

Engineered Stainless Steel Pipe and Fittings

Catalog US-2014 Rev.0



Certified to
NSF / ANSI 61 & 372

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Welcome to Douglas Barwick Inc.

As a result of the merger between Douglas Brothers and Henderson Barwick in 2000 Douglas Barwick Inc. has become a leader in the manufacture of stainless steel pipe and fittings. Douglas Barwick Inc. boasts more than a century of growth and expertise in the fabrication of stainless steel metal products.

Products

[Douglas Barwick Inc.](#) 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.

[Douglas Barwick Inc.](#)'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 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.](#) also 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 [Douglas Barwick Inc.](#) supplies 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

At [Douglas Barwick Inc.](#), we value product quality and customer satisfaction. Our technicians design quality assurance procedures and ensure that they are rigorously applied.

[Douglas Barwick Inc.](#) also 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 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 [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, forward bend tests is performed.

Welded elbows can be supplied as smooth flow or mitred construction, reducers are supplied as 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 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 $\pm 12.5\%$

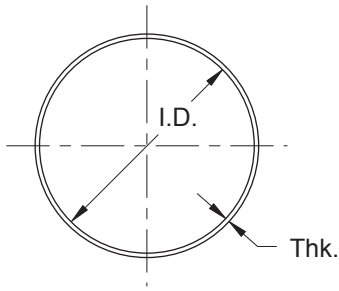
Pipe and fittings are normally furnished in square cut ends but can also be provided with beveled ends.

Note

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

O.D. Pipes ASTM A778

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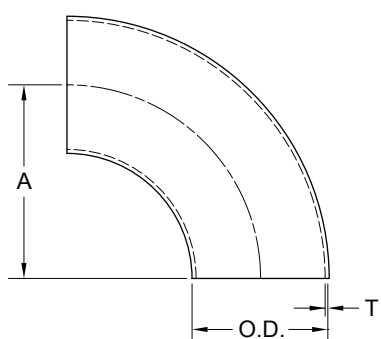


O.D. Outside Diameter		Thickness and Weight									
		14 gauge		11 gauge		10 gauge		3/16" th.		1/4" th.	
		0.078 in / 2.0mm		0.125 in / 3.2 mm		0.140 in / 3.6 mm		0.1875 in / 4.7 mm		0.25 in / 6.3 mm	
Inches	mm	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m	lb / ft	kg / m
1 1/2	38	1.3	2.0	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

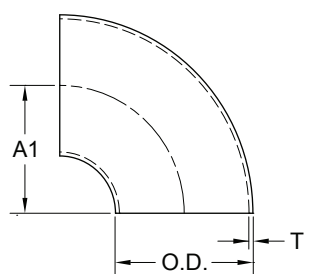
General Notes:

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

O.D. 90° Elbows ASTM A774



90° Elbow
Long Radius



90° Elbow
Short Radius

O.D.		T			90° Elbow, Long Radius				90° Elbow, Short Radius			
Outside Diameter		[Nominal Thickness]			A		Weight		A1		Weight	
In	mm	Gauge	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
		11	0.125	3.2			39.0	17.7			26.0	11.8
12	305	11	0.125	3.2	18.000	457	53.1	24.1	14.000	356	-----	-----
		3/16"	0.188	4.8			79.9	36.3			53.3	24.2
14	356	11	0.125	3.2	21.000	533	69.2	31.4			-----	-----
		3/16"	0.188	4.8			104.2	47.3			69.5	31.5
16	406	10	0.140	3.6	24.000	610	87.5	39.7	16.000	406	51.7	23.5
		3/16"	0.188	4.8			131.8	59.8			69.5	31.5
18	457	11	0.125	3.2	27.000	686	104.2	47.3	18.000	457	-----	-----
		3/16"	0.188	4.8			176.3	80.0			87.8	39.8
20	508	11	0.125	3.2	30.000	762	117.5	53.3	20.000	508	117.5	53.3
		1/4"	0.250	6.4			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

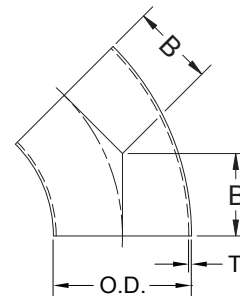
General Notes:

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

O.D. 45° Elbow s ASTM A774

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O.D. Outside Diameter		T [Nominal Thickness]			45° Elbow			
					B		Weight	
In	mm	Gauge	In	mm	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
		11	0.125	3.2			8.7	4.0
10	254	11	0.125	3.2	6.250	159	13.6	6.2
12	305	11	0.125	3.2	7.500	191	19.5	8.9
14	356	11	0.125	3.2	8.750	222	26.5	12.0
		3/16"	0.188	4.8			40.0	18.1
16	406	11	0.125	3.2	10.000	254	34.6	15.7
		10	0.140	3.6			38.8	17.6
18	457	3/16"	0.188	4.8	11.250	286	52.1	23.6
		1/4"	0.250	6.4			88.1	40.0
20	508	11	0.125	3.2	12.500	318	54.0	24.5
		3/16"	0.188	4.8			81.3	36.9
24	610	1/4"	0.250	6.4	15.000	381	108.7	49.3
		3/16"	0.188	4.8			116.8	53.0
30	762	1/4"	0.250	6.4	18.625	473	156.2	70.8
		3/16"	0.188	4.8			182.3	82.7
							243.5	110.5



General Notes:

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

O.D. Mitred Elbows ASTM A 774 Weight Table

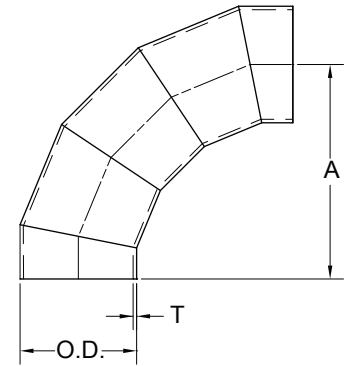


O.D. Outside Diameter		T	90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
In	mm	Gauge	lb	kg	lb	kg	lb	kg
1 1/2	38	14	1.1	0.5	0.7	0.3	0.5	0.2
		11	1.8	0.8	1.2	0.5	0.8	0.4
2	51	14	1.5	0.7	1.1	0.5	0.7	0.3
		11	2.5	1.1	1.7	0.8	1.2	0.5
3	64	14	2.0	0.9	1.5	0.7	1.1	0.5
		11	3.3	1.5	2.4	1.1	1.7	0.8
3	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	11	41.7	18.9	26.4	12.0
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
16	406	11	70.1	31.8	43.8	19.9	28.2	12.8
		10	78.6	35.7	49.1	22.3	31.6	14.3
18	457	3/16	105.6	47.9	66.0	29.9	42.5	19.3
		11	87.0	39.5	54.2	24.6	33.7	15.3
20	508	10	97.6	44.3	60.8	27.6	37.8	17.1
		3/16	131.0	59.4	81.6	37.0	50.7	23.0
24	610	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
36	914	3/16	340.5	154.5	205.1	93.1	148.6	67.4
		1/4	455.0	206.4	274.1	124.3	198.5	90.0
42	1067	3/16	482.0	218.6	275.4	124.9	213.7	97.0
		1/4	643.8	292.0	367.9	166.9	285.5	129.5
48	1219	3/16	647.9	293.9	355.5	161.3	290.7	131.9
		1/4	865.2	392.5	474.7	215.3	388.2	176.1
48	1219	3/16	838.3	380.3	445.4	202.0	379.5	172.1
		1/4	1119.2	507.7	594.6	269.7	506.6	229.8

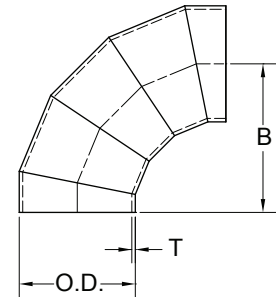
O.D. Mitred Elbows ASTM A 774

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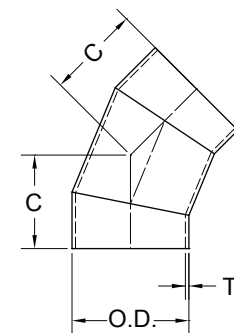
O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
		Gauge			A		B		C	
In	mm		In	mm	In	mm	In	mm	In	mm
1 1/2	38	14	0.078	2.0	6.000	152	4.000	102	2.250	57
		11	0.125	3.2						
2	51	14	0.078	2.0	6.500	165	4.500	114	2.500	64
		11	0.125	3.2						
2 1/2	64	14	0.078	2.0	7.000	178	5.000	127	3.000	76
		11	0.125	3.2						
3	76	14	0.078	2.0	7.750	197	5.500	140	3.000	76
		11	0.125	3.2						
4	102	14	0.078	2.0	9.000	229	6.500	165	4.000	102
		11	0.125	3.2						
5	127	14	0.078	2.0	10.250	260	7.500	191	4.500	114
		11	0.125	3.2						
6	152	14	0.078	2.0	11.500	292	8.000	203	5.000	127
		11	0.125	3.2						
8	203	14	0.078	2.0	14.000	356	9.000	229	5.500	140
		11	0.125	3.2						
10	254	11	0.125	3.2	16.500	419	11.000	279	6.500	165
12	305	11	0.125	3.2	19.000	483	12.000	305	7.500	191
14	356	11	0.125	3.2	21.500	546	14.000	356	7.500	191
		10	0.140	3.6						
		11	0.125	3.2						
16	406	10	0.140	3.6	24.000	610	15.000	381	8.000	203
		3/16	0.188	4.8						
18	457	11	0.125	3.2						
		10	0.140	3.6	26.500	673	16.500	419	8.500	216
		3/16	0.188	4.8						
20	508	11	0.125	3.2						
		10	0.140	3.6						
		3/16	0.188	4.8	29.000	737	18.000	457	9.500	241
		1/4	0.250	6.4						
24	610	11	0.125	3.2						
		10	0.140	3.6						
		3/16	0.188	4.8	34.000	864	22.000	559	11.000	279
		1/4	0.250	6.4						
30	762	3/16	0.188	4.8	41.500	1054	25.000	635	15.000	381
		1/4	0.250	6.4						
36	914	3/16	0.188	4.8	49.000	1245	28.000	711	18.000	457
		1/4	0.250	6.4						
42	1067	3/16	0.188	4.8	56.500	1435	31.000	787	21.000	533
		1/4	0.250	6.4						
48	1219	3/16	0.188	4.8	64.000	1626	34.000	864	24.000	610
		1/4	0.250	6.4						



90° Mitred Elbow
Long Radius



90° Mitred Elbow
Short Radius

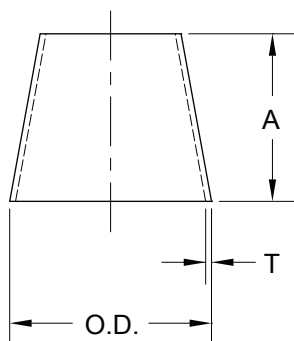


45° Mitred Elbow

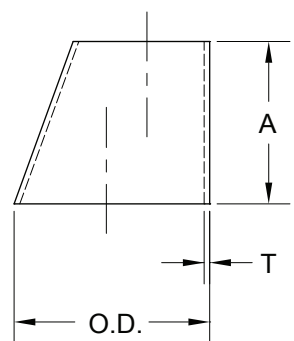
General Notes:

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

O.D. Reducers ASTM A774



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	64	0.3	0.1
		11	0.125	3.2			0.5	0.2
2	51	14	0.078	2.0	3.000	76	0.4	0.2
		11	0.125	3.2			0.7	0.3
2 1/2	64	14	0.078	2.0	3.500	89	0.6	0.3
		11	0.125	3.2			1.0	0.5
3	76	14	0.078	2.0	3.500	89	0.8	0.3
		11	0.125	3.2			1.2	0.6
4	102	14	0.078	2.0	4.000	102	1.2	0.5
		11	0.125	3.2			1.9	0.9
5	127	14	0.078	2.0	5.000	127	1.8	0.8
		11	0.125	3.2			2.9	1.3
6	152	14	0.078	2.0	5.500	140	2.4	1.1
		11	0.125	3.2			3.8	1.7
8	203	14	0.078	2.0	6.000	152	3.4	1.6
		11	0.125	3.2			5.6	2.5
10	254	11	0.125	3.2	7.000	178	8.1	3.7
		12	0.125	3.2			11.0	5.0
12	305	11	0.125	3.2	8.000	203	20.9	9.5
		14	0.125	3.2			23.4	10.6
14	356	10	0.140	3.6	13.000	330	25.7	11.7
		11	0.125	3.2			28.8	13.1
16	406	3/16	0.188	4.8	14.000	356	38.7	17.6
		11	0.125	3.2			31.0	14.0
18	457	10	0.140	3.6	15.000	381	34.7	15.7
		3/16	0.188	4.8			46.6	21.1
20	508	11	0.125	3.2	20.000	508	45.8	20.8
		10	0.140	3.6			51.4	23.3
24	610	3/16	0.188	4.8	20.000	508	69.0	31.3
		1/4	0.250	6.4			92.2	41.8
30	762	11	0.125	3.2	24.000	610	54.9	24.9
		10	0.140	3.6			61.6	27.9
36	914	3/16	0.188	4.8	24.000	610	82.6	37.5
		1/4	0.250	6.4			110.5	50.1
42	1067	3/16	0.188	4.8	24.000	610	123.8	56.1
		1/4	0.250	6.4			165.4	75.0
48	1219	3/16	0.188	4.8	28.000	711	148.4	67.3
		1/4	0.250	6.4			198.2	89.9
48	1219	3/16	0.188	4.8	28.000	711	173.0	78.5
		1/4	0.250	6.4			231.0	104.8
48	1219	3/16	0.188	4.8	28.000	711	230.5	104.5
		1/4	0.250	6.4			307.7	139.6

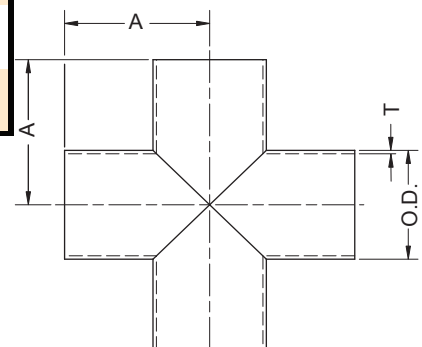
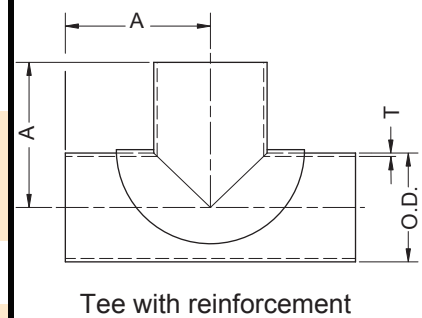
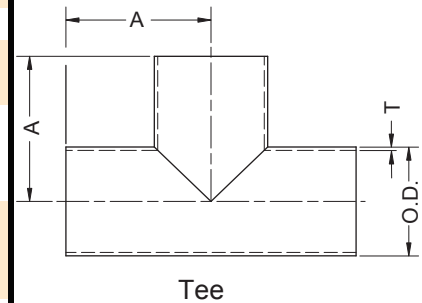
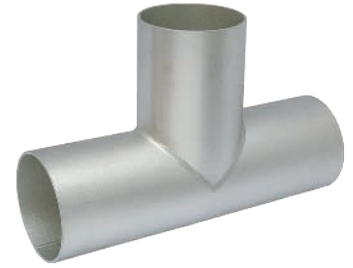
General Notes:

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

O.D. Tees & Cross ASTM A774

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

O.D. Outside Diameter		T [Nominal Thickness]			A		Weight			
							Tee		Cross	
In	mm	Gauge	In	mm	In	mm	lb	kg	lb	kg
1 1/2	38	14	0.078	2.0	4.000	102	1.3	0.6	1.8	0.8
		11	0.125	3.2			2.2	1.0	3.0	1.3
2	51	14	0.078	2.0	4.500	114	2.0	0.9	2.7	1.2
		11	0.125	3.2			3.3	1.5	4.4	2.0
2 1/2	64	14	0.078	2.0	5.000	127	2.7	1.2	3.7	1.7
		11	0.125	3.2			4.5	2.0	6.0	2.7
3	76	14	0.078	2.0	5.500	140	3.6	1.6	4.8	2.2
		11	0.125	3.2			5.9	2.7	7.8	3.6
4	102	14	0.078	2.0	6.500	165	5.7	2.6	7.5	3.4
		11	0.125	3.2			9.2	4.2	12.2	5.5
5	127	14	0.078	2.0	7.500	191	8.1	3.7	10.8	4.9
		11	0.125	3.2			13.1	6.0	17.5	7.9
6	152	14	0.078	2.0	8.000	203	10.4	4.7	13.8	6.3
		11	0.125	3.2			16.7	7.6	22.3	10.1
8	203	14	0.078	2.0	9.000	229	15.5	7.0	20.7	9.4
		11	0.125	3.2			25.0	11.4	33.3	15.1
10	254	11	0.125	3.2	11.000	279	38.1	17.3	50.7	23.0
		11	0.125	3.2			49.7	22.6	66.3	30.1
12	305	11	0.125	3.2	12.000	305	67.6	30.7	90.1	40.9
		10	0.140	3.6			75.7	34.4	101.0	45.8
14	356	11	0.125	3.2	14.000	356	82.6	37.6	110.2	50.0
		10	0.140	3.6			92.6	42.1	123.5	56.0
16	406	3/16	0.188	4.8	15.000	381	124.4	56.6	165.9	75.3
		11	0.125	3.2			102.2	46.4	136.2	61.8
18	457	10	0.140	3.6	16.500	419	114.5	52.1	152.7	69.3
		3/16	0.188	4.8			153.8	69.9	205.1	93.0
20	508	11	0.125	3.2	18.000	457	123.8	56.3	165.0	74.9
		10	0.140	3.6			138.7	63.1	185.0	83.9
24	610	3/16	0.188	4.8	22.000	559	186.2	84.6	248.3	112.6
		1/4	0.250	6.4			249.1	113.2	332.1	150.6
30	762	11	0.125	3.2	25.000	635	181.3	82.4	241.8	109.7
		10	0.140	3.6			203.2	92.4	271.0	122.9
36	914	3/16	0.188	4.8	28.000	711	272.7	124.0	363.6	164.9
		1/4	0.250	6.4			364.5	165.7	486.1	220.5
42	1067	3/16	0.188	4.8	31.000	787	386.8	175.8	515.7	233.9
		1/4	0.250	6.4			516.7	234.9	689.0	312.5
48	1219	3/16	0.188	4.8	34.000	864	519.3	236.0	692.4	314.1
		1/4	0.250	6.4			693.5	315.2	924.7	419.5
		3/16	0.188	4.8			670.2	304.6	893.6	405.3
		1/4	0.250	6.4			894.9	406.8	1193.3	541.3
		3/16	0.188	4.8			839.6	381.6	1119.5	507.8
		1/4	0.250	6.4			1121.0	509.5	1494.6	678.0

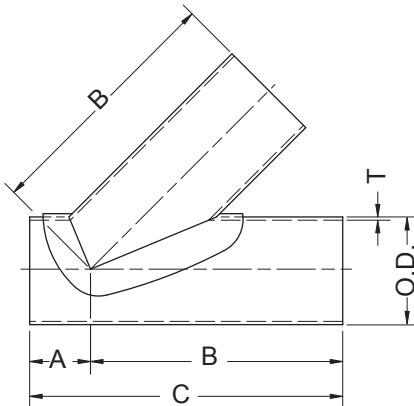
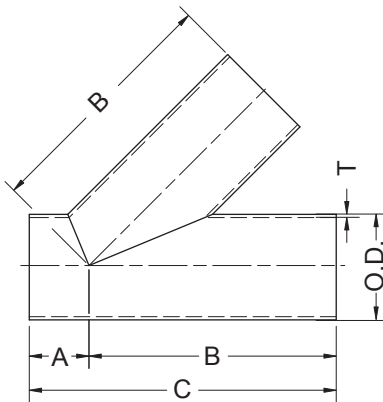


General Notes:

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

Note:

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



45° Lateral
with reinforcement.

O.D. Outside Diameter		T [Nominal Thickness]			A		B		C		Weight	
In	mm	Gauge	In	mm	In	mm	In	mm	In	mm	lb	kg
1 1/2	38	14	0.078	2.0	2.000	51	7.000	178	9.000	229	1.8	0.8
		11	0.125	3.2							3.0	1.3
2	51	14	0.078	2.0	2.500	64	8.000	203	10.500	267	2.7	1.2
		11	0.125	3.2							4.5	2.0
2 1/2	64	14	0.078	2.0	2.500	64	9.500	241	12.000	305	3.9	1.8
		11	0.125	3.2							6.4	2.9
3	76	14	0.078	2.0	3.000	76	10.000	254	13.000	330	5.0	2.3
		11	0.125	3.2							8.2	3.7
4	102	14	0.078	2.0	3.000	76	12.000	305	15.000	381	7.8	3.5
		11	0.125	3.2							12.7	5.8
5	127	14	0.078	2.0	3.500	89	13.500	343	17.000	432	11.0	5.0
		11	0.125	3.2							17.8	8.1
6	152	14	0.078	2.0	3.500	89	14.500	368	18.000	457	14.0	6.4
		11	0.125	3.2							22.7	10.3
8	203	14	0.078	2.0	4.500	114	17.500	445	22.000	559	22.7	10.3
		11	0.125	3.2							36.5	16.6
10	254	11	0.125	3.2	5.000	127	20.500	521	25.500	648	53.0	24.1
		11	0.125	3.2							75.3	34.1
12	305	11	0.125	3.2	5.500	140	24.500	622	30.000	762	96.5	43.8
		11	0.125	3.2							108.2	49.1
14	356	11	0.125	3.2	6.000	152	27.000	686	33.000	838	122.1	55.4
		10	0.140	3.6							136.9	62.1
16	406	11	0.125	3.2	6.500	165	30.000	762	36.500	927	183.9	83.4
		3/16	0.188	4.8							220.6	100.1
18	457	11	0.125	3.2	7.000	178	32.000	813	39.000	991	178.8	81.1
		10	0.140	3.6							200.4	90.9
		3/16	0.188	4.8							269.0	122.0
20	508	11	0.125	3.2	8.000	203	35.000	889	43.000	1092	359.8	163.2
		10	0.140	3.6							497.1	225.5
		3/16	0.188	4.8							556.9	252.6
24	610	11	0.125	3.2	9.000	229	40.500	1029	49.500	1257	744.1	337.5
		10	0.140	3.6							890.2	403.8
		3/16	0.188	4.8							1188.9	539.3
		1/4	0.250	6.4							1181.9	536.1
30	762	3/16	0.188	4.8	10.000	254	49.000	1245	59.000	1499	1578.2	715.9
		1/4	0.250	6.4							1489.9	675.8
36	914	3/16	0.188	4.8	24.000	610	60.000	1524	84.000	2134	1989.1	902.3
		1/4	0.250	6.4								
42	1067	3/16	0.188	4.8	26.000	660	69.000	1753	95.000	2413		
		1/4	0.250	6.4								
48	1219	3/16	0.188	4.8	27.000	686	77.000	1956	104.000	2642		
		1/4	0.250	6.4								

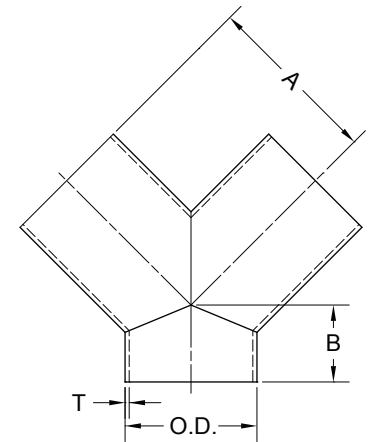
General Notes:

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

O.D. Wyees ASTM A774

Douglas Barwick
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O.D. Outside Diameter		T [Nominal Thickness]			A		B		Weight	
In	mm	Gauge	In	mm	In	mm	In	mm	lb	kg
1 1/2	38	14	0.078	2.0	3.375	86	2.000	51	1.0	0.4
		11	0.125	3.2					1.6	0.7
2	51	14	0.078	2.0	4.500	114	2.500	64	1.7	0.8
		11	0.125	3.2					2.8	1.3
2 1/2	64	14	0.078	2.0	5.000	127	2.500	64	2.3	1.0
		11	0.125	3.2					3.7	1.7
3	76	14	0.078	2.0	5.500	140	3.000	76	3.1	1.4
		11	0.125	3.2					5.0	2.3
4	102	14	0.078	2.0	6.500	165	3.000	76	4.6	2.1
		11	0.125	3.2					7.5	3.4
5	127	14	0.078	2.0	7.500	191	3.500	89	6.7	3.0
		11	0.125	3.2					10.8	4.9
6	152	14	0.078	2.0	8.000	203	3.500	89	8.4	3.8
		11	0.125	3.2					13.6	6.2
8	203	14	0.078	2.0	9.000	229	4.500	114	12.9	5.9
		11	0.125	3.2					20.8	9.4
10	254	11	0.125	3.2	11.000	279	5.000	127	31.1	14.1
		11	0.125	3.2					40.7	18.5
12	305	11	0.125	3.2	12.000	305	5.500	140	54.7	24.8
		10	0.140	3.6					61.3	27.8
14	356	11	0.125	3.2	14.000	356	6.000	152	67.0	30.4
		10	0.140	3.6					75.1	34.1
16	406	11	0.125	3.2	15.000	381	6.500	165	100.9	45.8
		3/16	0.188	4.8					82.6	37.5
18	457	11	0.125	3.2	16.500	419	7.000	178	92.5	42.0
		3/16	0.188	4.8					124.3	56.4
20	508	11	0.125	3.2	18.000	457	8.000	203	100.8	45.7
		10	0.140	3.6					113.0	51.3
24	610	3/16	0.188	4.8	22.000	559	9.000	229	151.7	68.8
		1/4	0.250	6.4					202.9	92.1
30	762	11	0.125	3.2	25.000	635	10.000	254	145.6	66.1
		10	0.140	3.6					163.2	74.0
36	914	3/16	0.188	4.8	28.000	711	24.000	610	219.0	99.3
		1/4	0.250	6.4					292.7	132.8
42	1067	3/16	0.188	4.8	31.000	787	26.000	660	309.4	140.3
		1/4	0.250	6.4					413.4	187.5
48	1219	3/16	0.188	4.8	34.000	864	27.000	686	494.5	224.3
		1/4	0.250	6.4					660.5	299.6
		3/16	0.188	4.8					634.2	287.7
		1/4	0.250	6.4					846.8	384.1
		3/16	0.188	4.8					782.0	354.7
		1/4	0.250	6.4					1044.0	473.6

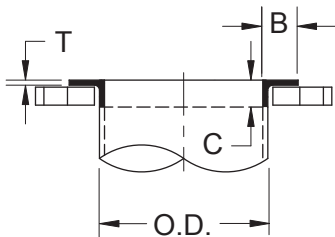


General Notes:

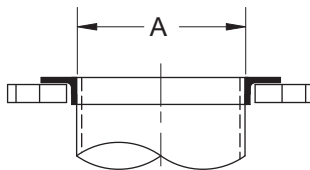
- Material: Stainless Steel 304L, 316L, 317L, Other alloys available upon request.
- Suggested Maximum Working Pressure : See technical section.
- Fabrication Tolerance: See technical section.
- Other diameter and thickness available upon request.
- The addition of reinforcement may be necessary. Upon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

O.D. Angle Collars ASTM A774

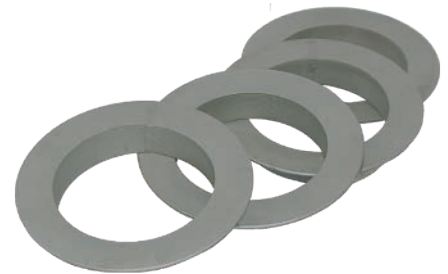
O.D. Outside Diameter		A	Angle Dimension B-C-T		Weight	
In	mm		In	mm.	lb	kg
3	76	Outside of pipe diameter + 1/16" (1.8 mm)	3/4 x 3/4 x 1/8	19 x 19 x 3.2	0.5	0.2
4	102		1 x 1 x 1/8	25 x 25 x 3.2	0.8	0.4
5	127		1 x 1 x 1/8	25 x 25 x 3.2	1.0	0.5
6	152		1 x 1 x 1/8	25 x 25 x 3.2	1.3	0.6
			1 x 1 x 3/16	25 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	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	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		1 1/2 x 1 1/2 x 3/16	38 x 38 x 4.8	8.5	3.8
			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. 2-14



Slip-on Angle Collars
For using with Slip-on Backing Flange
See P. 2-15



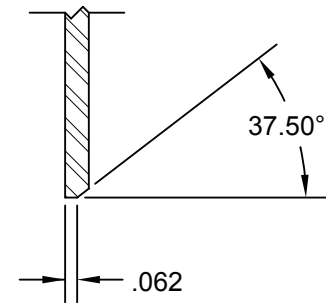
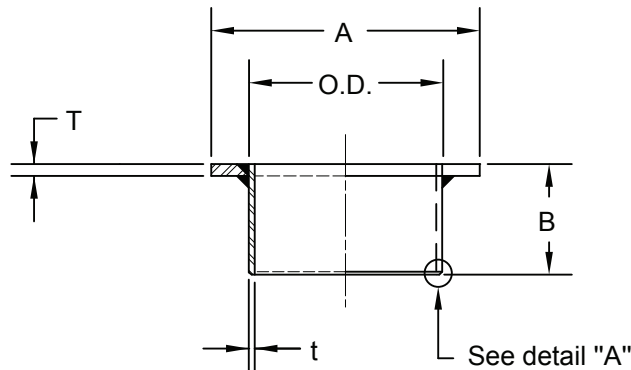
General Notes:

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

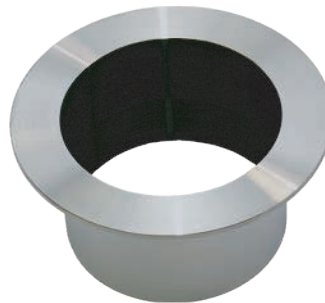
O.D. Stub-End "Type B"

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

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



Detail "A" [Note 1]



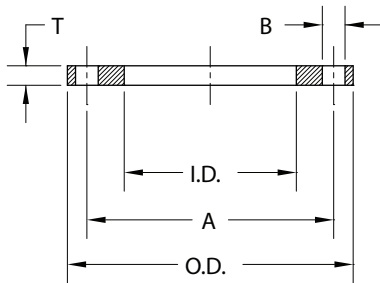
General Notes:

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

Note:

- 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

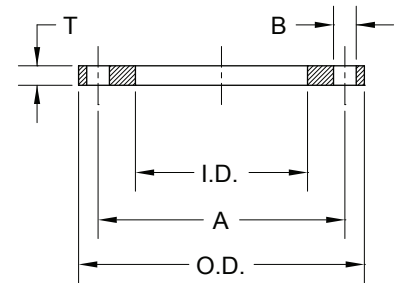
General Notes:

- Material: Carbon Steel with chemical composition and mechanical strength equivalent to ASTM A 105.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

O.D. Slip-On Backing Flanges

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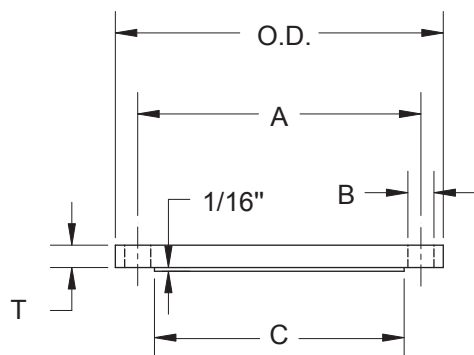
Nominal Diameter	O.D.	I.D.	A	# of holes	B	T	Weight
In mm	In mm	In mm	In mm		In mm	In mm	lb kg
3 76	7.500 191	3.688 94	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	4.688 119	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	5.688 144	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	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	12.813 325	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 and mechanical strength equivalent to ASTM A 105.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "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 38	5.000 127	3.875 98	4	0.625 16	3.000 76	0.750 19	4.3 2.0
2 51	6.000 152	4.750 121	4	0.750 19	3.500 89	0.750 19	6.2 2.8
2 1/2 64	7.000 178	5.500 140	4	0.750 19	4.500 114	0.750 19	8.5 3.9
3 76	7.500 191	6.000 152	4	0.750 19	5.000 127	0.750 19	9.8 4.4
4 102	9.000 229	7.500 191	8	0.750 19	6.500 165	0.750 19	14.0 6.4
5 127	10.000 254	8.500 216	8	0.875 22	7.375 187	0.750 19	17.6 8.0
6 152	11.000 279	9.500 241	8	0.875 22	8.375 213	0.750 19	21.0 9.5
8 203	13.500 343	11.750 298	8	0.875 22	10.625 270	0.750 19	32.2 14.6
10 254	16.000 406	14.250 362	12	1.000 25	13.000 330	1.000 25	58.0 26.3
12 305	19.000 483	17.000 432	12	1.000 25	15.625 397	1.000 25	83.1 37.7
14 356	21.000 533	18.750 476	12	1.125 29	17.250 438	1.125 29	113.0 51.3
16 406	23.500 597	21.250 540	16	1.125 29	19.750 502	1.125 29	142.0 64.4
18 457	25.000 635	22.750 578	16	1.250 32	21.125 537	1.250 32	179.0 81.2
20 508	27.500 699	25.000 635	20	1.250 32	23.375 594	1.250 32	217.5 98.7
24 610	32.000 813	29.500 749	20	1.375 35	27.750 705	1.375 35	323.0 146.5
30 762	38.750 984	36.000 914	28	1.375 35	34.250 870	1.500 38	530.0 240.4
36 914	46.000 1168	42.750 1086	32	1.625 41	40.750 1035	1.500 38	755.0 342.5
42 1067	53.000 1346	49.500 1257	36	1.625 41	46.750 1187	1.500 38	906.0 411.0
48 1219	59.500 1511	56.000 1422	44	1.625 41	52.750 1340	1.750 44	1334.0 605.1

General Notes:

- Material: Carbon Steel with chemical composition and mechanical strength equivalent to ASTM A 105 and 316L Stainless Steel inner.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

Summary of specifications

Our NPS⁽¹⁾ (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⁽²⁾.

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 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 tests 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 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 $\pm 12.5\%$

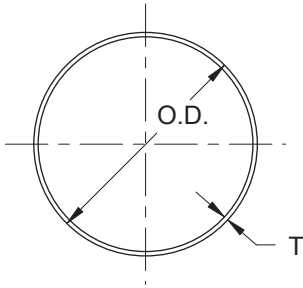
Pipe and fittings are normally furnished in square cut ends but can also be provided with beveled ends.

Notes:

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

NPS Pipe ASTM A778

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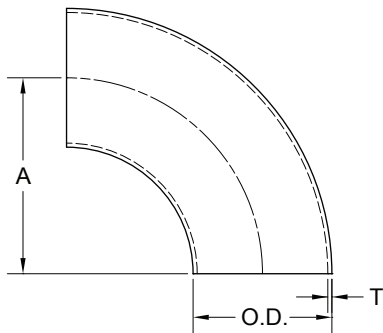
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			Weight	
In	mm	In	mm	Ga / Sch	In	mm	lb / ft	kg / m
3/4	19	1.050	27	Sch 5S	0.065	1.7	0.7	1.1
				Sch 10S	0.083	2.1	0.9	1.4
1	25	1.320	34	Sch 5S	0.065	1.7	0.9	1.4
				Sch 10S	0.109	2.8	1.4	2.3
1 1/4	32	1.660	42	Sch 5S	0.065	1.7	1.1	1.8
				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
				Sch 10S	0.180	4.6	24.7	39.7
14	356	14.000	356	11	0.125	3.2	19.0	30.4
				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
16	406	16.000	406	11	0.125	3.2	21.7	34.8
				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
18	457	18.000	457	11	0.125	3.2	24.4	39.2
				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
20	508	20.000	508	10	0.140	3.6	30.4	48.7
				1/4"	0.250	6.4	54.0	86.5
				Sch 5S	0.188	4.8	40.6	65.1
				Sch 10S	0.218	5.5	47.1	75.6
24	610	24.000	610	10	0.140	3.6	36.5	58.5
				3/16"	0.188	4.8	48.8	78.3
				Sch 5S	0.218	5.5	56.7	90.9
				Sch 10S	0.250	6.4	64.9	104.1
30	762	30.000	762	3/16"	0.188	4.8	61.1	98.0
				Sch 5S	0.250	6.4	81.3	130.4
				Sch 10S	0.312	7.9	101.3	162.3
36	914	36.000	914	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
48	1219	48.000	1219	3/16"	0.188	4.8	98.0	157.1
				1/4"	0.250	6.4	130.5	209.2
				5/16"	0.312	7.9	162.7	260.8

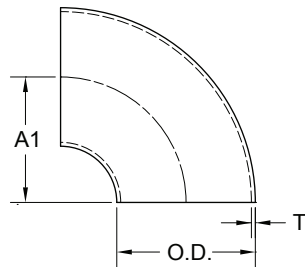
Notes:

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

NPS 90° Elbows ASTM A774



**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
				11	0.125	3.2			40.7	18.4			-----	-----
12	305	12.750	324	Sch 5S	0.156	4.0	18.000	457	50.6	23.0	12.000	305	33.7	15.3
				Sch 10S	0.180	4.6			58.3	26.4			38.9	17.6
				11	0.125	3.2			52.1	23.6			-----	-----
				Sch 5S	0.156	4.0			64.9	29.4			43.3	19.6
14	356	14.000	356	Sch 10S	0.188	4.8	21.000	533	78.0	35.4	14.000	356	52.0	23.6
				11	0.125	3.2			52.1	23.6			-----	-----
				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

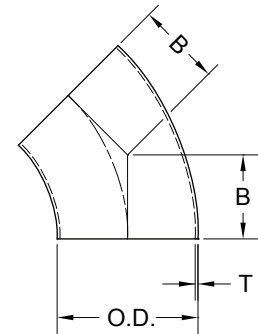
General Notes:

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

NPS 45° Elbows ASTM A774

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Douglas Barwick

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			45° Elbow			
							B		Weight	
In	mm	In	mm	Ga / Sch	In	mm	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
				11	0.125	3.2			9.1	4.1
				Sch 5S	0.109	2.8			8.0	3.6
				Sch 10S	0.148	3.8			10.8	4.9
10	254	10.750	273	11	0.125	3.2	6.250	159	14.3	6.5
				Sch 5S	0.134	3.4			15.3	6.9
				Sch 10S	0.165	4.2			18.7	8.5
12	305	12.750	324	11	0.125	3.2	7.500	191	20.3	9.2
				Sch 5S	0.156	4.0			25.3	11.5
				Sch 10S	0.180	4.6			29.1	13.2
14	356	14.000	356	11	0.125	3.2	8.750	222	26.1	11.8
				Sch 5S	0.156	4.0			32.5	14.7
				Sch 10S	0.188	4.8			39.0	17.7
16	406	16.000	406	11	0.125	3.2	10.000	254	34.1	15.5
				10	0.140	3.6			38.1	17.3
				Sch 5S	0.165	4.2			44.9	20.4
				Sch 10S	0.188	4.8			51.0	23.2
18	457	18.000	457	11	0.125	3.2	11.250	286	43.2	19.6
				10	0.140	3.6			48.3	21.9
				Sch 5S	0.165	4.2			56.9	25.8
				Sch 10S	0.188	4.8			64.7	29.3
20	508	20.000	508	10	0.140	3.6	12.500	318	59.7	27.1
				1/4"	0.250	6.4			106.0	48.1
				Sch 5S	0.188	4.8			79.7	36.2
				Sch 10S	0.218	5.5			92.6	42.0
24	610	24.000	610	10	0.140	3.6	15.000	381	86.0	39.0
				3/16"	0.188	4.8			115.0	52.2
				Sch 5S	0.218	5.5			133.6	60.6
				Sch 10S	0.250	6.4			152.9	69.4
30	762	30.000	762	10	0.140	3.6	18.625	473	134.6	61.1
				3/16"	0.188	4.8			180.0	81.6
				Sch 5S	0.250	6.4			239.5	108.6
				Sch 10S	0.312	7.9			298.3	135.3



General Notes:

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

NPS Mitred Elbows ASTM A 774 Weight Table

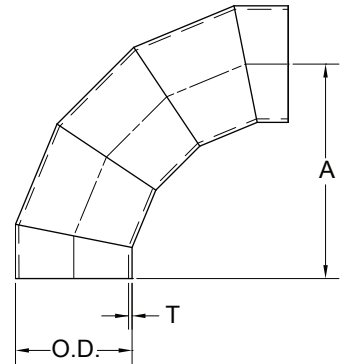


NPS Nominal Pipe Size		T	90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
In	mm		lb	kg	lb	kg	lb	kg
3	76	14	1.7	0.8	1.2	0.5	0.9	0.4
		11	2.8	1.3	1.8	0.8	1.4	0.6
		Sch 5S	1.9	0.8	1.2	0.6	0.9	0.4
		Sch 10S	2.6	1.2	1.8	0.8	1.3	0.6
4	102	14	3.0	1.4	2.0	0.9	1.5	0.7
		11	4.8	2.2	3.2	1.4	2.4	1.1
		Sch 5S	3.2	1.4	2.1	1.0	1.6	0.7
		Sch 10S	4.6	2.1	3.0	1.4	2.3	1.0
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	2.0	3.2	1.5
		Sch 10S	7.9	3.6	5.3	2.4	4.0	1.8
6	152	14	6.7	3.0	4.4	2.0	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	5.0
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	7.0
		Sch 10S	38.0	17.3	25.3	11.5	19.0	8.6
12	305	11	41.2	18.7	27.5	12.5	20.6	9.3
		Sch 5S	51.3	23.3	34.2	15.5	25.6	11.6
		Sch 10S	59.0	26.8	39.4	17.9	29.5	13.4
14	356	11	52.8	24.0	35.2	16.0	26.4	12.0
		Sch 5S	65.8	29.9	43.8	19.9	32.9	14.9
		Sch 10S	79.1	35.9	52.7	23.9	39.5	17.9
16	406	11	69.0	31.4	46.0	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
		Sch 10S	103.4	47.0	69.0	31.3	51.7	23.5
18	457	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
		Sch 10S	131.1	59.6	87.4	39.6	65.5	29.7
20	508	10	120.9	55.0	80.6	36.6	60.5	27.4
		1 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
		Sch 10S	187.6	85.3	125.0	56.7	93.8	42.5
24	610	10	174.3	79.2	116.2	52.7	87.2	39.5
		3/16"	233.0	105.9	155.4	70.5	116.5	52.9
		Sch 5S	270.6	123.0	180.4	81.8	135.3	61.4
		Sch 10S	309.9	140.9	206.6	93.7	154.9	70.3
30	762	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	110.0
		Sch 10S	604.3	274.7	402.9	182.7	302.1	137.1
36	914	3/16"	438.1	199.1	292.1	132.5	219.0	99.4
		Sch 5S	699.7	318.0	466.5	211.6	349.8	158.7
		Sch 10S	871.7	396.2	581.1	263.6	435.9	197.7
42	1067	3/16"	716.1	325.5	477.4	216.5	358.0	162.4
		1 1/4"	953.3	433.3	635.5	288.3	476.7	216.2
		5/16"	1189.9	540.8	793.2	359.8	594.9	269.9
48	1219	3/16"	935.8	425.4	623.9	283.0	467.9	212.2
		1 1/4"	1246.1	566.4	830.7	376.8	623.0	282.6
		5/16"	1555.6	707.1	1037.0	470.4	777.8	352.8

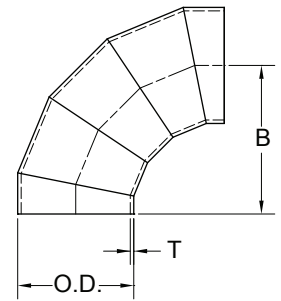
NPS Mitred Elbows ASTM A 774

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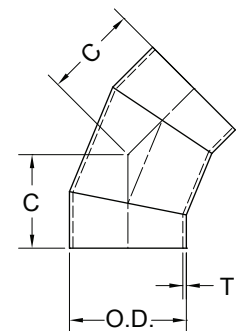
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			90° Elbow Long Radius		90° Elbow Short Radius		45° Elbow	
							A		B		C	
In	mm	In	mm	Ga / Sch	In	mm	In	mm	In	mm	In	mm
3	76	3.500	89	14	0.078	2.0	4.500	114	3.000	76	1.875	48
				11	0.125	3.2						
				Sch 5S	0.083	2.1						
				Sch 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						
				11	0.125	3.2						
12	305	12.750	324	Sch 5S	0.156	4.0	18.000	457	12.000	305	7.500	191
				Sch 10S	0.180	4.6						
				11	0.125	3.2						
				Sch 5S	0.156	4.0						
14	356	14.000	356	Sch 10S	0.188	4.8	21.000	533	14.000	356	8.750	222
				11	0.125	3.2						
				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						
				Sch 10S	0.188	4.8						
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						
				Sch 10S	0.188	4.8						
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						
				Sch 10S	0.218	5.5						
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						
				Sch 10S	0.250	6.4						
30	762	30.000	762	3/16"	0.188	4.8	45.000	1143	30.000	762	18.750	476
				Sch 5S	0.250	6.4						
				Sch 10S	0.312	7.9						
				3/16"	0.188	4.8						
36	914	36.000	914	Sch 5S	0.250	6.4	54.000	1372	36.000	914	22.500	572
				Sch 10S	0.312	7.9						
				3/16"	0.188	4.8						
				1/4"	0.250	6.4						
42	1067	42.000	1067	5/16"	0.313	7.9	63.000	1600	42.000	1067	26.000	660
				3/16"	0.188	4.8						
				1/4"	0.250	6.4						
				5/16"	0.313	7.9						
48	1219	48.000	1219	3/16"	0.188	4.8	72.000	1829	48.000	1219	30.000	762
				1/4"	0.250	6.4						
				5/16"	0.313	7.9						
				5/16"	0.313	7.9						



90° Mitred Elbow
Long Radius



90° Mitred Elbow
Short Radius

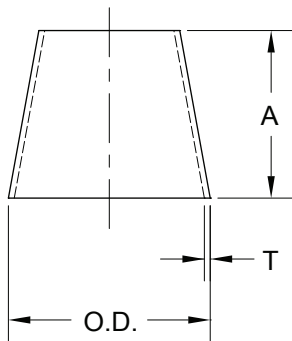


45° Mitred Elbow

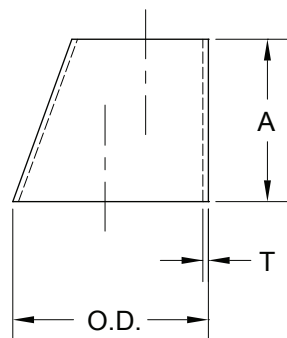
General Notes:

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

NPS Reducers ASTM A774



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
				Sch 10S	0.120	3.0			1.3	0.6
4	102	4.500	114	14	0.078	2.0	4.000	102	1.3	0.6
				11	0.125	3.2			2.0	0.9
				Sch 5S	0.083	2.1			1.3	0.6
				Sch 10S	0.120	3.0			1.9	0.9
5	127	5.563	141	14	0.078	2.0	5.000	127	1.9	0.9
				11	0.125	3.2			3.1	1.4
				Sch 5S	0.109	2.8			2.7	1.2
				Sch 10S	0.134	3.4			3.3	1.5
6	152	6.625	168	14	0.078	2.0	5.500	140	2.6	1.2
				11	0.125	3.2			4.1	1.8
				Sch 5S	0.109	2.8			3.6	1.6
				Sch 10S	0.134	3.4			4.4	2.0
8	203	8.625	219	14	0.078	2.0	6.000	152	3.6	1.7
				11	0.125	3.2			5.8	2.6
				Sch 5S	0.109	2.8			5.1	2.3
				Sch 10S	0.148	3.8			6.9	3.1
10	254	10.750	273	11	0.125	3.2	7.000	178	8.5	3.8
				Sch 5S	0.134	3.4			9.1	4.1
				Sch 10S	0.165	4.2			11.1	5.1
12	305	12.750	324	11	0.125	3.2	8.000	203	11.5	5.2
				Sch 5S	0.156	4.0			14.3	6.5
				Sch 10S	0.180	4.6			16.5	7.5
14	356	14.000	356	11	0.125	3.2	13.000	330	20.5	9.3
				10	0.140	3.6			23.0	10.4
				Sch 5S	0.156	4.0			25.6	11.6
				Sch 10S	0.188	4.8			30.8	14.0
16	406	16.000	406	11	0.125	3.2	14.000	356	25.3	11.5
				10	0.140	3.6			28.3	12.8
				Sch 5S	0.165	4.2			33.3	15.1
				Sch 10S	0.188	4.8			37.9	17.2
18	457	18.000	457	11	0.125	3.2	15.000	381	30.5	13.9
				10	0.140	3.6			34.2	15.5
				Sch 5S	0.165	4.2			40.2	18.2
				Sch 10S	0.188	4.8			45.8	20.8
20	508	20.000	508	10	0.140	3.6	20.000	508	50.7	23.0
				1/4"	0.250	6.4			90.0	40.8
				Sch 5S	0.188	4.8			67.7	30.7
				Sch 10S	0.218	5.5			78.6	35.6
24	610	24.000	610	10	0.140	3.6	20.000	508	60.9	27.6
				3/16"	0.188	4.8			81.4	36.9
				Sch 5S	0.218	5.5			94.5	42.9
				Sch 10S	0.250	6.4			108.2	49.1
30	762	30.000	762	3/16"	0.188	4.8	24.000	610	122.2	55.4
				Sch 5S	0.250	6.4			162.6	73.8
				Sch 10S	0.312	7.9			202.5	91.9
				3/16"	0.188	4.8			146.8	66.6
36	914	36.000	914	Sch 5S	0.250	6.4	24.000	610	195.4	88.6
				Sch 10S	0.312	7.9			243.5	110.4
				3/16"	0.188	4.8			171.4	77.8
				1/4"	0.250	6.4			228.2	103.5
42	1067	42.000	1067	5/16"	0.313	7.9	24.000	610	284.8	129.2
				3/16"	0.188	4.8			228.7	103.7
				1/4"	0.250	6.4			304.5	138.1
				5/16"	0.313	7.9			380.2	172.4

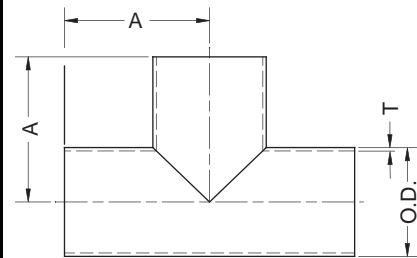
General Notes:

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

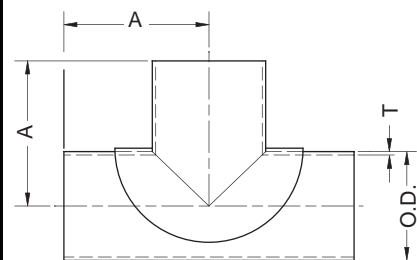
NPS Tees & Crosses ASTM A774

Douglas Barwick
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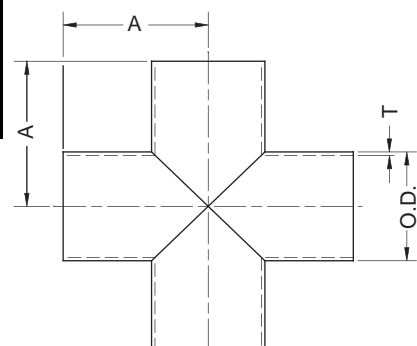
NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			A		Weight			
									Tee		Cross	
In	mm	In	mm	Ga / Sch	Po	mm	Po	mm	lb	kg	lb	kg
3	76	3.500	89	14	0.078	2.0	3.375	86	2.5	1.1	3.3	1.5
				11	0.125	3.2			3.9	1.8	5.2	2.4
				Sch 5S	0.083	2.1			2.6	1.2	3.5	1.6
				Sch 10S	0.120	3.0			3.7	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
				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
				Sch 10S	0.312	7.9			557.0	252.6	742.6	336.9
30	762	30.000	762	3/16"	0.188	4.8	22.000	559	486.4	220.6	648.5	294.1
				Sch 5S	0.250	6.4			647.3	293.6	863.1	391.5
				Sch 10S	0.312	7.9			806.5	365.8	1075.3	487.8
				3/16"	0.188	4.8			600.0	272.2	800.0	362.9
36	914	36.000	914	1/4"	0.250	6.4	26.500	673	798.8	362.3	1065.0	483.1
				5/16"	0.312	7.9			995.4	451.5	1327.2	602.0
				3/16"	0.188	4.8			808.6	366.8	1078.1	489.0
				1/4"	0.250	6.4			1076.7	488.4	1435.6	651.2
48	1219	48.000	1219	5/16"	0.312	7.9	33.000	838	1342.0	608.7	1789.3	811.6



Tee



Tee with reinforcement



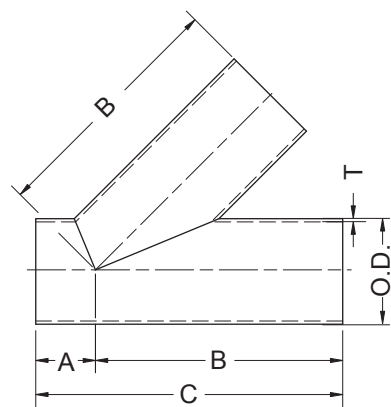
Cross [Note (1)]

General Notes:

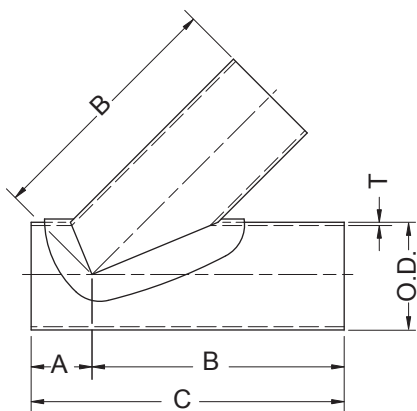
- Material: Stainless Steel 304L, 316L, 317L, Other alloys available upon request.
- Suggested Maximum Working Pressure : See technical section.
- Fabrication Tolerance: See technical section.
- Other diameter and thickness available upon request.

Note:

- The addition of reinforcement may be necessary. Upon request, the verification can be performed by Douglas Barwick, 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
				1/4"	0.250	6.4							350.9	159.2
				Sch 5S	0.188	4.8							264.0	119.7
20	508	20.000	508	Sch 10S	0.218	5.5	8.000	203	35.000	889	43.000	1092	306.5	139.0
				10	0.140	3.6							273.9	124.2
				3/16"	0.188	4.8							366.1	166.1
				Sch 5S	0.218	5.5							425.1	192.8
24	610	24.000	610	Sch 10S	0.250	6.4	9.000	229	40.500	1029	49.500	1257	486.8	220.8
				3/16"	0.188	4.8							550.0	249.5
				Sch 5S	0.250	6.4							731.8	331.9
				Sch 10S	0.312	7.9							911.4	413.4
30	762	30.000	762	3/16"	0.188	4.8	10.000	254	49.000	1245	59.000	1499	880.9	399.6
				Sch 5S	0.250	6.4							1172.5	531.9
				Sch 10S	0.312	7.9							1460.8	662.6
				3/16"	0.188	4.8							1171.4	531.3
36	914	36.000	914	1/4"	0.250	6.4	24.000	610	60.000	1524	84.000	2134	1559.5	707.4
				Sch 5S	0.250	6.4							1943.4	881.5
				Sch 10S	0.312	7.9							1478.3	670.6
				3/16"	0.188	4.8							1968.5	892.9
42	1067	42.000	1067	1/4"	0.250	6.4	26.000	660	69.000	1753	95.000	2413	2453.5	1112.9
				5/16"	0.312	7.9								
				3/16"	0.188	4.8								
				1/4"	0.250	6.4								
48	1219	48.000	1219	5/16"	0.312	7.9	27.000	686	77.000	1956	104.000	2642		

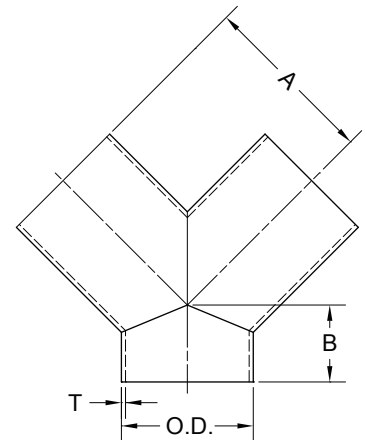
General Notes:

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

NPS Wyes ASTM A774

Douglas Barwick
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Douglas Barwick

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					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					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					66.0	29.9
				10	0.140	3.6					73.8	33.5
				Sch 5S	0.165	4.2					86.9	39.4
16	406	16.000	406	Sch 10S	0.188	4.8	15.000	381	6.500	165	98.9	44.8
				11	0.125	3.2					81.4	36.9
				10	0.140	3.6					91.1	41.3
				Sch 5S	0.165	4.2					107.2	48.6
18	457	18.000	457	Sch 10S	0.188	4.8	16.500	419	7.000	178	122.0	55.4
				10	0.140	3.6					111.5	50.6
				1/4"	0.250	6.4					197.9	89.8
				Sch 5S	0.188	4.8					148.9	67.5
20	508	20.000	508	Sch 10S	0.218	5.5	18.000	457	8.000	203	172.9	78.4
				10	0.140	3.6					161.3	73.2
				3/16"	0.188	4.8					215.6	97.8
				Sch 5S	0.218	5.5					250.3	113.6
24	610	24.000	610	Sch 10S	0.250	6.4	22.000	559	9.000	229	286.7	130.0
				3/16"	0.188	4.8					305.6	138.6
				Sch 5S	0.250	6.4					406.6	184.4
				Sch 10S	0.312	7.9					506.3	229.7
30	762	30.000	762	3/16"	0.188	4.8	25.000	635	10.000	254	489.4	222.0
				Sch 5S	0.250	6.4					651.4	295.5
				Sch 10S	0.312	7.9					811.6	368.1
				3/16"	0.188	4.8					628.5	285.1
36	914	36.000	914	1/4"	0.250	6.4	28.000	711	24.000	610	836.8	379.6
				5/16"	0.312	7.9					1042.8	473.0
				3/16"	0.188	4.8					775.9	352.0
				1/4"	0.250	6.4					1033.2	468.7
48	1219	48.000	1219	5/16"	0.312	7.9	34.000	864	27.000	686	1287.8	584.1
				1/4"	0.250	6.4						



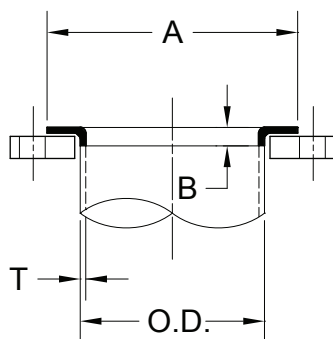
General Notes:

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

NPS Pressed Collars ASTM A774



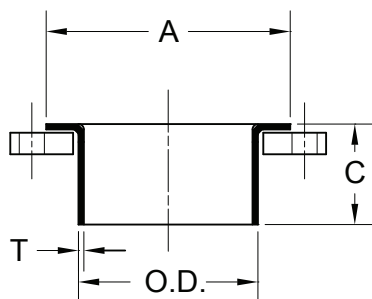
Pressed Collars



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

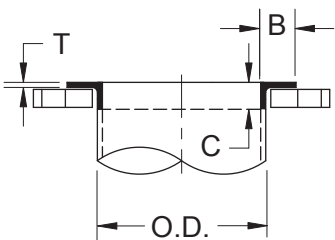
General Notes:

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

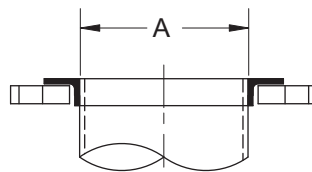
NPS Angle Collars ASTM A774

Douglas Barwick
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Douglas Barwick

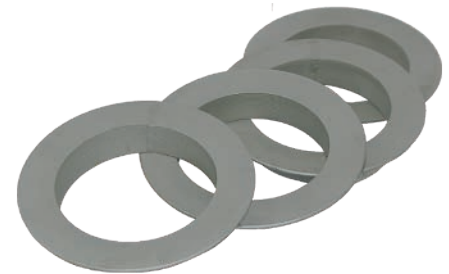
NPS Nominal Pipe Size		O.D. Outside Diameter		A		Angle Dimensions B-C-T		Weight	
In	mm	In	mm	In	mm	In	mm.	lb	kg
3	76	3.500	89	3.563	90	3/4 x 3/4 x 1/8	19 x 19 x 3.2	0.5	0.2
4	102	4.500	114	4.563	116	1 x 1 x 1/8	25 x 25 x 3.2	0.9	0.4
5	127	5.563	141	5.625	143	1 x 1 x 1/8	25 x 25 x 3.2	1.2	0.5
6	152	6.625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

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

NPS Backing Flanges



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
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

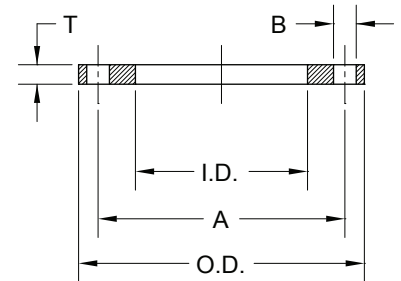
General Notes:

- Material: Carbon Steel with chemical composition and mechanical strength equivalent to ASTM A 105.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "A"
- Suggested Maximum Working Pressure : See technical section.
- Other diameter and thickness available upon request.

NPS Slip-on Flanges

Douglas Barwick
Douglas Barwick
Douglas Barwick
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Douglas Barwick

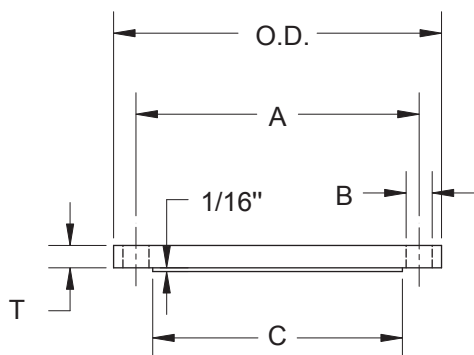
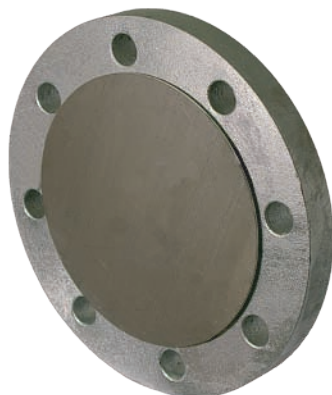
NPS Nominal Pipe Size	O.D.	I.D.	A	# of holes	B	T	Weight
In mm	In mm	In mm	In mm		In mm	In mm	lb kg
3 76	7.500 191	4.188 106	6.000 152	4	0.750 19	0.750 19	7.1 3.2
4 102	9.000 229	5.188 132	7.500 191	8	0.750 19	0.750 19	9.5 4.3
5 127	10.000 254	6.250 159	8.500 216	8	0.875 22	0.750 19	10.7 4.9
6 152	11.000 279	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:

- Material: Carbon Steel with chemical composition and mechanical strength equivalent to ASTM A 105.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "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 38	5.000 127	3.875 98	4	0.625 16	3.000 76	0.750 19	4.3 2.0
2 51	6.000 152	4.750 121	4	0.750 19	3.500 89	0.750 19	6.2 2.8
2 1/2 64	7.000 178	5.500 140	4	0.750 19	4.500 114	0.750 19	8.5 3.9
3 76	7.500 191	6.000 152	4	0.750 19	5.000 127	0.750 19	9.8 4.4
4 102	9.000 229	7.500 191	8	0.750 19	6.500 165	0.750 19	14.0 6.4
5 127	10.000 254	8.500 216	8	0.875 22	7.375 187	0.750 19	17.6 8.0
6 152	11.000 279	9.500 241	8	0.875 22	8.375 213	0.750 19	21.0 9.5
8 203	13.500 343	11.750 298	8	0.875 22	10.625 270	0.750 19	32.2 14.6
10 254	16.000 406	14.250 362	12	1.000 25	13.000 330	1.000 25	58.0 26.3
12 305	19.000 483	17.000 432	12	1.000 25	15.625 397	1.000 25	83.1 37.7
14 356	21.000 533	18.750 476	12	1.125 29	17.250 438	1.125 29	113.0 51.3
16 406	23.500 597	21.250 540	16	1.125 29	19.750 502	1.125 29	142.0 64.4
18 457	25.000 635	22.750 578	16	1.250 32	21.125 537	1.250 32	179.0 81.2
20 508	27.500 699	25.000 635	20	1.250 32	23.375 594	1.250 32	217.5 98.7
24 610	32.000 813	29.500 749	20	1.375 35	27.750 705	1.375 35	323.0 146.5
30 762	38.750 984	36.000 914	28	1.375 35	34.250 870	1.500 38	530.0 240.4
36 914	46.000 1168	42.750 1086	32	1.625 41	40.750 1035	1.500 38	755.0 342.5
42 1067	53.000 1346	49.500 1257	36	1.625 41	46.750 1187	1.500 38	906.0 411.0
48 1219	59.500 1511	56.000 1422	44	1.625 41	52.750 1340	1.750 44	1334.0 605.1

General Notes:

- Material: Carbon Steel with chemical composition and mechanical strength equivalent to ASTM A 105 and 316L Stainless Steel inner.
- Finish: Galvanized to ASTM A 123
- Drilling: 1 1/2" to 24" ASME B16.5 Class150, 30" to 48" ASME B16.47 Class150 serie "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 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.

Douglas Barwick 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)] 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 are shown inside the ASME B16.5

Notes:

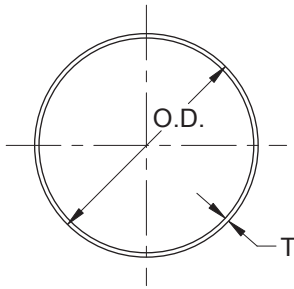
1. ASTM A312 and ASME SA-312 seamless pipes can be provided upon request.
2. ASTM A 269 and ASTM A 409 pipes can be supplied upon request.
3. Non-destructive examination is not performed on class "W" fittings when the welding process is done without filler addition.
4. In accordance with specifications 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 ⁽³⁾
WP	WX	Welded	Radiography
WP	WU	Welded	Ultrasonic

Table 1

NPS Pipe ASTM A312 & ASME SA-312

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Douglas Barwick
Douglas Barwick

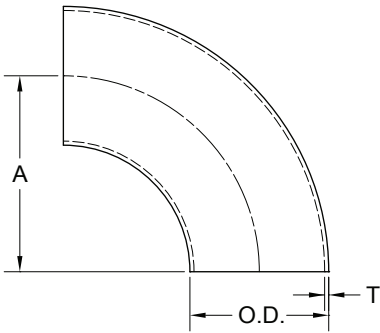


NPS Nominal Pipe Size		O.D. Outside Diameter		Nominal Thickness and Weight											
				Schedule 5S				Schedule 10S				Schedule 40S			
				T		Weight		T		Weight		T		Weight	
In	mm	In	mm	In	mm	lb / ft	kg / m	In	mm	lb / ft	kg / m	In	mm	lb / ft	kg / m
3/4	19	1.050	27	0.065	1.7	0.7	1.0	0.083	2.1	0.9	1.3	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

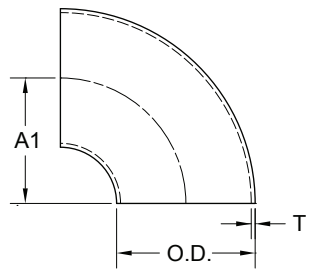
General Notes:

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

90° Elbows NPS ASTM A 403 & ASME SA-403



**90° Elbow
(Short 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	Sch	In	mm	In	mm	lb	kg	In	mm	lb	kg
1 1/2	38	1.900	48	5S	0.065	1.7	2.250	57	0.4	0.2	1.500	38	0.3	0.1
				10S	0.109	2.8			0.6	0.3			0.4	0.2
				40S	0.145	3.7			0.8	0.4			0.5	0.2
2	51	2.375	60	5S	0.065	1.7	3.000	76	0.6	0.3	2.000	51	0.4	0.2
				10S	0.109	2.8			1.1	0.5			0.7	0.3
				40S	0.154	3.9			1.5	0.7			1.0	0.4
2 1/2	64	2.875	73	5S	0.083	2.1	3.750	95	1.2	0.6	2.500	64	0.8	0.4
				10S	0.120	3.0			1.8	0.8			1.2	0.5
				40S	0.203	5.2			2.9	1.3			1.9	0.9
3	76	3.500	89	5S	0.083	2.1	4.500	114	1.8	0.8	3.000	76	1.2	0.6
				10S	0.120	3.0			2.6	1.2			1.7	0.8
				40S	0.216	5.5			4.6	2.1			3.0	1.4
4	102	4.500	114	5S	0.083	2.1	6.000	152	3.1	1.4	4.000	102	2.1	1.0
				10S	0.120	3.0			4.5	2.0			3.0	1.4
				40S	0.237	6.0			8.7	3.9			5.8	2.6
5	127	5.563	141	5S	0.109	2.8	7.500	191	6.4	2.9	5.000	127	4.3	1.9
				10S	0.134	3.4			7.8	3.5			5.2	2.4
				40S	0.258	6.6			14.7	6.7			9.8	4.4
6	152	6.625	168	5S	0.109	2.8	9.000	229	9.1	4.1	6.000	152	6.1	2.8
				10S	0.134	3.4			11.2	5.1			7.5	3.4
				40S	0.280	7.1			22.9	10.4			15.3	6.9
8	203	8.625	219	5S	0.109	2.8	12.000	305	15.9	7.2	8.000	203	10.6	4.8
				10S	0.148	3.8			21.5	9.8			14.4	6.5
				40S	0.322	8.2			45.9	20.8			30.6	13.9
10	254	10.750	273	5S	0.134	3.4	15.000	381	30.5	13.9	10.000	254	20.4	9.2
				10S	0.165	4.2			37.5	17.0			25.0	11.3
				40S	0.365	9.3			81.4	36.9			54.2	24.6
12	305	12.750	324	5S	0.156	4.0	18.000	457	50.6	23.0	12.000	305	33.7	15.3
				10S	0.180	4.6			58.3	26.4			38.9	17.6
				40S	0.375	9.5			119.5	54.2			79.7	36.1
14	356	14.000	356	5S	0.156	4.0	21.000	533	64.9	29.4	14.000	356	43.3	19.6
				10S	0.188	4.8			78.0	35.4			52.0	23.6
				40S	0.375	9.5			153.6	69.7			102.4	46.4
16	406	16.000	406	5S	0.165	4.2	24.000	610	89.7	40.7	16.000	406	59.8	27.1
				10S	0.188	4.8			102.1	46.3			68.1	30.9
				40S	0.375	9.5			201.2	91.3			134.2	60.9
18	457	18.000	457	5S	0.165	4.2	27.000	686	113.7	51.6	18.000	457	75.8	34.4
				10S	0.188	4.8			129.4	58.7			86.3	39.1
				40S	0.375	9.5			255.4	115.8			170.3	77.2
20	508	20.000	508	5S	0.188	4.8	30.000	762	159.9	72.5	20.000	508	106.6	48.4
				10S	0.218	5.5			185.1	84.0			123.4	56.0
				40S	0.375	9.5			316.0	143.3			210.6	95.5
24	610	24.000	610	5S	0.218	5.5	36.000	914	267.1	121.2	24.000	610	178.1	80.8
				10S	0.250	6.4			305.9	138.8			203.9	92.5
				40S	0.375	9.5			456.4	207.0			304.3	1.0

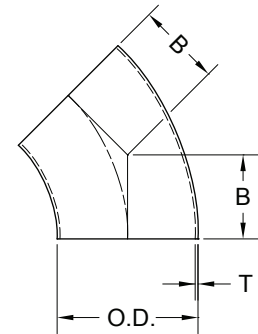
General Notes:

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

45° Elbows NPS ASTM A 403 & ASME SA-403

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			B		Weight	
In	mm	In	mm	Sch	In	mm	Po	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
				10S	0.148	3.8			10.8	4.9
				40S	0.322	8.2			23.0	10.4
10	254	10.750	273	5S	0.134	3.4	6.250	159	15.3	6.9
				10S	0.165	4.2			18.7	8.5
				40S	0.365	9.3			40.7	18.5
12	305	12.750	324	5S	0.156	4.0	7.500	191	25.3	11.5
				10S	0.180	4.6			29.1	13.2
				40S	0.375	9.5			59.8	27.1
14	356	14.000	356	5S	0.156	4.0	8.750	222	32.5	14.7
				10S	0.188	4.8			39.0	17.7
				40S	0.375	9.5			76.8	34.8
16	406	16.000	406	5S	0.165	4.2	10.000	254	44.9	20.4
				10S	0.188	4.8			51.0	23.2
				40S	0.375	9.5			100.6	45.6
18	457	18.000	457	5S	0.165	4.2	11.250	286	56.9	25.8
				10S	0.188	4.8			64.7	29.3
				40S	0.375	9.5			127.7	57.9
20	508	20.000	508	5S	0.188	4.8	12.500	318	80.0	36.3
				10S	0.218	5.5			92.6	42.0
				40S	0.375	9.5			158.0	71.7
24	610	24.000	610	5S	0.218	5.5	15.000	381	133.6	60.6
				10S	0.250	6.4			152.9	69.4
				40S	0.375	9.5			228.2	1.0

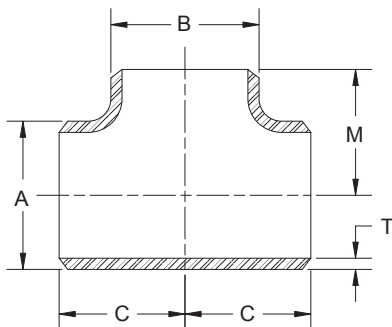


General Notes:

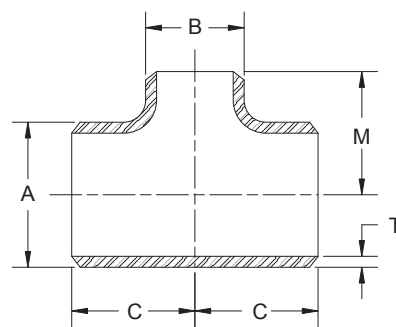
- Material: Stainless Steel 304L, 316L. Other alloys available on request.
- Grade WP - Class W, WX, WU, (Class S on request).
- Diameter and thickness: ASME B36.19
- Dimensions: ASME B16.9
- Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- Dimensional Tolerance: ASME B16.9, Table 13.
- Bevel: ASME B16.9, Table 12
- 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



Straight Tee



Reducing Tee

NPS Tees ASTM A 403 & ASME SA-403

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Douglas Barwick

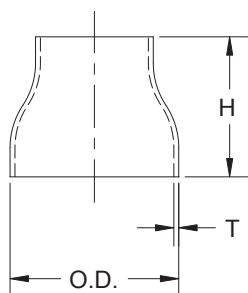
Run				Outlet				C		M		SCH 10S				SCH 40S			
NPS Nominal Pipe Size		A		NPS Nominal Pipe Size		B						T		Weight		T		Weight	
In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	In	mm	lb	kg	In	mm	lb	kg
10	254	10.750	273	4	102	4.500	114	8.500	216	7.250	184	0.165	4.2	30.1	13.7	0.365	9.3	80.0	36.3
				5	127	5.563	141			7.500	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	16	406	16.000	406	13.500	343	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	16	406	16.000	406	15.000	381	13.000	330	0.218	5.5	90.2	40.9	0.375	9.5	241.0	109.3
				18	457	18.000	457			13.500	343			94.7	43.0			249.0	112.9
				8	203	10.750	273			12.750	324			124.0	56.2			328.0	148.8
				10	254	10.750	273			13.125	333			126.0	57.2			332.0	150.6
				14	356	14.000	356			14.000	356			126.0	57.2			336.0	152.4
24	610	24.000	610	16	406	16.000	406	17.000	432	14.000	356	0.250	6.4	127.0	57.6	0.375	9.5	338.0	153.3
				18	457	18.000	457			14.500	368			128.0	58.1			340.0	154.2
				20	508	20.000	508			15.000	381			128.0	58.1			340.0	154.2
				12	305	12.750	324			15.625	397			130.0	59.0			347.0	157.4
				14	356	14.000	356			16.000	406			191.0	86.6			510.0	231.3
				16	406	16.000	406			16.000	406			192.0	87.1			513.0	232.7
				18	457	18.000	457			16.000	406			193.0	87.5			516.0	234.1
				20	508	20.000	508			16.500	419			194.0	88.0			519.0	235.4
				24	610	24.000	610			17.000	432			195.0	88.5			522.0	236.8
										17.000	432			200.0	90.7			528.0	239.5

General Notes:

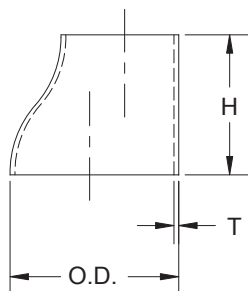
- Material: Stainless Steel 304L, 316L. Other alloys available on request.
- Grade WP - Class W, WX, WU, (Class S on request).
- Diameter and thickness: ASME B36.19
- Dimensions: ASME B16.9
- Thickness Tolerance: According to A / SA-403 will never be less than 87.5% of the nominal thickness.
- Dimensional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



NPS Reducers ASTM A 403 & ASME SA-403



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:

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

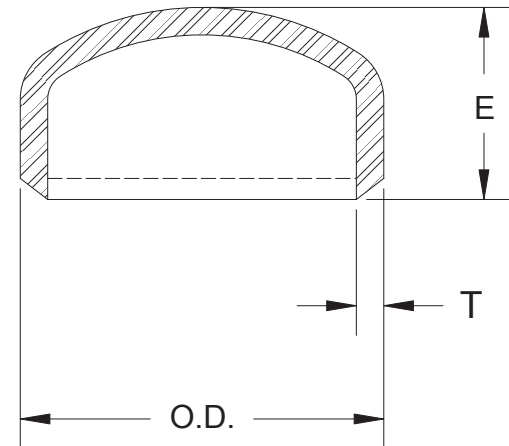
NPS Caps ASTM A 403 & ASME SA-403

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			E		Weight	
In	mm	In	mm	Identi- fication	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	43.5



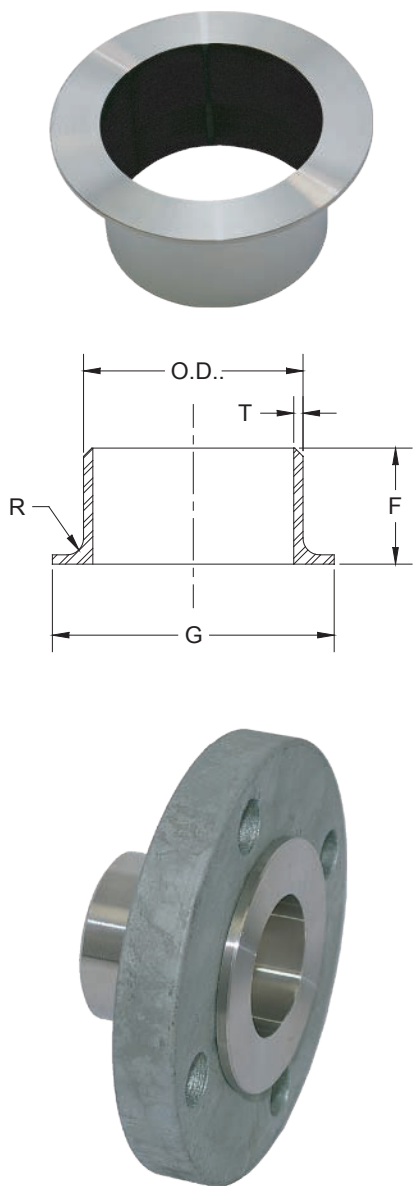
Ellipsoidal Shaped Cap



General Notes:

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

NPS Stub-Ends ASTM A 403 & ASME SA-403



NPS Nominal Pipe Size		O.D. Outside Diameter		T [Nominal Thickness]			F		G		R		Weight	
In	mm	In	mm	Sch.	Po.	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)

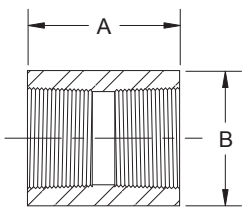
General Notes:

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

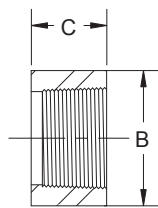
NPS Couplings ASTM A 182 & ASME SA-182 ASME B16.11, Class 3000

Douglas Barwick
Douglas Barwick
Douglas Barwick
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Douglas Barwick
Douglas Barwick

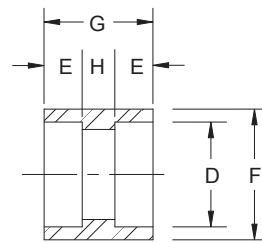
NPS Nominal Pipe Size	A	B	C	D	E	F	G	H	Weight	
									Coupling	Half Coupling
In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	lb kg	lb kg
1/8	1.250	0.750	0.625	0.420	0.375	0.750	1.000	0.250	0.13	0.07
3	32	19	16	11	10	19	25	6	0.1	0.03
1/4	1.375	0.750	0.688	0.555	0.375	0.875	1.000	0.250	0.13	0.07
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



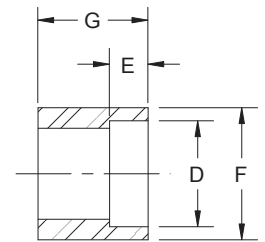
Threaded Coupling



Threaded Half-Coupling

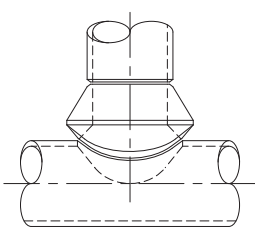


Socket-Welding Coupling

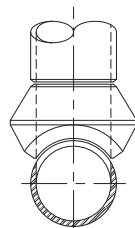


Socket-Welding Half-Coupling

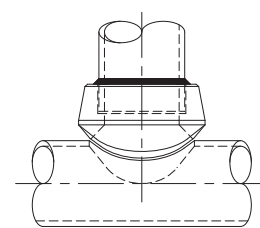
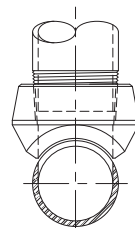
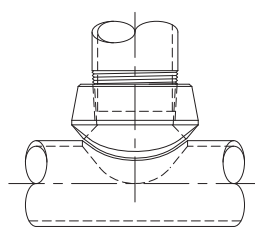
Also available, Integrally Reinforced Forged Branch Outlet Fittings. (A/SA-182, MSS-SP 97)



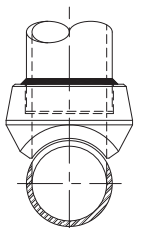
Buttwelding



Threaded



Socket Welding

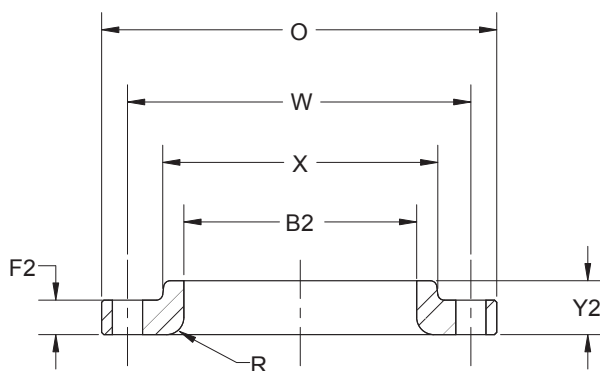


NPS Lap-joints

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 Lap-joints

ASTM A105 & ASME SA-105

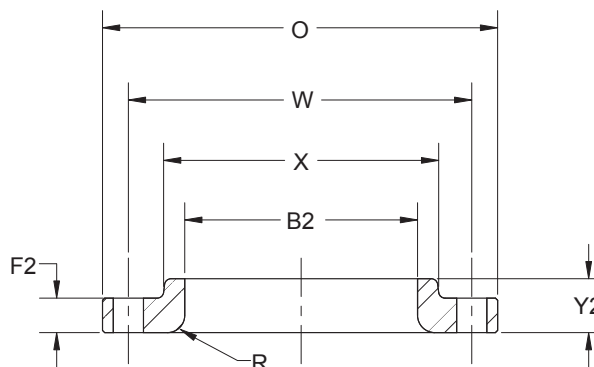
Class 300, Galvanized

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

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

General Notes:

- Material: Forged Carbon Steel, ASTM A105 and ASME SA-105
- Finish: Galvanized to ASTM A 123
- Dimension: ASME B16.5 Class 300
- 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.



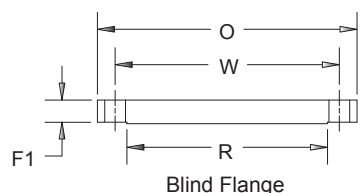
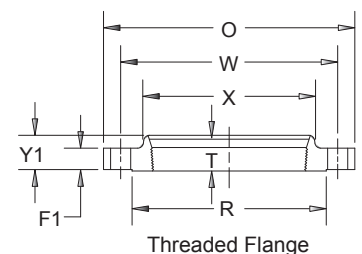
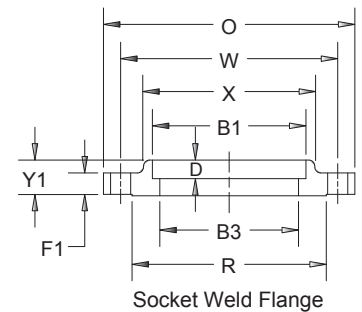
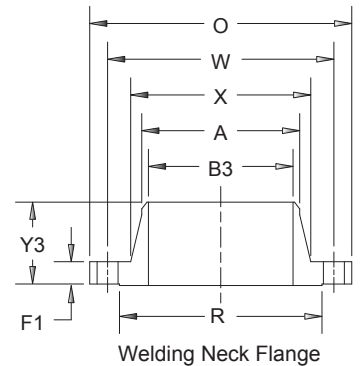
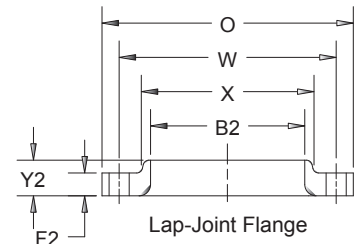
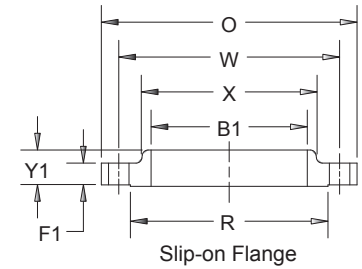
NPS ASTM A182 & ASME SA-182 Class 150

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

NPS Flanges ASTM A182 & ASME SA-182 Class 150

Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick
Douglas Barwick

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



General Notes:

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

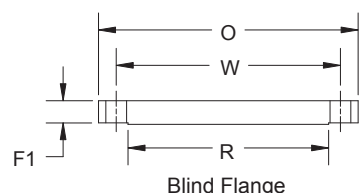
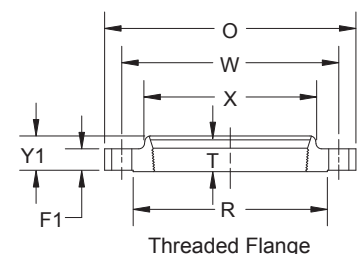
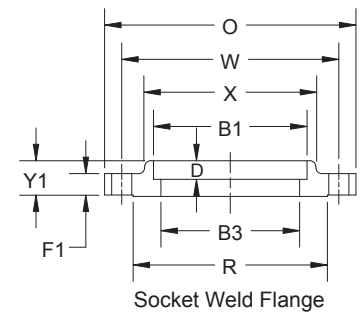
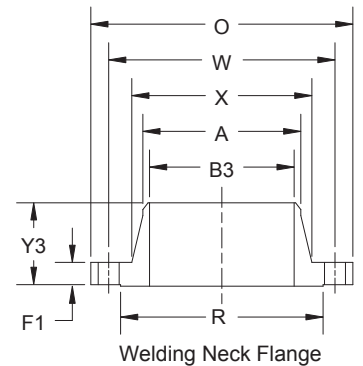
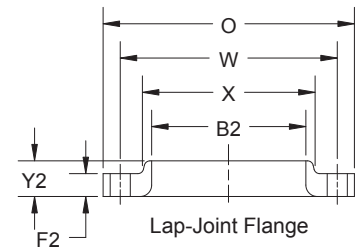
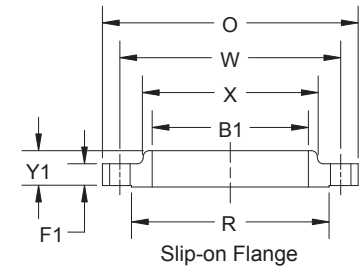
NPS Flanges ASTM A182 & ASME SA-182 Class 300

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

NPS Flanges ASTM A182 & ASME SA-182 Class 300

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



General Notes:

- Material: Stainless Steel F304L & F316L. (Other grades available on request).
- Dimension: ASME B16.5 Class 300 (Others Class available on request).
- 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.



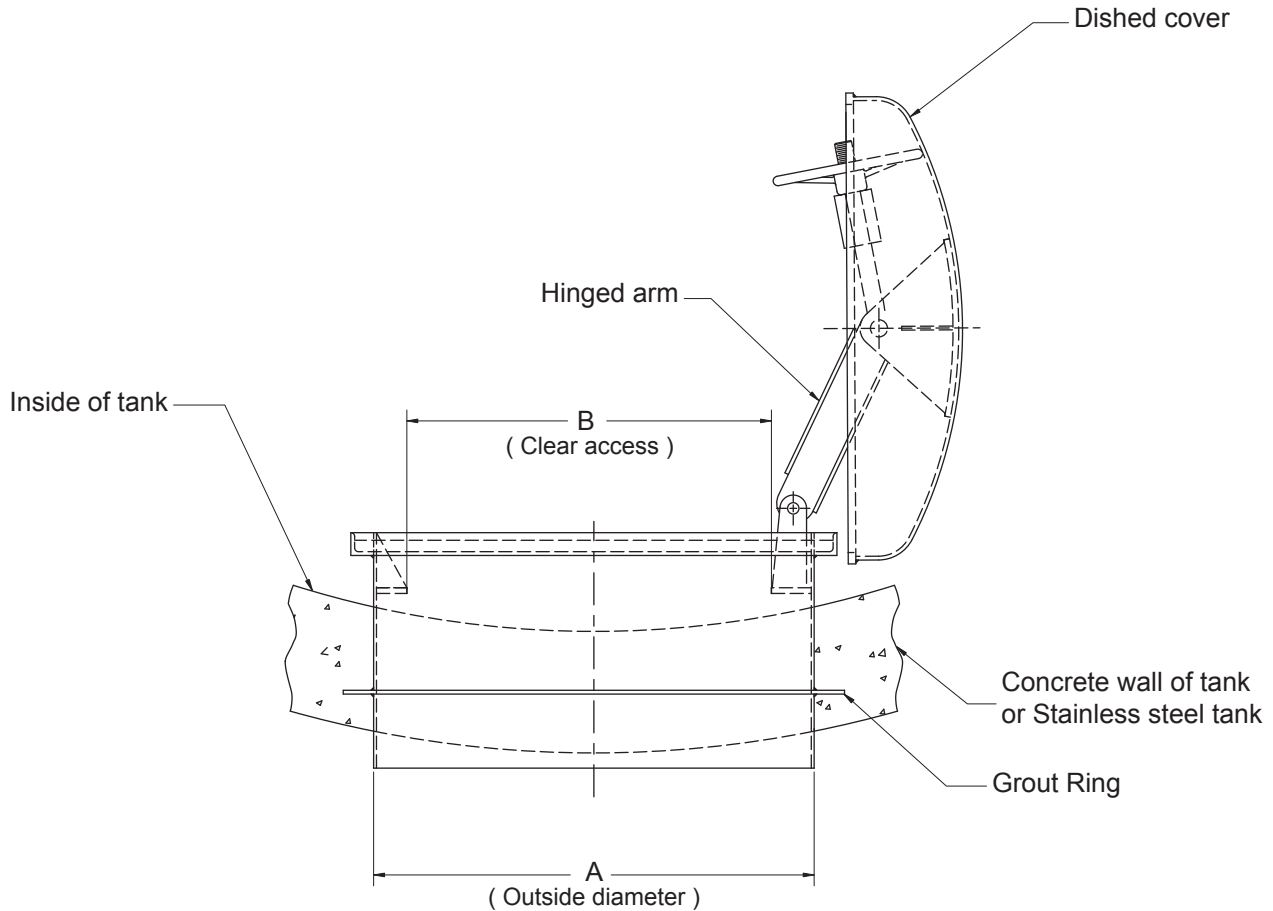
Threaded (Screwed) Flanges

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 create a hazard.

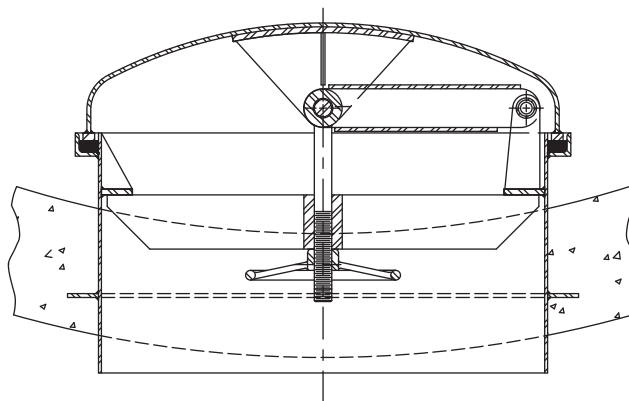


Blind Flanges

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



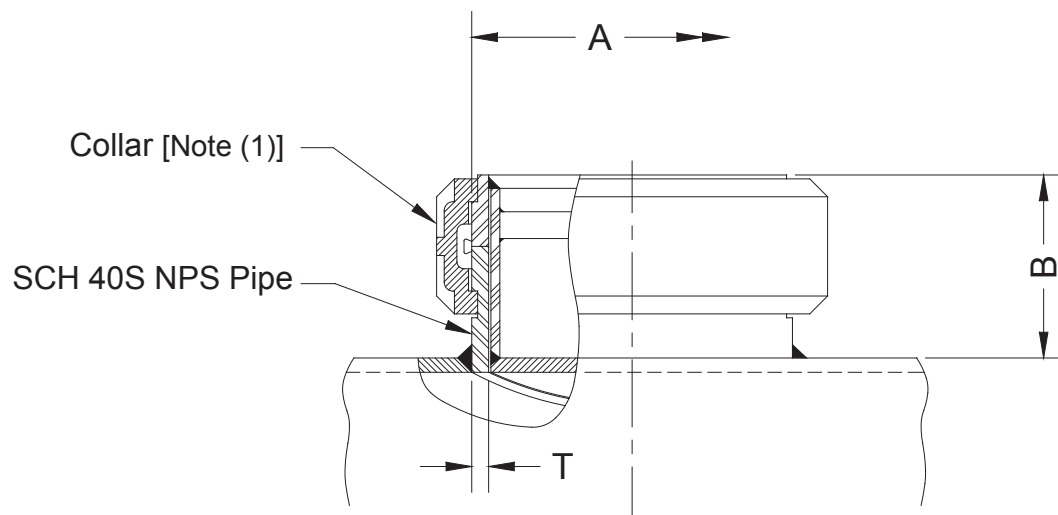
Closed position dished manway

General Notes:

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

Grooved Style Clean-Outs

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:

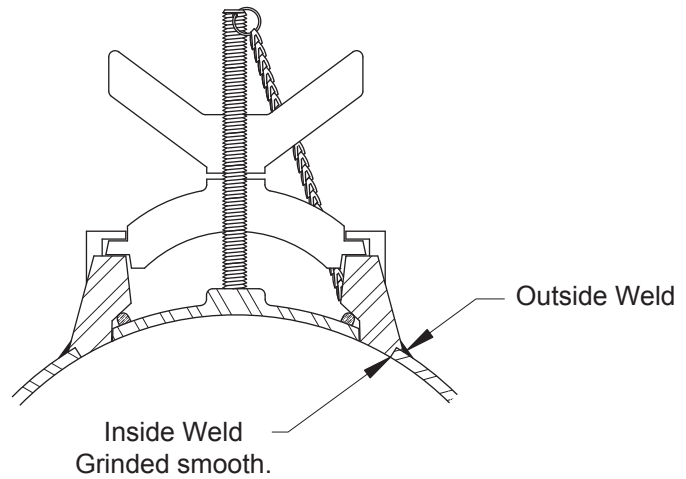
- a. Material: Stainless Steel 316L.
- b. Available upon request in larger size.

Note:

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

Diamond Clean-Outs

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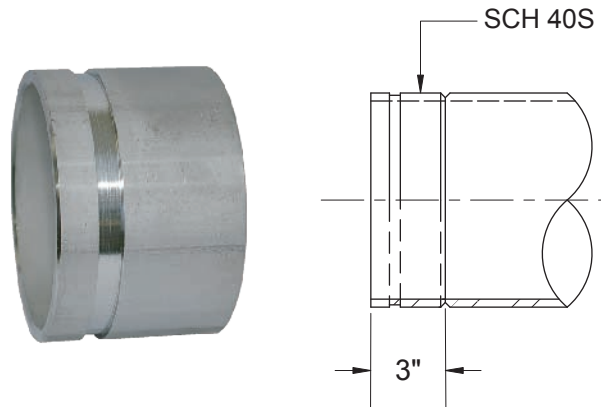


Clean-out number	For installation on			
	90° Elbows	45° Elbows	Reducers	Pipe
in / mm	in / mm	in / mm	in / mm	in / mm
# 4	4 102	4 102	6 152	6 13
# 6	6 152	6 152	8 & 10 203 & 254	8 & 10 203 & 254
# 8	8 203	8 203	12 to 16 304 to 406	12 to 16 304 to 406
# 10	10 254	10 254	18 to 22 457 to 559	18 to 22 457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

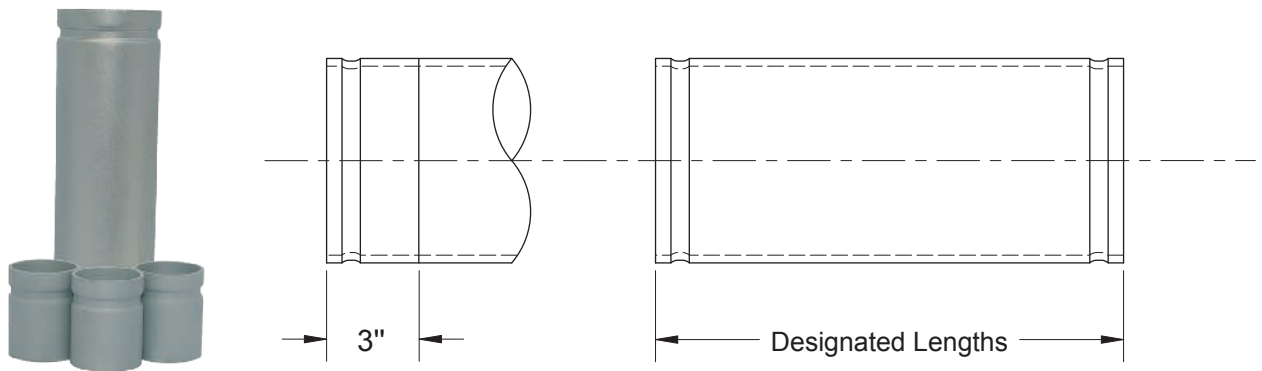
General Notes:

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

Cut and Rolled Groove Adaptors



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



Rolled Groove and AGS⁽¹⁾ for use with I.D. and NPS Pipes and Fittings

General Notes:

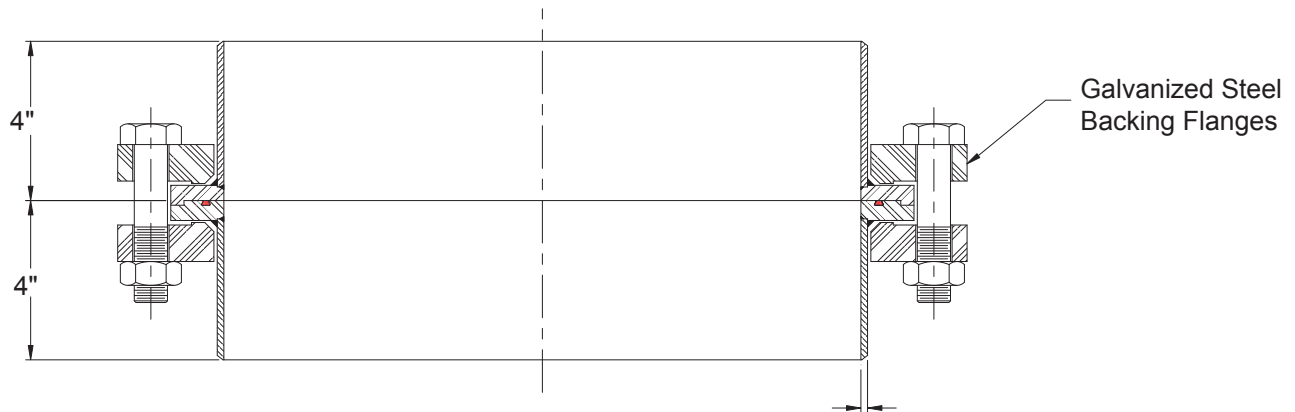
- Material : Stainless Steel 304L, 316L. Other alloys available upon request.
- Available from stock in sizes 3" to 12" with standard groove.
- Larger sizes and other adaptor styles available upon request for both I.D. & NPS pipe.

Note:

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

Metal to Metal Flange.

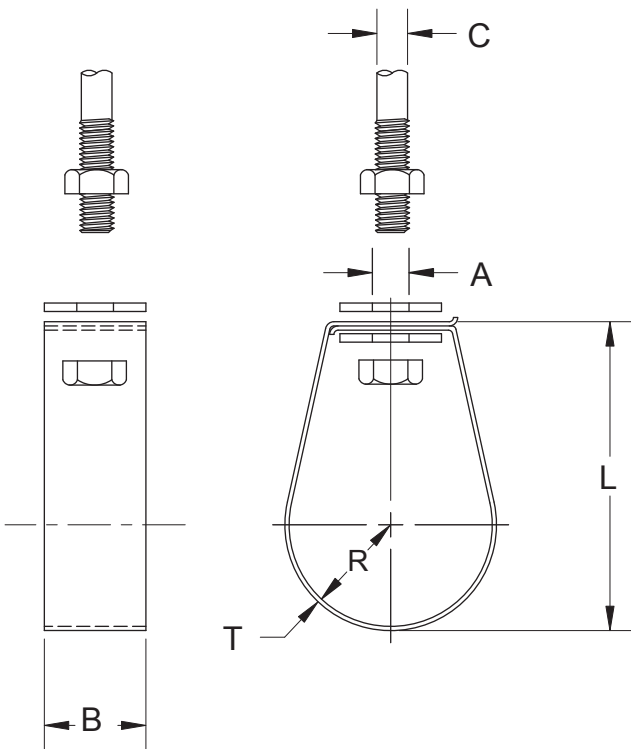
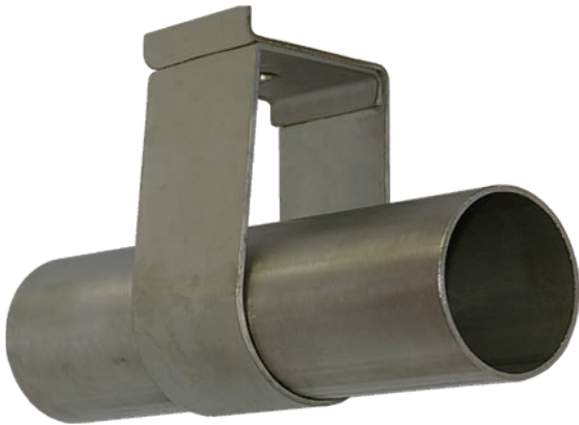
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Douglas Barwick
Douglas Barwick
Douglas Barwick



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

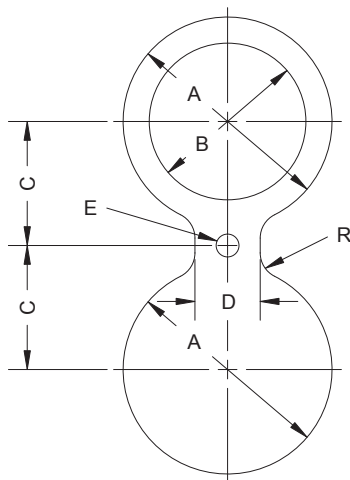
General Note:

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

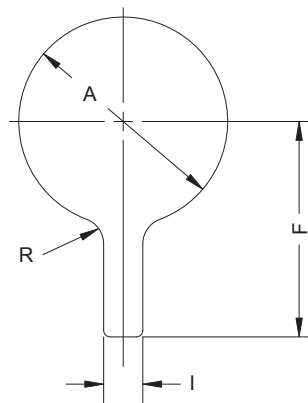
Line Blanks

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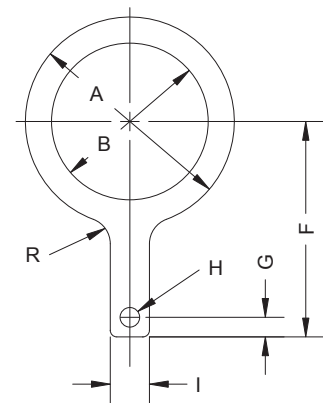
Nominal Diameter	A	B	C	D	E	F	G	H	I	R	Thk
In mm	In mm		In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm	In mm
2 50.8	4.000 101.6	Inside of pipe, unless otherwise specified.	2.375 60.3	2.000 50.8	0.750 19.1	5.500 139.7	0.500 12.7	0.500 12.7	1.000 25.4	1.000 25.4	0.250 6.4
2 1/2 63.5	4.750 120.7		2.750 69.9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



Spectacle Blank



Paddle Blank



Paddle Spacer

General Notes:

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

Suggested Maximum Working Pressure .

O.D. Pipe and Fittings ASTM A 778 / A 774.
For Maximum Working Temperature of 200°F (93°C).

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Outside 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
14	356	11	0.125	3.2	250	1724	225	1551	200	1379	125	862	75	517
		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
16	406	11	0.125	3.2	220	1517	200	1379	175	1207	110	758	60	414
		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
18	457	11	0.125	3.2	195	1344	175	1207	155	1069	95	655	50	345
		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
20	508	11	0.125	3.2	175	1207	160	1103	135	931	85	586	45	310
		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:

- 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.
- Thickness tolerance to ASTM A 778 & A 774.

Note:

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

Suggested Maximum Working Pressure .

NPS Pipe and Fittings ASTM A 778 / A 774.
For Maximum Working Temperature of 200°F (93°C).

NPS Nominal Pipe Size		Outside Diameter		Nominal Thickness			Pipes & Reducers		Pressed Elbows		Mitred Elbows		Tees [Note (1)]		Laterals [Note (1)]	
In	mm	In	mm	Gauge	In	mm	psig	kPa	psig	kPa	psig	kPa	psig	kPa	psig	kPa
4	102	4.5	114	14	0.078	2.0	505	3482	450	3103	380	2620	250	1724	155	1069
				5S	0.083	2.1	535	3689	485	3344	405	2792	265	1827	165	1138
				12	0.109	2.8	710	4895	640	4413	535	3689	355	2448	220	1517
				10S	0.120	3.0	790	5447	710	4895	595	4102	390	2689	245	1689
				11	0.125	3.2	825	5688	740	5102	620	4275	410	2827	255	1758
5	127	5.563	141	14	0.078	2.0	405	2792	365	2517	305	2103	200	1379	125	862
				5S	0.109	2.8	570	3930	515	3551	425	2930	285	1965	175	1207
				11	0.125	3.2	660	4551	595	4102	490	3378	325	2241	200	1379
				10S	0.134	3.4	710	4895	640	4413	530	3654	350	2413	215	1482
6	152	6.625	168	14	0.078	2.0	340	2344	305	2103	260	1793	168	1158	105	724
				5S	0.109	2.8	475	3275	430	2965	365	2517	235	1620	145	1000
				11	0.125	3.2	550	3792	495	3413	420	2896	275	1896	170	1172
				10S	0.134	3.4	590	4068	530	3654	450	3103	295	2034	180	1241
8	203	8.625	219	14	0.078	2.0	260	1793	230	1586	200	1379	125	862	80	552
				5S	0.109	2.8	365	2517	325	2241	280	1931	180	1241	110	758
				11	0.125	3.2	420	2896	375	2586	320	2206	210	1448	130	896
				10S	0.148	3.8	450	3103	405	2792	345	2379	225	1551	140	965
10	254	10.750	273	12	0.109	2.8	290	1999	260	1793	225	1551	140	965	90	621
				11	0.125	3.2	335	2310	300	2068	260	1793	160	1103	105	724
				5S	0.134	3.4	360	2482	320	2206	275	1896	170	1172	110	758
				10S	0.165	4.2	445	3068	400	2758	340	2344	215	1482	135	931
12	305	12.750	324	12	0.109	2.8	245	1689	220	1517	190	1310	115	793	75	517
				11	0.125	3.2	280	1931	250	1724	220	1517	130	896	85	586
				5S	0.156	4.0	350	2413	315	2172	275	1896	165	1138	110	758
				10S	0.180	4.6	405	2792	365	2517	315	2172	195	1344	125	862
14	356	14.0	356	11	0.125	3.2	255	1758	230	1586	200	1379	120	827	80	552
				10	0.140	3.6	285	1965	255	1758	225	1551	135	931	90	621
				5S	0.156	4.0	320	2206	285	1965	255	1758	150	1034	100	689
				10S	0.188	4.8	385	2654	350	2413	305	2103	185	1276	120	827
16	406	16.0	406	11	0.125	3.2	220	1517	200	1379	175	1207	95	655	65	448
				10	0.140	3.6	250	1724	225	1551	200	1379	110	758	70	483
				5S	0.165	4.2	295	2034	265	1827	235	1620	128	883	85	586
				10S	0.188	4.8	335	2310	305	2103	265	1827	145	1000	95	655
18	457	18.0	457	11	0.125	3.2	195	1344	175	1207	155	1069	85	586	50	345
				10	0.140	3.6	220	1517	200	1379	175	1207	95	655	60	414
				5S	0.165	4.2	260	1793	235	1620	205	1413	115	793	70	483
				10S	0.188	4.8	300	2068	270	1862	235	1620	130	896	80	552
20	508	20.0	508	10	0.140	3.6	200	1379	180	1241	160	1103	85	586	55	379
				5S	0.188	4.8	268	1848	240	1655	215	1482	115	793	75	517
				10S	0.218	5.5	310	2137	280	1931	245	1689	135	931	85	586
				1/4	0.250	6.4	360	2482	325	2241	285	1965	155	1069	100	689
24	610	24.0	610	10	0.140	3.6	165	1138	150	1034	130	896	60	414	40	276
				3/16	0.188	4.8	225	1551	200	1379	175	1207	85	586	55	379
				5S	0.218	5.5	260	1793	235	1620	205	1413	100	689	65	448
				10S	0.250	6.4	300	2068	270	1862	235	1620	115	793	75	517
30	762	30.0	762	3/16	0.188	4.8	180	1241	160	1103	140	965	75	517	35	241
				5S	0.250	6.4	235	1620	210	1448	190	1310	100	689	45	310
				10S	0.312	7.9	295	2034	265	1827	235	1620	125	862	60	414
36	914	36.0	914	3/16	0.188	4.8	145	1000	130	896	115	793	60	414	40	276
				1/4	0.250	6.4	195	1344	175	1207	155	1069	80	552	50	345
				5/16	0.312	7.9	245	1689	220	1517	195	1344	105	724	65	448
42	1067	42.0	1067	3/16	0.188	4.8	125	862	110	758	100	689	45	310	35	241
				1/4	0.250	6.4	165	1138	150	1034	130	896	60	414	50	345
				5/16	0.312	7.9	205	1413	190	1310	165	1138	80	552	65	448
48	1219	48.0	1219	3/16	0.188	4.8	105	724	100	689	85	586	40	276	35	241
				1/4	0.250	6.4	145	1000	130	896	115	793	55	379	45	310
				5/16	0.312	7.9	180	1241	165	1138	145	1000	70	483	55	379

General Notes:

- 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.
- Thickness tolerance to ASTM A 778 & A 774.

Note:

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

Suggested Maximum Working Pressure.
ASTM A 774 Collard and Carbon Steel Backing Flanges.
For Maximum Working Temperature of 200°F (93°C).

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Nominal Diameter		Pressed Collars ⁽¹⁻²⁻³⁾		Rolled Collars ⁽¹⁻²⁻³⁾		Backing Flanges ⁽¹⁻⁵⁻⁶⁾		Blind Flanges ⁽¹⁻⁵⁻⁶⁾	
						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 ⁽⁴⁾	862/1034	100	689	125	862
36	914	n/a	n/a	125/150 ⁽⁴⁾	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 are 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 of the pages 2-14 to 2-16 and 3-14 to 3-16 with gasket, bolts and torque as recommended by Douglas Barwick Inc.
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:

- Type of reinforcement: A = Angle, B = Flat bar
- 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.

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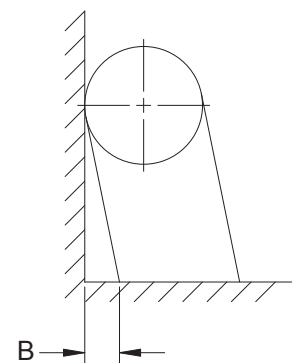
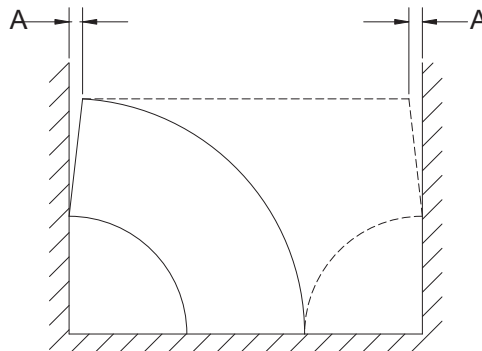
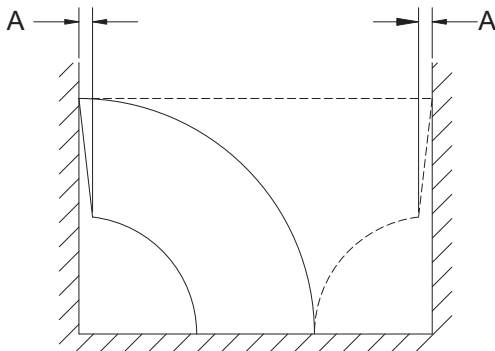
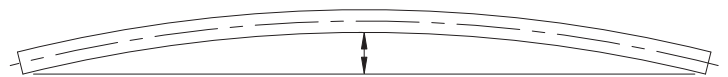
Nominal Diameter		Thickness													
		Gauge 14		Gauge 11		Gauge 10		3/16"		1/4"		SCH 5S		SCH 10S	
		0.78" 2mm		0.125" 3.2mm		0.14" 3.6 mm		0.1875" 4.8 mm		0.25" 6.3 mm					
In	mm	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m	Ft	m
2 1/2	64	11.0	3.4	11.0	3.4							11.0	3.4	11.0	3.4
3	76	11.0	3.4	12.0	3.7							11.0	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 are 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.

Nominal Diameter		All pipe and fitting		- 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 lenght	O.D & I.D.	Bolt circle	A	B		in.	mm			
1 1/2	38	± 1/32" ± 0.8mm	Shall be ± 12.5% of nominal thickness. In accordance with ASTM A-312, A403, A774 & A778	± 1/16" ±1.6 mm	± 1/16" ±1.6 mm	± 1/8" ± 3.2 mm	± 1/16" ± 1.6 mm	1/32" 0.8 mm	1/16" 1.6 mm	± 1/16" ± 1.6 mm	1 1/2	38			
2	51									2	51				
2 1/2	64									2 1/2	64				
3	76									3	76				
4	102				4			102							
6	152	+ 1/16" - 1/32" + 1.6 mm - 0.8mm			6			152							
8	203				8			203							
10	254	+ 3/32" -1/32 +2.4 mm -0.8 mm			± 3/32" ± 2.4 mm			± 3/32" ± 2.4 mm			3/16" 4.8 mm	± 1/8" ± 3.2 mm	10	254	
12	305									3/32" 2.4 mm	1/4" 6.4 mm	± 5/32" ± 4 mm	12	305	
14	356												14	356	
16	406												16	406	
18	457										1/8" 3.2 mm	3/8" 9.5 mm	± 3/16" ± 4.8 mm	18	457
20	508	+ 1/8" -1/32 +3.2 mm -0.8 mm			± 1/8" ± 3.2 mm			± 1/8" ± 3.2 mm						20	508
24	610													24	610
30	762													30	762
36	914													36	914
40	1016										3/16" 4.8 mm	1/2" 12.7 mm	± 1/4" ± 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"

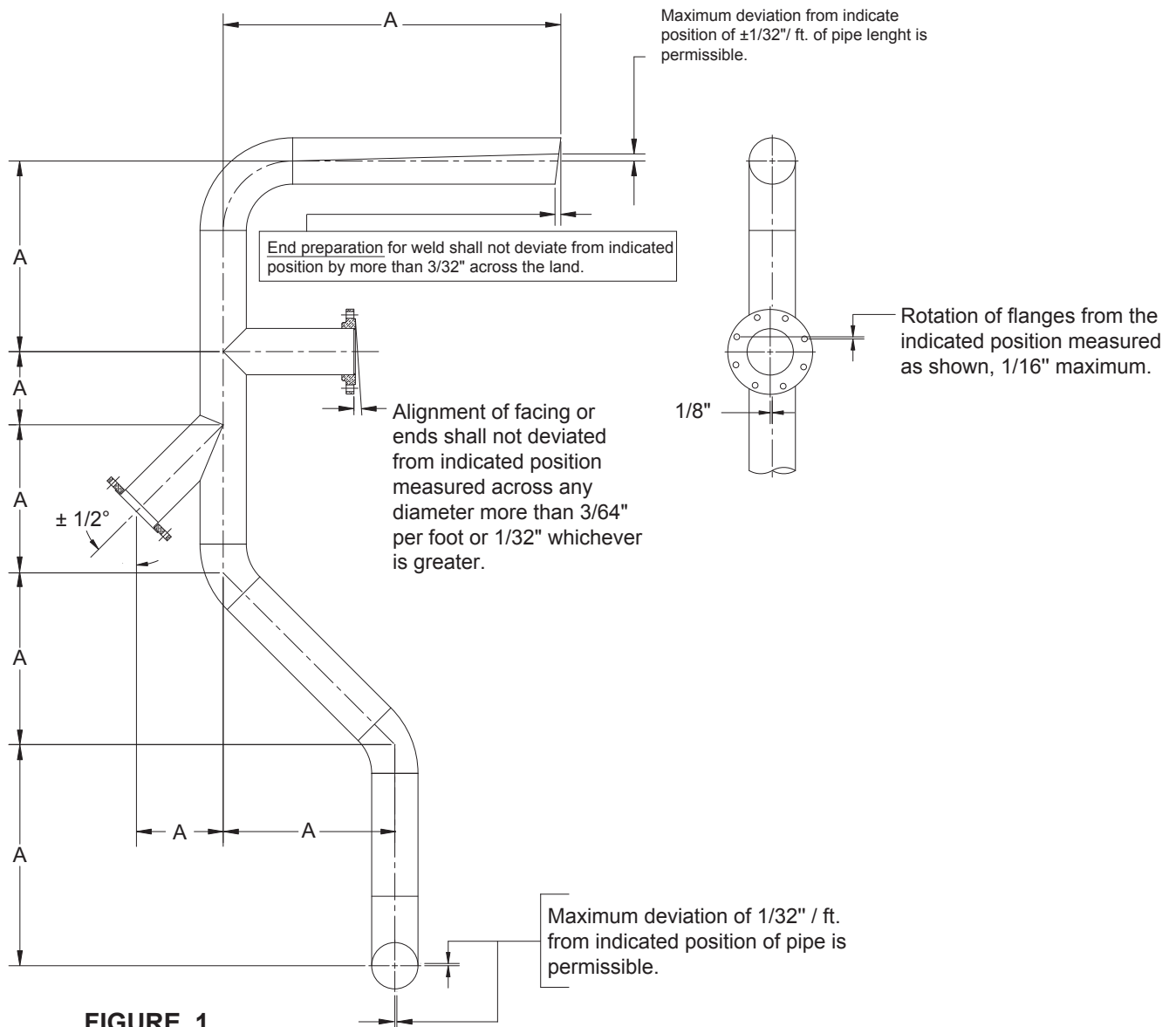
2.4 Due to the cumulative effects of tolerances on fitting or flanges, when joined without intervening pipe segments, deviations in excess of those specified in paragraphs 2.2 and 2.3 may occur.

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.



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