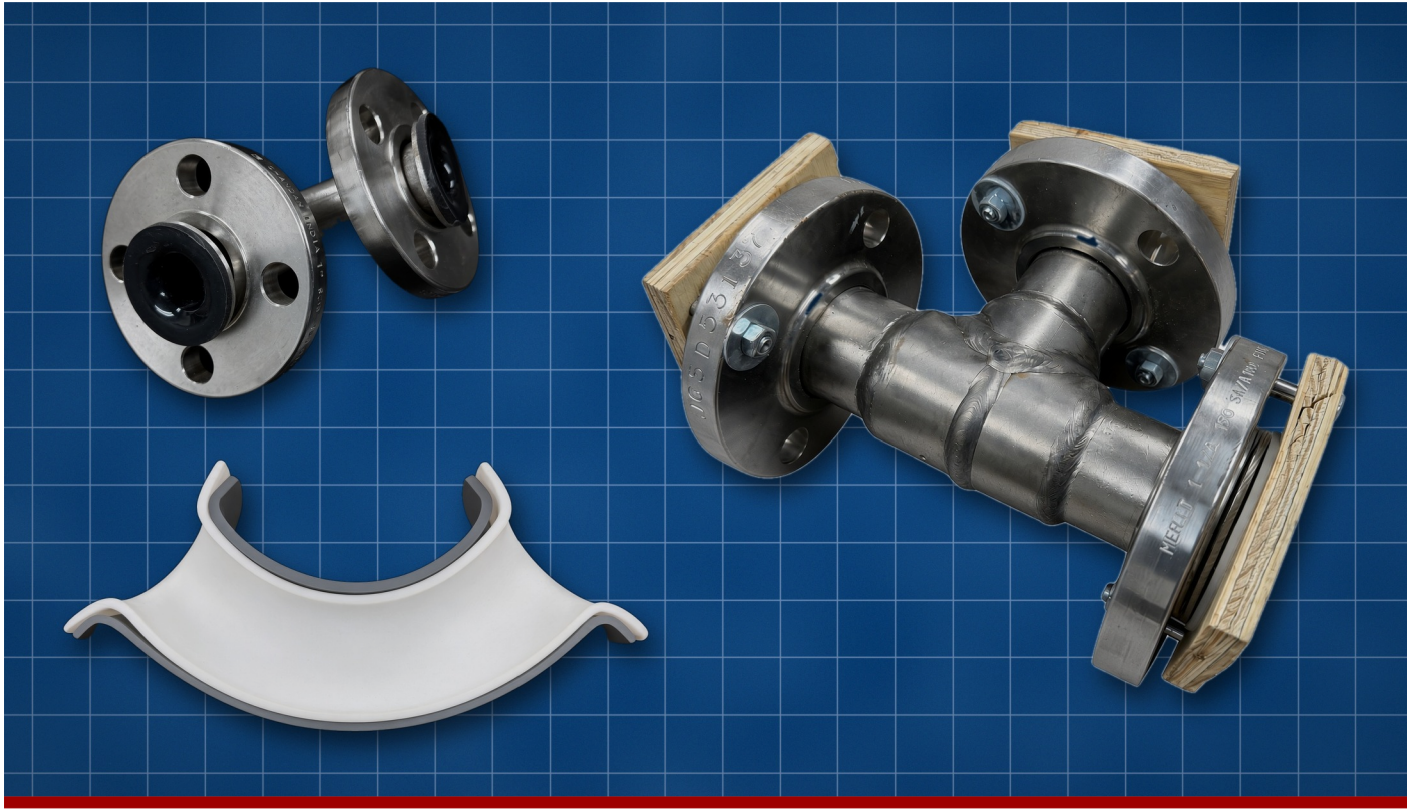




LinedPipe.Com

A DIVISION OF MARSPEC 

Plastic Lined Pipe and Fittings

Dimensional data, materials and installation

CONTENTS

Plastic Lined Pipe and Fittings	3
---------------------------------------	---

FITTINGS AND SPOOLS

90° Elbows	4
Reducing 90° Elbows	4
45° Elbows	5
Tees	5
Reducing Tees	6
Reducing Run Tees	7
Short Stack Tees	7
Standard Instrument Tees	8
Lug Body Instrument Tees	9
Short Stack Crosses	10
Standard Crosses	10
Laterals	11
Blind Flanges	11
Spacers	11

Concentric Reducers	12
---------------------------	----

Eccentric Reducers	13
--------------------------	----

Reducing Flanges	14
------------------------	----

Scalloped Reducing Flanges	15
----------------------------------	----

Straight Bore Reducing Flanges	16
--------------------------------------	----

Pipe Spool Data	17
-----------------------	----

Jacketed Pipe Spool Data	17
--------------------------------	----

Pipe and Fitting Options	17
--------------------------------	----

TECHNICAL DATA

Lined Pipe and Fittings Materials	18
---	----

Housing Materials and Quality Standards	19
---	----

Flange Details	20
----------------------	----

Bolting and Fastener Torque	21
-----------------------------------	----

Recommended Torque Procedures	22
-------------------------------------	----

Contact	23
---------------	----

PLASTIC LINED PIPE AND FITTINGS

Custom plastic lined pipe spools and stock lined fittings, from our own shop in Fairhope, Alabama.

With more than fifty years of experience in supplying, stocking and fabricating plastic lined piping systems, Marspec is your source for anything that conveys corrosive, toxic or high purity media in an industrial environment. LinedPipe.Com is the place for custom pipe spools and fittings lined with PTFE, PVDF or polypropylene, with housings in carbon steel or 304 and 316 stainless steel.

This catalog holds the dimensional data for every fitting and spool we commonly fabricate, followed by the material, flange, bolting and torque data an engineer needs to specify and install them. The tables list the sizes we commonly fabricate; other sizes and configurations are quoted on request. All dimensions are in inches and refer to the letters on each drawing. Carbon steel housings are standard; 304 and 316 stainless are available on every item, and most shapes are also available with polypropylene or PVDF liners.

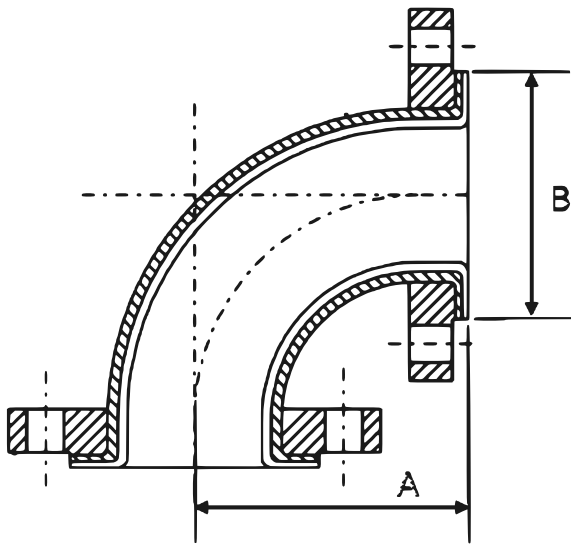
WHAT WE STOCK AND WHAT WE BUILD

- PTFE lined fittings in carbon and stainless steel, from stock. PVDF and polypropylene lined fittings are lined to order.
- Custom pipe spools fabricated to your drawing, 1/2" through 12", in lengths up to 20 feet, with rotating flanges over a flared liner.
- Lined valves, strainers, expansion joints, spacers, spectacle blinds, sight glasses, solid PTFE pipe and temperature maintenance products, which have their own pages at linedpipe.com.

HOW TO GET A QUOTE

Send a spool drawing, an isometric, a fitting list or a photo of the part being replaced, with the liner, the housing material, the flange class and the quantity. We quote a delivery time with every order. Call (251) 625-4949, email Info@LinedPipe.Com, or use the quote form at linedpipe.com/contact/.

90° ELBOWS

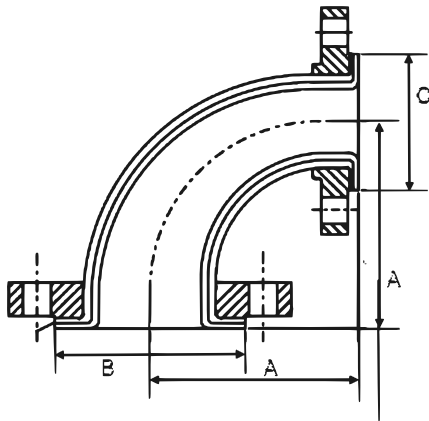


Size	A (150 lb)	A (300 lb)	B
1/2	3.5	4	1.75
3/4	3.5	4	1.75
1	3.5	4	2
1 1/2	4	4.5	2.88
2	4.5	5	3.63
2 1/2	5	5.5	4.13
3	5.5	6	5
4	6.5	7	6.19
6	8	8.5	8.5
8	9	10	10.5
10	11	NA	12.5

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined 90° elbows are produced with a free sintered liner and rotating flanges. Standard elbows are carbon steel with stainless available on request. True 300 lb ells and 150 lb ells with 300 lb flanges are also available.

REDUCING 90° ELBOWS



Size	A	B	C
1 1/2 x 1	4	2.88	2
2 x 1	4.5	3.63	2
2 x 1 1/2	4.5	3.63	2.88
3 x 2	5.5	5	3.63
4 x 2*	6.5	6.19	3.63
4 x 3	6.5	6.19	5
6 x 4**	8	8.5	6.19

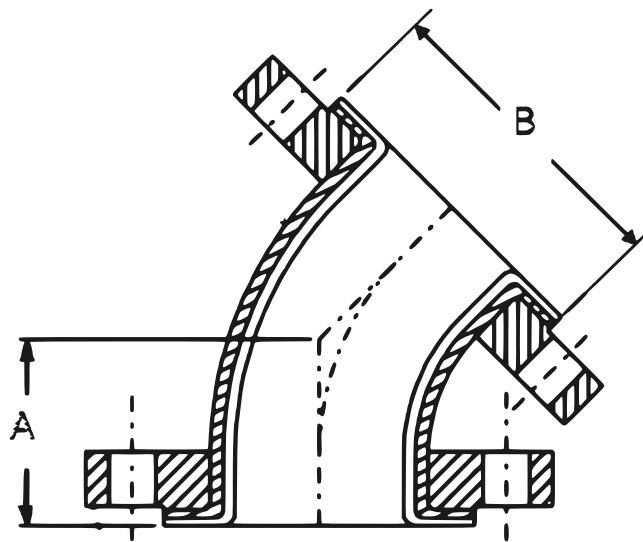
ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined reducing elbows are available in seven sizes. These fittings have rotating flanges** and a free sintered liner. Stainless steel is also available.

* 4" x 2" ells have a fixed flange on the 4" end and a rotating flange on the 2" end.

** 6" x 4" ells have fixed flanges.

45° ELBOWS



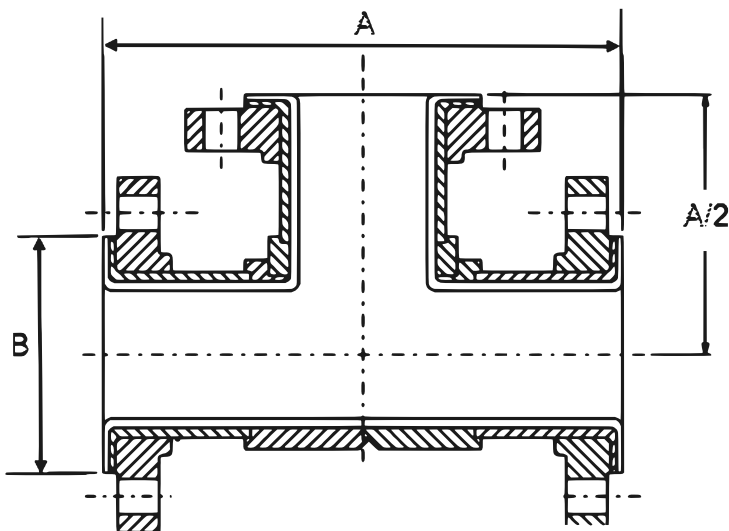
Size	A (150 lb)	A (300 lb)	B
1/2	1.75	2.25	1.75
3/4	1.75	2.25	1.75
1	1.75	2.25	2
1 1/2	2.25	2.75	2.88
2	2.5	3	3.63
3	3	3.5	5
4	4	4.5	6.19
6	5	5.5	8.5
8*	5.5	6	10.5
10	6.5	NA	12.5

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined 45° elbows are produced with a free sintered liner and rotating flanges except where noted. Standard elbows are carbon steel with stainless available on request. True 300 lb ells are also available.

* Fixed flanges standard.

TEES

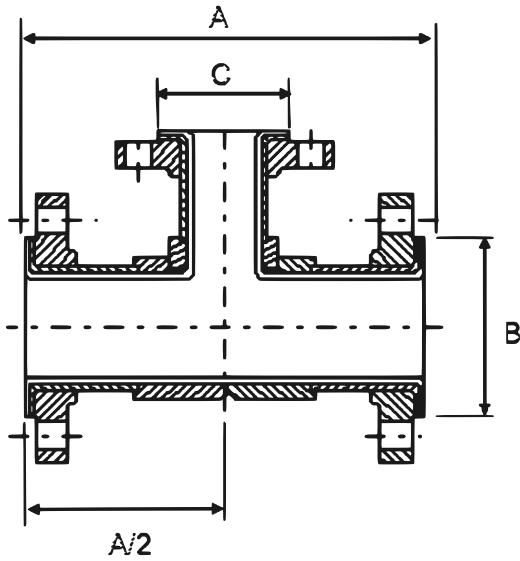


Size	A (150 lb)	A (300 lb)	B
1/2	7	8	1.75
3/4	7	8	1.75
1	7	8	2
1 1/2	8	9	2.88
2	9	10	3.63
2 1/2	10	11	4.13
3	11	12	5
4	13	14	6.19
6	16	17	8.5
8	18	20	10.5
10	22	23	12.5

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined tees are produced with a free sintered liner and rotating flanges. Standard tees are carbon steel with stainless available on request. 300 lb flanged tees are also available. Custom lengths are available on dimension A; the amount of adjustment depends on size.

REDUCING TEES

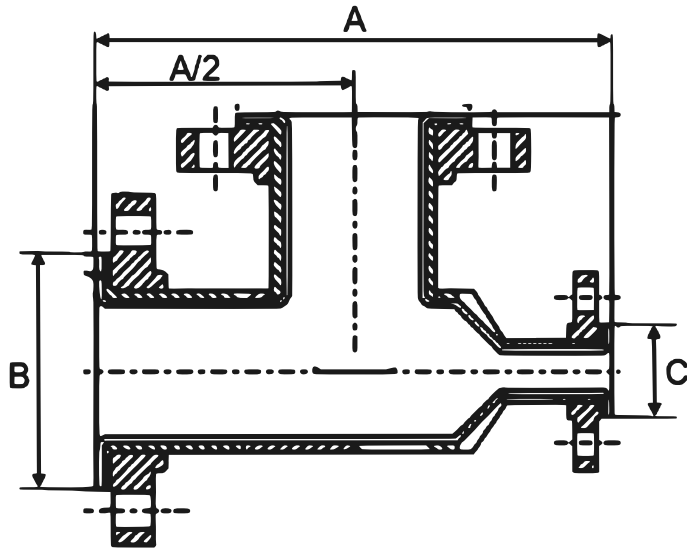


ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

Size	A	B	C
1 1/2 x 1 1/2 x 1	8	2.88	2
2 x 2 x 1	9	3.63	2
2 x 2 x 1 1/2	9	3.63	2.88
3 x 3 x 1	11	5	2
3 x 3 x 1 1/2	11	5	2.88
3 x 3 x 2	11	5	3.63
4 x 4 x 1	13	6.19	2
4 x 4 x 1 1/2	13	6.19	2.88
4 x 4 x 2	13	6.19	3.63
4 x 4 x 3	13	6.19	5
6 x 6 x 1	16	8.5	2
6 x 6 x 1 1/2	16	8.5	2.88
6 x 6 x 2	16	8.5	3.63
6 x 6 x 3	16	8.5	5
6 x 6 x 4	16	8.5	6.19
8 x 8 x 1	18	10.62	2
8 x 8 x 2	18	10.62	3.63
8 x 8 x 3	18	10.62	5
8 x 8 x 4	18	10.62	6.19
8 x 8 x 6	18	10.62	8.5
10 x 10 x 4	22	12.5	6.19
10 x 10 x 6	22	12.5	8.5
10 x 10 x 8	22	12.5	10.63

PTFE lined reducing tees are produced with a free sintered liner and rotating flanges. Standard reducing tees are carbon steel with stainless available on request. 300 lb reducing tees are also available. 1/2" and 3/4" reductions on the outlet are also available.

REDUCING RUN TEES

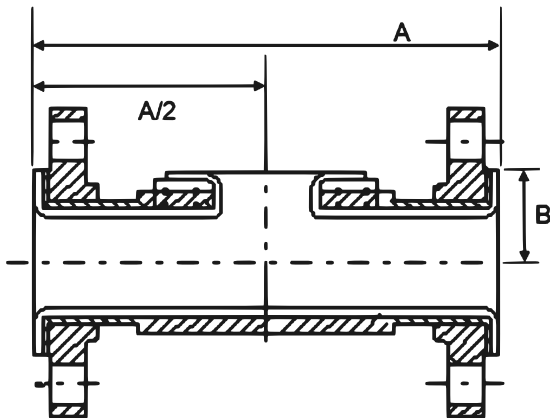


Size	A	B	C
1 1/2 x 1 x 1 1/2	8	2.88	2
2 x 1 x 2	9	3.63	2
2 x 1 1/2 x 2	9	3.63	2.88
3 x 1 x 3	11	5	2
3 x 1 1/2 x 3	11	5	2.88
3 x 2 x 3	11	5	3.63
4 x 1 x 4	13	6.19	2
4 x 1 1/2 x 4	13	6.19	2.88
4 x 2 x 4	13	6.19	3.63
4 x 3 x 4	13	6.19	5
6 x 3 x 6	16	8.5	5
6 x 4 x 6	16	8.5	6.19

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

Reducing run tees can eliminate the need for a concentric reducer or reducing flange. They are great for tight spaces.

SHORT STACK TEES

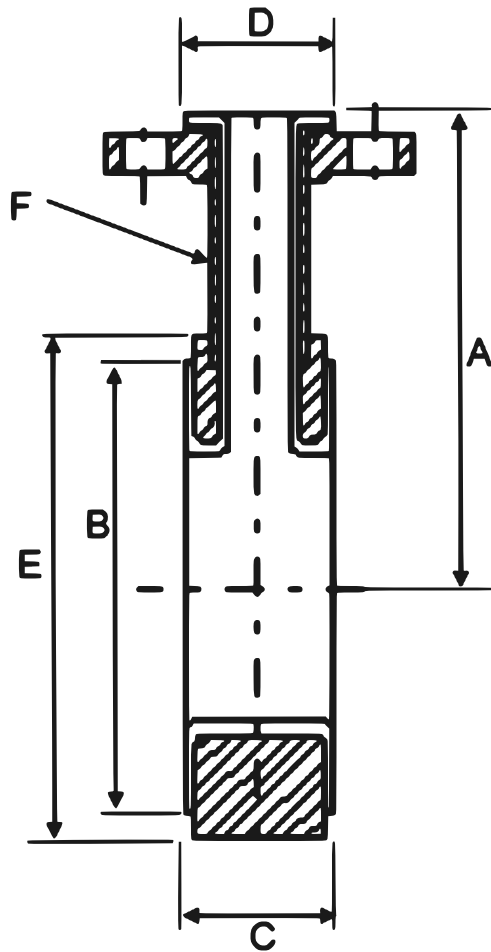


Size	A	B
1	7	1 1/4
1 1/2	8	1 1/2
2	9	1 3/4
3	11	2 3/4
4	13	3 1/4
6	16	4 1/4
8	18	5 1/4
10	22	6 1/4

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined short stack tees are produced with a free sintered liner and rotating flanges on the run connections. Short stack tees are carbon steel with stainless available on request.

STANDARD INSTRUMENT TEES



ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

1" OUTLET

Size	A	B	C	D	E	F
1	3.5	2	2	2	2.63	1
1 1/2	4	2.88	2	2	3.38	1
2	4.5	3.63	2	2	4.13	1
3	5.5	5	2	2	5.38	1
4	6.5	6.19	2	2	6.88	1
6	8	8.5	2	2	8.75	1
8	9	10.25	2	2	11	1
10	11	12.75	2	2	13.14	1

1-1/2" OUTLET

Size	A	B	C	D	E	F
1 1/2	4	2.88	4	2.88	3.38	1 1/2
2	4.5	3.63	4	2.88	4.13	1 1/2
3	5.5	5	4	2.88	5.38	1 1/2
4	6.5	6.19	4	2.88	6.88	1 1/2
6	8	8.5	4	2.88	8.75	1 1/2
8	9	10.25	4	2.88	11	1 1/2
10	11	12.75	4	2.88	13.14	1 1/2

2" OUTLET

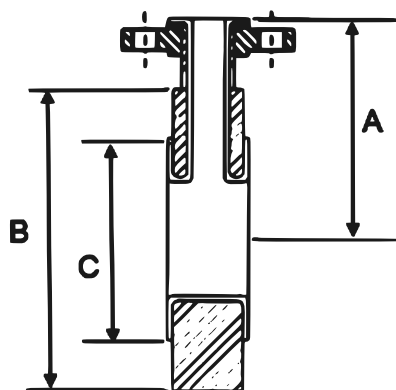
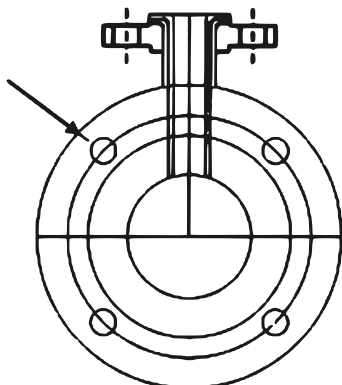
Size	A	B	C	D	E	F
2	4.5	3.63	4	3.63	4.13	2
3	5.5	5	4	3.63	5.38	2
4	6.5	6.19	4	3.63	6.88	2
6	8	8.5	4	3.63	8.75	2
8	9	10.25	4	3.63	11	2
10	11	12.75	4	3.63	13.14	2

PTFE lined instrument tees are produced with a free sintered liner and a split body. All instrument tees have a rotating outlet flange. Housings are carbon steel and stainless steel. ANSI 300 lb instrument tees are also available.

1/2" and 3/4" outlets are also available; dimensions are the same as 1". An 8" x 3" instrument tee is also available.

LUG BODY INSTRUMENT TEES

D Drilled & tapped
E Bolt circle
F Number of lugs



ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

1" OUTLET

Size	A	B	C	D (lug thread)	E	F (lugs)
1	3.5	4.25	2	1/2-13	3.12	4
1 1/2	4	5	2.88	1/2-13	3.88	4
2	4.5	6	3.63	5/8-11	4.75	4
3	5.5	7.5	5	5/8-11	6	4
4	6.5	9	6.19	5/8-11	7.5	8
6	8	11	8.5	3/4-10	9.5	8
8	9	13.5	10.25	3/4-10	11.75	8

1-1/2" OUTLET

Size	A	B	C	D (lug thread)	E	F (lugs)
1 1/2	4	5	2.88	1/2-13	3.88	4
2	4.5	6	3.63	5/8-11	4.75	4
3	5.5	7.5	5	5/8-11	6	4
4	6.5	9	6.19	5/8-11	7.5	8
6	8	11	8.5	3/4-10	9.5	8
8	9	13.5	10.25	3/4-10	11.75	8

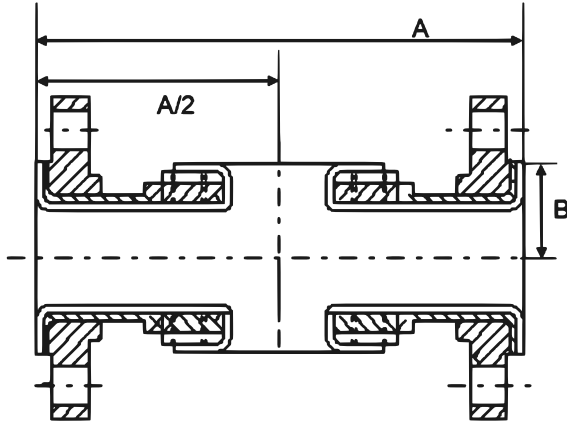
2" OUTLET

Size	A	B	C	D (lug thread)	E	F (lugs)
2	4.5	6	3.63	5/8-11	4.75	4
3	5.5	7.5	5	5/8-11	6	4
4	6.5	9	6.19	5/8-11	7.5	8
6	8	11	8.5	3/4-10	9.5	8
8	9	13.5	10.25	3/4-10	11.75	8

PTFE lined lug body instrument tees are produced with a free sintered liner and a split body. All instrument tees have a rotating outlet flange. Housings are carbon steel and stainless steel. ANSI 300 lb lug body instrument tees are also available.

1/2" and 3/4" outlets are also available; dimensions are the same as 1". D = lug thread, F = number of lugs.

SHORT STACK CROSSES

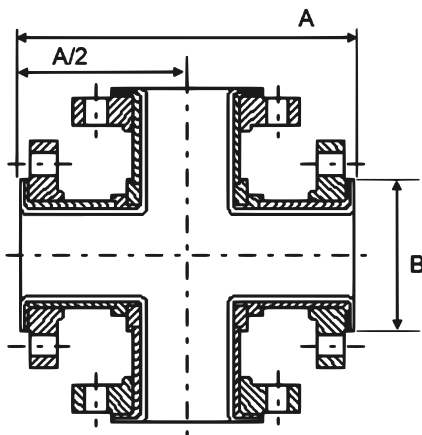


Size	A	B
1	7	1 1/4
1 1/2	8	1 1/2
2	9	1 3/4
3	11	2 3/4
4	13	3 1/4
6	16	4 1/4
8	18	5 1/4

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined short stack crosses are produced with a free sintered liner and rotating flanges on the run connections. Short stack crosses are carbon steel with stainless available on request. Short stack reducing crosses are also available.

STANDARD CROSSES

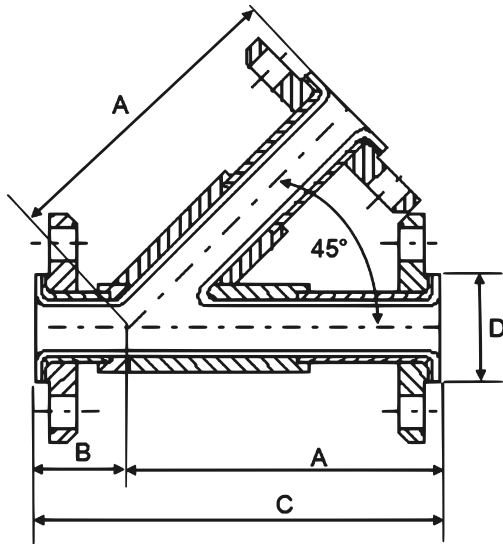


Size	A	B
1	7	2
1 1/2	8	2 7/8
2	9	3 5/8
3	11	5
4	13	6 3/16
6	16	8 1/2
8	18	10 5/8

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined crosses are produced with a free sintered liner and rotating flanges. Crosses are carbon steel with stainless available on request. Reducing crosses are also available.

LATERALS

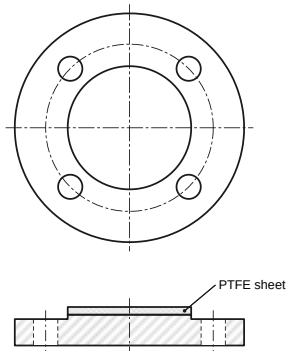


Size	A	B	C	D
1	5.75	1.75	7.5	2
1 1/2	7	2	9	2.88
2	8	2.5	10.5	3.63
3	10	3	13	5
4	12	3	15	6.19
6	14.5	3.5	18	8.5

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined laterals are produced with a free sintered liner and rotating flanges. Laterals are carbon steel with stainless available on request. Reducing laterals are also available.

BLIND FLANGES



PTFE lined blind flanges are available in sizes ½" through 12" in class 150 and 300. Materials include A105 forged steel, 316 and 304 stainless steel. Dimensions follow ANSI B16.5 for the class ordered.

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

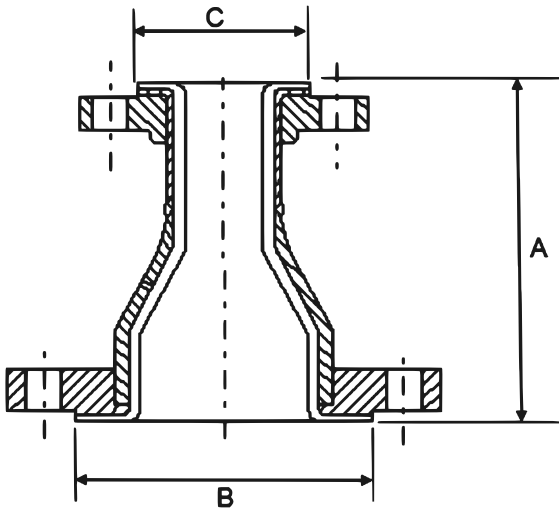
SPACERS

Ring and full face spacers in **PTFE**, **PVDF** or **polypropylene**, matched to the liner in the line, in solid or armored construction.

- Lined armored ring spacers
- Lined armored full face spacers
- Solid ring spacers
- Solid full face spacers
- Solid spacers with tapped side holes for flow orifice use

Install a ½" spacer between lined pipe or fittings and other lined components, particularly valves, when the raised-face diameters differ. See torque procedures.

CONCENTRIC REDUCERS



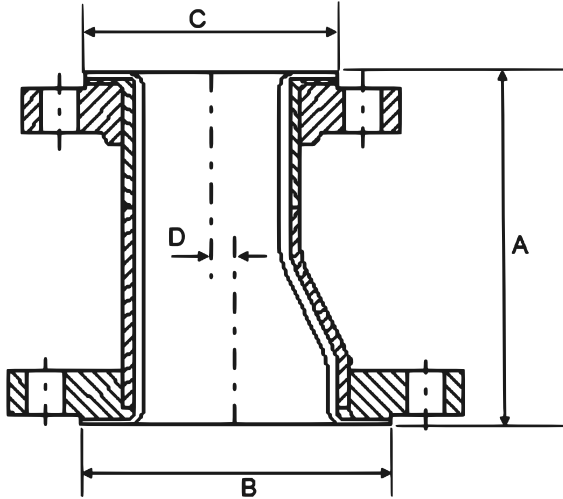
ALSO AVAILABLE IN POLYPROPYLENE AND PVDF

Size	A	B	C
1 x 1/2 *	4.5	2	1.75
1 x 3/4 *	4.5	2	1.75
1 1/2 x 1	4.5	2.88	2
2 x 1	5	3.63	2
2 x 1 1/2	5	3.63	2.88
2 1/2 x 1	5.5	4.125	2
2 1/2 x 1 1/2	5.5	4.125	2.88
2 1/2 x 2	5.5	4.125	3.63
3 x 1	6	5	2
3 x 1 1/2	6	5	2.88
3 x 2	6	5	3.63
4 x 1	7	6.19	2
4 x 1 1/2	7	6.19	2.88
4 x 2	7	6.19	3.63
4 x 3	7	6.19	5
6 x 1	9	8.5	2
6 x 1 1/2	9	8.5	2.88
6 x 2	9	8.5	3.63
6 x 3	9	8.5	5
6 x 4	9	8.5	6.19
8 x 2	11	10.62	3.63
8 x 3	11	10.62	5
8 x 4	11	10.62	6.19
8 x 6	11	10.62	8.5
10 x 4	12	12.25	6.19
10 x 6	12	12.25	8.5
10 x 8	12	12.25	10.62
12 x 6	14	15.5	8.5
12 x 8	14	15.5	10.62
12 x 10	14	15.5	12.25

PTFE lined concentric reducers are produced with a free sintered liner and rotating flanges on the small end except where noted. Standard housings are carbon steel with stainless steel on request.

* Welded flanges.

ECCENTRIC REDUCERS



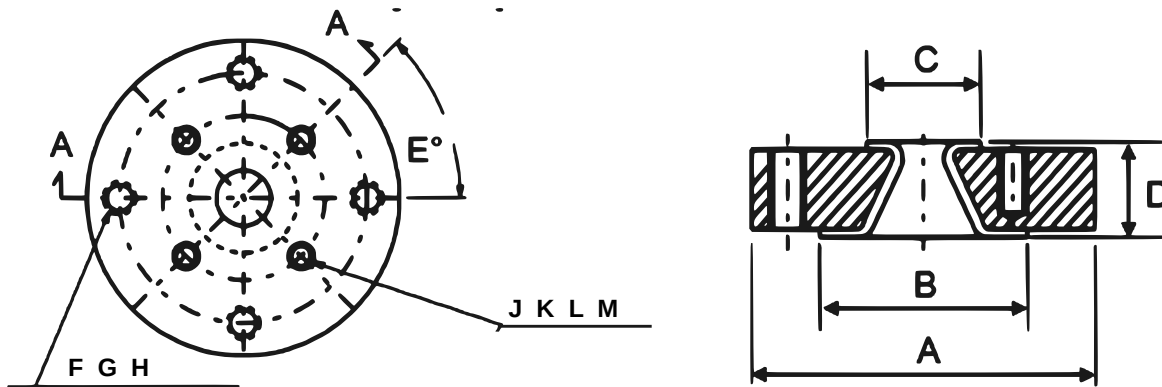
ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

Size	A	B	C	D (offset)
1 x 1/2*	4.5	2	1.75	0.24
1 x 3/4*	4.5	2	1.75	0.14
1 1/2 x 1	4.5	2.88	2	0.29
2 x 1	5	3.63	2	0.56
2 x 1 1/2	5	3.63	2.88	0.24
3 x 1	6	5	2	1.06
3 x 1 1/2	6	5	2.88	0.78
3 x 2	6	5	3.63	0.56
4 x 1	7	6.19	2	1.5
4 x 1 1/2	7	6.19	2.88	1.24
4 x 2	7	6.19	3.63	1.06
4 x 3	7	6.19	5	0.56
6 x 2	9	8.5	3.63	2.06
6 x 3	9	8.5	5	1.5
6 x 4	9	8.5	6.19	1.06
8 x 4	11	10.62	6.19	2.06
8 x 6	11	10.62	8.5	1.06
10 x 6	12	12.5	8.5	2.06
10 x 8	12	12.5	10.62	1.06
12 x 8	14	15.5	10.62	2.06
12 x 10	14	15.5	12.5	1.00

PTFE lined eccentric reducers are produced with a free sintered liner and rotating flanges on the small end except where noted. Standard housings are carbon steel with stainless steel on request.

* Welded flanges.

REDUCING FLANGES



ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined reducing flanges are produced with a free sintered liner. Standard housings are carbon steel with stainless steel available.

E = bolt-hole offset angle. Large end: F thru hole (or thread where tapped) on G bolt circle, H places. Small end: J drill and tap, K inch deep, on L bolt circle, M places.

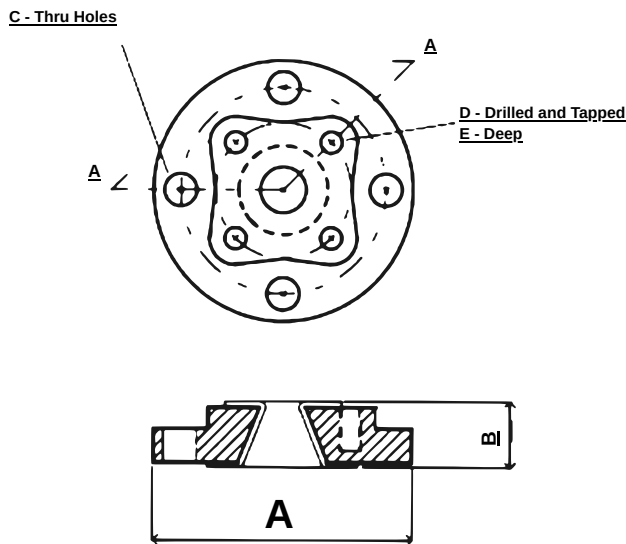
Size	A	B	C	D	E(°)	F	G	H	J	K	L	M
1 x 1/2	4.25	2	1.75	1.5	45	1/2-13	3.13	4	1/2-13	0.75	2.38	4
1 x 3/4	4.25	2	1.75	1.5	45	1/2-13	3.13	4	1/2-13	0.75	2.75	4
1 1/2 x 1	5	2.88	2	1.5	45	1/2-13	3.88	4	1/2-13	1	3.13	4
2 x 1	6	3.63	2	1.5	0	5/8-11	4.75	4	1/2-13	1	3.13	4
2 x 1 1/2	6	3.63	2.88	1.63	45	5/8-11	4.75	4	1/2-13	1	3.88	4
3 x 1	7.5	5	2	1.63	0	5/8-11	6	4	1/2-13	1	3.13	4
3 x 1 1/2	7.5	5	2.88	1.63	0	5/8-11	6	4	1/2-13	1	3.88	4
3 x 2	7.5	5	3.63	1.63	45	5/8-11	6	4	5/8-11	1	4.75	4
4 x 1	9	6.19	2	1.75	0	3/4	7.5	8	1/2-13	0.75	3.13	4
4 x 1 1/2	9	6.19	2.88	1.75	0	3/4	7.5	8	1/2-13	0.75	3.88	4
4 x 2	9	6.19	3.63	1.63	0	3/4	7.5	8	5/8-11	1	4.75	4
4 x 3	9	6.19	5	1.63	0	5/8-11	7.5	8	5/8-11	1	6	4
6 x 1	11	8.5	2	2.13	0	7/8	9.5	8	1/2-13	0.63	3.13	4
6 x 1 1/2	11	8.5	2.88	2.13	0	7/8	9.5	8	1/2-13	0.63	3.88	4
6 x 2	11	8.5	3.63	2.13	0	7/8	9.5	8	5/8-11	0.75	4.75	4
6 x 3	11	8.5	5	2.13	0	7/8	9.5	8	5/8-11	0.75	6	4
6 x 4	11	8.5	6.19	1.63	0	3/4-10	9.5	8	5/8-11	0.75	7.5	8

REDUCING FLANGES (CONTINUED)

Size	A	B	C	D	E (°)	F	G	H	J	K	L	M
8 x 2	13.5	10.62	3.63	2.13	0	7/8	11.75	8	5/8-11	0.75	4.75	4
8 x 3	13.5	10.62	5	2.13	0	7/8	11.75	8	5/8-11	0.812	6	4
8 x 4	13.5	10.62	6.19	2.13	0	7/8	11.75	8	5/8-11	0.75	7.5	8
8 x 6	13.5	10.62	8.5	1.63	0	3/4-10	11.75	8	3/4-10	0.812	9.5	8
10 x 3	16	12.25	5	2	0	1	14.25	12	5/8-11	0.625	6	4
10 x 4	16	12.25	6.19	2	0	1	14.25	12	5/8-11	0.75	7.5	8
10 x 6	16	12.25	8.5	2	0	1	14.25	12	3/4-10	0.812	9.5	8
10 x 8	16	12.25	10.62	2	0	7/8-9	14.25	12	3/4-10	0.812	11.75	8
12 x 1	19	14.37	2	2.13	0	1	17	12	1/2-13	0.56	3.13	4
12 x 2	19	14.37	3.63	2.13	0	1	17	12	5/8-11	0.56	4.75	4
12 x 3	19	14.37	5	2.13	0	1	17	12	5/8-11	0.56	6	4
12 x 4	19	14.37	6.19	2	0	1	17	12	5/8-11	0.56	7.5	8
12 x 6	19	14.37	8.5	2	0	1	17	12	3/4-10	0.81	9.5	8
12 x 8	19	14.37	10.62	2	0	1	17	12	3/4-10	0.81	11.75	8
12 x 10	19	14.37	12.25	2	0	7/8-9	17	12	7/8-9	1	14.25	12
14 x 6	21	15.6	8.5	2.5	0	1.13	18.75	12	3/4-10	1.25	9.5	8
14 x 8	21	15.6	10.62	2.5	0	1.13	18.75	12	3/4-10	1.25	11.75	8
14 x 10	21	15.6	12.25	2.5	0	1.13	18.75	12	7/8-9	1.25	14.25	12
14 x 12	21	15.6	14.4	2.5	15	1-8	18.75	12	7/8-9	1.75	17	12

E = bolt-hole offset angle. Large end: F thru hole (or thread where tapped) on G bolt circle, H places. Small end: J drill and tap, K inch deep, on L bolt circle, M places.

SCALLOPED REDUCING FLANGES

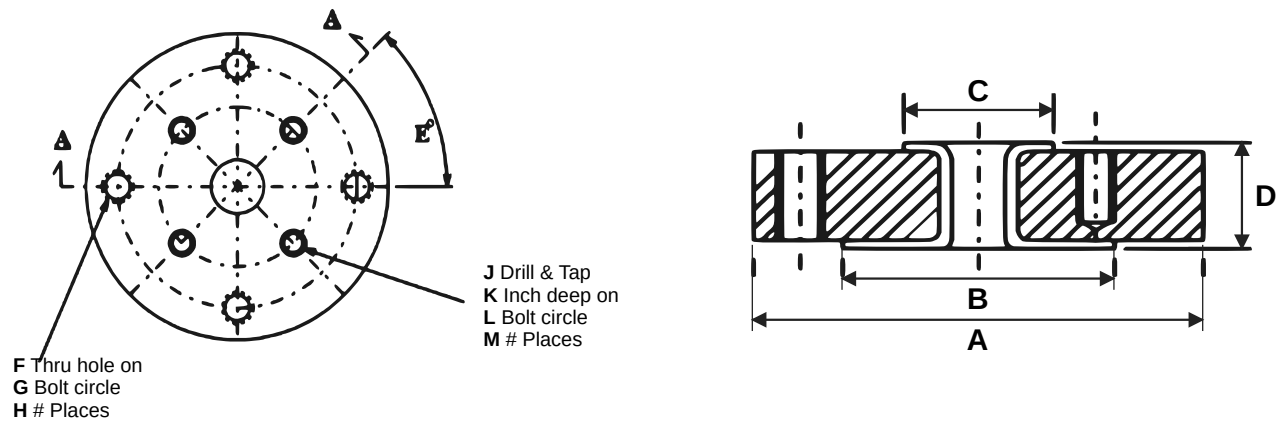


ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

Size	A	B	C	D	E	Offset (°)
1 1/2 x 1	5	1 1/2	5/8	1/2-13	0.75	45
2 x 1	6	1 1/2	3/4	1/2-13	0.75	45
2 x 1 1/2	6	1 1/2	3/4	1/2-13	1	45
3 x 1	7.5	1 1/2	3/4	1/2-13	1	45
3 x 1 1/2	7.5	1 1/2	3/4	1/2-13	1	45
3 x 2	7.5	1 1/2	3/4	5/8-11	1	45
4 x 1	9	1 1/2	3/4	1/2-13	0.75	0
4 x 1 1/2	9	1 1/2	3/4	1/2-13	0.75	0
4 x 2	9	1 1/2	3/4	5/8-11	1	0
4 x 3	9	1 1/2	3/4	5/8-11	1	0
6 x 1	11	15/8	7/8	1/2-13	0.63	0
6 x 1 1/2	11	15/8	7/8	1/2-13	0.63	0
6 x 2	11	15/8	7/8	5/8-11	0.75	0
6 x 3	11	15/8	7/8	5/8-11	0.75	0
6 x 4	11	15/8	7/8	5/8-11	0.75	45
8 x 6	13.5	2	7/8	3/4-10	0.56	22.5
10 x 8	16	2	1	3/4-10	0.75	0

D = bolt thread. Offset = bolt-hole offset angle in degrees.

STRAIGHT BORE REDUCING FLANGES

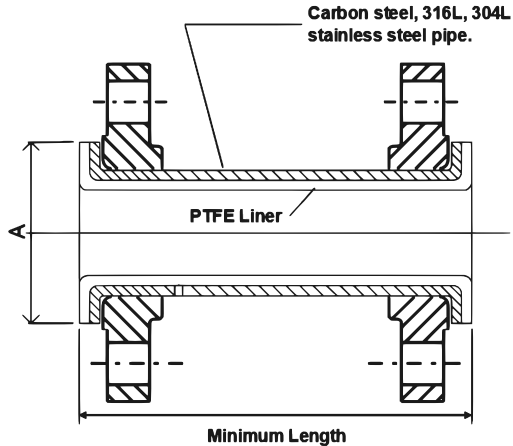


ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

E = bolt-hole offset angle. Large end: F thru hole on G bolt circle, H places. Small end: J drill and tap, K inch deep, on L bolt circle, M places.

Size	A	B	C	D	E(°)	F	G	H	J	K	L	M
1 x 1/2	4.25	2	1.75	1.5	45	1/2-13	3.13	4	1/2-13	0.75	2.38	4
1 x 3/4	4.25	2	1.75	1.5	45	1/2-13	3.13	4	1/2-13	0.75	2.75	4
1 1/2 x 1	5	2.88	2	1.5	45	1/2-13	3.88	4	1/2-13	1	3.13	4
2 x 1	6	3.63	2	1.5	0	5/8-11	4.75	4	1/2-13	1	3.13	4
2 x 1 1/2	6	3.63	2.88	1.63	45	5/8-11	4.75	4	1/2-13	1	3.88	4
3 x 1	7.5	5	2	1.63	0	5/8-11	6	4	1/2-13	1	3.13	4
3 x 1 1/2	7.5	5	2.88	1.63	0	5/8-11	6	4	1/2-13	1	3.88	4
3 x 2	7.5	5	3.63	1.63	45	5/8-11	6	4	5/8-11	1	4.75	4
4 x 1	9	6.19	2	1.75	0	3/4	7.5	8	1/2-13	0.75	3.13	4
4 x 1 1/2	9	6.19	2.88	1.75	0	3/4	7.5	8	1/2-13	0.75	3.88	4
4 x 2	9	6.19	3.63	1.63	0	3/4	7.5	8	5/8-11	1	4.75	4
4 x 3	9	6.19	5	1.63	0	5/8-11	7.5	8	5/8-11	1	6	4
6 x 1	11	8.5	2	2.13	0	7/8	9.5	8	1/2-13	0.63	3.13	4
6 x 1 1/2	11	8.5	2.88	2.13	0	7/8	9.5	8	1/2-13	0.63	3.88	4
6 x 2	11	8.5	3.63	2.13	0	7/8	9.5	8	5/8-11	0.75	4.75	4
6 x 3	11	8.5	5	2.13	0	7/8	9.5	8	5/8-11	0.75	6	4
6 x 4	11	8.5	6.19	1.63	0	3/4-10	9.5	8	5/8-11	0.75	7.5	8
8 x 2	13.5	10.62	3.63	2.13	0	7/8	11.75	8	5/8-11	0.75	4.75	4
8 x 3	13.5	10.62	5	2.13	0	7/8	11.75	8	5/8-11	0.812	6	4
8 x 4	13.5	10.62	6.19	2.13	0	7/8	11.75	8	5/8-11	0.75	7.5	8
8 x 6	13.5	10.62	8.5	1.63	0	3/4-10	11.75	8	3/4-10	0.812	9.5	8

PIPE SPOOL DATA



Size	A (in)	Minimum length (in)
1	2	3-1/2
1 1/2	2-7/8	3-1/2
2	3-5/8	3-1/2
3	5	4
4	6-3/16	4-1/2
6	8-3/8	5-1/2
8	10-1/2	6-1/2
10	12-1/4	6-1/2

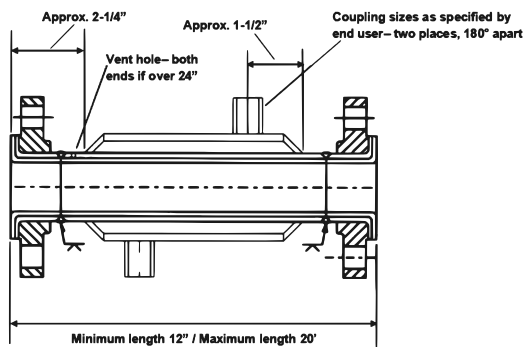
Grounding lugs available on all spools and fittings.

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

PTFE lined pipe spools are lined with a high quality paste extruded liner. The pipe is A587, A106 or A53 carbon steel with stainless steel available as an option. Standard spools come with two rotating flanges. Fixed flanges can be ordered if desired. Spools can be specified in lengths up to 20 feet.

Marspec has over 50 years experience in fabricating custom-length pipe spools in our own shop on the Eastern Shore of Mobile Bay.

JACKETED PIPE SPOOL DATA



Pipe size	Jacket size
1	2
1 1/2	2-1/2
2	3
3	5
4	6
6	8
8	10

ALSO AVAILABLE IN **POLYPROPYLENE** AND **PVDF**

Fully jacketed spools for steam or hot-oil temperature maintenance. See Piping Accessories for clamp-on heaters, electric tracing and heat transfer compounds.

PIPE AND FITTING OPTIONS

- Grounding lugs for static charge control
- Extended vent couplings for critical services
- Special lugs for pipe support
- Special coatings over the standard gray primer
- Fixed flanges in place of rotating

LINED PIPE AND FITTINGS MATERIALS

PTFE LINED PIPE & FITTINGS

LinedPipe.Com offers ½ inch through 12 inch PTFE lined pipe and fittings in both carbon steel and stainless steel in standard and special configurations. PTFE liners are produced using a proprietary technology and the highest quality resins. This process creates free sintered liners with superior properties for strength and resistance to permeation.

Pipe liners are ram paste extruded or isostatically molded and have consistent, dimensional accuracy for excellent performance in service. The liners are installed in A587, A106 and A53 steel pipe with rotating A395 ductile iron or A105 forged steel flanges.

PLASTIC LINER THICKNESSES

Size	LinedPipe.Com PTFE liner	LinedPipe.Com PP & PVDF liner	ASTM F1545 minimum (PTFE)
1/2"	.120"	.125"	.120"
3/4"	.120"	.125"	.120"
1"	.125"	.130"	.120"
1-1/2"	.150"	.140"	.120"
2"	.165"	.150"	.120"
3"	.190"	.180"	.120"
4"	.210"	.190"	.120"
6"	.300"	.225"	.125"
8"	.300"	—	.125"
10"	.330"	—	.125"

LinedPipe.Com liners meet or exceed the ASTM F1545 minimum at every size. PP and PVDF liners are listed through 6"; larger sizes on request.

PLASTIC LINER CHARACTERISTICS

Liner type	Tensile @ yield	Elongation @ yield	Colorant	Operating temperatures
PTFE	3,000 psi, min.	250% min.	None	-20 °F (-29 °C) to 450 °F (232 °C)
PVDF	4,500 psi, min.	10% min.	Black	0 °F (-18 °C) to 275 °F (135 °C)
Polypropylene	3,000 psi, min.	10% min.	Orange	0 °F (-18 °C) to 225 °F (107 °C)

HOUSING MATERIALS AND QUALITY STANDARDS

CARBON STEEL FITTINGS

ALL FITTINGS CONFORM DIMENSIONALLY TO ANSI B16.5

Fitting	Body	Stub ends	Flanges
One-piece 90° and 45° elbows	ASTM A587 pipe, or ASTM A53/A106 Gr B steel	—	ASTM A105 forged steel
Welded 90° and 45° elbows	ASTM A234 Gr WPB steel	ASTM A587, ASTM A53/A106 Gr B, or SAE 1010–1030 steel	ASTM A105 forged steel
Tees, instrument tees, crosses, laterals	ASTM A105 machined forged steel, SAE 1010–1030 steel, or ASTM A53/A106 Gr B steel	ASTM A587, ASTM A53/A106 Gr B steel	ASTM A105 forged steel
Concentric reducer	SAE 1010–1030, ASTM A516 Gr 70, ASTM A105, or ASTM A234 steel	ASTM A587, ASTM A53/A106 Gr B, or SAE 1010–1030 steel	ASTM A105 forged steel
Eccentric reducer	ASTM A234 Gr WPB forged steel	ASTM A587, ASTM A53/A106 Gr B steel	ASTM A105 forged steel
Reducing flange	ASTM A105, ASTM A516 Gr 70, or SAE 1010–1030 steel	—	—

STAINLESS STEEL FITTINGS

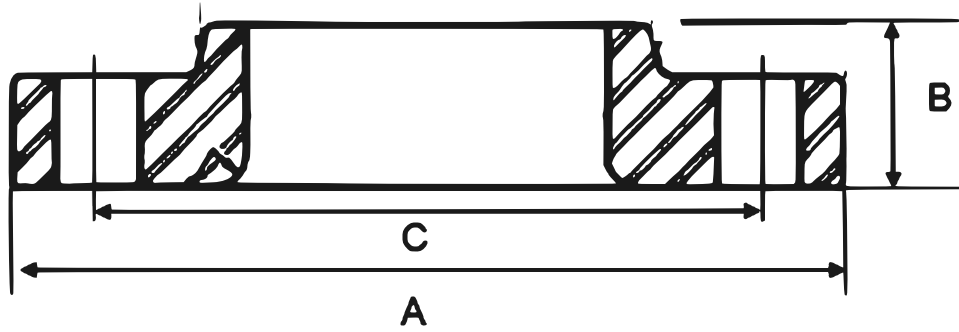
ALL FITTINGS CONFORM DIMENSIONALLY TO ANSI B16.5

Fitting	Body	Stub ends	Flanges
One-piece 90° and 45° elbows	ASTM A312 pipe	—	ASTM A182 forged stainless steel
Welded 90° and 45° elbows	ASTM A403	ASTM A312	ASTM A182 forged stainless steel
Tees, instrument tees, crosses, laterals	ASTM A479 machined stainless steel	ASTM A312	ASTM A182 forged stainless steel
Concentric reducer	ASTM A479 or ASTM A403 stainless steel	ASTM A312	ASTM A182 forged stainless steel
Eccentric reducer	ASTM A403 stainless steel	ASTM A312	ASTM A182 forged stainless steel
Reducing flange	ASTM A479	—	—

QUALITY STANDARDS

- All lined pipe, fittings and flanges comply with ASTM F1545 Standard Specification for Plastic Lined Ferrous Metal Pipe, Fittings and Flanges.
- The lined fittings we supply are welded in compliance with ASME B31.3 by welders certified to Section IX of the ASME Boiler and Pressure Vessel Code. Lined pipe spools are assembled with rotating flanges over a flared liner and need little welding.
- Carbon steel components are primed with rust preventative gray primer and are suitable for top coating in the field. Special coatings are available on request.
- All lined spools and fittings are subjected to a minimum 10,000 volt spark test to detect liner defects. Any audible or visible spark is cause for rejection of the liner.
- All flared surfaces are protected by wooden end covers to insure their integrity during shipping and handling. Covers must remain in place prior to installation.
- Lined fittings carry identifying markings on their flanges in accordance with ASTM F1545. Spools fabricated by Marspec are stamped with the Marspec M on the flange.

FLANGE DETAILS



ANSI CLASS 150 FLANGE DIMENSIONS

Size	A	B	C	Bolt hole dia.	No. of bolt holes
1/2"	3.5	0.437	2.375	0.62	4
3/4"	3.875	0.5	2.75	0.62	4
1"	4.25	0.562	3.125	0.62	4
1-1/2"	5	0.687	3.875	0.62	4
2"	6	0.75	4.75	0.75	4
2-1/2"	7	0.875	5.5	0.75	4
3"	7.5	0.937	6	0.75	4
4"	9	0.937	7.5	0.75	8
6"	11	1	9.5	0.88	8
8"	13.5	1.125	11.75	0.88	8
10"	16	1.187	14.25	1	12
12"	19	1.25	17	1	12
14"	21	1.38	18.75	1.13	12

ANSI CLASS 300 FLANGE DIMENSIONS

Size	A	B	C	Bolt hole dia.	No. of bolt holes
1/2"	3.75	0.562	2.625	0.62	4
3/4"	4.625	0.625	3.25	0.75	4
1"	4.875	0.687	3.5	0.75	4
1-1/2"	6.125	0.812	4.5	0.875	4
2"	6.5	0.875	5	0.75	8
2-1/2"	7.5	1	5.875	0.875	8
3"	8.25	1.125	6.625	0.875	8
4"	10	1.25	7.875	0.875	8
6"	12.5	1.437	10.625	0.875	12
8"	15	1.625	13	1	12
10"	17.5	1.875	15.25	1.125	16
12"	20.5	2	17.75	1.25	16

A = outside diameter · B = thickness · C = bolt circle. Metric flanges are also available.

BOLTING AND FASTENER TORQUE

RECOMMENDED BOLT AND STUD LENGTHS

Flange size (150 lb)	Bolt or stud dia.	No. of bolt holes	Bolt length*	Stud length*
1"	1/2"	4	2-3/4"	3-1/4"
1-1/2"	1/2"	4	3"	3-1/2"
2"	5/8"	4	3-1/2"	4-1/4"
3"	5/8"	4	4"	4-1/2"
4"	5/8"	8	4"	4-1/2"
6"	3/4"	8	4-1/2"	5-1/4"
8"	3/4"	8	4-3/4"	5-1/2"
10"	7/8"	12	5-1/4"	6"
12"	7/8"	12	5-1/2"	6-1/4"

* Including a flat washer on each side.

RECOMMENDED FASTENER TORQUE

RECOMMENDED BOLT TORQUE (FT·LB)

ANSI class 150 PTFE lined systems using A193 B7 bolts and A194 2H nuts

Pipe size	Lightly oiled, min	Lightly oiled, max	PTFE coated, min	PTFE coated, max	Zinc plated, min	Zinc plated, max
1/2"	7	10	4	6	9	13
3/4"	11	16	7	8	12	15
1"	8	13	5	8	12	19
1-1/2"	19	31	11	19	27	46
2"	39	65	23	39	57	94
3"	62	103	37	62	90	149
4"	40	67	24	40	59	98
6"	75	124	45	75	108	180
8"	98	164	61	97	150	240
10"	130	175	95	120	225	290
12"	190	240	105	145	270	360

ANSI class 150 PP lined systems using A193 B7 bolts and A194 2H nuts

Pipe size	Lightly oiled, min	Lightly oiled, max	PTFE coated, min	PTFE coated, max	Zinc plated, min	Zinc plated, max
1"	13	17	8	10	19	25
1-1/2"	31	41	19	25	46	59
2"	65	85	39	51	94	123
3"	103	134	62	80	149	194
4"	103	134	62	80	149	194
6"	124	161	75	97	180	234

The maximum recommended torque values are suggested for lined systems operating at or near the maximum recommended pressures and temperatures. Systems operating under less severe conditions can in general experience leak-free performance using lower torque values. Any time gaskets or spring type washers are used, we suggest using the minimum recommended torque value and increasing only to obtain satisfactory sealing. For systems that will require frequent disassembly, start at the minimum recommended torque to avoid distortion of the plastic face.

RECOMMENDED TORQUE PROCEDURES

The same general techniques used to install flanged carbon steel piping systems can be applied to plastic lined piping systems.

When assembling flange connections, always use a full complement of clean, new high strength A193 B7 bolting. If using stainless steel bolting, use A193 (or A320) Grade B8M Class 2 bolts with A194 Grade 8M nuts. If other bolting materials are used, the end user must ensure that the new bolting material strength properties exceed the calculated bolt stress values to be generated in making the piping connection.

- Always use flat washers on both sides of the connection.
- Tighten the flange bolts with a calibrated torque wrench to the specified bolt torques. NOTE: if using anti-seize compounds, the torque values will be different.
- Tighten the flange bolts with a torque wrench using a crisscross pattern that alternately tightens the bolts located 180° apart.
- Using this pattern, tighten the bolts in 20% increments of the final bolt torque until 80% of the final bolt torque has been achieved.
- For tightening to the final torque values, tighten the bolts sequentially clockwise once around the flange. This will help insure that the bolts are evenly stressed.
- Care should be taken to prevent over-torqueing, which will cause damage to the sealing surfaces.

NOTE: when bolting together dissimilar materials, always tighten to the lowest recommended torque of the components in the joint. Using higher torques may cause excessive deformation of the "softer" material in the joint. Install a ½" thick spacer between plastic lined pipe or fittings and other plastic lined components, particularly valves, if the diameters of the raised faces are different. Belleville washers are not recommended for use with PTFE lined products.

RE-TORQUEING

A re-torque should be applied a minimum of 24 hours after the initial torque or after the first thermal cycle. This allows for seating of the plastic and for relaxation of the bolts. Torqueing should only be done on the system in the ambient, cooled state, never while the process is at elevated temperature or excessive force could be applied to the plastic faces. Never disassemble a flange joint in a hot system. Wait until the system has cooled to ambient temperature.

HYDROTESTING

Normally, after initial torque and re-torque, a hydrotest should be performed following ANSI requirements. If a flange leaks, first check the torque values and then tighten in 10% increments over the specified bolt torques until sealed. However, if 150% of the specified torque value is reached and the flange joint still leaks, stop and disassemble the flange joint. Something else is likely wrong such as a scratched plastic face. Only after the hydrotest has been successfully completed and any leaks corrected can the pipeline be signed off and commissioned.

ANNUAL RE-TORQUEING

Re-torqueing should be done at least annually thereafter, especially if the process line experiences elevated temperatures or thermal cycling. Torqueing should only be done on the system in the ambient, cooled state and never while the process is at an elevated temperature; excessive force will likely be applied to the plastic faces.

CONTACT

LinedPipe.Com

a division of Marspec Technical Products, Inc.

24042 US Highway 98, Fairhope, AL 36532

(251) 625-4949

Info@LinedPipe.Com

linedpipe.com

Lined pipe, fittings, valves and accessories ship nationwide from Fairhope, Alabama.

Lined valves and automated valve packages: linedpipe.com/plastic-lined-valves/

Accessories and temperature maintenance: linedpipe.com/other-products/

Parent company: marspec.com

Dimensions in this catalog are for the sizes we commonly fabricate and are subject to the tolerances of ASTM F1545 and ASME B16.5. Confirm critical dimensions with the shop before cutting pipe. Version 1.1, released 10-28-2026.