1.12	4.62	1.69	3.60	0.38	6.62	7/8	8	13.0	
76	210	28	117	43	91	10	168	22		5.9	
4	10.00	1.25	5.75	1.88	4.60	0.44	7.88	7/8	8	22.0	
102	254	32	146	48	117	11	200	22		10.0	
5	11.00	1.38	7.00	2.00	5.69	0.44	9.25	7/8	8	28.0	
127	279	35	178	51	145	11	235	22		12.7	
6	12.50	1.44	8.12	2.06	6.75	0.50	10.62	7/8	12	39.0	
152	318	37	206	52	171	13	270	22		17.7	
8	15.00	1.62	10.25	2.44	8.75	0.50	13.00	1	12	58.0	
203	381	41	260	62	222	13	330	25		26.4	
10	17.50	1.88	12.62	3.75	10.92	0.50	15.25	1 1/8	16	91.0	
254	445	48	321	95	277	13	387	29		41.4	
12	20.50	2.00	14.75	4.00	12.92	0.50	17.75	1 1/4	16	140.0	
305	521	51	375	102	328	13	451	32		63.6	
14	23.00	2.12	16.75	4.38	14.18	0.50	20.25	1 1/4	20	190.0	
356	584	54	425	111	360	13	514	32		86.4	
16	25.50	2.25	19.00	4.75	16.19	0.50	22.50	1 3/8	20	250.0	
406	648	57	483	121	411	13	572	35		113.6	
18	28.00	2.38	21.00	5.12	18.20	0.50	24.75	1 3/8	24	295.0	
457	711	60	533	130	462	13	629	35		134.1	
20	30.50	2.50	23.12	5.50	20.25	0.50	27.00	1 3/8	24	370.0	
508	775	64	587	140	514	13	686	35		168.2	
24	36.00	2.75	27.62	6.00	24.25	0.50	32.00	1 5/8	24	550.0	
610	914	70	702	152	616	13	813	41		250.0	

**General Notes:**

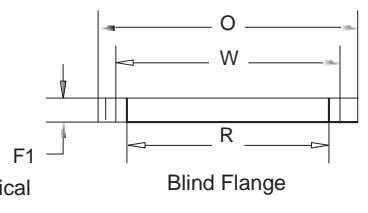
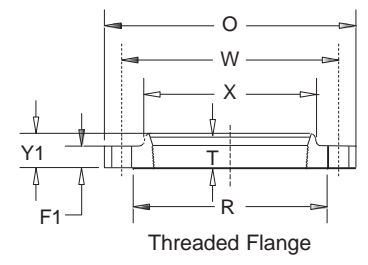
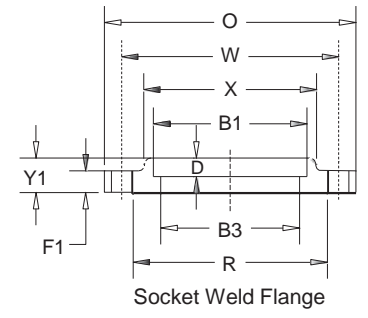
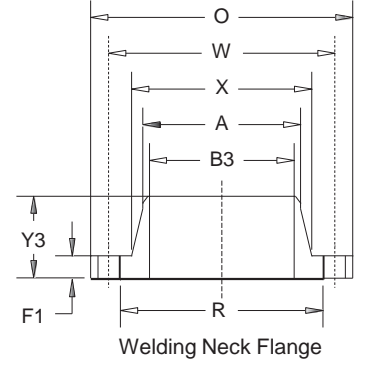
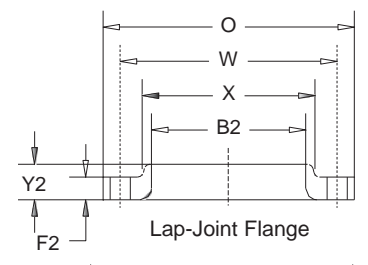
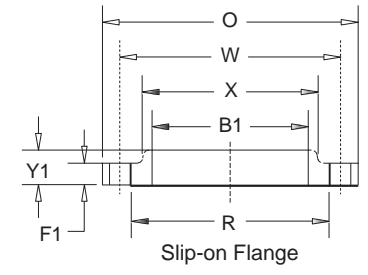
- a. Material: Forged Carbon Steel, ASTM A105 and ASME SA-105
- b. Finish: Galvanized to ASTM A 123
- c. Dimension: ASME B16.5 Class 300
- d. Maximum Allowable Working Pressure: See ASME B16.5 material group, Table F2-1.1 material group 1.1, or contact our technical representatives.
- e. Other classes available on request.



# NPS ASTM A182 & ASME SA-182 Class 150

NPS Nominal Pipe Size	O	F1	F2	X	A	Y1	Y2	Y3	T	Bore			r	D	R
										B1	B2	B3			
Po mm	Po mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm
3/4	3.88	0.44	0.50	1.50	1.05	0.56	0.62	2.00	0.62	1.09	1.11	0.82	0.12	0.44	1.69
19	98	11	13	38	27	14	16	51	16	28	28	21	3	11	43
1	4.25	0.50	0.56	1.94	1.32	0.62	0.69	2.12	0.69	1.36	1.38	1.05	0.12	0.50	2.00
25	108	13	14	49	34	16	18	54	18	35	35	27	3	13	51
1 1/4	4.62	0.56	0.62	2.31	1.66	0.75	0.81	2.19	0.81	1.70	1.72	1.38	0.19	0.56	2.50
32	117	14	16	59	42	19	21	56	21	43	44	35	5	14	64
1 1/2	5.00	0.62	0.69	2.56	1.90	0.81	0.88	2.38	0.88	1.95	1.97	1.61	0.25	0.62	2.88
38	127	16	18	65	48	21	22	60	22	50	50	41	6	16	73
2	6.00	0.69	0.75	3.06	2.38	0.94	1.00	2.44	1.00	2.44	2.46	2.07	0.31	0.69	3.62
51	152	17	19	78	60	24	25	62	25	62	62	53	8	18	92
2 1/2	7.00	0.81	0.88	3.56	2.88	1.06	1.12	2.69	1.12	2.94	2.97	2.47	0.31	0.75	4.12
64	178	21	22	90	73	27	28	68	28	75	75	63	8	19	105
3	7.50	0.88	0.94	4.25	3.50	1.12	1.19	2.69	1.19	3.57	3.60	3.07	0.38	0.81	5.00
76	191	22	24	108	89	28	30	68	30	91	91	78	10	21	127
4	9.00	0.88	0.94	5.31	4.50	1.25	1.31	2.94	1.31	4.57	4.60	4.03	0.44	-----	6.19
102	229	22	24	135	114	32	33	75	33	116	117	102	11	-----	157
5	10.00	0.88	0.94	6.44	5.56	1.38	1.44	3.44	1.44	5.66	5.69	5.05	0.44	-----	7.31
127	254	22	24	164	141	35	37	87	37	144	145	128	11	-----	186
6	11.00	0.94	1.00	7.56	6.63	1.50	1.56	3.44	1.56	6.72	6.75	6.07	0.50	-----	8.50
152	279	24	25	192	168	38	40	87	40	171	171	154	13	-----	216
8	13.50	1.06	1.12	9.69	8.63	1.69	1.75	3.94	1.75	8.72	8.75	7.98	0.50	-----	10.62
203	343	27	28	246	219	43	44	100	44	221	222	203	13	-----	270
10	16.00	1.12	1.19	12.00	10.75	1.88	1.94	3.94	1.94	10.88	10.92	10.02	0.50	-----	12.75
254	406	28	30	305	273	48	49	100	49	276	277	255	13	-----	324
12	19.00	1.19	1.25	14.38	12.75	2.12	2.19	4.44	2.19	12.88	12.92	12.00	0.50	-----	15.00
305	483	30	32	365	324	54	56	113	56	327	328	305	13	-----	381
14	21.00	1.31	1.38	15.75	14.00	2.19	3.12	4.94	2.25	14.14	14.18	Must be specified at time of purchase	0.50	-----	16.25
356	533	33	35	400	356	56	79	125	57	359	360		13	-----	413
16	23.50	1.38	1.44	18.00	16.00	2.44	3.44	4.94	2.50	16.16	16.19		0.50	-----	18.50
406	597	35	37	457	406	62	87	125	64	410	411		13	-----	470
18	25.00	1.50	1.56	19.88	18.00	2.62	3.81	5.44	2.69	18.18	18.20		0.50	-----	21.00
457	635	38	40	505	457	67	97	138	68	462	462		13	-----	533
20	27.50	1.62	1.69	22.00	20.00	2.81	4.06	5.62	2.88	20.20	20.25		0.50	-----	23.00
508	699	41	43	559	508	71	103	143	73	513	514		13	-----	584
24	32.00	1.81	1.88	26.12	24.00	3.19	4.38	5.94	3.25	24.25	24.25		0.50	-----	27.25
610	813	46	48	663	610	81	111	151	83	616	616		13	-----	692

Drilling			Approximate Weight				Nominal Pipe Size (NPS)
W Diameter of Bolt Circle	Diameter of Bolt Holes	Number of bolts	Threaded Slip-on Socket Welding	Lap Joint	Welding Neck	Blind	
In mm	In mm		lb kg	lb kg	lb kg	lb kg	
2.75	5/8	4	2.0	2.0	2.0	2.0	3/4
70	16		0.9	0.9	0.9	0.9	19
3.12	5/8	4	2.0	2.0	3.0	2.0	1
79	16		0.9	0.9	1.4	0.9	25
3.50	5/8	4	3.0	3.0	3.0	3.0	1 1/4
89	16		1.4	1.4	1.4	1.4	32
3.88	5/8	4	3.0	3.0	4.0	4.0	1 1/2
98	16		1.4	1.4	1.8	1.8	38
4.75	3/4	4	5.0	5.0	6.0	5.0	2
121	19		2.3	2.3	2.7	2.3	51
5.50	3/4	4	7.0	7.0	8.0	7.0	2 1/2
140	19		3.2	3.2	3.6	3.2	64
6.00	3/4	4	8.0	8.0	10.0	9.0	3
152	19		3.6	3.6	4.5	4.1	76
7.50	3/4	8	13.0	13.0	15.0	17.0	4
191	19		5.9	5.9	6.8	7.7	102
8.50	7/8	8	15.0	15.0	19.0	20.0	5
216	22		6.8	6.8	8.6	9.1	127
9.50	7/8	8	19.0	19.0	24.0	26.0	6
241	22		8.6	8.6	10.9	11.8	152
11.75	7/8	8	30.0	30.0	39.0	45.0	8
298	22		13.6	13.6	17.7	20.5	203
14.25	1	12	43.0	43.0	52.0	70.0	10
362	25		19.5	19.5	23.6	31.8	254
17.00	1	12	64.0	64.0	80.0	110.0	12
432	25		29.1	29.1	36.4	50.0	305
18.75	1 1/8	12	90.0	105.0	110.0	140.0	14
476	29		40.9	47.7	50.0	63.6	356
21.25	1 1/8	16	98.0	140.0	140.0	180.0	16
540	29		44.5	63.6	63.6	81.8	406
22.75	1 1/4	16	130.0	160.0	150.0	220.0	18
578	32		59.1	72.7	68.2	100.0	457
25.00	1 1/4	20	165.0	195.0	180.0	285.0	20
635	32		75.0	88.6	81.8	129.5	508
29.50	1 3/8	20	220.0	275.0	260.0	430.0	24
749	35		100.0	125.0	118.2	195.5	610



**General Notes:**

- a. Material: Stainless Steel F304L & F316L. Other grades available on request.
- b. Dimension: ASME B16.5 Class 150. Others Class available on request.
- c. Maximum Allowable Working Pressure: See ASME B16.5 Table F2-2.3 material group 2.3, or contact our technical representatives.

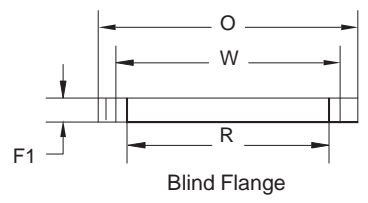
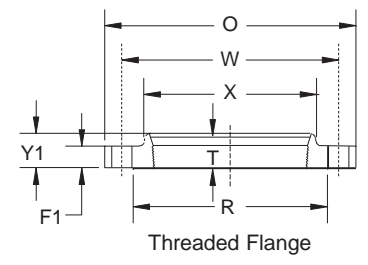
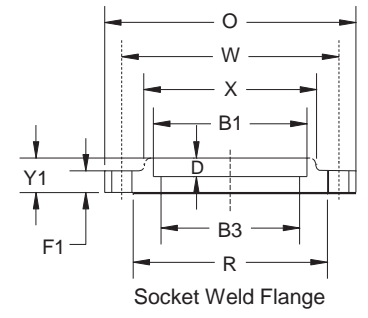
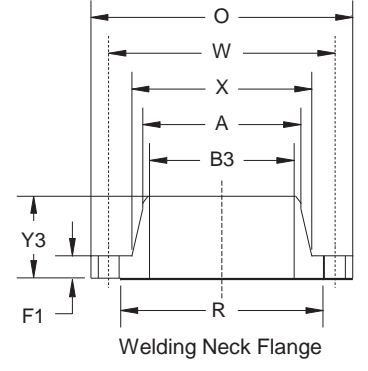
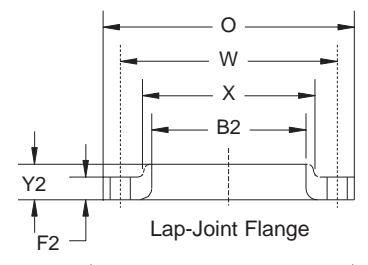
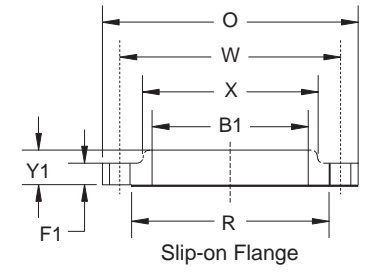


# NPS Flanges ASTM A182 & ASME SA-182

## Class 300

NPS Nominal Pipe Size	O	F1	F2	X	A	Y1	Y2	Y3	T	Bore			r	D	R
										B1	B2	B3			
In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm
3/4	4.62	0.56	0.62	1.88	1.05	0.94	1.00	2.19	0.62	1.09	1.11	0.82	0.12	0.44	1.69
19	117	14	16	48	27	24	25	56	16	28	28	21	3	11	43
1	4.88	0.62	0.69	2.12	1.32	1.00	1.06	2.38	0.69	1.36	1.38	1.05	0.12	0.50	2.00
25	124	16	18	54	34	25	27	60	18	35	35	27	3	13	51
1 1/4	5.25	0.69	0.75	2.50	1.66	1.00	1.06	2.50	0.81	1.70	1.72	1.38	0.19	0.56	2.50
32	133	18	19	64	42	25	27	64	21	43	44	35	5	14	64
1 1/2	6.12	0.75	0.81	2.75	1.90	1.13	1.19	2.63	0.88	1.95	1.97	1.61	0.25	0.63	2.88
38	155	19	21	70	48	29	30	67	22	50	50	41	6	16	73
2	6.50	0.81	0.88	3.31	2.38	1.25	1.31	2.69	1.12	2.44	2.46	2.07	0.31	0.69	3.62
51	165	21	22	84	60	32	33	68	28	62	62	53	8	17	92
2 1/2	7.50	0.94	1.00	3.94	2.88	1.44	1.50	2.94	1.25	2.94	2.97	2.47	0.31	0.75	4.12
64	191	24	25	100	73	37	38	75	32	75	75	63	8	19	105
3	8.25	1.06	1.12	4.62	3.50	1.63	1.69	3.06	1.25	3.57	3.60	3.07	0.38	0.81	5.00
76	210	27	28	117	89	41	43	78	32	91	91	78	10	21	127
4	10.00	1.19	1.25	5.75	4.50	1.82	1.88	3.32	1.44	4.57	4.60	4.03	0.44	-----	6.19
102	254	30	32	146	114	46	48	84	37	116	117	102	11	-----	157
5	11.00	1.31	1.38	7.00	5.56	1.94	2.00	3.82	1.69	5.66	5.69	5.05	0.44	-----	7.31
127	279	33	35	178	141	49	51	97	43	144	145	128	11	-----	186
6	12.50	1.38	1.44	8.12	6.63	2.00	2.06	3.82	1.81	6.72	6.75	6.07	0.50	-----	8.50
152	318	35	37	206	168	51	52	97	46	171	171	154	13	-----	216
8	15.00	1.56	1.62	10.25	8.63	2.38	2.44	4.32	2.00	8.72	8.75	7.98	0.50	-----	10.62
203	381	40	41	260	219	60	62	110	51	221	222	203	13	-----	270
10	17.50	1.81	1.88	12.62	10.75	2.56	3.75	4.56	2.19	10.88	10.92	10.02	0.50	-----	12.75
254	445	46	48	321	273	65	95	116	56	276	277	255	13	-----	324
12	20.50	1.94	2.00	14.75	12.75	2.82	4.00	5.06	2.38	12.88	12.92	12.00	0.50	-----	15.00
305	521	49	51	375	324	72	102	129	60	327	328	305	13	-----	381
14	23.00	2.06	2.12	16.75	14.00	2.94	4.38	5.56	2.50	14.14	14.18	Must be specified at time of purchase	0.50	-----	16.25
356	584	52	54	425	356	75	111	141	64	359	360		13	-----	413
16	25.50	2.19	2.25	19.00	16.00	3.19	4.75	5.69	2.69	16.16	16.19		0.50	-----	18.50
406	648	56	57	483	406	81	121	145	68	410	411		13	-----	470
18	28.00	2.31	2.38	21.00	18.00	3.44	5.12	6.19	2.75	18.18	18.20		0.50	-----	21.00
457	711	59	60	533	457	87	130	157	70	462	462		13	-----	533
20	30.50	2.44	2.50	23.12	20.00	3.69	5.50	6.32	2.88	20.20	20.25		0.50	-----	23.00
508	775	62	64	587	508	94	140	161	73	513	514		13	-----	584
24	36.00	2.69	2.75	27.62	24.00	4.13	6.00	6.56	3.25	24.25	24.25		0.50	-----	27.25
610	914	68	70	702	610	105	152	167	83	616	616		13	-----	692

Drilling			Approximate Weight				Nominal Pipe Size (NPS)
W Diameter of Bolt Circle	Diameter of Bolt Holes	Number of bolts	Threaded Slip-on Socket Welding	Lap Joint	Welding Neck	Blind	
In mm	In mm		lb kg	lb kg	lb kg	lb kg	
3.25	3/4	4	3.0	3.0	3.0	3.0	3/4
83	19		1.4	1.4	1.4	1.4	19
3.50	3/4	4	3.0	3.0	4.0	3.0	1
89	19			1.4	1.8	1.4	25
3.88	3/4	4	4.0	4.0	5.0	4.0	1 1/4
99	19			1.8	2.3	1.8	32
4.50	7/8	4	6.0	6.0	7.0	6.0	1 1/2
114	22			2.7	3.2	2.7	38
5.00	3/4	8	7.0	7.0	9.0	8.0	2
127	19		3.2	3.2	4.1	3.6	51
5.88	7/8	8	10.0	10.0	12.0	12.0	2 1/2
149	22		4.5	4.5	5.5	5.5	64
6.62	7/8	8	13.0	13.0	15.0	16.0	3
168	22		5.9	5.9	6.8	7.3	76
7.88	7/8	8	22.0	22.0	25.0	27.0	4
200	22		10.0	10.0	11.4	12.3	102
9.25	7/8	8	28.0	28.0	32.0	35.0	5
235	22		12.7	12.7	14.5	15.9	127
10.62	7/8	12	39.0	39.0	42.0	50.0	6
270	22		17.7	17.7	19.1	22.7	152
13.00	1	12	58.0	58.0	67.0	81.0	8
330	25		26.4	26.4	30.5	36.8	203
15.25	1 1/8	16	81.0	91.0	91.0	125.0	10
387	29		36.8	41.4	41.4	56.8	254
17.75	1 1/4	16	115.0	140.0	140.0	185.0	12
451	32		52.3	63.6	63.6	84.1	305
20.25	1 1/4	20	165.0	190.0	180.0	250.0	14
514	32		75.0	86.4	81.8	113.6	356
22.50	1 3/8	20	190.0	250.0	250.0	295.0	16
572	35		86.4	113.6	113.6	134.1	406
24.75	1 3/8	24	250.0	295.0	320.0	395.0	18
629	35		113.6	134.1	145.5	179.5	457
27.00	1 3/8	24	315.0	370.0	400.0	505.0	20
686	35		143.2	168.2	181.8	229.5	508
32.00	1 5/8	24	475.0	550.0	580.0	790.0	24
813	41		215.9	250.0	263.6	359.1	610



**General Notes:**

- a. Material: Stainless Steel F304L & F316L. Other grades available on request.
- b. Dimension: ASME B16.5 Class 300. Others Class available on request.
- c. Maximum Allowable Working Pressure: See ASME B16.5 Table F2-2.3 material group 2.3, or contact our technical representatives.



## Slip-On Flanges

The slip-on flange has a low hub because the pipe slips into the flange prior to welding. It is welded both inside and out to provide sufficient strength and prevent leakage. Slip-on flanges are all bored slightly larger than the O.D. of the matching pipe. They are preferred over welding neck flanges by many users due to their lower initial cost, but final installation cost is probably not much less than that of the welding neck flange because of the additional welding involved.



## Lap-Joint Flanges

The lap joint flange is practically identical to a slip-on flange except it has a radius at the intersection of the bore and flange face. This radius is necessary to have the flange accommodate a lap joint stub end. Normally, a lap joint flange and stub end are mated together in an assembly system.



## Welding Neck Flanges

The welding neck flange is normally referred to as the "high hub" flange. It is designed to transfer stresses to the pipe, thereby reducing high stress concentration at the base of the flange. The welding neck flange is the best designed butt-welding flange of those currently available because of the design.



## Socket Welding Flanges

The socket welding flange is similar to a slip-on flange except it has a bore and a counter bore dimension. The counter bore is slightly larger than the O.D. of the matching pipe, allowing the pipe to be inserted into the flange similar to a slip-on flange. The diameter of the smaller bore is the same as the I.D. of the matching pipe. A restriction is built into the bottom of the bore which sets as a shoulder for the pipe to rest on. This eliminates any restriction in flow when using a socket welding flange.



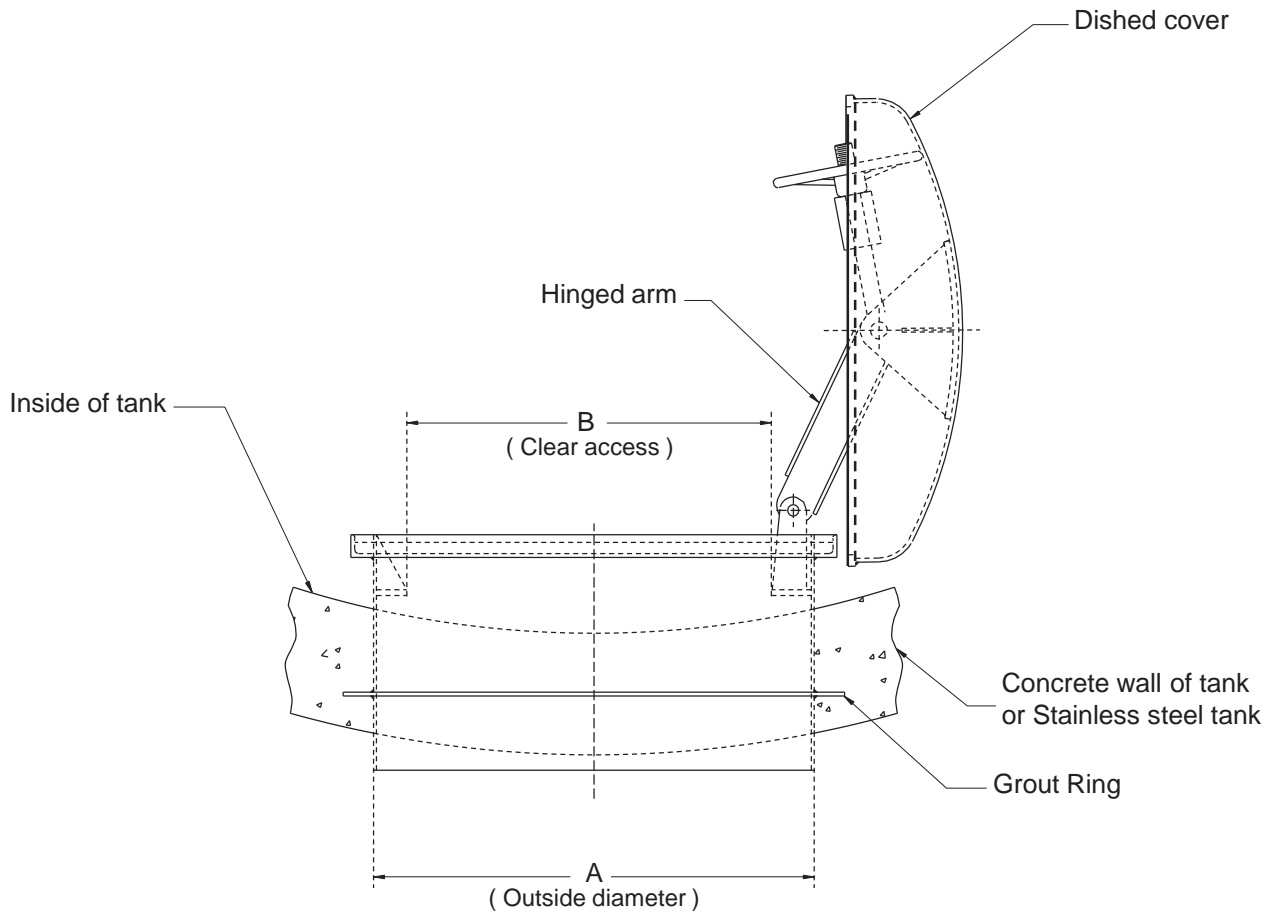
## Threaded (Screwed) Flanges

The threaded flange is similar to the slip-on flange, but the bore is threaded. Its chief merit is that it can be assembled without welding, explaining its use in low pressure services at ordinary atmospheric temperatures, and in highly explosive areas where welding creates a hazard.

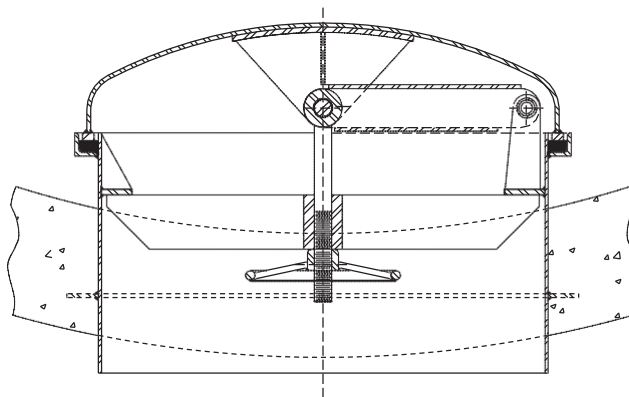


## Blind Flanges

The blind flange is a flange without a bore. It is used to close off the ends of a piping system and / or a pressure vessel opening. It also permits easy access to the interior of line or vessel once it has been sealed and must be reopened.



**Open position dished manway**



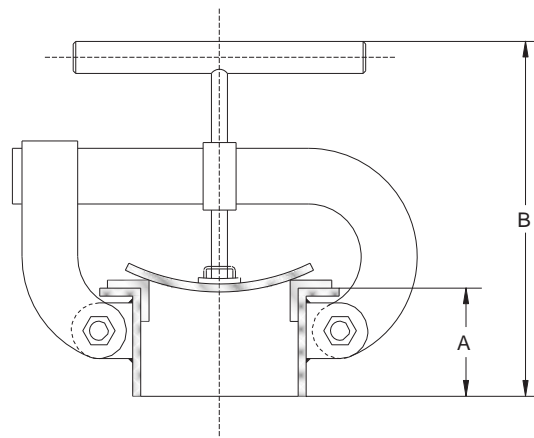
**Closed position dished manway**

**General Notes:**

- a. Design can be different from illustration. Contact DBI representative for actual design.
- b. Material : Stainless Steel 304L, 316L. Other alloys available upon request.
- c. Dim "A" available from 24" up to 48". Dim "B" from 20" up to 42"

# Quick Opening Clean-Out

I.D. Inside Diameter		T		A		B		Weight	
In	mm	In	mm	In	mm	In	mm	lb	kg
3	76	0.125	3.2	2.500	64	10.750	273	11.0	5.0
4	102	0.125	3.2	3.000	76	11.000	279	13.0	5.9
6	152	0.125	3.2	3.500	89	12.250	311	20.0	9.1
8	203	0.140	3.6	4.000	102	12.000	305	28.0	12.7
10	254	0.140	3.6	5.000	127	14.500	368	34.0	15.4
12	305	0.140	3.6	6.000	152	15.500	394	44.0	20.0
14	356	0.188	4.8	7.000	178	18.000	457	60.0	27.2
16	406	0.188	4.8	8.000	203	19.250	489	80.0	36.3



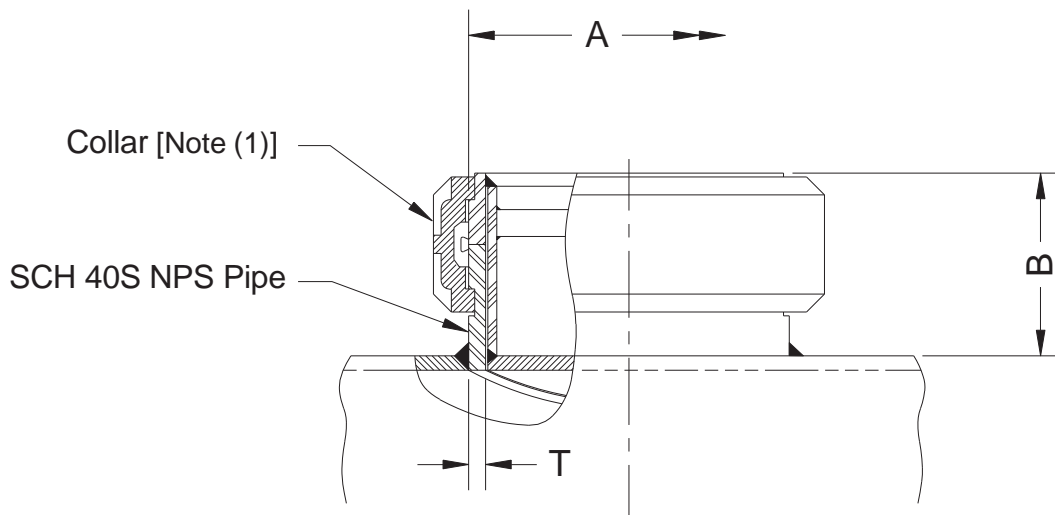
*Fabricated for an easy installation at the end of pipe or on elbows.  
 It offers a quick and easy access to the interior of pipe for inspection and cleaning.*



**General Note:**

a. Material : Stainless Steel 304L

Nominal Diameter		T		A		B	
inches	mm	in	mm	in	mm	in	mm
3	76	0.216	5.5	3.500	89	2.750	70
4	102	0.237	6.0	4.500	114	2.750	70
6	152	0.280	7.1	6.625	168	2.750	70



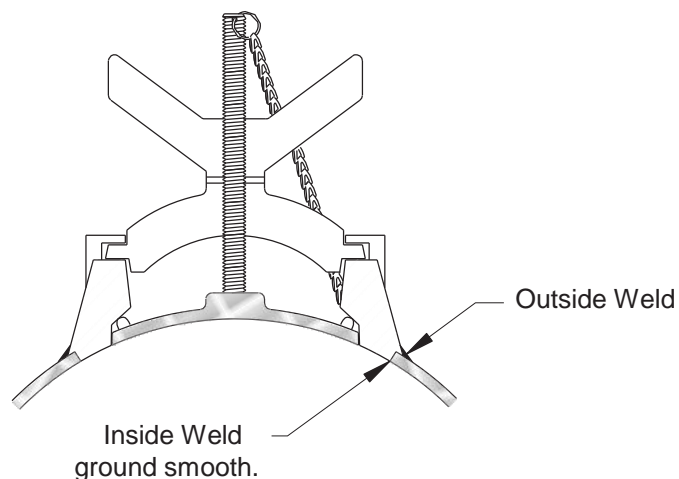
*The cover of this type of clean-out is provided with a snugly fitting plug, which provides a smooth bore on the interior of the pipe, thus eliminating stock hang-up.*

**General Notes:**

- a. Material: Stainless Steel 316L.
- b. Available upon request in larger size.

**Note:**

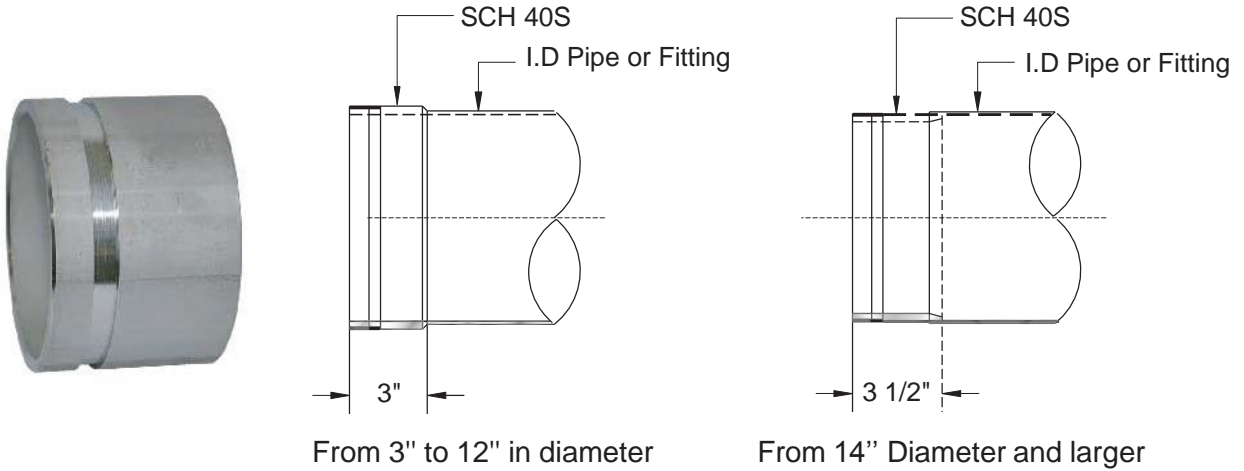
- 1. Usually provided with a Victaulic® collar Style 78 Snap-Joint.



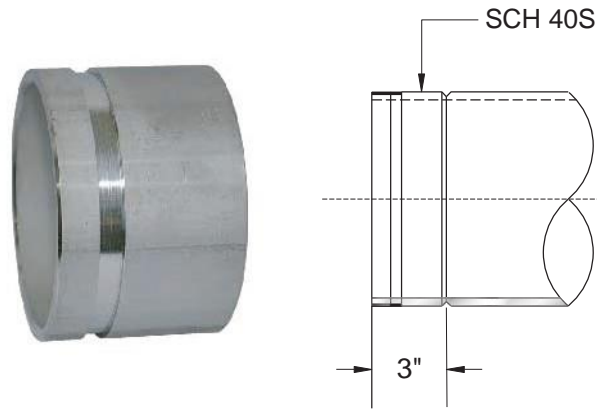
Clean-out number	For installation on			
	90° Elbows	45° Elbows	Reducers	Pipe
in / mm	in / mm	in / mm	in / mm	in / mm
# 4	4 102	4 102	6 152	6 13
# 6	6 152	6 152	8 & 10 203 & 254	8 & 10 203 & 254
# 8	8 203	8 203	12 to 16 304 to 406	12 to 16 304 to 406
# 10	10 254	10 254	18 to 22 457 to 559	18 to 22 457 to 559
# 12	12 to 18 300 to 450	12 to 18 300 to 450	24 & larger 610 & larger	24 & larger 610 & larger

**General Notes:**

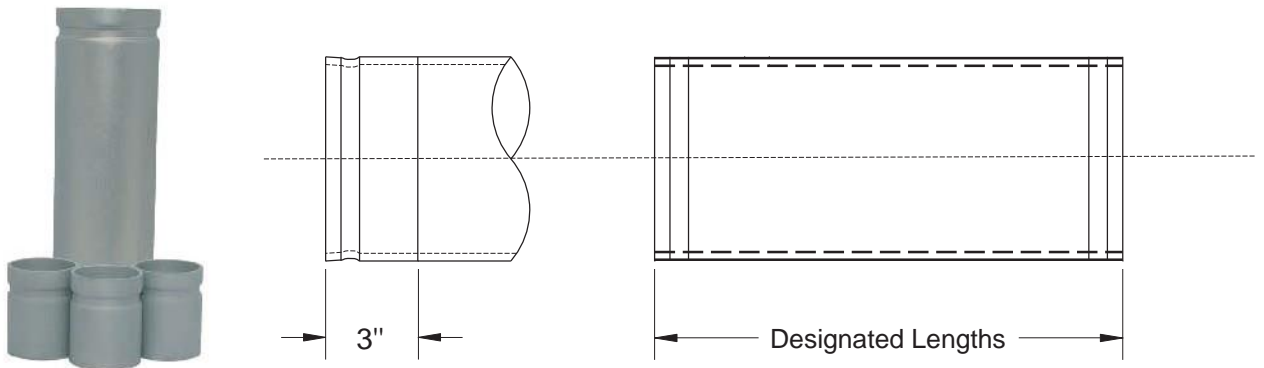
- a. Constructed of all 316L Stainless Steel parts, including the wing nut.
- b. High sealing strengths (the higher the pressure the tighter cover seals).
- c. Permit quick flushing when installed on both sides of pumps and valves without removing bolted connections.
- d. Quick and easy visual access into piping systems, tanks and vessels.
- e. No tools required to open.



*Cut Groove for use with I.D. Pipes and Fittings*



*Cut Groove for use with NPS Pipes and Fittings Sch 5S, 10S and 40S*



*Rolled Groove and AGS<sup>(1)</sup> for use with I.D. and NPS Pipes and Fittings*

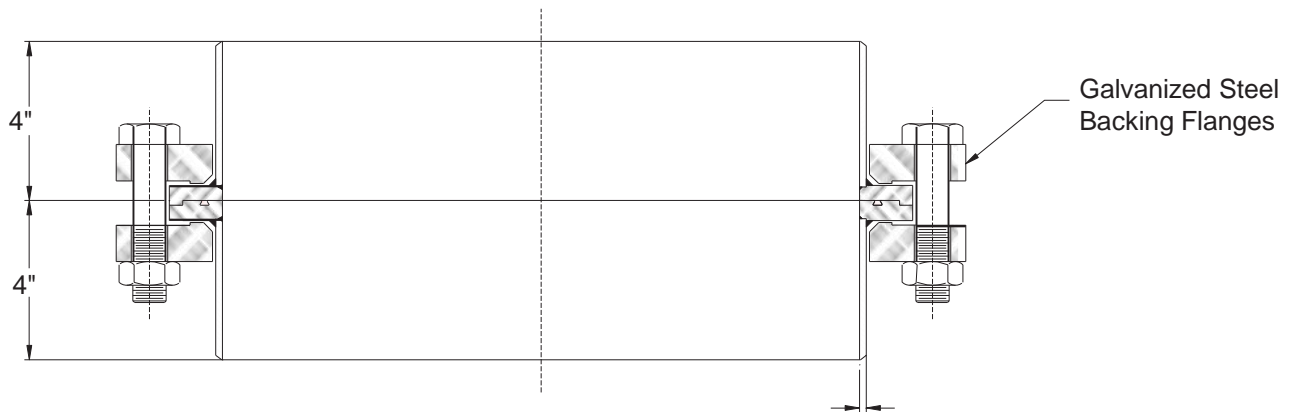
**General Notes:**

- a. Material : Stainless Steel 304L, 316L. Other alloys available upon request.
- b. Available from stock in sizes 3" to 12" with standard groove.
- c. Larger sizes and other adaptor styles available upon request for both I.D. & NPS pipe.

**Note:**

- 1. For use with Victaulic® flexible and rigid collar AGS (Advance Groove System) for NPS 14" to 24", Sch 10S



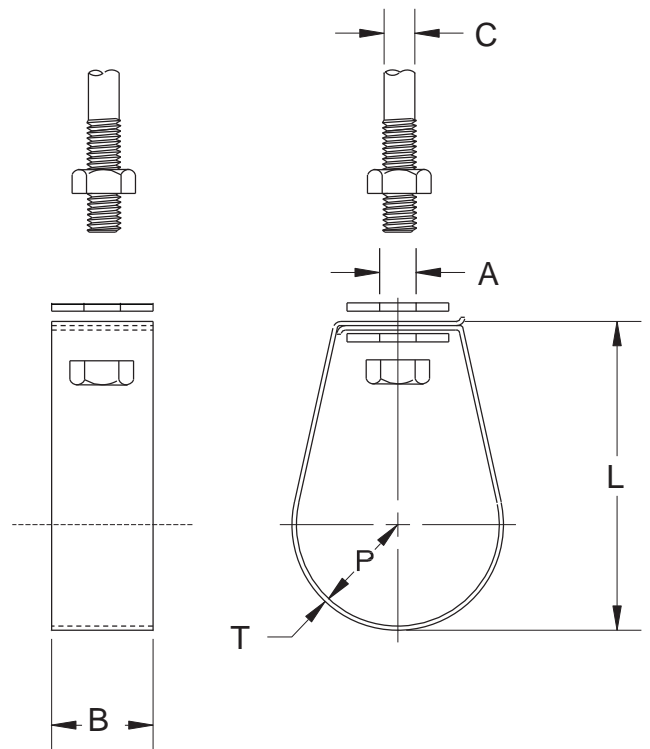


*Mainly used on the headbox approach piping.*

**General Note:**

- a. Material : Stainless Steel 304L, 316L.
- b. Fabricated upon request in size 4" and larger.
- c. Inside finish: 32 micro inch or electropolishing on request.
- d. Design can be different from illustration. Contact DBI representative for actual design.

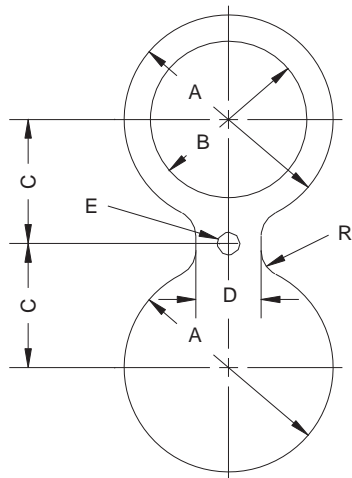
Nominal Diameter	A	B	C	L	R	T
In mm	In mm	In mm	In mm	In mm	In mm	In mm
1	0.563	1.5	0.5	2.0	0.563	0.078
25.4	14.3	38.1	12.7	50.8	14.3	2.0
1 1/4	0.563	1.5	0.5	3.0	0.688	0.078
31.8	14.3	38.1	12.7	76.2	17.5	2.0
1 1/2	0.563	1.5	0.5	3.0	0.813	0.078
38.1	14.3	38.1	12.7	76.2	20.6	2.0
2	0.563	1.5	0.5	4.0	1.062	0.078
50.8	14.3	38.1	12.7	101.6	27.0	2.0
2 1/2	0.563	1.5	0.5	5.0	1.313	0.078
63.5	14.3	38.1	12.7	127.0	33.3	2.0
3	0.563	3.0	0.5	6.0	1.563	0.078
76.2	14.3	76.2	12.7	152.4	3.0	2.0
4	0.563	3.0	0.5	7.0	2.125	0.078
101.6	14.3	76.2	12.7	177.8	54.0	2.0
6	0.563	3.0	0.5	9.0	3.125	0.078
152.4	14.3	76.2	12.7	228.6	79.4	2.0
8	0.563	3.0	0.5	11.0	4.125	0.125
203.2	14.3	76.2	12.7	279.4	104.8	3.2
10	0.563	3.0	0.5	13.0	5.188	0.125
254.0	14.3	76.2	12.7	330.2	131.8	3.2
12	0.563	3.0	0.5	15.0	6.188	0.125
304.8	14.3	76.2	12.7	381.0	157.2	3.2
14	0.688	3.0	0.6	17.0	7.188	0.125
355.6	17.5	76.2	15.9	431.8	182.6	3.2
16	0.688	3.0	0.6	19.0	8.188	0.125
406.4	17.5	76.2	15.9	482.6	208.0	3.2
18	0.688	3.0	0.6	21.0	9.188	0.188
457.2	17.5	76.2	15.9	533.4	233.4	4.8
20	0.688	3.0	0.6	23.0	10.188	0.188
508.0	17.5	76.2	15.9	584.2	258.8	4.8
24	0.688	4.0	0.6	27.0	12.3	0.188
609.6	17.5	101.6	15.9	685.8	311.2	4.8
30	0.688	4.0	0.6	34.0	15.3	0.188
762.0	17.5	101.6	15.9	863.6	387.4	4.8
36	0.688	4.0	0.6	40.0	18.3	0.250
914.4	17.5	101.6	15.9	1016.0	463.6	6.4



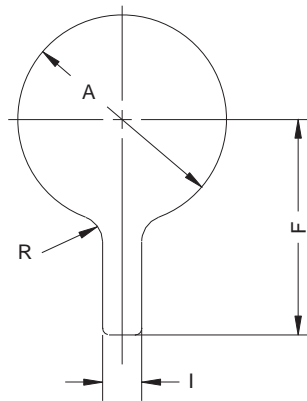
**General Note:**

- a. Material: Stainless Steel 304L.
- b. Hardware not included.

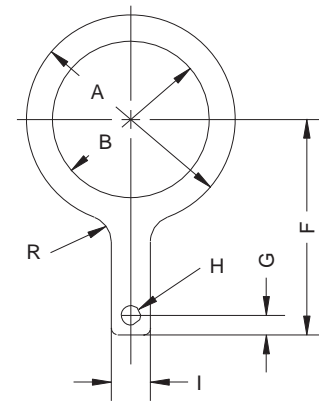
Nominal Diameter	A	B	C	D	E	F	G	H	I	R	Thk
In mm	In mm		In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm
2	4.000	Inside of pipe, unless otherwise specified.	2.375	2.000	0.750	5.500	0.500	0.500	1.000	1.000	0.250
50.8	101.6		60.3	50.8	19.1	139.7	12.7	12.7	25.4	25.4	6.4
2 1/2	4.750		2.750	2.000	0.750	6.000	0.500	0.500	1.000	1.000	0.250
63.5	120.7		69.9	50.8	19.1	152.4	12.7	12.7	25.4	25.4	6.4
3	5.250		3.000	2.500	0.750	6.250	0.500	0.750	1.000	1.000	0.250
76.2	133.4		76.2	63.5	19.1	158.8	12.7	19.1	25.4	25.4	6.4
4	6.750		3.750	2.500	0.750	7.000	0.500	0.750	1.000	1.000	0.375
101.6	171.5		95.3	63.5	19.1	177.8	12.7	19.1	25.4	25.4	9.5
6	8.625		4.750	3.000	0.875	8.000	0.500	0.750	1.000	1.000	0.500
152.4	219.1		120.7	76.2	22.2	203.2	12.7	19.1	25.4	25.4	12.7
8	10.875		5.875	3.000	0.875	9.250	0.750	0.750	1.500	1.000	0.500
203.2	276.2		149.2	76.2	22.2	235.0	19.1	19.1	38.1	25.4	12.7
10	13.250		7.125	4.000	1.000	10.500	0.750	0.750	1.500	1.000	0.625
254.0	336.6		181.0	101.6	25.4	266.7	19.1	19.1	38.1	25.4	15.9
12	16.000		8.500	4.000	1.000	12.000	0.750	0.750	1.500	1.000	0.750
304.8	406.4		215.9	101.6	25.4	304.8	19.1	19.1	38.1	25.4	19.1
14	17.625		9.375	4.250	1.125	13.000	0.750	0.750	1.500	1.000	0.750
355.6	447.7		238.1	108.0	28.6	330.2	19.1	19.1	38.1	25.4	19.1
16	20.125		10.625	4.250	1.125	14.250	0.750	0.750	1.500	1.000	1.000
406.4	511.2		269.9	108.0	28.6	362.0	19.1	19.1	38.1	25.4	25.4
18	21.500	11.375	4.500	1.250	15.000	0.750	0.750	1.500	1.000	1.000	
457.2	546.1	288.9	114.3	31.8	381.0	19.1	19.1	38.1	25.4	25.4	
20	23.750	12.500	4.750	1.250	16.250	0.750	0.750	1.500	1.000	1.125	
508.0	603.3	317.5	120.7	31.8	412.8	19.1	19.1	38.1	25.4	28.6	
24	28.125	14.750	5.500	1.375	18.500	0.750	0.750	1.500	1.000	1.250	
609.6	714.4	374.7	139.7	34.9	469.9	19.1	19.1	38.1	25.4	31.8	



Spectacle Blank



Paddle Blank



Paddle Spacer

**General Notes:**

- a. These Line Blanks are designed to be used with flanges having the dimension to ASME B16.5 Class 150.
- b. Material : Stainless Steel 304L, 316L. Other alloys available upon request.
- c. Thickness: See "Thk". Other thicknesses and designs available upon request.
- d. Maximum Allowable Working Pressure must be calculated with the ASME B31 code applicable.
- e. Tolerances:  $\pm 1/16"$ .

Inside Diameter		Nominal Thickness			Pipes & Reducers		Elbows		Mitred Elbows		Tees [Note (1)]		Laterals [Note (1)]	
In	mm	Gauge	In	mm	psig	kPa	psig	kPa	psig	kPa	psig	kPa	psig	kPa
4	102	14	0.078	2.0	545	3758	490	3378	315	2172	270	1862	170	1172
		11	0.125	3.2	875	6033	785	5412	550	3792	435	2999	270	1862
5	127	14	0.078	2.0	435	2999	395	2723	240	1655	215	1482	135	931
		12	0.109	2.8	610	4206	550	3792	360	2482	305	2103	190	1310
		11	0.125	3.2	700	4826	630	4344	425	2930	350	2413	215	1482
6	152	14	0.078	2.0	365	2517	330	2275	195	1344	180	1241	112	772
		12	0.109	2.8	510	3516	460	3172	290	1999	255	1758	155	1069
		11	0.125	3.2	585	4033	525	3620	340	2344	290	1999	180	1241
8	203	14	0.078	2.0	275	1896	250	1724	135	931	135	931	85	586
		12	0.109	2.8	380	2620	340	2344	205	1413	190	1310	120	827
		11	0.125	3.2	435	2999	390	2689	245	1689	215	1482	135	931
10	254	12	0.109	2.8	305	2103	275	1896	155	1069	150	1034	95	655
		11	0.125	3.2	350	2413	315	2172	185	1276	175	1207	110	758
12	305	12	0.109	2.8	255	1758	230	1586	125	862	125	862	80	552
		11	0.125	3.2	290	1999	260	1793	150	1034	145	1000	90	621
		11	0.125	3.2	250	1724	225	1551	200	1379	125	862	75	517
14	356	10	0.140	3.6	280	1931	250	1724	220	1517	140	965	85	586
		3/16	0.188	4.8	375	2586	340	2344	295	2034	185	1276	110	758
		11	0.125	3.2	220	1517	200	1379	175	1207	110	758	60	414
16	406	10	0.140	3.6	245	1689	220	1517	195	1344	120	827	65	448
		3/16	0.188	4.8	330	2275	300	2068	260	1793	165	1138	90	621
		11	0.125	3.2	195	1344	175	1207	155	1069	95	655	50	345
18	457	10	0.140	3.6	220	1517	195	1344	170	1172	110	758	55	379
		3/16	0.188	4.8	290	1999	260	1793	230	1586	145	1000	75	517
		11	0.125	3.2	175	1207	160	1103	135	931	85	586	45	310
20	508	10	0.140	3.6	195	1344	175	1207	155	1069	95	655	50	345
		3/16	0.188	4.8	260	1793	235	1620	205	1413	130	896	70	483
		1/4	0.250	6.4	350	2413	315	2172	270	1862	175	1207	95	655
24	610	11	0.125	3.2	145	1000	130	896	115	793	70	483	35	241
		10	0.140	3.6	165	1138	145	1000	125	862	80	552	40	276
		3/16	0.188	4.8	220	1517	200	1379	170	1172	110	758	50	345
		1/4	0.250	6.4	290	1999	260	1793	225	1551	145	1000	70	483
30	762	3/16	0.188	4.8	175	1207	155	1069	135	931	85	586	35	241
		1/4	0.250	6.4	235	1620	210	1448	180	1241	115	793	45	310
36	914	3/16	0.188	4.8	145	1000	130	896	110	758	65	448	35	241
		1/4	0.250	6.4	195	1344	175	1207	150	1034	85	586	50	345
42	1067	3/16	0.188	4.8	125	862	110	758	100	689	50	345	35	241
		1/4	0.250	6.4	165	1138	150	1034	130	896	65	448	50	345
48	1219	3/16	0.188	4.8	110	758	100	689	85	586	40	276	30	207
		1/4	0.250	6.4	145	1000	130	896	115	793	55	379	45	310

**General Notes:**

- a. Pressure ratings are limited to non-toxic, non-lethal, non-flammable liquids in non-cyclic, vibration-free service, and/or where ASME B-31 Codes are not applicable.
- b. Thickness tolerance to ASTM A 778 & A 774.

**Note:**

- 1. Pressure ratings of tees & laterals can be increased by the use of reinforcing pads. Please contact our technical services.



## Suggested Maximum Working Pressure. ASTM A774 Collars and Carbon Steel Backing Flanges. For Maximum Working Temperature of 200°F (93°C).

Nominal Diameter		Pressed Collars <sup>(1-2-3)</sup>		Rolled Collars <sup>(1-2-3)</sup>		Backing Flanges <sup>(1-5-6)</sup>		Blind Flanges <sup>(1-5-6)</sup>	
						Carbon Steel. Up to 200° F max.		Carbon Steel. Up to 200° F max.	
In	mm	psig	kPa	psig	kPa	psig	kPa	psig	kPa
1 1/2	38	150	1034	150	1034	300	2068	300	2068
2	51	150	1034	150	1034	300	2068	300	2068
2 1/2	64	150	1034	150	1034	300	2068	300	2068
3	76	150	1034	150	1034	300	2068	300	2068
4	102	150	1034	150	1034	300	2068	300	2068
5	127	150	1034	150	1034	300	2068	300	2068
6	152	150	1034	150	1034	300	2068	300	2068
8	203	150	1034	150	1034	175	1207	200	1379
10	254	150	1034	150	1034	225	1551	300	2068
12	305	150	1034	150	1034	150	1034	225	1551
14	356	n/a	n/a	150	1034	175	1207	225	1551
16	406	n/a	n/a	150	1034	125	862	175	1207
18	457	n/a	n/a	150	1034	150	1034	200	1379
20	508	n/a	n/a	150	1034	125	862	175	1207
24	610	n/a	n/a	150	1034	100	689	150	1034
30	762	n/a	n/a	125/150 <sup>(4)</sup>	862/1034	100	689	125	862
36	914	n/a	n/a	125/150 <sup>(4)</sup>	862/1034	70	483	90	621
42	1067	n/a	n/a	125	862	60	414	90	621
48	1219	n/a	n/a	125	862	60	414	90	621

**Notes:**

1. Pressure ratings are limited to non-toxic, non-lethal, non-flammable liquids in non-cyclic, vibration-free service, and/or where ASME B-31 Codes are not applicable.
2. Thickness tolerance to ASTM A 778 & A 774.
3. The leak test over 150 psig is not suggested with the use of smooth face collars.
4. Use 0.250" for 125 psig and 0.375" for 150 psig.
5. The suggested maximum working pressures are based on the thickness (see pages 2-15 to 2-17 and 3-14 to 3-16) with gasket, bolts and torque as recommended by our technical department.
6. The hydrostatic test pressure should not exceed 1.3 x Maximum Working Pressure indicated in table.

# Reinforcement of Stainless Steel Pipe

for Full Vacuum For Maximum Design Temperature of 200°F  
(93°C).

Nominal Diameter		Nominal Thickness			Maximum Spacing		Dimension of reinforcing rings		
In	mm	Ga / Sch	In	mm	In	mm	Type	In	mm.
6	152	14	0.078	2.0	-	-	-	-	-
		11	0.125	3.2	-	-	-	-	-
		5S	0.109	2.8	-	-	-	-	-
8	203	14	0.078	2.0	80	2032	B	1 1/2 x 1/4	38 x 4.8
		11	0.125	3.2	-	-	-	-	-
		5S	0.109	2.8	-	-	-	-	-
10	254	11	0.109	2.8	-	-	-	-	-
		5S	0.134	3.4	-	-	-	-	-
12	305	11	0.125	3.2	120	3048	B	1 1/2 x 1/4	38 x 4.8
		5S	0.156	4.0	-	-	-	-	-
14	356	11	0.125	3.2	120	3048	B	1 1/2 x 1/4	38 x 4.8
		10	0.140	3.6	-	-	-	-	-
		5S	0.156	4.0	-	-	-	-	-
16	406	11	0.125	3.2	80	2032	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		10	0.140	3.6	115	2921	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		5S	0.165	4.2	200	5080	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		3/16	0.188	4.8	-	-	-	-	-
18	457	11	0.125	3.2	60	1524	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		10	0.140	3.6	95	2413	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		5S	0.165	4.2	145	3683	A	1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8
		3/16	0.188	4.8	-	-	-	-	-
20	508	11	0.125	3.2	60	1524	A	1 1/2 x 1 1/2 x 1/4	38 x 38 x 6.4
		10	0.140	3.6	80	2032	A	1 1/2 x 1 1/2 x 1/4	38 x 38 x 6.4
		5S	0.188	4.8	160	4064	A	1 1/2 x 1 1/2 x 1/4	38 x 38 x 6.4
		10S	0.218	5.5	-	-	-	-	-
		1/4	0.250	6.4	-	-	-	-	-
24	610	3/16	0.188	4.8	120	3048	A	2 x 2 x 1/8	50 x 50 x 3.2
		5S	0.218	5.5	180	4572	A	2 x 2 x 1/8	50 x 50 x 3.2
		10S	0.250	6.4	-	-	-	-	-
30	762	3/16	0.188	4.8	80	2032	A	2 x 2 x 3/16	50 x 50 x 4.8
		5S	0.250	6.4	180	4572	A	2 x 2 x 3/16	50 x 50 x 4.8
		10S	0.312	7.9	-	-	-	-	-
36	914	3/16	0.188	4.8	72	1829	A	2 x 2 x 3/16	50 x 50 x 4.8
		1/4	0.250	6.4	144	3658	A	2 x 2 x 1/4	50 x 50 x 6.4
42	1067	3/16	0.188	4.8	60	1524	A	2 x 2 x 3/16	50 x 50 x 4.8
		1/4	0.250	6.4	120	3048	A	2 1/2 x 2 1/2 x 1/4	64 x 64 x 6.4
48	1219	3/16	0.188	4.8	48	1219	A	2 x 2 x 1/4	50 x 50 x 6.4
		1/4	0.250	6.4	96	2438	A	2 1/2 x 2 1/2 x 1/4	64 x 64 x 6.4

**General Notes:**

- a. Type of reinforcement: A = Angle, B = Flat bar
- b. Minimum total weld length on each side shall not be less than half of the circumference.

## Maximum Unsupported Span for Pipe. For Stainless Steel Pipe filled with water.

Nominal Diameter		Thickness													
		Gauge 14		Gauge 11		Gauge 10		3/16"		1/4"		SCH 5S		SCH 10S	
		0.78" 2mm		0.125" 3.2mm		0.14" 3.6 mm		0.1875" 4.8 mm		0.25" 6.3 mm		Ft	m	Ft	m
In	mm	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m
2 1/2	64	11.0	3.4	11.0	3.4							11.0	3.4	11.0	3.4
3	76	11.0	3.4	12.0	3.7							11.0	3.4	12.0	3.7
4	102	13.0	4.0	13.0	4.0							13.0	4.0	13.0	4.0
5	127	13.0	4.0	14.0	4.3							14.0	4.3	15.0	4.6
6	152	14.0	4.3	16.0	4.9							15.0	4.6	16.0	4.9
8	203	14.0	4.3	17.0	5.2							16.0	4.9	17.0	5.2
10	254			17.0	5.2	18.0	5.5					18.0	5.5	19.0	5.8
12	305			18.0	5.5	18.0	5.5					19.0	5.8	20.0	6.1
14	356			18.0	5.5	19.0	5.8					20.0	6.1	21.0	6.4
16	406			18.0	5.5	19.0	5.8	21.0	6.4			20.0	6.1	21.0	6.4
18	457			18.0	5.5	19.0	5.8	22.0	6.7			21.0	6.4	22.0	6.7
20	508					19.0	5.8	22.0	6.7	24.0	7.3	22.0	6.7	23.0	7.0
24	610							22.0	6.7	25.0	7.6	24.0	7.3	25.0	7.6
30	762							21.0	6.4	26.0	7.9	26.0	7.9	28.0	8.5
36	914							15.0	4.6	25.0	7.6				
42	1067							11.0	3.4	19.0	5.8				
48	1219							9.0	2.7	15.0	4.6				

**General Note:**

- a. The data in the table above is valid for pipes operating at temperatures not exceeding 200° F (93° C) and supported on at least one third of the circumference and without additional live or dead load.

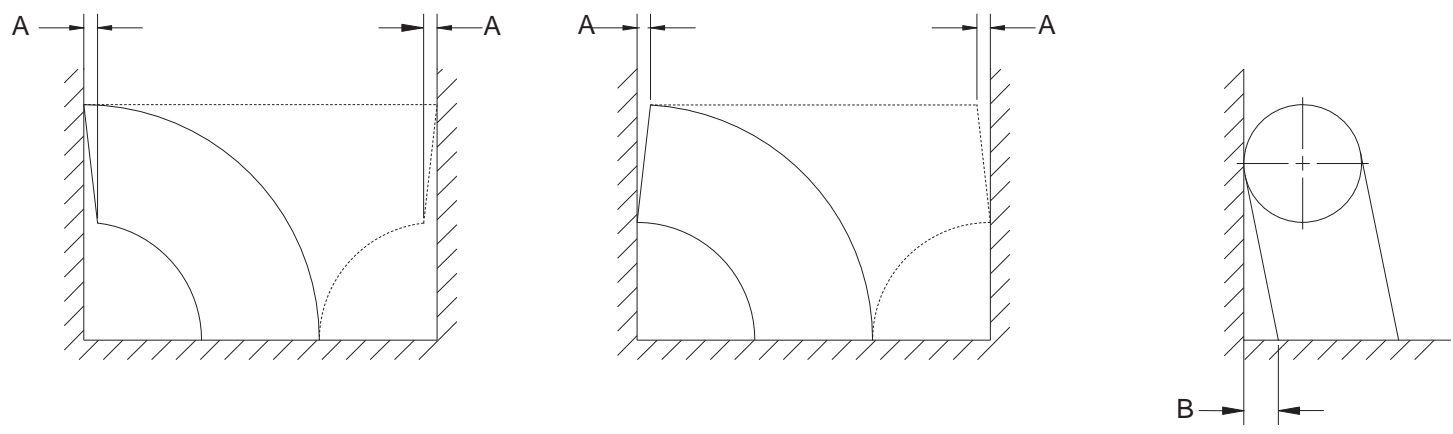
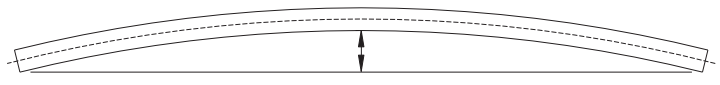


# Tolerances of Pipe and Fittings.

## I.D. & NPS, ASTM A 778 / A 774

Nominal Diameter		All pipe and fittings		- Elbows (90° & 45°) - Laterals - Tees - Wyes	Reducers & Collars	Backing flanges & blind flanges		Squareness for all pipes & fittings		Ovality at welding end for all pipes & fittings	Nominal Diameter						
in.	mm	O.D. at welding end	Wall Th'k	Center to end dimension	Overall length	O.D & I.D.	Bolt circle	A	B		in.	mm					
1 1/2	38	± 1/32"	Shall be ± 12.5% of nominal thickness. In accordance with ASTM A-312, A403, A774 & A778	± 1/16"	± 1/16"	± 1/8"	± 1/16"	1/32"	1/16"	± 1/16"	1 1/2	38					
2	51	± 0.8mm		± 1.6 mm	± 1.6 mm			± 1.6 mm	± 1.6 mm		0.8 mm	1.6 mm	± 1.6 mm	2	51		
2 1/2	64													2 1/2	64		
3	76													3	76		
4	102													4	102		
6	152	+ 1/16" - 1/32"										1/16"	1/8"	± 3/32"	6	152	
8	203	+ 1.6 mm - 0.8mm										1.6 mm	3.2 mm	± 2.4 mm	8	203	
10	254	+ 3/32" - 1/32"			± 3/32"			± 3/32"	± 3.2 mm		± 1.6 mm	3/32"	3/16"	± 1/8"	10	254	
12	305			± 2.4 mm	± 2.4 mm			± 2.4 mm				2.4 mm	4.8 mm	± 3.2 mm		12	305
14	356	+2.4 mm -0.8 mm			± 1/8"			± 1/8"					1/4"	± 5/32"		14	356
16	406			± 3.2 mm	± 3.2 mm			± 3.2 mm				6.4 mm	± 4 mm			16	406
18	457															18	457
20	508	+ 1/8"					1/8"	3/8"		± 3/16"			20	508			
24	610						3.2 mm	9.5 mm		± 4.8 mm			24	610			
30	762												30	762			
36	914	-1/32 +3.2 mm -0.8 mm					3/16"			± 1/4"			36	914			
40	1016						4.8 mm	12.7 mm		± 6.4 mm			40	1016			
42	1067												42	1067			
48	1219												48	1219			

Pipe straightness = 0.025 in per foot / 2mm per meter



**1. Scope**

1.1 This standard covers general pipe shop fabricating tolerances for prefabricated piping assemblies.

**2. Linear tolerances**

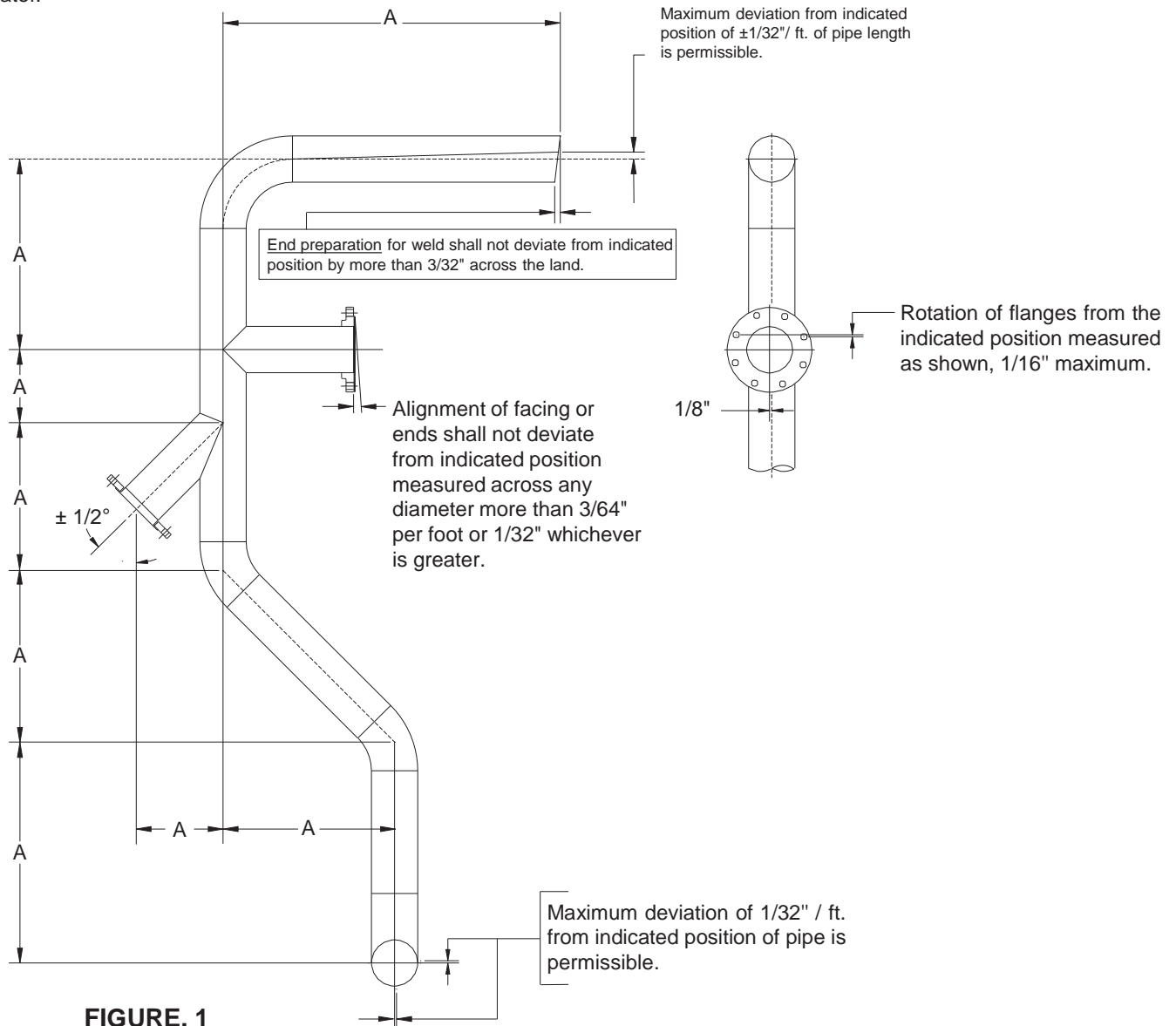
- 2.1 The tolerances on linear dimensions (intermediate or overall) apply to the face to face, face to end, and end to end measurements of fabricated straight pipe and headers; center to end or center to face of bends; as illustrated on fig.1. These tolerances are not cumulative.
- 2.2 Linear tolerance on "A" are  $\pm 1/8"$  (3.0 mm) for size 10" and under,  $\pm 3/16"$  (5 mm) for size 12" through 24" and  $\pm 1/4"$  (6 mm) for size over 24" through 36".
- 2.3 Linear tolerances on "A" for size over 36" are subject to tolerance of  $\pm 1/4"$  (6 mm), increasing by  $\pm 1/16"$  (2 mm) for each 12" in diameter over 36"
- 2.4 Due to the cumulative effects of tolerances on fitting or flanges, when joined without intervening pipe segments, deviations in excess of those specified in paragraphs 2.2 and 2.3 may occur.

**3. Angularity and rotation tolerances.**

3.1 Angularity tolerance across the face of flanges, weld end preparation and on rotation of flanges are as stated on Fig 1.

**4. Closer tolerances**

4.1 When closer tolerances than those given in paragraphs 2.2, 2.3 and 2.4 , they shall be subject to agreement between the Purchaser and Fabricator.





With roots starting in 1875, Douglas Barwick focuses on piping projects for multiple industries as well as offering loose pipe, fittings and flanges for specific projects. With locations in Ontario and Quebec and over 100,000 square feet of shop space and an experienced work force, they are able to manage both small and large scale contracts, allowing their customers to focus on planning to manage their project on time and on budget.



ABE joined the group in 2013. They are a highly efficient, lean manufacturer that focuses on selling loose pipe and fittings to distribution and manufacturers. Founded in 1973, ABE has been focused on producing ANSI, ID and OD Pipe sizes in light to heavy wall sizes with a wide range of alloys and specifications. With robotic manufacturing and a global supply chain they can provide customers with a complete package that ensures they will be competitive.



 Piping Group company





Douglas Brothers provides engineered fabrication for multiple products. Incorporated in 1972, their highly experienced team of estimators, assemblers and welders can focus on specific engineered needs from tanks to aerators to piping segments to specialized designs. Located in Portland, Maine they can manage jobs from local to international; from big to small. When customers choose Douglas Brothers for their industrial stainless steel fabrication, they can expect stringent attention to detail, steadfast dependability and timely delivery.



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# The Piping Group

 Douglas Barwick



 Douglas Brothers

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