

FLUOROCARBON LININGS

Fluorocarbon Expansion Joints

Two and Three Convolutes

Flanges: Ductile iron or steel

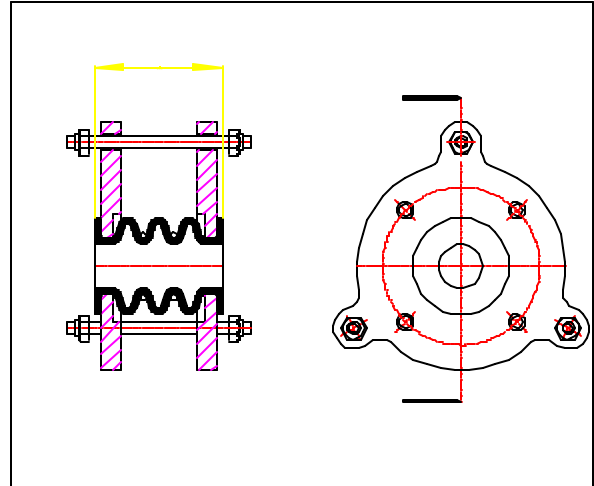
PTFE: ASTM D 1457 Type I or III

Support Rings: Stainless steel ASTM A 316L

Limit bolts: Steel with washers and locknuts

Insulating sleeve: Polyethylene (195°F max.)

PTFE (480°F max.)



Two Convolutions					Three Convolutions			
Size	Length	Extension/ Compression	Axial deflection	Angular deflection	Length	Extension/ Compression	Axial deflection	Angular deflection
ins	ins	+/- ins	ins	degrees	ins	+/- ins	ins	degrees
1	1.8	0.3	0.2	16	2.2	0.5	0.2	19
1.5	2.2	0.3	0.2	16	2.8	0.5	0.2	18
2	2.4	0.4	0.2	12	2.8	0.7	0.4	16
2.5	2.4	0.4	0.2	12	3.1	0.7	0.4	16
3	2.6	0.5	0.3	11	3.5	1	0.5	15
4	2.8	0.6	0.3	10	3.7	1	0.5	14
5	3	0.6	0.3	9	3.9	1	0.5	12
6	3	0.6	0.3	8	4.1	1.1	0.6	11
8	3.1	0.7	0.3	7	4.3	1.1	0.6	10
10	3.5	0.7	0.4	7	4.7	1.2	0.6	10
12	3.7	0.7	0.4	6	4.9	1.2	0.6	10
14	3.9	0.8	0.4	5	4.9	1.2	0.6	8
16	3.9	0.8	0.4	5	5.3	1.2	0.6	8
18	3.9	0.8	0.4	4	5.5	1.2	0.6	6
20	4.1	0.8	0.4	4	5.5	1.2	0.6	6
22	3.9	0.7	0.4	3	4.9	1	0.5	5
24	3.9	0.7	0.4	3	4.9	1	0.5	5
32	4.5	1	0.4	2	6.3	1.25	0.6	3

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Fluorocarbon Expansion Joints

Four and Five Convolutes

Flanges: Ductile iron or steel

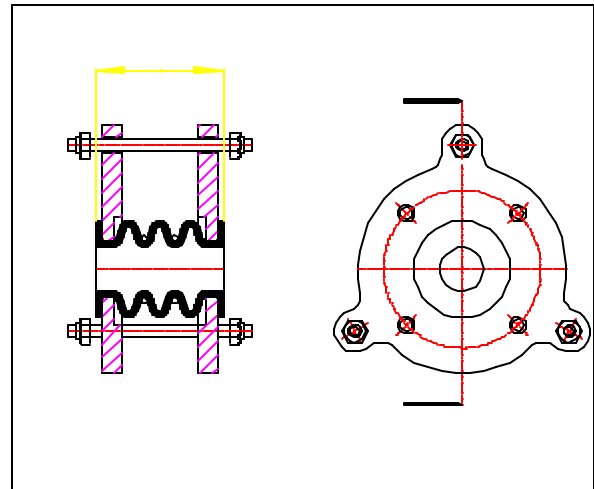
PTFE: ASTM D 1457 Type I or III

Support Rings: Stainless steel ASTM A 316L

Limit bolts: Steel with washers and locknuts

Insulating sleeve: Polyethylene (195°F max.)

PTFE (480°F max.)



Four Convolutions					Five Convolutions			
Size	Length	Extension/ Compression	Axial deflection	Angular deflection	Length	Extension/ Compression	Axial deflection	Angular deflection
ins	ins	+/- ins	ins	degrees	ins	+/- ins	ins	degrees
1	2.6	0.6	0.3	25	80	0.7	0.4	30
1.5	3.3	0.7	0.3	24	95	0.9	0.5	30
2	3.3	0.9	0.6	23	100	1.1	0.6	26
2.5	3.9	1	0.6	21	120	1.2	0.6	25
3	4.3	1.2	0.6	19	135	1.3	0.7	24
4	4.7	1.2	0.6	18	145	1.4	0.7	22
5	4.9	1.3	0.6	16	150	1.5	0.7	19
6	4.9	1.3	0.7	15	150	1.5	0.7	17
8	5.1	1.3	0.7	13	155	1.5	0.7	15
10	5.3	1.3	0.7	12	160	1.5	0.7	13
12	5.9	1.3	0.7	11	175	1.6	0.8	13
14	5.9	1.3	0.7	10	175	1.6	0.8	12
16	6.1	1.4	0.7	10	180	1.7	0.8	12
18	6.3	1.4	0.7	8	180	1.7	0.8	10
20	6.3	1.4	0.7	8	185	1.7	0.8	10
22	6.1	1.3	0.6	7	185	1.7	0.9	8
24	6.1	1.3	0.6	6	185	1.7	0.9	8
32	8	1.6	0.7	4	9.8	1.8	0.9	5

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Fluorocarbon Expansion Joints Six and Seven Convolute

Flanges: Ductile iron or steel

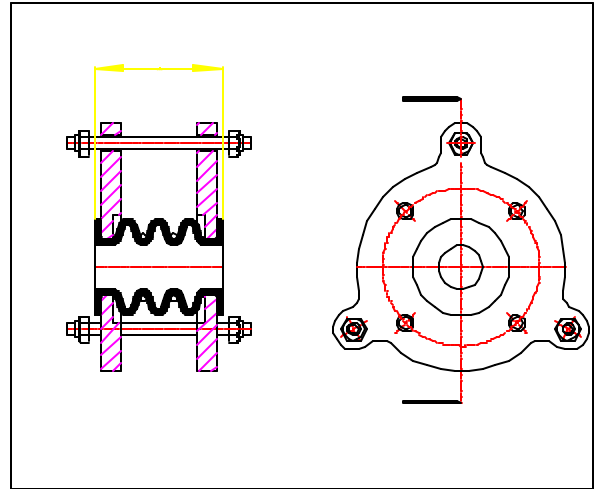
PTFE: ASTM D 1457 Type I or III

Support Rings: Stainless steel ASTM A 316L

Limit bolts: Steel with washers and locknuts

Insulating sleeve: Polyethylene (195°F max.)

PTFE (480°F max.)



Six Convolutions					Seven Convolutions			
Size	Length	Extension/ Compression	Axial deflection	Angular deflection	Length	Extension/ Compression	Axial deflection	Angular deflection
ins	ins	+/- ins	ins	degrees	ins	+/- ins	ins	degrees
1	3.6	0.9	0.5	38	4.1	1.2	0.7	45
1.5	4.3	1.2	0.6	36	4.9	1.4	0.9	42
2	4.7	1.3	0.7	32	5.3	1.5	0.9	42
2.5	5.3	1.5	0.7	30	6.1	1.7	0.9	36
3	6.3	1.6	0.8	28	7.1	1.8	1	33
4	6.7	1.7	0.8	27	7.7	1.9	1	30
5	6.7	1.7	0.8	23	7.9	1.9	1.1	27
6	6.9	1.7	0.9	19	8.1	2	1.1	23
8	6.9	1.8	0.9	17	8.1	2	1.1	20
10	7.3	1.8	0.9	15	8.5	2	1.2	18
12	7.9	1.9	0.9	15	8.9	2.1	1.3	17
14	7.9	1.9	0.9	14	8.9	2.2	1.3	16
16	8.1	2	1	14	9.1	2.3	1.3	16
18	8.1	2	1	12	9.1	2.4	1.4	14
20	8.3	2	1	12	9.3	2.4	1.4	14
22	8.3	2	1	11	9.3	2.4	1.4	13
24	8.3	2	1	10	9.4	2.4	1.4	11

FLUOROCARBON LININGS

Fluorocarbon Expansion Joints Eight and Nine Convolute

Flanges: Ductile iron or steel

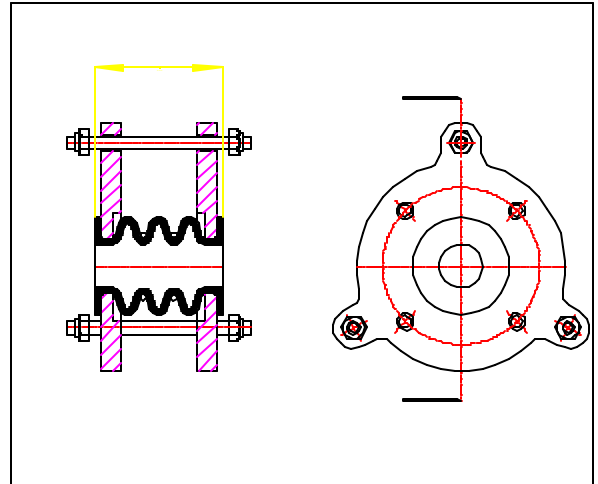
PTFE: ASTM D 1457 Type I or III

Support Rings: Stainless steel ASTM A 316L

Limit bolts: Steel with washers and locknuts

Insulating sleeve: Polyethylene (195°F max.)

PTFE (480°F max.)



Size	Eight Convolutions				Nine Convolutions			
	Length	Extension/ Compression	Axial deflection	Angular deflection	Length	Extension/ Compression	Axial deflection	Angular deflection
ins	ins	+/- ins	ins	degrees	ins	+/- ins	ins	degrees
1	4.5	1.3	0.8	51	4.9	1.5	0.9	55
1.5	5.5	1.5	1	47	6.1	1.7	1.2	52
2	5.9	1.7	1.1	46	6.5	3	1.3	50
2.5	6.9	1.8	1.1	41	7.7	1.9	1.3	46
3	8.1	1.9	1.2	37	9.1	2.1	1.4	41
4	8.7	2.1	1.2	34	9.6	2.3	1.4	37
5	8.9	2.2	1.3	31	9.8	2.4	1.5	35
6	9.1	2.2	1.3	27	10	2.5	1.6	31
8	9.1	2.2	1.4	23	10.2	2.6	1.6	26
10	9.4	2.3	1.5	21	10.6	2.7	1.7	23
12	9.8	2.4	1.5	20	11	2.8	1.7	22
14	10	2.6	1.6	18	11	2.9	1.8	20
16	10	2.7	1.6	18	11	3.1	1.8	20
18	10.2	2.9	1.7	16	11.2	3.3	1.9	18
20	10.2	2.9	1.7	16	11.2	3.3	1.9	18
22	10.4	3	1.7	15	11.6	3.3	1.9	16
24	10.6	3	1.7	13	11.8	3.3	1.9	15

FLUOROCARBON LININGS

Fluorocarbon Expansion Joints Ten Convolute

Flanges: Ductile iron or steel

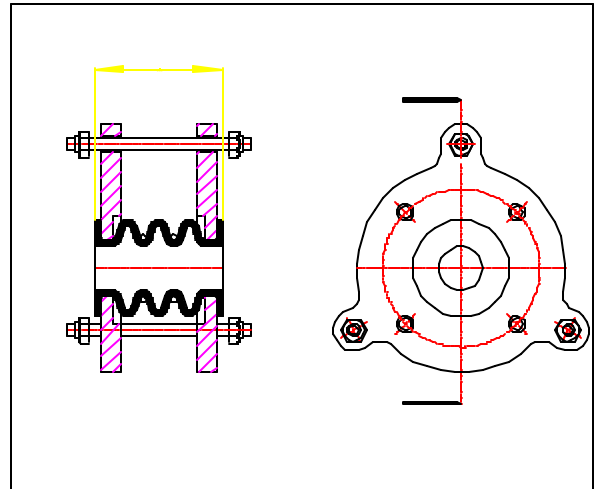
PTFE: ASTM D 1457 Type I or III

Support Rings: Stainless steel ASTM A 316L

Limit bolts: Steel with washers and locknuts

Insulating sleeve: Polyethylene (195°F max.)

PTFE (480°F max.)



Ten Convolute				
Size	Length	Extension/ Compression	Axial deflection	Angular deflection
ins	ins	+/- ins	ins	degrees
1	5.3	1.7	1.1	61
1.5	6.7	1.9	1.4	58
2	7.1	2	1.5	55
2.5	8.5	2	1.5	51
3	10	2.2	1.6	45
4	10.6	2.5	1.7	40
5	10.8	2.6	1.7	38
6	11	2.8	1.8	35
8	11.2	2.9	1.9	28
10	11.8	3.1	1.9	26
12	12	3.1	1.9	24
14	12	3.3	2	22
16	12.2	3.3	2	22
18	12.4	3.5	2.1	20
20	12.4	3.5	2.1	20
22	12.6	3.6	2.2	18
24	12.8	3.6	2.2	17

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Flange Specifications

Size ins	Thickness ins	Clearance Diameter ins	ANSI #150		
			No. of Tapped Holes	Thread UNC ins.	Bolt Circle Dia. ins.
1	0.55	6.1	4	1/2	3 1/8
1.5	0.63	7.5	4	1/2	3 7/8
2	0.63	8.1	4	5/8	4 3/4
2.5	0.63	8.9	4	5/8	5 1/2
3	0.63	9.4	4	5/8	6
4	0.63	10.2	8	5/8	7 1/2
5	0.63	11.4	8	3/4	8 1/2
6	0.71	13.6	8	3/4	9 1/2
8	0.71	15.7	8	3/4	11 3/4
10	0.71	17.9	12	7/8	14 1/4
12	0.71	21.3	12	7/8	17
14	0.79	22.2	12	1	18 3/4
16	0.79	25	16	1	21 1/4
18	0.87	27.4	16	1 1/8	22 3/4
20	0.87	29.1	20	1 1/8	25
22	0.94	31.9	20	1 1/4	27
24	0.94	34.6	20	1 1/4	29 1/2

Recommended Bolt Torques

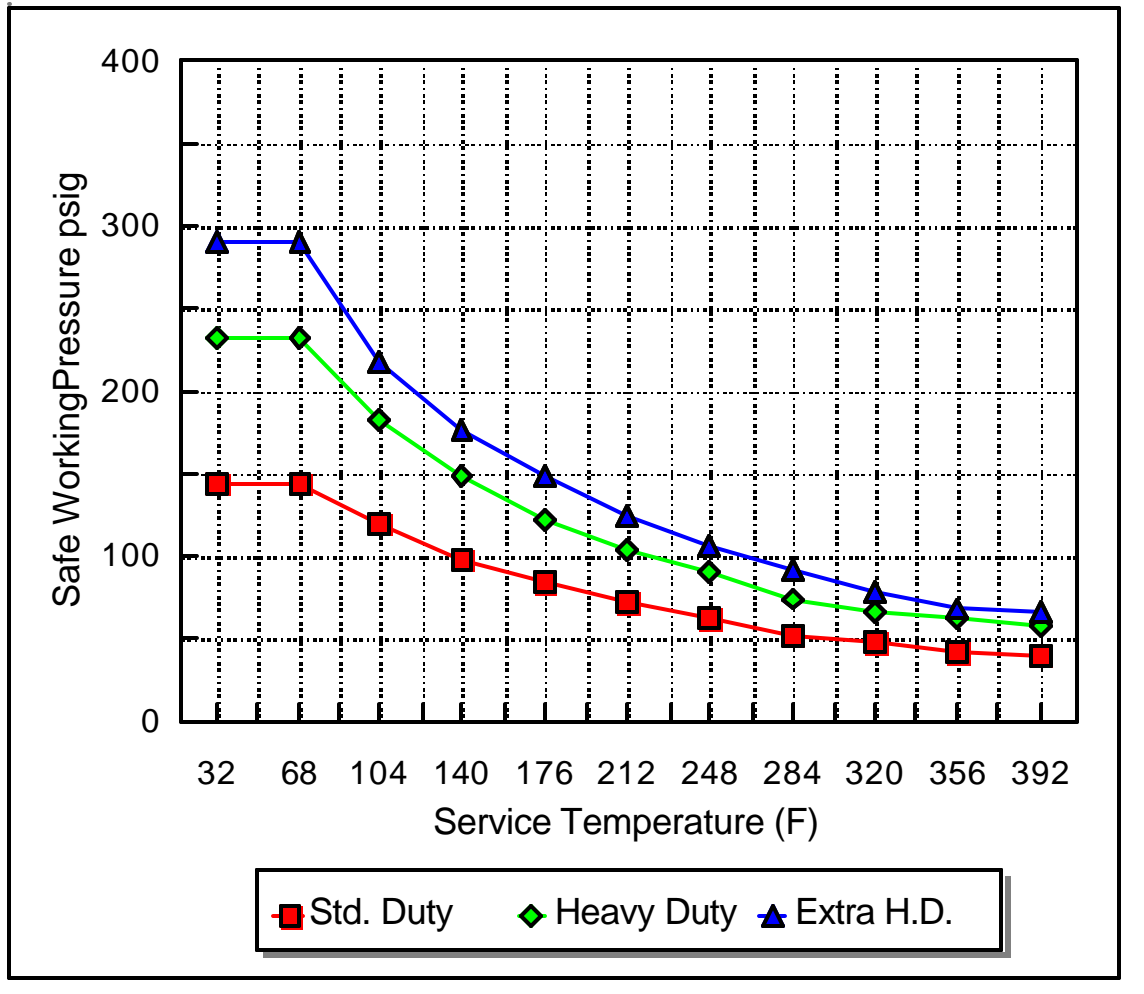
NB	Lb-ft	NB	Lb-ft
1	10	10	70
1.5	15	12	90
2	25	14	150
2.5	35	16	145
3	40	18	210
4	30	20	190
5	45	22	210
6	60	24	220
8	75		

32 NB flanges are designed to suit the application.

FLUOROCARBON LININGS

Pressure/Temperature Ratings

This graph is produced from data generated by long term testing in our Technical division. It includes a 4:1 safety factor.



Vacuum Service

Units in the table below are rated to full vacuum at the stated temperature

Duty	Nominal Size	2 Convolutions	3 Convolutions
Heavy Duty	1 - 6	390 ⁰ F	350 ⁰ F
	8 - 12	260 ⁰ F	212 ⁰ F
Extra Heavy Duty	1 - 6	390 ⁰ F	390 ⁰ F
	8 - 12	260 ⁰ F	260 ⁰ F

FLUOROCARBON LININGS

Options

Liner Tube

- v **Standard wall**
 - v **Heavy Duty**
 - v **Extra-Heavy Duty**
- Static Dissipating**

Flange Material

- v **Stainless Steel**
- v Carbon Steel

Flange Drillings

- v **To client's specification**
- v Oversize flanges for Carbon Block Heat Exchangers

Reinforcing Rings

- v **Hastelloy**

Handling and Storage

PTFE expansion joints are easily damaged in handling, having no external metal housings. Great care must be taken when they are being moved, or in storage.

The flare protection covers serve to shield the sealing flare faces from impact damage, and to restrain the flares in a flat position.

Flare covers should be immediately replaced if removed for any reason, and then finally removed immediately prior to installation.

Unpacking and Checking

All items will have undergone a rigorous test and inspection procedure before dispatch from the factory, however PTFE expansion joints should be unpacked on arrival, and visually checked for damage that may have occurred in transit.

This operation should be carried out under cover, in a clean area.

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Installation

Before installation adjoining pipework must be checked for firm support and anchorage to prevent overstretching or compression of the unit during installation and subsequent service. It is good practice to install with the limit rods in position. However it should be noted that these rods might not prevent excessive movement due to pipework movements in service. Mating flanges must be within the travel and angular movement limits prior to installation, and gaps should be dimensioned so that the unit is in a position close to its median dimensions when in service.

Installation is the same as for PTFE lined piping, with subsequent checking of bolt torques after installation.

Bolt torques are specified on page 6 of this section. PTFE installation is defined in section FMS 33 in the catalogue.

Welding

Because of the risk of damage to the PTFE, welding close to these items must be avoided.

Physical Damage

The PTFE components in these items are easily damaged. Consideration may be given to fitting them with shrouds and guards, to prevent damage and minimise risk of uncontrolled fluid escapes.

In-Service Inspection

These items should be inspected visually on a regular basis, as with all plastic lined systems. It is recommended that bolts be re-tightened after the first and second thermal cycles to counteract creep that have taken place in the flares.