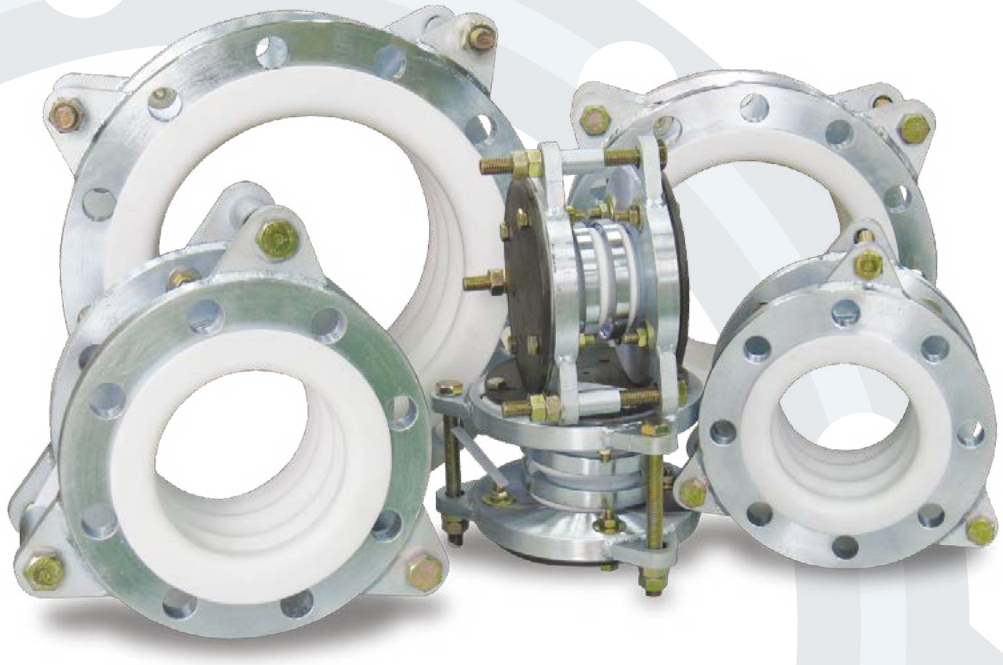
EXPANSION JOINT

Expansion Joint & Flexible Joint Design & Manufacture
No-Leak Type Non-Metallic Expansion Joint
Rubber Joint
Teflon Joint



DMT CO., LTD

INTRODUCTION

Development for Man Technology

Since our initiation of business in 2008, we are doing our best to attain the best quality of products in the industry with you customers' ceaseless encourage and supports.

We think all those are thanks to you customers' affection and love of our company, and are deeply thankful to you customers.

This company is doing its best to be responsible for the industry's best quality level, and to fully satisfy all of customers' demands such as quality, delivery date and prime cost, at the nearest position to the customers, always based on reliance.

This company will continue to make more endeavor to attain highest level of customer satisfaction with the quality principle of 'quality in high grade' and the attitude of always humbleness. We hope to always get you customers' encourage and supports without change.

Chief Executive Officer Huh Man

CONTENTS

GENERAL CONSTRUCTION OF EXPANSION JOINT

1. Bellows
After piping high-class stainless plate, it is manufactured by The hydraulic forming or roll forming processing It is disposed of by heat or acid to remove residual stress of welded end and working stress when shaping.

2. End pipe
It is Generally made in same size with pipe-line to connect End fitting both part of bellows.

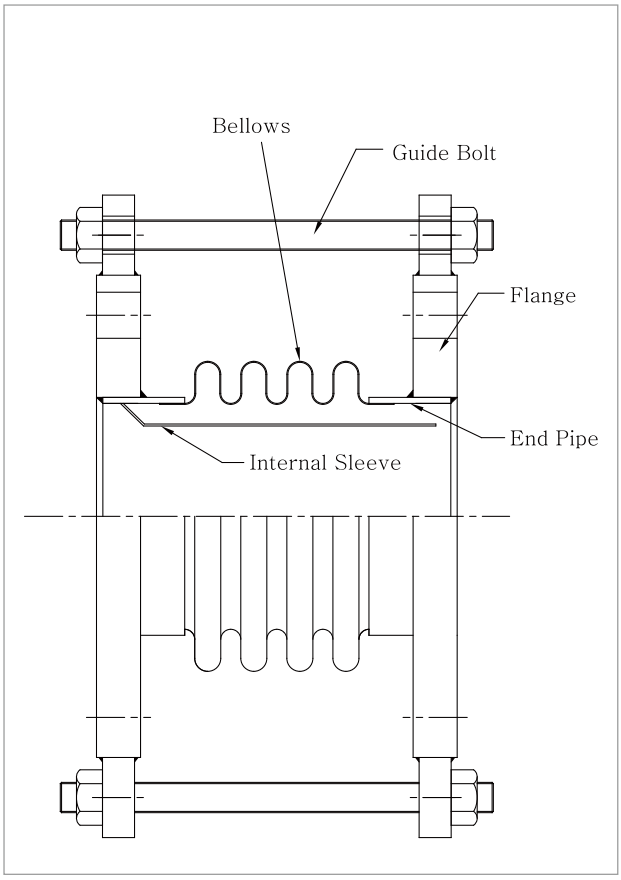
3. Control-ring
It is equalizing or reinforcing rings installed at round part of bellows. It reinforces intensity of bellows and make every part of bellows elastic.

4. Internal sleeve
Installed inside of bellows , it isolate the fluid from bellows. So it prevents the loss of pressure erasion and wear bellows.

5. Flange
It is selected among KS(JIS), ANSI. DIN ,etc as you request.

6. Tie rods
When deflection , it guides exansion of Expansion joint' s connection and supports tare.

7. Set bolts
It is necessary to keep overall length of product and to be removed after installation.



▪ The Main Quality of Fluid Temperature

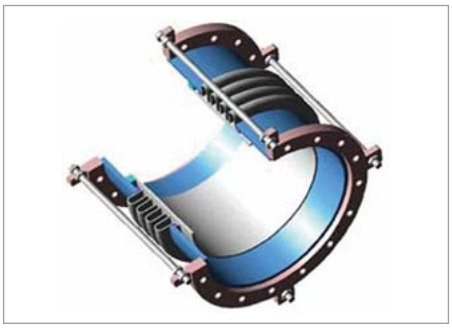
Part name \ Temperature(℃)	-200 ~ -20	-20~350	350~450	450~600
Bellows	STS304	STS304	STS316 STS321	STS321 INCONEL INCOLOY
End Pipe	STS304	SPP SS400	SB42	STS304 STS321 Cr-Mo Steel
Control ring	STS304	FC20 SS400	SB42	STS321 Cr-Mo Steel
Flange	STS304	SS400 S45C	SF45 S45C	STS321 Cr-Mo Steel
The-rods	STS304	S25C	SCM3	STS304
Set-bolts	STS400	SS400	SS400	SS400

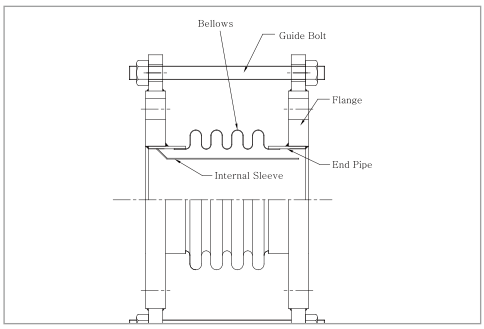
FREE TYPE EXPANSION JOINT

It’ s designed that end pipe and flange are welded at the both edge of bellows. And it is mainly used for expansion of low pressure pipe and absorbing vibration.

Application : For absorption of extension/compression low-pressure piping, exhaust piping , ducts, flues, etc, and for vibration absorption of suction and exhaust pipes of engines and blowers, and at the inlet and outlet of pumps, etc.

Pressure : 0.1 MPa to 0.3 MPa





Diameter No.	Width (mm)	Q x W (mm)	Bellows No.	Length (mm)	Axial Mov.	Laternal Defl.	Angular Rotation	Spinning Rate		Effective Diameter	Effective Section Area
								k_x	k_y		
50A	0.4	10x12	10	240	12	5.5	20.2	5	20.2	20.2	20.2
65A	0.4	10x12	10	250	12	16.5	16.5	6	16.5	16.5	16.5
80A	0.4	10x16	6 12	250 340	12 25	3.9 15.8	14.1 28.1	5 3	14.1 28.1	14.1 28.1	14.1 28.1
100A	0.4	23x24	6 12	250 360	12 25	3.3 13.0	11.8 23.6	6 3	11.8 23.6	11.8 23.6	11.8 23.6
125A	0.8	20x26	5 10	300 440	12 25	3.1 12.5	10.8 22.3	9 5	10.8 22.3	10.8 22.3	10.8 22.3
150A	0.8	35x35	5 10	300 440	15 30	4.0 15.9	9.9 19.9	16.9 8.5	9.9 19.9	9.9 19.9	9.9 19.9
200A	1.0	45x38	4 8	300 440	16 32	2.6 10.7	7.6 15.3	14.0 7.0	7.6 15.3	7.6 15.3	7.6 15.3
250A	1.0	45x42	4 7	300 440	18 32	2.9 8.8	7.1 12.4	25.2 14.4	7.1 12.4	7.1 12.4	7.1 12.4
300A	1.0	50x50	3 5 7	300 440 524	18 30 42	2.3 6.5 12.4	6.0 9.9 13.9	27.4 16.4 11.7	6.0 9.9 13.9	6.0 9.9 13.9	6.0 9.9 13.9
350A	1.0	50x50	3 5 6	300 440 524	23 37 45	2.9 8.0 11.6	6.6 11.1 13.3	18.8 11.3 9.4	6.6 11.1 13.3	6.6 11.1 13.3	6.6 11.1 13.3
400A	1.0	50x50	3 5 6	300 475 545	23 37 45	2.6 7.1 10.3	9.8 11.8 5.1	21.3 12.8 10.6	9.8 11.8 5.1	9.8 11.8 5.1	9.8 11.8 5.1
450A	1.0	50x50	3 5 6	300 475 545	23 37 45	2.2 6.1 8.8	8.4 10.1 4.8	24.8 14.9 12.4	8.4 10.1 4.8	8.4 10.1 4.8	8.4 10.1 4.8
500A	1.2	50x50	3 5 6	300 475 545	23 37 45	2.1 5.8 8.4	8.0 9.6 2.8	26.1 15.6 13.0	8.0 9.6 2.8	8.0 9.6 2.8	8.0 9.6 2.8
600A	1.2	60x60	3 5 6	300 475 545	16 40 49	1.0 6.0 8.7	7.0 8.3 2.4	48.2 19.3 16.1	7.0 8.3 2.4	7.0 8.3 2.4	7.0 8.3 2.4
700A	1.5	60x60	3 5 6	300 475 545	16 40 48	0.8 5.2 7.5	2.0 7.2 3.2	55.6 22.2 18.5	2.0 7.2 3.2	2.0 7.2 3.2	2.0 7.2 3.2
800A	1.5	60x60	3 5 6	400 580 600	24 40 48	1.6 4.5 6.6	5.3 7.4 2.9	82.0 49.2 41.0	5.3 7.4 2.9	5.3 7.4 2.9	5.3 7.4 2.9

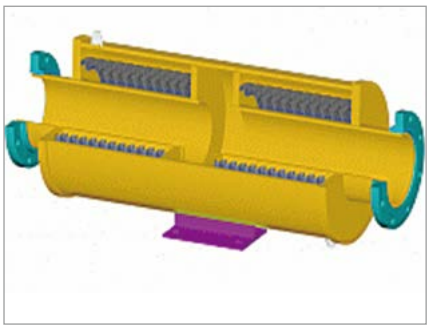
Q = Bellows Pitch W = Bellows Height

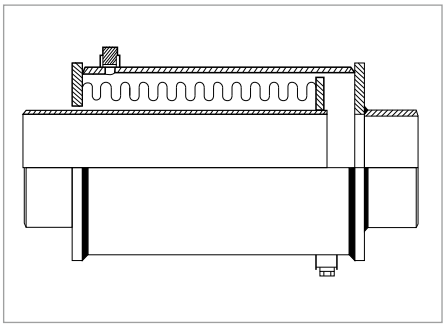
EXTERNALLY PRESSURIZED EXPANSION JOINT

Externally pressurized type expansion joint is advanced product as a result of research activities about the transmission part of high pressure steam and high temperature water. It is more excellent than more economical than Internally Pressurized expansion joint and widely used in an advanced country. Especially, It is evaluated as a suitable product for construction gas fired combined cycle power plant.

Application : steam, hot water, warm water, and other pipelines.

Pressure : 0.2 MPa to 1.5 MPa





Single type.

Diameter No.	Outside Diameter.	Bellows W x Q x T (mm)	No of Convolution	Overall Length(mm)	Axial Mov. (mm)	Spring Rate(k_x) (N/mm)	Effective Diameter (mm)	Effective Section Area (mm)
50A	140	18x16x0.8 -2ply	25	800(825)	25(-50)	105.0	84.0	55.4
65A	166	18x16x0.8 -2ply	25	800(825)	25(-50)	122.6	97.8	75.1
80A	166	18x16x0.8 -2ply	19	800(825)	25(-50)	148.1	118.0	109.3
100A	217	22x20x1.0 -2ply	19	800(825)	25(-50)	262.0	148.5	173.1
125A	268	30x22x1.0 -3ply	16	800(835)	35(-70)	230.6	180.0	254.3
150A	319	30x22x1.0 -3ply	16	800(835)	35(-70)	294.2	229.5	413.5
200A	356	30x22x1.0 -3ply	16	800(835)	35(-70)	357.0	278.0	606.7
250A	407	30x22x1.0 -3ply	16	800(835)	35(-70)	421.8	328.5	847.1
300A	458	35x24x1.2 -3ply	13	800(830)	30(-60)	718.0	387.0	1175.7
350A	508	35x24x1.2 -3ply	13	800(830)	30(-60)	811.0	437.8	1504.6
400A	559	35x24x1.2 -3ply	13	800(830)	30(-60)	867.0	467.4	1714.9

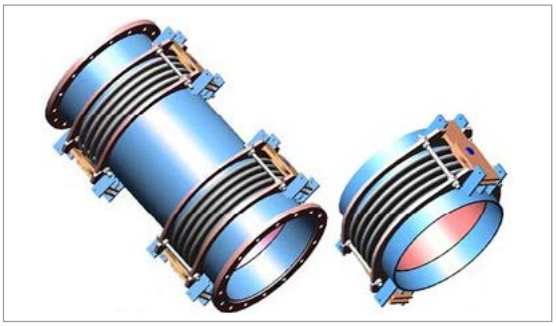
Q = Bellows Pitch W = Bellows Height

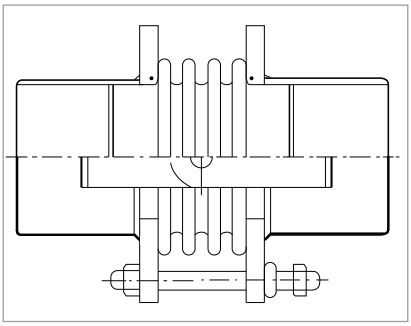
HINGED EXPANSION JOINT

These expansion joints contain hinges or pivots which cause the unit to bend in a single plane. Normally these units are prevented by their design from deflecting axially, either in extension or compression. Their hinge mechanisms are usually designed to accept the full pressure thrust. Also, because of the hinge mechanism' s design, shear loads, such as from the weight of adjacent piping, can be accepted by this expansion joint, relieving the piping designer of having to provide additional supports and anchors required by the Single type.

Application : Steam, cold water, hot water, and other pipelines.

Pressure : 0.2 MPa to 0.8 MPa





Diameter No.	Outside Dia.(mm)	No. of Convol.	Single type		Double Type Maximum Lateral Deflection						
			Angular Rotation	Length(mm) Weight(kg)		Length 1000mm	Length 1500mm	Length 2000mm	Length 2500mm	Length 3000mm	Length 4000mm
50A	150	4	8.53	264	Deflection(mm)	109	184	258	332	407	556
				20	Weight(kg)	38	41	44	47	50	56
65A	170	4	9.01	272	Deflection(mm)	91	154	217	280	343	469
				25	Weight(kg)	47	51	56	60	65	74
80A	210	4	8.03	272	Deflection(mm)	83	140	198	255	313	428
				29	Weight(kg)	55	61	67	73	79	91
100A	220	4	7.01	328	Deflection(mm)	68	119	170	221	273	375
				40	Weight(kg)	73	80	88	96	104	120
125A	270	4	5.66	328	Deflection(mm)	57	100	142	185	228	313
				47	Weight(kg)	85	94	103	112	121	139
150A	310	4	9.64	432	Deflection(mm)	82	154	226	298	370	514
				68	Weight(kg)	122	136	151	166	180	210
200A	360	4	7.28	462	Deflection(mm)	60	117	173	230	286	399
				89	Weight(kg)	154	176	199	221	244	289
250A	410	5	7.34	540	Deflection(mm)	53	111	173	228	286	402
				120	Weight(kg)	194	225	257	288	320	383
300A	460	5	6.11	590	Deflection(mm)	40	89	138	188	237	335
				166	Weight(kg)	258	299	341	382	424	507
350A	510	6	7.65	618	Deflection(mm)	46	107	168	228	290	411
				208	Weight(kg)	314	364	414	464	514	614
400A	570	6	6.68	618	Deflection(mm)	41	95	149	202	256	363
				261	Weight(kg)	394	459	524	589	654	784
450A	630	6	5.91	618	Deflection(mm)	36	84	132	180	228	324
				295	Weight(kg)	446	521	596	671	746	896
500A	700	6	5.24	618	Deflection(mm)`	35	75	118	161	204	290
				345	Weight(kg)	517	582	647	712	777	907

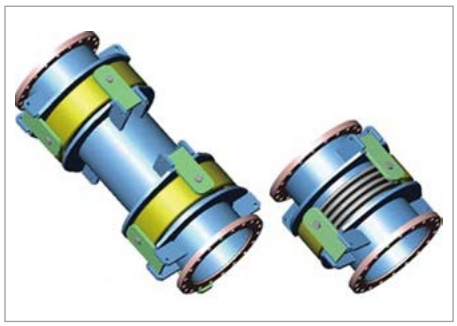
GIMBAL EXPANSION JOINT

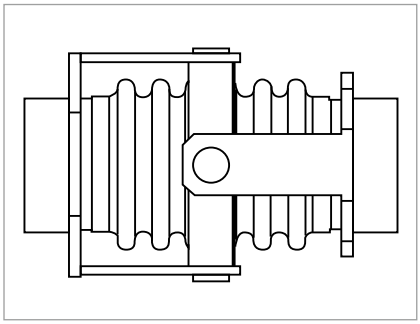
The gimbals expansion joint is basically the same as the hinge type, except that instead of being limited to deflection in only one plane, it can accept bending or angulation in any plane. It contains two sets of hinge pins or pivots, the axis of each set perpendicular to the other. Each set of pins is connected to each other with a central gimbals ring, in much the same way that a universal joint on an automobile works.

This unit provides the same type of restraint and resistance to axial forces, such as the pressure thrust, and to shear forces as the hinge type.

Application : Steam, cold water, hot water, and other pipelines.

Pressure : 0.2 MPa to 0.8 MPa





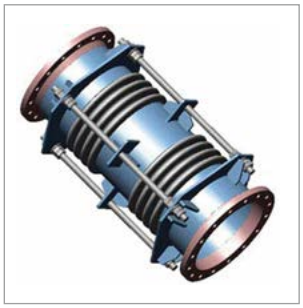
Diameter No.	Outside Dia.(mm)	No. of Convol.	Single type		Double Type Maximum Lateral Deflection						
			Angular Rotation	Length(mm) Weight(kg)		Length 1000mm	Length 1500mm	Length 2000mm	Length 2500mm	Length 3000mm	Length 4000mm
50A	150	4	8.6	264	Deflection(mm)	77	130	182	234	287	393
				23	Weight(kg)	43	46	49	52	55	61
65A	180	4	9.0	272	Deflection(mm)	64	108	153	197	242	331
				28	Weight(kg)	53	58	62	67	71	80
80A	220	4	8.0	272	Deflection(mm)	58	98	139	180	221	302
				33	Weight(kg)	63	69	75	81	87	99
100A	240	4	7.0	328	Deflection(mm)	48	84	120	156	193	265
				48	Weight(kg)	88	96	104	111	119	135
125A	285	4	5.7	328	Deflection(mm)	40	70	100	130	161	221
				56	Weight(kg)	104	113	122	131	140	158
150A	325	4	9.6	432	Deflection(mm)	57	108	159	210	261	363
				82	Weight(kg)	150	164	189	194	209	238
200A	375	4	7.2	462	Deflection(mm)	42	82	122	162	202	283
				107	Weight(kg)	190	212	215	257	280	325
250A	430	5	7.3	540	Deflection(mm)	37	78	120	161	202	284
				140	Weight(kg)	234	266	297	329	360	423
300A	480	5	6.1	590	Deflection(mm)	28	62	97	132	167	235
				193	Weight(kg)	311	352	394	435	477	605
350A	520	6	7.7	618	Deflection(mm)	32	75	118	161	205	290
				237	Weight(kg)	372	422	472	522	572	672
400A	590	6	6.7	618	Deflection(mm)	28	67	105	142	180	256
				302	Weight(kg)	471	541	606	671	736	866
450A	660	6	5.9	618	Deflection(mm)	25	59	93	127	161	229
				341	Weight(kg)	538	613	688	763	838	988
500A	730	6	5.2	618	Deflection(mm)`	22	53	83	113	144	205
				406	Weight(kg)	640	705	770	835	900	1030

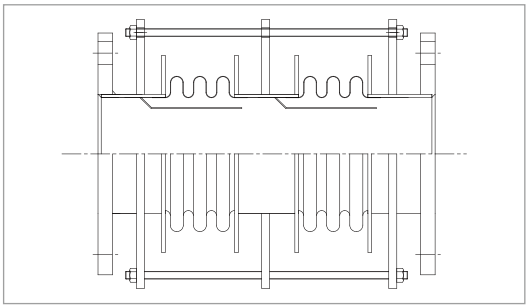
UNIVERSAL EXPANSION JOINT

Universal expansion joint assemblies consist of two bellows connected by a center spool piece wth flange or pipe ends. The universal arrangement allows greater axial, lateral and angular movements than a single bellows assembly.

Application : For possible subsidence of tanks, as well as for steam, hot water, oil, and other pipelines where non-straight connections are required.

Pressure : An officially certified product 1.0 MPa (MAX)
a general product 0.2 MPa to 2.0 MPa





Diameter No.	Outside Dia.(mm)	Maximum Lateral Deflection (Y)								
			50mm	100mm	150mm	200mm	250mm	300mm	350mm	400mm
100A	280	Length(mm)	700	1100	1400	1800	2100	2500	2800	3200
		Weight(kg)	56	66	74	84	92	102	110	120
200A	430	Length(mm)	900	1300	1700	2100	2500	2900	3300	3700
		Weight(kg)	145	170	190	215	240	260	285	305
300A	460	Length(mm)	1000	1400	1800	2200	2600	3000	3300	3700
		Weight(kg)	270	310	3.50	390	430	470	505	545
400A	550	Lengthmm)	1200	1600	2100	2400	2800	3200	3600	4000
		Weight(kg)	395	465	555	615	695	775	855	935
500A	650	Length(mm)	1300	1800	2300	2800	3300	3800	4300	4800
		Weight(kg)	645	745	845	945	1045	1145	1245	1345
600A	750	Length(mm)	1400	1900	2500	3000	3600	4100	4700	5300
		Weight(kg)	905	1025	1165	1285	1425	1545	1685	1825
700A	1070	Length(mm)	1400	2000	2500	3000	3600	4100	4700	5300
		Weight(kg)	860	1000	1120	1240	1380	1500	1640	1780
800A	1170	Length(mm)	1500	2100	2700	3200	3800	4300	4800	5400
		Weight(kg)	1080	1280	1360	1490	1640	1780	1890	2040
900A	1280	Length(mm)	1600	2200	2800	3400	4000	4600	5200	5800
		Weight(kg)	1230	1440	1650	1860	2070	2280	2490	2700
1000A	1440	Length(mm)	1800	2600	3300	4100	4800	5500	6300	7000
		Weight(kg)	1540	1830	2080	2330	2620	2830	3160	3410
1100A	1550	Length(mm)	1900	2800	3600	4400	5200	6000	6800	7600
		Weight(kg)	1735	2124	2465	2807	3151	3494	3837	4180
1200A	1680	Length(mm)	2000	2900	3800	4700	5600	6500	7300	8200
		Weight(kg)	2003	2442	2881	3322	3762	4200	4591	5035
1300A	1800	Length(mm)	2100	3100	4000	5000	5900	6900	7900	8800
		Weight(kg)	2395	2961	3483	4021	4569	5141	5713	6228
1400A	1900	Length(mm)	2200	3200	4300	5300	6300	7400	8400	9400
		Weight(kg)	2511	3116	3783	4390	4996	5662	6268	6874
1500A	2000	Length(mm)	2200	3400	4500	5600	6700	7600	8900	10000
		Weight(kg)	2665	3428	4139	4844	5548	6126	6959	7664

PRESSURE BALANCED EXPANSION JOINTS

A Pressure Balanced Expansion Joint is designed to absorb axial movement and lateral deflection, while absorbing pressure thrust. This is achieved by means of tie rod restraints that connect a line bellows with an opposed balanced bellows also subjected to line pressure.

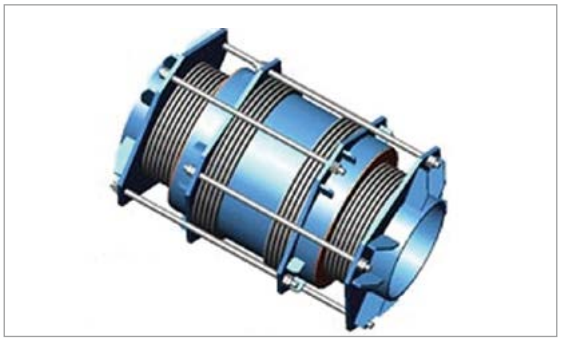
Generally, to use bellows type of expansion joint, It is needed to install fixed point that receive thrust force of internal pressure. In case of large diameter and high pressure, it is difficult to install fixed point according to the place. You can use Pressure Balanced type expansion joint in this case and you can save expense of installation of fixed point.

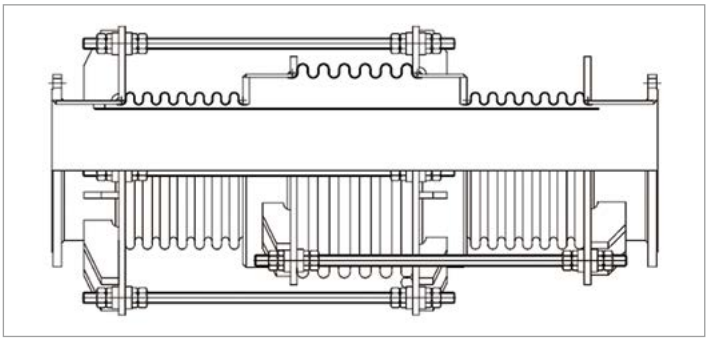
This type is classified into S type , T-type, L-type

Application : Oil, cold blast, steam, and other pipelines

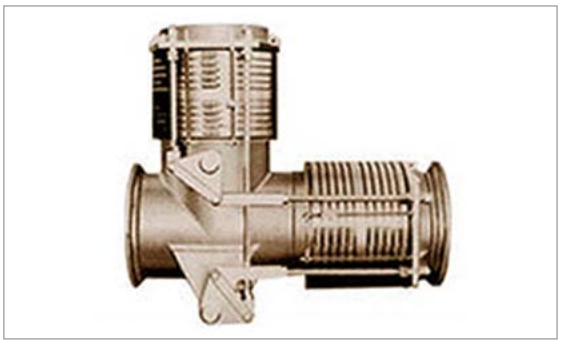
Pressure : 0.2MPa to 10MPa

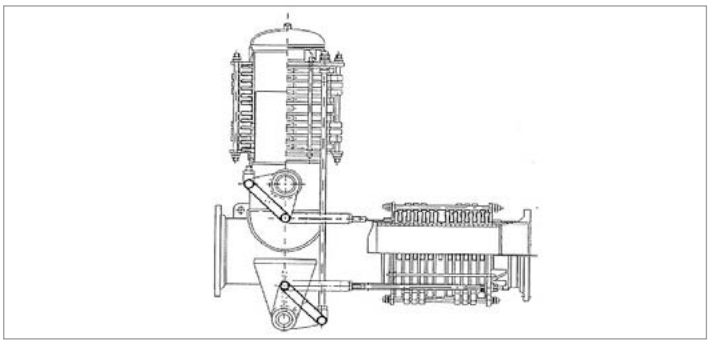
▪ PRESSURE BALANCED EXPANSION JOINTS (S-TYPE)



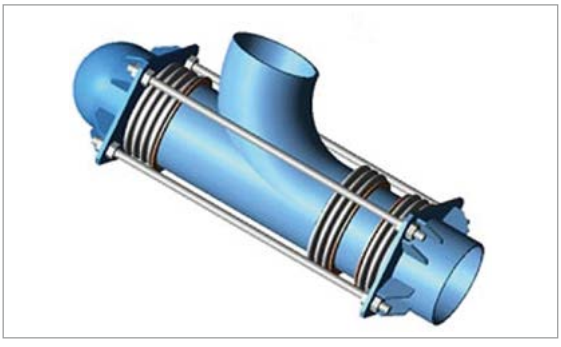


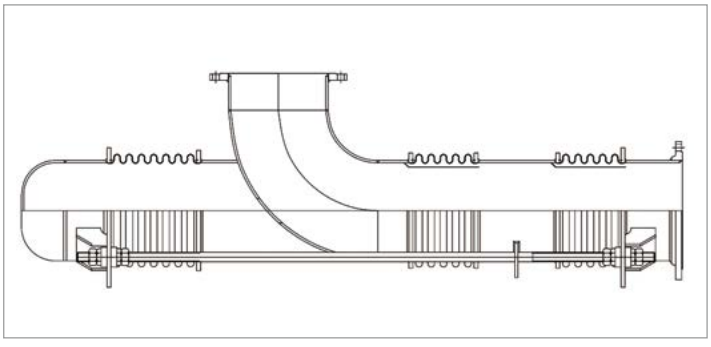
▪ PRESSURE BALANCED EXPANSION JOINTS (T-TYPE)





▪ PRESSURE BALANCED EXPANSION JOINTS (L-TYPE)



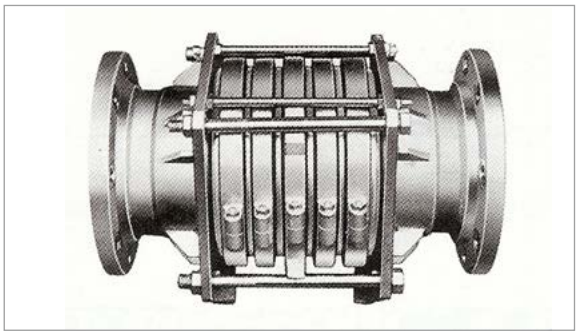


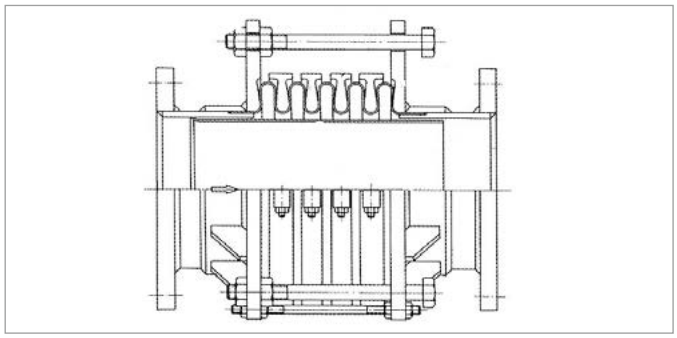
CONTROL RING TYPE EXPANSION JOINT

Control Ring Type Expansion Joint has strusture that inserted ring to make every bellows work equally and reinforced intensity of bellows internal pressure to endure high pressure.

Application : Hot water, high pressure steam, oil, and other pipelines.

Pressure : 0.2MPa to 20MPa





Diameter No.	Outside Diameter. (mm)	Bellows WxQxT(mm)	No of Convolution	Overall Length(mm) (at preset)	Axial Mov.(mm) (at preset)	Spring Rate Kx(N/mm)	Effective Diameter Dm(mm)	Effective Section Area(mm)	Weight (Kg)
50A	185	25x25x0.8	5	325(335)	±10(-20)	90.3	76.4	45.8	22
			10	450(470)	±20(-40)	48.1	76.4	45.8	29
65A	205	25x25x0.8	5	325(335)	±10(-20)	106.9	91.7	66.0	26
			10	450(470)	±20(-40)	54.0	91.7	66.0	35
80A	220	25x25x0.8	6	350(362)	±12(-24)	102.0	104.2	85.2	31
			12	500(524)	±24(-48)	51.0	104.2	85.2	42
100A	255	30x30x0.8	5	390(404)	±14(-28)	90.3	133.0	138.9	42
			11	570(602)	±32(-64)	41.2	133.0	138.9	59
125A	280	30x30x0.8	5	480(404)	±14(-28)	106.9	157.7	195.2	51
			11	640(602)	±32(-64)	48.1	157.7	195.2	69
150A	340	40x40x1.0	4	480(496)	±16(-32)	133.4	192.0	289.4	74
			8	640(672)	±32(-64)	66.7	192.0	289.4	101
			10	720(760)	±40(-80)	54.0	192.0	289.4	114
200A	395	40x40x1.0	4	480(496)	±16(-32)	168.7	241.5	457.8	103
			8	640(672)	±32(-64)	84.4	241.5	457.8	136
			10	720(760)	±40(-80)	67.7	241.5	457.8	152
250A	375	50x50x1.2	3	500(516)	±16(-32)	246.2	299.8	705.6	140
			6	650(682)	±32(-64)	123.6	299.8	705.6	182
			8	750(792)	±42(-84)	92.2	299.8	705.6	211
300A	450	60x50x1.5	3	550(567)	±17(-34)	366.8	360.0	1017.4	210
			6	700(733)	±33(-66)	183.4	360.0	1017.4	269
			7	750(789)	±39(-78)	157.0	360.0	1017.4	305
350A	485	60x50x1.5	5	600(617)	±17(-34)	403.1	395.5	1227.9	266
			6	750(783)	±33(-66)	201.1	395.5	1227.9	329
			7	800(839)	±39(-78)	172.6	395.5	1227.9	353
400A	535	60x50x1.5	3	650(667)	±17(-34)	452.1	444.0	1547.5	311
			6	800(833)	±33(-66)	225.6	444.0	1547.5	381
			7	850(889)	±39(-78)	194.2	444.0	1547.5	406
450A	590	60x50x1.5	3	650(667)	±17(-34)	503.1	494.5	1919.6	338
			6	800(833)	±33(-66)	252.1	494.5	1919.6	415
			7	850(889)	±39(-78)	215.8	494.5	1919.6	440
500A	650	60x50x1.5	3	700(717)	±17(-34)	555.1	545.5	2335.9	410
			6	750(883)	±33(-66)	277.6	545.5	2335.9	501
			7	900(919)	±39(-78)	238.3	545.5	2335.9	537
600A	750	60x50x1.5	3	700(717)	±17(-34)	658.1	646.5	3281.0	542
			6	850(883)	±33(-66)	329.5	646.5	3281.0	647
			7	900(939)	±39(-78)	282.5	646.5	3281.0	688

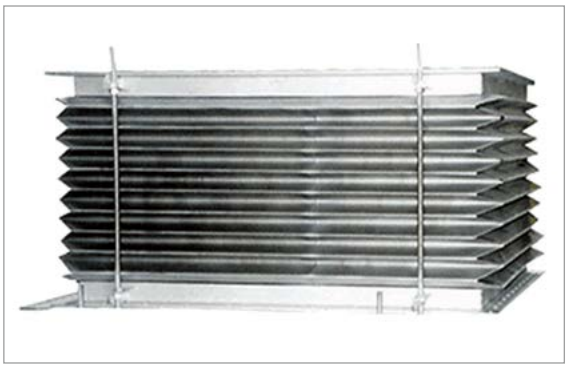
Q = Bellows Pitch W = Bellows Height

RECTANGULAR TYPE EXPANSION JOINT

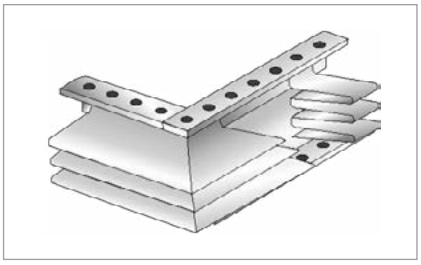
Rectangular Type Expansion Joint is designed to absorb the thermal expansion of large size rectangular duct line of high temperature with low pressure temperature. Rectangular Type Expansion Joint is classified Miter(single, double) corner type, Round corner type, and Camera corner type.

Application : Gas turbine exhaust system, turbine/condenser connections, Boiler breaching, Forced draft fans, flue gas ducts, regenerators, precipitators and other hot gas, large volume ducting systems.

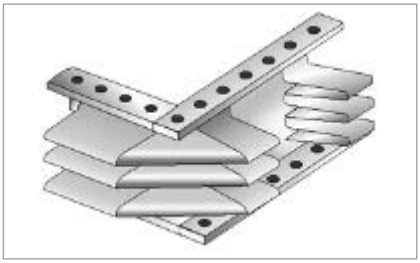
Pressure : -0.05MPa to 0.2MPa



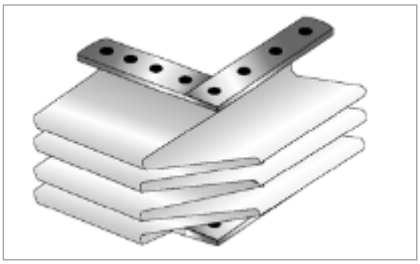
Single Miter :
This is the most common and economical type used to compensate for thermal expansion and can readily be bolted or welded into the connecting duct work. These are preferred in low cycle and vibration-free application.



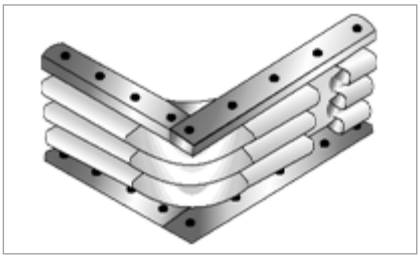
Double Miter :
This corner is slightly more expensive to manufacture than the single miter design. However, they do provide a greater cycle life under the same set of operating conditions.



Camera Corners :
These are used mainly on low-pressure applications. They have good cycle life characteristics and are less costly than the double miter corner design.



Rounded Corners :
Should be considered in applications up to 2kg/㎠ and where vibration and cycle life are important factors. Rounded corners are the most costly to manufacture.

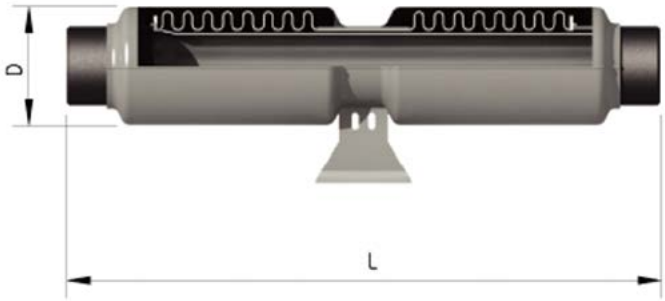


WELDED TYPE OF GENERAL EXPANSION JOINT

standard manufacture

▪ Single type.

▪ Double type.



Type	Single		Double	
Model No.	JBS-10W	JBS-20W	JBD-10W	JBD-20W
Max. Pressure(Kgf/㎠)	Max.10	Max.20	Max.10	Max.20
Max. Temperature(℃)	Max.220			
Connection	Butt-Weld			
Material	Bellows(STS304), Sleeve(STS304), Pipe(Carbon steel)			
Using Fluid	Steam, Air, Gases, Water & Oils			
Axial Movement(mm)	Max.40(-30, +10)		Max.80(-60, +20)	
Code.	KS B 1536 A	MFG.STD	KS B 1536 A	MFG.STD

▪ Single spec.

N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	365	49.6	10	30	1.1	1.2
25A	365	54	10	30	1.1	1.2
32A	365	60.5	10	30	1.3	1.5
40A	365	70	10	30	1.4	1.8
50A	365	90	10	30	2.0	2.3
65A	415	102	10	30	2.7	4.0
80A	415	130	10	30	4.5	5.6
100A	415	155	10	30	7.0	7.5
125A	440	190	10	30	8.8	10.0
150A	440	228	10	30	11.7	14.7
200A	440	318.5	10	30	25.3	33.0
250A	465	355.6	10	30	32.5	42.0
300A	465	457.2	10	30	44.0	53.0
350A	465	457.2	10	30	49.0	69.0
400A	490	508	10	30	64.0	79.0
450A	490	558.8	10	30	65.0	95.0
500A	490	609.6	10	30	72.0	108.0

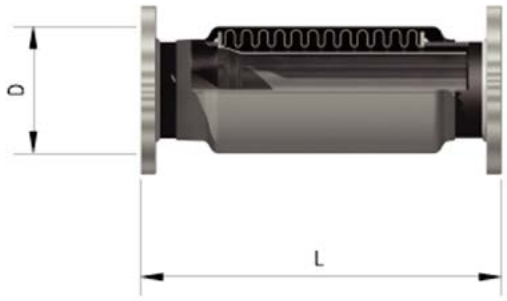
▪ Double spec.

N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	680	49.6	20	60	3.0	3.5
25A	680	54	20	60	3.0	3.5
32A	680	60.5	20	60	3.5	3.9
40A	680	70	20	60	3.9	4.5
50A	680	90	20	60	4.7	5.7
65A	780	102	20	60	7.2	8.6
80A	780	130	20	60	10.8	12.8
100A	880	155	20	60	16.9	17.8
125A	880	190	20	60	19.0	24.0
150A	930	228	20	60	25.2	33.1
200A	930	318.5	20	60	59.9	71.5
250A	930	355.6	20	60	76.0	106.5
300A	980	457.2	20	60	86.0	130.0
350A	1030	457.2	20	60	115.0	160.0
400A	1030	508	20	60	129.0	192.0
450A	1080	558.8	20	60	152.0	239.0
500A	1080	609.6	20	60	180.0	268.0

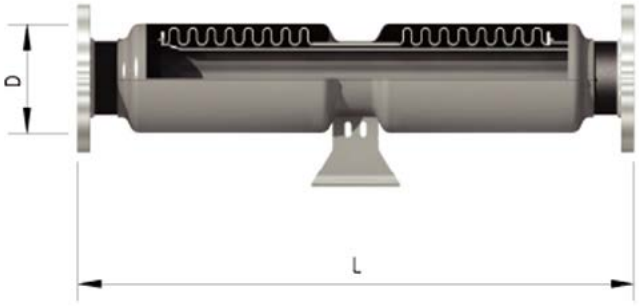
FLANGED TYPE OF GENERAL EXPANSION JOINT

standard manufacture

▪ Single type.



▪ Double type.



Type	Single		Double	
Model No.	JBS-10F	JBS-20F	JBD-10F	JBD-20F
Max. Pressure(Kgf/㎠)	Max.10	Max.20	Max.10	Max.20
Max. Temperature(℃)	Max.220			
Connection	Flanged			
Material	Bellows(STS304), Sleeve(STS304), Pipe(Carbon steel)			
Using Fluid	Steam, Air, Gases, Water & Oils			
Axial Movement(mm)	Max.40(-30, +10)		Max.80(-60, +20)	
Code.	KS B 1536 A	MFG.STD	KS B 1536 A	MFG.STD

▪ Single spec.

N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	365	49.6	10	30	3.5	3.6
25A	365	54	10	30	3.5	3.6
32A	365	60.5	10	30	4.4	4.6
40A	365	70	10	30	4.7	5.0
50A	365	90	10	30	5.9	6.0
65A	415	102	10	30	8.2	9.1
80A	415	130	10	30	9.8	13.9
100A	415	155	10	30	13.2	16.8
125A	440	190	10	30	18.4	20.0
150A	440	228	10	30	21.4	34.0
200A	440	318.5	10	30	39.8	59.6
250A	465	355.6	10	30	57.1	88.8
300A	465	457.2	10	30	71.6	108.4
350A	465	457.2	10	30	85.4	147.4
400A	490	508	10	30	114.4	187.4
450A	490	558.8	10	30	131.0	238.4
500A	490	609.6	10	30	147.2	280.4

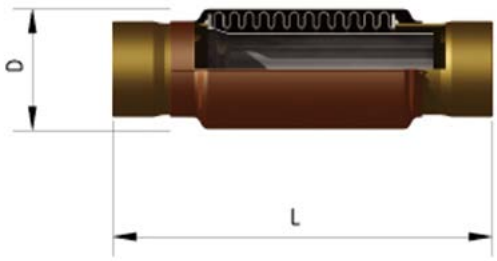
▪ Double spec.

N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	680	49.6	20	60	5.7	6.0
25A	680	54	20	60	5.7	6.0
32A	680	60.5	20	60	6.7	7.0
40A	680	70	20	60	7.6	8.2
50A	680	90	20	60	9.2	9.6
65A	780	102	20	60	12.7	13.8
80A	780	130	20	60	15.9	20.0
100A	880	155	20	60	23.4	27.0
125A	880	190	20	60	29.0	37.0
150A	930	228	20	60	40.0	53.0
200A	930	318.5	20	60	74.3	98.1
250A	930	355.6	20	60	100.4	153.3
300A	980	457.2	20	60	113.6	185.4
350A	1030	457.2	20	60	151.4	238.4
400A	1030	508	20	60	179.4	300.4
450A	1080	558.8	20	60	218.0	382.4
500A	1080	609.6	20	60	255.2	440.4

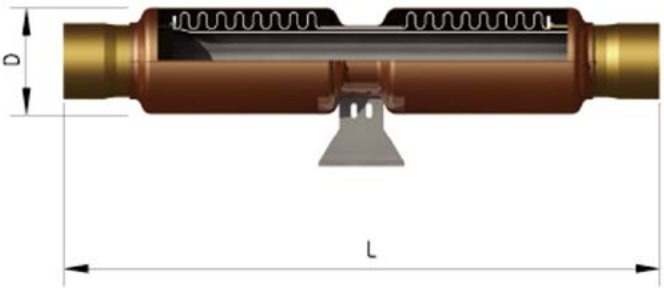
SOKET - BRAZING TYPE EXPANSION JOINT

standard manufacture

▪ Single type.



▪ Double type.



Type	Single		Double	
Model No.	JBCUS-10K	JBCUS-20K	JBD-10K	JBD-20K
Max. Pressure(Kgf/㎠)	Max.10	Max.20	Max.10	Max.20
Max. Temperature(℃)	Max.220			
Connection	Socket-brazing			
Material	Bellows(STS304), Sleeve(STS304), Pipe(Copper)			
Using Fluid	Steam, Air, Gases, Water & Oils			
Axial Movement(mm)	Max.35(-25, +10)		Max.70(-50, +20)	
Code.	KS B 1536 A	MFG.STD	KS B 1536 A	MFG.STD

▪ Single spec.

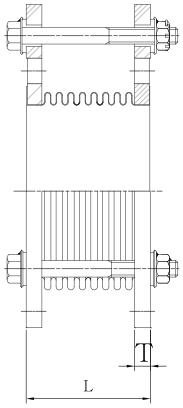
N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	365	49.6	10	25	0.9	0.9
25A	365	49.6	10	25	0.9	0.9
32A	365	54	10	25	0.9	0.9
40A	365	60.5	10	25	1.0	1.0
50A	365	70	10	25	1.4	1.4
65A	415	90	10	25	2.0	2.0
80A	415	102	10	25	2.7	2.7
100A	415	129	10	25	4.5	4.5
125A	440	151	10	25	5.7	5.7
150A	440	228	10	25	10.3	-
200A	440	318.5	10	25	22.9	-
250A	465	355.6	10	25	29.2	-

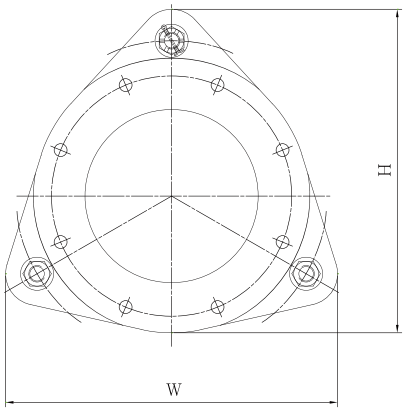
▪ Double spec.

N.D	L	D	Axial Movement		Weight(Kg)	
			ext.	comp.	10K	20K
20A	680	49.6	20	50	2.4	2.4
25A	680	49.6	20	50	2.4	2.4
32A	680	54	20	50	2.6	2.6
40A	680	60.5	20	50	3.0	3.0
50A	680	70	20	50	3.4	3.4
65A	780	90	20	50	5.7	5.7
80A	780	102	20	50	7.0	7.0
100A	880	129	20	50	12.5	12.5
125A	880	151	20	50	15.5	15.5
150A	930	228	20	50	22.5	-
200A	930	318.5	20	50	53.7	-
250A	930	355.6	20	50	68.2	-

TIED PUMP CONNECTOR (TPC)

standard manufacture





Model No.	TPC-10K	TPC-20K
Max. Pressure(Kgf/㎠)	Max.10	Max.20
Max. Temperature(℃)	Max.220	
Connection	Flanged	
Material	Bellows(STS304), Flange(Carbon steel)	
Using Fluid	Steam, Air, Gases, Water & Oils	
Axial Movement(mm)	Axial : Max.18(-15, +3), Lateral : 3	
Code.	MFG.STD	MFG.STD

▪ 10K spec.

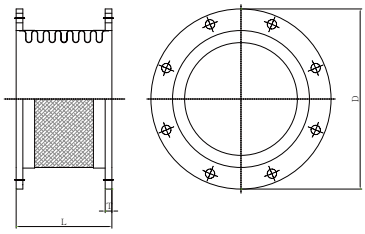
N.D	L	L'	T	W	H	Movement			Weight (Kg)
						Axial		Lateral	
						ext.	comp.		
25A	90	75	16	197	178	3	15	3	6.4
32A	90	75	16	206	186	3	15	3	6.8
40A	90	75	16	210	189	3	15	3	7.2
50A	125	110	16	249	225	3	15	3	9.5
65A	125	110	16	266	240	3	15	3	10.5
80A	125	110	16	275	247	3	15	3	11.3
100A	125	110	16	296	271	3	15	3	12.7
125A	130	115	19	331	311	3	15	3	17.0
150A	150	135	19	357	341	3	15	3	19.3
200A	150	135	19	400	391	3	15	3	23.6

▪ 20K spec.

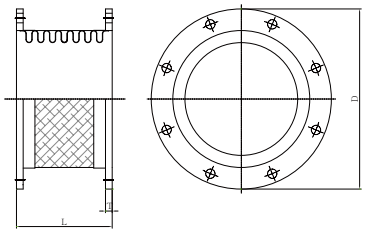
N.D	L	L'	T	W	H	Movement			Weight (Kg)
						Axial		Lateral	
						ext.	comp.		
25A	90	75	16	197	178	3	15	3	6.4
32A	95	80	19	206	185	3	15	3	7.6
40A	95	80	19	206	185	3	15	3	8.2
50A	130	115	19	248	224	3	15	3	10.5
65A	130	115	19	265	239	3	15	3	12.2
80A	135	120	22	287	260	3	15	3	13.9
100A	145	130	25	308	285	3	15	3	20.5
125A	145	130	25	347	330	3	15	3	25.8
150A	170	155	28	385	370	3	15	3	32.9
200A	170	155	30	416	410	3	15	3	40.0

FLEXIBLE HOSE PUMP CONNECTOR (FPC)

standard manufacture



25A~300A



350A~

Model No.	FPC-10K	FPC-20K
Max. Pressure(Kgf/㎠)	Max.10	Max.20
Max. Temperature(℃)	Max.220	
Connection	Flanged	
Material	Bellows(STS304), Flange(Carbon steel)	
Using Fluid	Steam, Air, Gases, Water & Oils	
Axial Movement(mm)	Axial : Max.6(-3, +3), Lateral : 3	
Braid	25A~350A(wire Braid)/350A~(Ribbon Braid)	
Code.	MFG.STD	MFG.STD

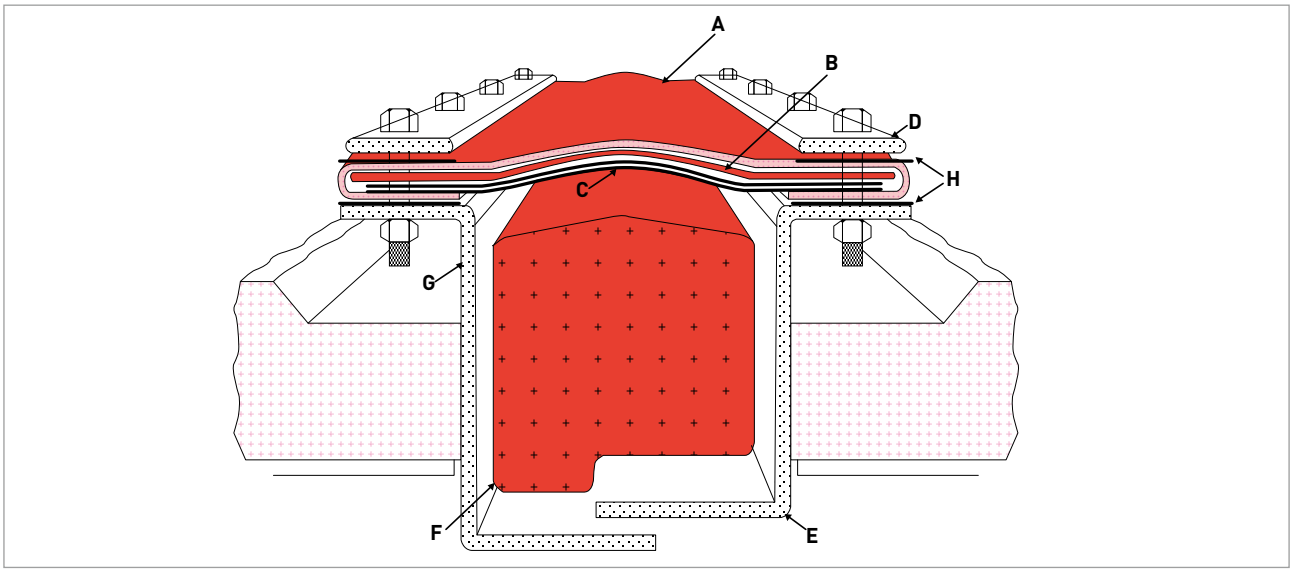
▪ 10K spec.

N.D	L	D	T	Movement			Weight (Kg)
				Axial		Lateral	
				Ext.	Comp.		
25A	200	125	14	3	3	3	2.7
32A	200	135	16	3	3	3	3.4
40A	220	140	16	3	3	3	3.5
50A	220	155	16	3	3	3	4.2
65A	220	175	18	3	3	3	4.4
80A	240	185	18	3	3	3	6.1
100A	240	210	18	3	3	3	7.6
125A	280	250	20	3	3	3	10.5
150A	280	280	22	3	3	3	13.8
200A	300	330	22	3	3	3	15.2
250A	300	400	24	3	3	3	24.5
300A	300	445	24	3	3	3	42.0
350A	300	490	26	3	3	3	55.0

▪ 20K spec.

N.D	L	D	T	Movement			Weight (Kg)
				Axial		Lateral	
				Ext.	Comp.		
25A	200	125	16	3	3	3	6.2
32A	200	135	18	3	3	3	7.0
40A	220	140	18	3	3	3	7.2
50A	220	155	18	3	3	3	8.0
65A	220	175	20	3	3	3	8.2
80A	240	200	22	3	3	3	11.8
100A	240	225	24	3	3	3	15.6
125A	280	270	26	3	3	3	23.6
150A	280	305	28	3	3	3	30.0
200A	300	350	30	3	3	3	30.4
250A	300	430	34	3	3	3	54.8
300A	300	480	36	3	3	3	64.8
350A	300	540	40	3	3	3	91.7

FUNCTION OF FABRIC EXPANSION JOINT COMPONENT



A. Gas Seal Membrane

The gas seal membrane is intended to withstand system pressure and be resistant to chemical attack from the interior and the exterior. The gas seal must also have the flexibility to absorb thermal movements. Depending on system temperature, it may require additional thermal protection.

B. Insulating Layers

The insulating layers provide a thermal barrier to ensure that the inside surface temperature of the gas seal membrane does not exceed its maximum service temperature. The insulating layer can also reduce condensation caused by the gas stream coming in contact with the "cool" surface of an insulated gas seal membrane.

C. Insulating Retainer Layer

This layer is provided to keep the insulating layers in place in order to maintain thermal integrity. The retaining layer must be capable of withstanding gas stream temperatures and must be chemically compatible with system media.

D. Back up bars

Back up bars, positioned at the flange attachment, use clamping pressure to create the fabric-to-duct seal and restrain the fabric when it is subjected to the system pressure. The thickness and width of the back up bars should be sufficient to perform this function with the bolt spacing being used. The edges of the back up bars should have a radius to preclude cutting of the fabric.

E. Metal Liner or Baffle

A liner is designed to protect the gas seal membrane and insulating layers of the flexible element from abrasive particles which may be present in the gas stream. A liner is also used to reduce flutter of the fabric element caused by turbulence, to help control the accumulation of dust or ash in the expansion joint cavity, and to reduce the temperature of the flexible element.

F. Accumulation Bag

An accumulation bag is intended to deter flash from building up in the expansion joint cavity, It is typically used, in conjunction with a liner, in duct runs from boilers to air clean-up equipment such as precipitators, scrubbers and bag houses, or whenever high amounts of duct or ash are present in the gas. A flash barrier must be capable of retaining its strength and flexibility while being exposed to maximum system temperatures and media.

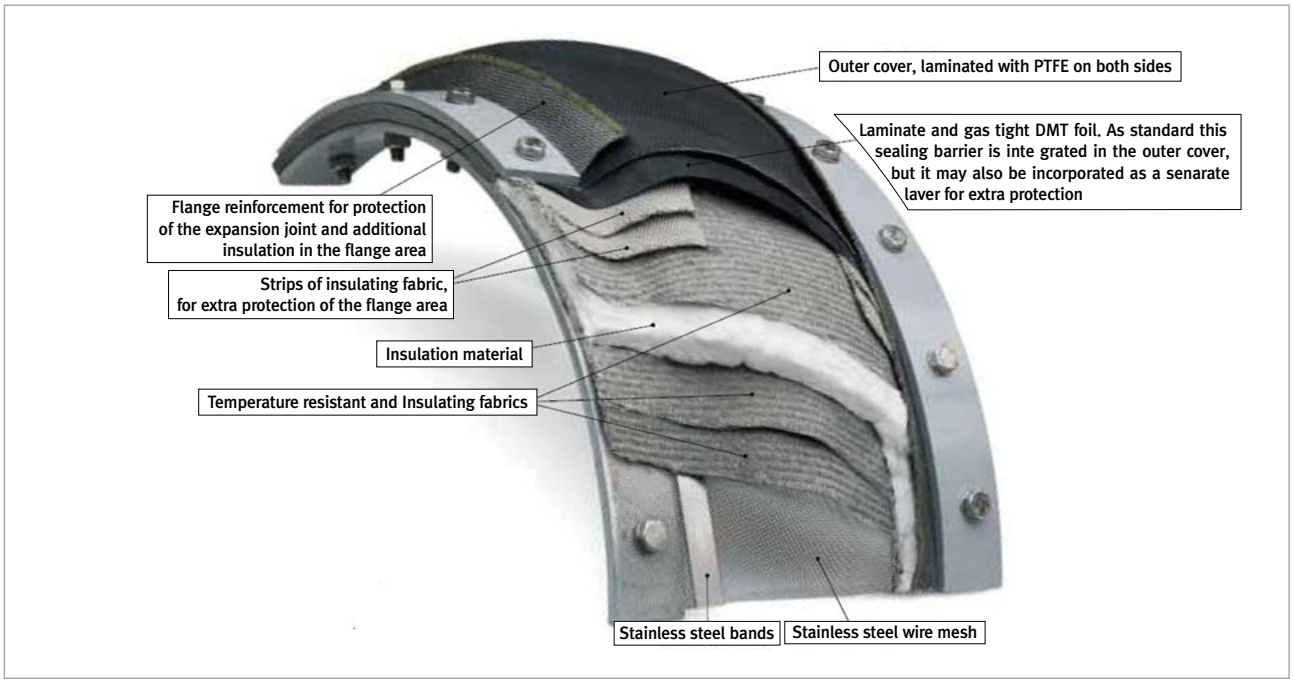
G. Fabric Attachment Flanges

Fabric attachment flanges are required to connect the flexible element to the ductwork. Properly designed, they can be attached directly to the duct work and thus eliminate the necessity for an adjoining duct flange. Flanges can be designed with a "landing bar" duct attachment which allows some installation misalignment without affecting the flexible element. the edges of the flanges in contact with the gas seal membrane should also have a radius to prevent damage.

H. Gasket

Fabric belts with insulating layers require a thermal insulating gasket to protect fabric components from hot attachment flanges and backup bars. Low temperature, single ply designs require flexible, chemically insert gasket.

STRUCTURE OF FABRIC BELLOWS (BELLOWS LAYERS)



Multi-layer expansion joints

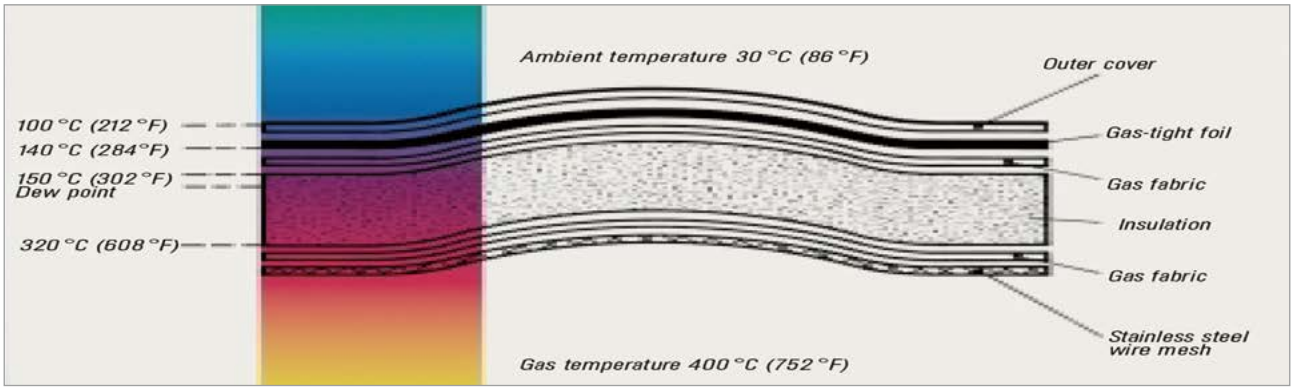
By combining different materials and taking into account their thermal, chemical and mechanical resistance as well as their fatigue properties, we ensure the optimum solution both in technical and economical respect. Basically, the design of multi-layer expansion joints comprises four groups of materials.

- **Outer cover material**
  Protects the expansion joint from pressure and temperature and guarantees from stability. In most cases the material is coated and may also function as gas sealing barrier. Stainless steel wire mesh and steel bands are further used for special designs to give added mechanical protection and dimensional stability.

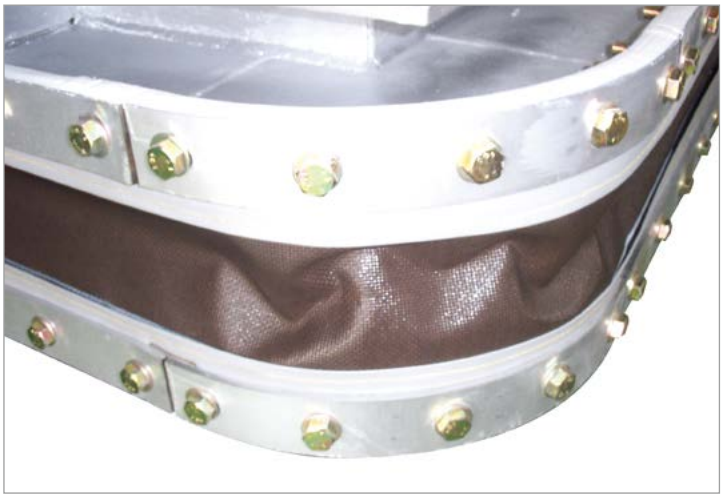
- **Gas sealing foil**
  The gas sealing foil is the actual sealing element, usually imbedded between fabric layers. Impermeable and chemically resistant

- **Temperature-resistant fabrics**
  Very strong and Temperature resistant fabrics are used to protect the gas sealing foil and/or the insulation materials.

- **Insulating materials**
  Protect both the gas sealing foil and other expansion joint materials from high temperatures of the medium.



STRUCTURE OF FABRIC BELLOWS (INSULATION LAYERS)



Variables to consider

The following considerations will influence the design and the choice of the right expansion joint type.

• Medium

The choice of expansion joint type is determined, among other things, by possible chemical influences. Abrasion from solid matter is largely prevented by using a sleeve/baffle construction.

• Temperature

A specific number of insulating materials are required for reducing the temperature. Our Technical Department determines the insulating effect by calculating and measuring the temperatures in a compute expansion joint. The exact temperature flow is found by means of temperature probes and recorders. Temperature range: -60...+ 1,200℃ (-76...+2,192℉) (dependant on design)

• Pressure

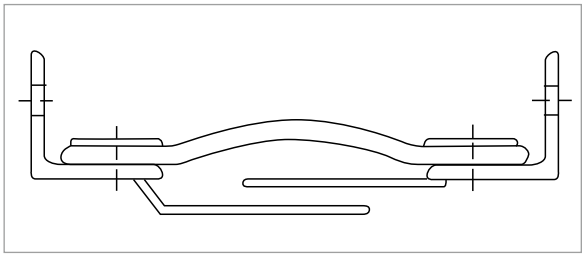
Will the expansion joint be used in a positive pressure or negative pressure area? This will ,have influence on both type and design of the expansion joint. The main application area covers the pressure range of 400 amber (40 kPa). (fabric expansion joints will resist pressures of up to approx 0.3 bars), dependant on other operating parameters.

• Tightness (sealing)

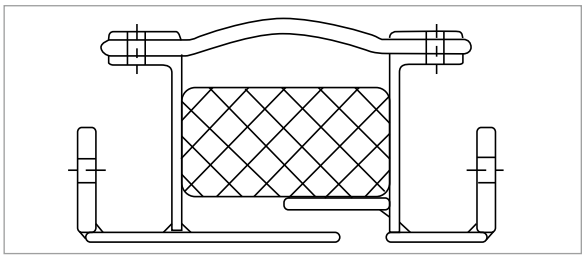
The requirements for tightness have influence on the design and especially the configuration of the flange area. If the sealing rate must be documented (Nekal tightness or specific leakage rates), the expansion joints are built with special flange designs. We are able to determine leakage rates for various materials and complete expansion joint structures on our test rigs.

FABRIC EXPANSION JOINT-GEOMETRIES

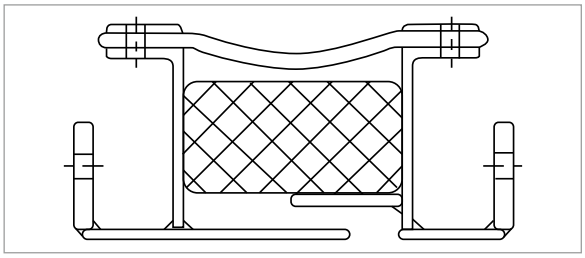
• Clamp Fixed Type	• Lateral Offset : 10%
• Sleeve establishment	• Low Temp. Duct Line
• Positive Pressure	• Air Duct
• Temperature : −40℃ ~ 400℃	• Round Oval Conical
• Axial Extention : 10%	• Rectangular
• Axial Compression : 25%	



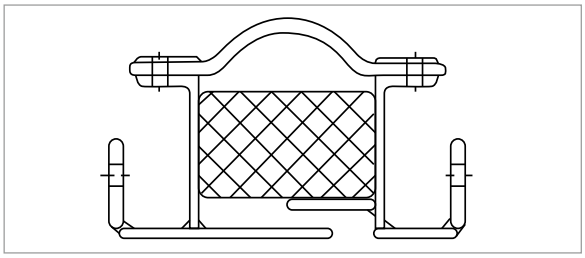
• Clamp Fixed Type	• Axial Extention : 10%
• Sleeve establishment Insert Insulation Between Sleeve and Tube	• Axial Compression : 25% • Lateral Offset : 10% • High Temp. Duct Line
• Positive Pressure	• Round Oval Conical
• Temperature : −40℃ ~ 1100℃	• Rectangular



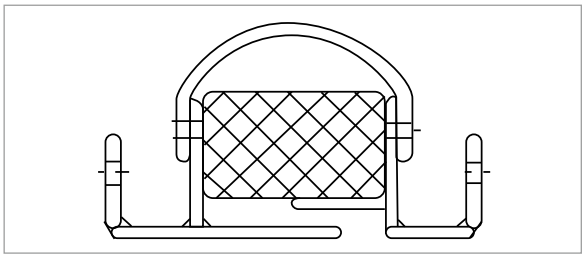
• Clamp Fixed Type	• Axial Extention : 10%
• Sleeve establishment Insert Insulation Between Sleeve and Tube	• Axial Compression : 25% • Lateral Offset : 10% • High Temp. Duct Line
• Positive Pressure	• Round Oval Conical
• Temperature : −40℃ ~ 1100℃	• Rectangular



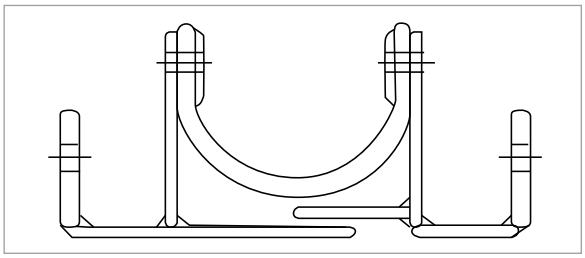
• Clamp Fixed Type	• Axial Extention : 20%
• Sleeve establishment Insert Insulation Between Sleeve and Tube	• Axial Compression : 50% • Lateral Offset : 20% • High Temp. Duct Line
• Positive Pressure	• Round Oval
• Temperature : −40℃ ~ 1100℃	• Rectangular



• Flange Fixed Type	• Axial Extention : 30%
• Sleeve establishment Insert Insulation Between Sleeve and Tube	• Axial Compression : 50% • Lateral Offset : 20% • High Temp. Duct Line
• Positive Pressure	• Round Oval
• Temperature : −40℃ ~ 1100℃	• Rectangular

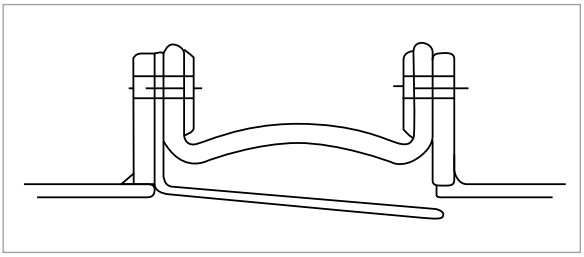


• Flange Fixed Type	• Axial Compression : 50%
• Sleeve establishment	• Lateral Offset : 20%
• Negative Pressure	• Middle Temp. Duct Line
• Temperature : −40℃ ~ 400℃	• Round Oval jConical
• Axial Extention : 30%	• Rectangular

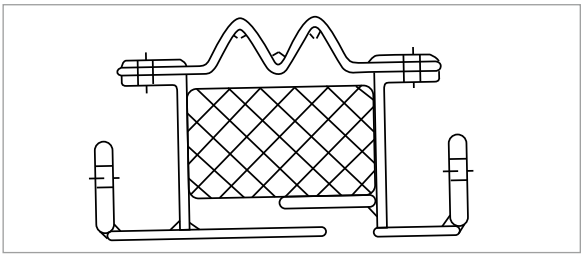


FABRIC EXPANSION JOINT-GEOMETRIES

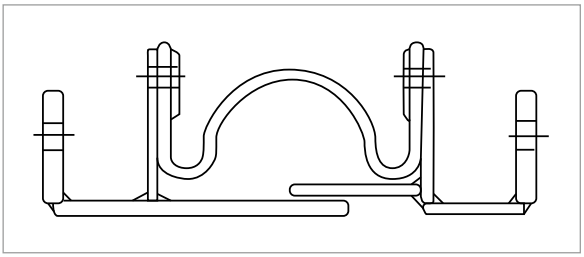
• Flange Fixed Type	• Axial Compression : 25%
• Sleeve establishment	• Lateral Offset : 10%
• Negative Pressure	• Middle Temp. Duct Line
• Temperature : −40℃ ~ 400℃	• Round Oval
• Axial Extention : 10%	• Rectangular



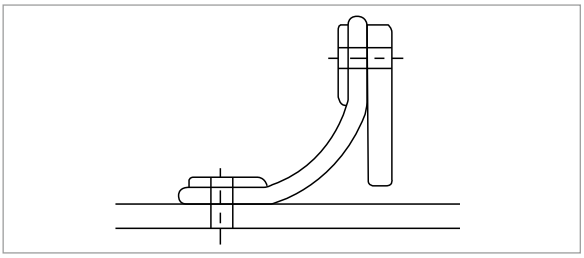
• Flange Fixed Type	• Axial Compression : 50%
• Insert Insulation Between Sleeve and bellows	• Lateral Offset : 15%
• Negative Pressure	• Middle Temp. Duct Line
• Positive Pressure	• Round Oval
• Temperature : −40℃ ~ 750℃	• Rectangular
• Axial Extention : 50%	



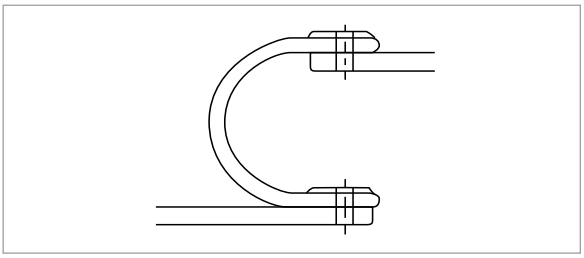
• Flange Fixed Type	• Axial Compression : 40%
• Sleeve establishment	• Lateral Offset : 20%
• Negative Pressure	• Middle Temp. Duct Line
• Positive Pressure	• Round Oval
• Temperature : −40℃ ~ 400℃	• Rectangular
• Axial Extention : 20%	



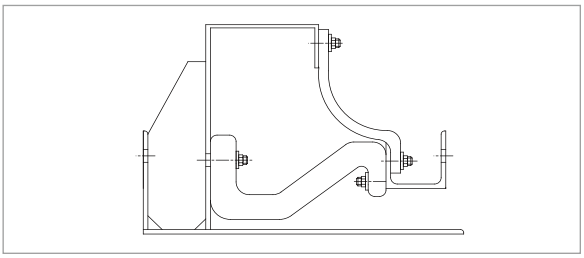
• Flange Fixed Type	• Axial Compression : 20%
• Negative Pressure	• Lateral Offset : 20%
• Positive Pressure	• High Temp. Structure
• Temperature : −40℃ ~ 750℃	• Round
• Axial Extention : 20%	• Rectangular



• Flange Fixed Type	• Axial Compression : 50%
• Sleeve establishment	• Lateral Offset : 20%
• Positive Pressure	• Round Oval
• Temperature : −40℃ ~ 750℃	• Rectangular
• Axial Extention : 50%	



• Flange Fixed Type	• Axial Compression : 80%
• Sleeve establishment	• Lateral Offset : 20%
• Positive / Negative presure	• Round Oval
• Temperature : −40℃ ~ 1100℃	• Rectangular
• Axial Extention : 80%	



NO LEAK TYPE-
NON METALLIC EXPANSION JOINT

COMPOSITE NO-LEAK TYPE NON-METALLIC EXPANSION JOINT

Dmtflex composite-type flexible elements consist of multiple layer of high temperature fabrics, thermal insulation and an external cover of materials dictated by the operating conditions and external atmosphere around the expansion joint location. The addition of a PFE film laminated fiberglass vapor barrier and extra rein-forcing piles are also incorporated in this construction if there is a cycling of the flue gas through the dew point.

ELASTOMERIC NO-LEAK TYPE NON-METALLIC EXPANSION JOINT

Dmtflex elastomeric-type flexible elements are manufactured to meet the specific operating conditions encountered. The proper elastomers are calendered to the required skim and cover gauges and the fabric reinforcement more compatible with the elastomer is selected. All component are then press-cured under heat and pressure to form a tough, homogeneous fabric reinforced flexible element.

Bellows structure

- PTFE Sheet 0.5
- Reainforce code – 2PLY
- Viton Rubber
- Reainforce Ring (PTFE Tube / STS 316L)

THE KIND OF FABRIC

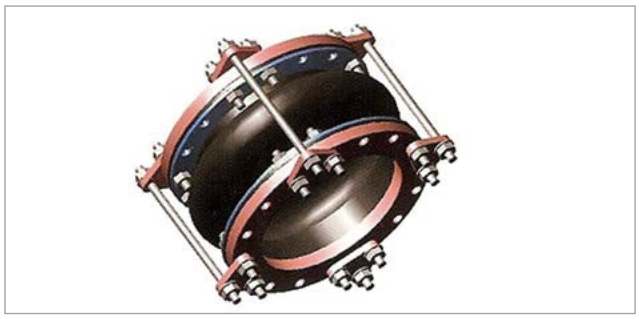
Material	Thickness (mm)	Weight or Density	Thermal resistance(℃) Duration shorttermed		Chem. resistance Acids Lyes		Remarks
structural fabrics or Insulating Fabric							
Cotton	0.2	170g/㎡	80	100	–	–	
Polyester	0.2	230g/㎡	150	180	○	○	
Glass cloth	0.35to1.6	400to1830g/㎡	540	600	○	○	
Aramid	0.6to2.4	180to850g/㎡	300	350	–	○	
Silica cloth	0.4to1.2	300to1190g/㎡	1100	1260	●	●	
White asbestos 4A	0.8to3.0	600to2000g/㎡	480	550	–	○	
White asbestos 2A	0.8to3.0	480to1500g/㎡	320	400	–	○	
White asbestos A	0.8to3.0	460to1400g/㎡	290	3500	–	○	
White asbestos B	2.0to3.0	450to1350g/㎡	230	280	–	○	
Blue asbestos	2.0to3.0	1300to2000g/㎡	430	480	●	○	
Ceramic cloth	1.5to3.0	700to1400g/㎡	800	1000	○	○	
Coatings							
Silicon rubber	0.2to1.0	220to1100g/㎡	250	280	○	○	
PTFE	0.1to0.25	240to600g/㎡	250	280	●	●	
Neoprene	0.2to1.5	210to1570g/㎡	90	100	○	○	
Hypalon	0.2to1.5	210to1570g/㎡	110	140	○	○	
EP rubber	0.2to1.5	207to1550g/㎡	120	140	○	○	
Viton (Fluoride rubber)	0.2to1.5	370to2800g/㎡	205	315	●	○	
PVC	0.1to0.3	140to420g/㎡	80	90	○	–	
Aluminium coating	0.08to0.15	110to210g/㎡	600	700	–	–	
Sealing foil							
PTFE	0.15to0.3	180to360g/㎡	250	280	●	●	
Stainless steel(321)	0.1to0.2	790to1580g/㎡	800	800	●	○	
Hypalon rubber	0.3to2.0	315to2100g/㎡	110	140	○	○	
Silicon rubber	0.3to0.2	330to2200g/㎡	250	280	○	○	
Aluminium	0.15	210g/㎡	600	700	–	–	
Insulating materials							
Ceramic	6.0,12.5,25.0	130g/㎡	1300	1400	●	●	
Glass Fiber	25to100	24g/㎡	350	400	○	○	
Mineral Wool	25to75	40g/㎡	600	650	○	○	
Reinforced Fabric							
Stainless steel mesh	0.2to0.6	400to1200g/㎡	800	1000	○	○	
Carbon steel mes	0.3to0.6	570to1140g/㎡	400	500	–	–	
Branze mesh	0.2to0.6	400to1200g/㎡	450	600	○	○	
Branze mes	0.2to0.6	400to1200g/㎡	400	500	○	–	

●resistant ○conditionally resistant –non resistant

RUBBER EXPANSION JOINT

Rubber expansion joints are flexible connectors made from natural or synthetic elastomers(Neoprene, EPDM, Nitrile, Hypalon, FKM, Buthyl) in which special fabrics are embedded to provide physical reinforcement. Rubber expansion joints provide a proven and flexible solution to accommodate many types of movements and requirements of industrial plant and equipment.

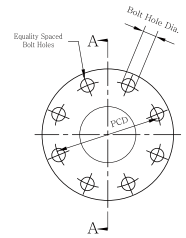
Application :
Air conditioning, heating and ventilating systems in industrial buildings, hospitals, hotels and on board ships Central and ancillary power generating stations in industrial buildings, factories, ships and off-shore Sewage disposal and water treatment plant, pumps, etc. Process piping in pulp and paper manufacture.

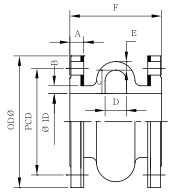


▪ Material Chat of Rubber Expansion Joint

Material	Main applications	temperature
Neoprene(CR)	Applications involving sea water, water cooling systems	-30℃~100℃
EPDM	Hot water, heating and ventilation systems	-40℃~140℃
Hypalon(CSM)	Chemical plants, transportation of strong acids (except nitric or sulphuric acid)	-25℃~130℃
Viton(FKM))	High temperature applications, transportation of products derived from petroleum	-25℃~220℃
Nitrile(NBR)	Transportation of foodstuffs, potable water distribution Oil and Gas transportation, refineries	-25℃~100℃
Buthyl TH	High temperature	-40℃~150℃

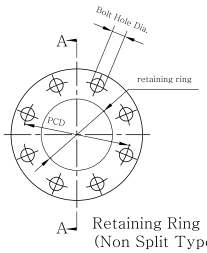
RUBBER EXPANSION JOINT



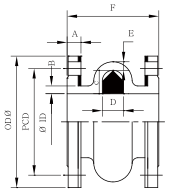


Section A–A

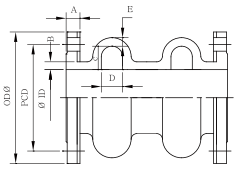
Single Open Arch



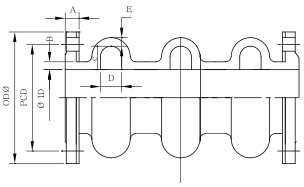
Retaining Ring
(Non Split Type)



Single Filed Arch



Two Open Arch



Three Open Arch

Nominal Pipe Size joint I.D	Flange	Min.Face to Face(F)				Dimension				Retaining Ring		Bolt Holes			Control Unit Ass'y				Pressure / Vaccum		Approx. W(Lbs)	
		1 Arch	2 Arch	3 Arch	A Flange Width	B Body width	C Arch Heigt	D Arch Width	E Arch Thick.	I.D	Thick.	PCD	No. bolts	Dia. Holes	Plate Thick.	No.of Plate	Rod Dia.	No.of Dia.	PSIG	mmHg	joint	Set of Ret/R
1	4 1/4	6	10	12	9/16	7/8	1 1/8	1/2	7/16	2 3/8	13/32	3 1/8	4	5/8	3/8	4	1/2	2	200	26	1.4	2.3
1 1/4	4 5/8	6	10	12	9/16	7/8	1 1/8	1/2	7/16	2 5/8	13/32	3 1/2	4	5/8	3/8	4	1/2	2	200	26	1.8	2.5
1 1/2	5	6	10	12	9/16	7/8	1 1/8	1/2	7/16	2 7/8	13/32	3 7/8	4	5/8	3/8	4	1/2	2	200	26	2.2	3.0
2	6	6	10	12	9/16	29/32	1 1/4	1/2	1/2	2 5/8	13/32	4 3/4	4	3/4	3/8	4	5/8	2	200	26	2.7	4.0
2 1/2	7	6	10	12	9/16	29/32	1 1/4	1/2	1/2	4 1/8	13/32	5 1/2	4	3/4	3/8	4	5/8	2	200	26	3.7	5.5
3	7 1/2	6	10	12	9/16	29/32	1 1/4	1/2	1/2	4 5/8	13/32	6	4	3/4	3/8	4	5/8	2	200	26	4.3	6.0
4	9	6	10	12	9/16	7/8	1 1/4	1/2	1/2	5 7/8	13/32	7 1/2	8	3/4	3/8	4	5/8	2	200	26	5.7	7.5
5	10	6	10	12	9/16	7/8	1 1/4	1/2	1/2	6 7/8	13/32	8 1/2	8	7/8	3/8	4	5/8	2	190	26	7.6	8.0
6	11	6	10	12	5/8	1	1 1/4	1/2	1/2	7 7/8	13/32	9 1/2	8	7/8	1/2	4	5/8	2	190	26	8.6	9.0
8	13 1/2	6	10	14	3/4	1	1 1/2	3/4	5/8	9 7/8	13/32	11 3/4	8	7/8	1/2	4	3/4	2	190	26	12.7	12.0
10	16	8	12	14	3/4	15/32	1 1/2	3/4	11/16	12 1/8	13/32	14 1/4	12	1	3/4	4	7/8	2	190	26	18.3	18.0
12	19	8	12	14	3/4	15/32	1 1/2	3/4	11/16	14 1/2	13/32	17	12	1	3/4	4	1	2	190	26	26.0	25.0
14	21	8	12	16	7/8	15/32	2	3/4	3/4	16 1/2	13/32	18 3/4	12	1 1/8	3/4	4	1	2	130	26	33.3	27.0
16	23 1/2	8	12	16	7/8	15/32	2	3/4	3/4	18 1/2	13/32	21 1/4	16	1 1/8	3/4	4	1 1/8	2	110	26	42.1	33.0
18	25	8	12	16	7/8	15/32	2	3/4	3/4	20 1/2	13/32	22 3/4	16	1 1/4	3/4	4	1 1/8	2	110	26	46.0	35.0
20	27 1/2	8	12	16	1	15/32	2	7/8	25/32	22 5/8	13/32	25	20	1 1/4	3/4	4	1 1/8	2	110	26	51.6	38.0
22	29 1/2	10	14	18	1	15/32	2	7/8	25/32	24 5/8	13/32	27 1/4	20	1 3/8	1	4	1 1/4	2	100	26	53.4	44.0
24	32	10	14	18	1	15/32	2	7/8	25/32	26 5/8	13/32	29 1/2	20	1 3/8	1	4	1 1/4	2	100	26	70.6	48.0
26	34 1/4	10	14	18	1	13/16	2 1/4	1	13/16	28 5/8	13/32	31 3/4	24	1 3/8	1	4	1 1/4	2	90	26	84.4	57.0
28	36 1/2	10	14	18	1	13/16	2 1/4	1	13/16	30 7/8	13/32	34	28	1 3/8	1 1/4	4	1 3/8	2	90	26	86.5	62.0
30	38 3/4	10	14	18	1	13/16	2 1/4	1	13/16	32 7/8	13/32	36	28	1 3/8	1 1/4	4	1 1/2	2	90	26	97.7	66.0
32	41 3/4	10	14	18	1	13/16	2 1/4	1	13/16	34 7/8	13/32	38 1/2	28	1 5/8	1 1/4	4	1 1/2	2	90	26	100.6	75.0
34	43 3/4	10	14	18	1	13/16	2 1/4	1	13/16	37 7/8	13/32	40 1/2	32	1 5/8	1 1/2	4	1 5/8	2	90	26	103.2	78.0
36	45	10	14	18	1	13/16	2 1/4	1	13/16	39 7/8	13/32	42 3/4	32	1 5/8	1 1/2	4	1 3/4	2	90	26	112.1	81.0
38	48 3/4	10	14	18	1	13/16	2 1/4	1	13/16	41 7/8	13/32	45 1/4	32	1 5/8	1 1/2	4	1 3/4	2	90	26	125.2	95.0
40	50 3/4	10	14	18	1	13/16	2 1/4	1	13/16	43 7/8	13/32	47 1/4	36	1 5/8	1 1/2	6	1 1/2	3	90	26	144.1	106.0
42	53	12	14	18	1 1/8	1 1/4	2 1/2	1 1/8	29/32	45 1/4	13/32	49 1/2	36	1 5/8	1 1/2	6	1 5/8	3	80	26	157.9	116.0
44	55 1/4	12	14	18	1 1/8	1 1/4	2 1/2	1 1/8	29/32	47 1/4	13/32	51 3/4	40	1 5/8	1 1/2	6	1 5/8	3	80	26	178.4	127.0
46	57 1/4	12	14	18	1 1/8	1 1/4	2 1/2	1 1/8	29/32	49 1/4	13/32	53 3/4	40	1 5/8	1 1/2	6	1 5/8	3	80	26	186.7	132.0
48	59 1/2	12	14	18	1 1/8	1 1/4	2 1/2	1 1/8	29/32	51 1/4	13/32	56	44	1 5/8	1 1/2	6	1 3/4	3	80	26	195.2	138.0
50	61 3/4	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	53 1/4	13/32	58 1/4	44	1 7/8	1 1/2	6	1 3/4	3	70	26	200.1	152.0
52	64	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	55 1/4	13/32	60 1/21	44	1 7/8	1 1/2	6	1 3/4	3	70	26	213.2	157.0
54	66 1/4	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	57 1/4	13/32	62 3/4	44	1 7/8	1 1/2	6	2	3	70	26	224.5	160.0
56	68 3/4	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	59 1/4	13/32	65	48	1 7/8	1 1/2	6	2	3	70	26	237.6	174.0
58	71	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	61 1/4	13/32	67 1/4	48	1 7/8	1 1/2	6	2	3	70	26	250.3	182.0
60	73	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	63 1/4	15/32	69 1/4	52	1 7/8	1 3/4	6	2	3	70	26	262.3	190.0
62	75 3/4	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	65 1/4	15/32	71 3/4	52	1 7/8	1 3/4	8	2	4	70	26	275.8	212.0
64	78	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	67 1/4	15/32	74	52	1 7/8	1 3/4	8	2	4	70	26	288.4	224.0
66	80	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	69 1/4	15/32	76	52	1 7/8	1 7/8	8	2	4	70	26	302.6	236.0
68	82 1/2	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	71 1/4	15/32	78 1/4	56	1 7/8	1 7/8	8	2	4	70	26	318.6	248.0
70	84 1/2	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	73 1/4	15/32	80 1/2	56	1 7/8	1 7/8	8	2	4	70	26	326.7	262.0
72	86 1/2	12	14	18	1 1/8	1 1/8	2 1/2	1 1/8	29/32	75 1/4	15/32	82 1/2	60	1 7/8	1 7/8	8	2	4	70	26	335.5	278.0

RUBBER EXPANSION JOINT

▪ SPOOL TYPE

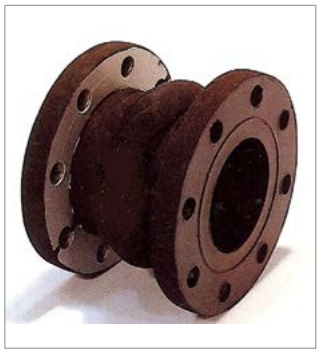
Design condition

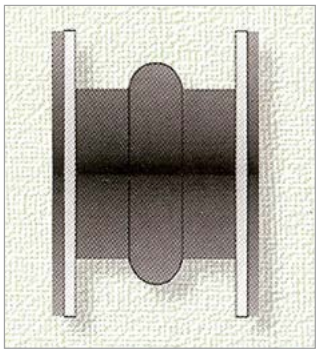
- **Pressure**

  50A~250A (−760mmHg~10kgf/㎠)
  300A~350A (−760mmHg~7kgf/㎠)
  400A~750A (−760mmHg~5kgf/㎠)
  800A~900A (−760mmHg~4kgf/㎠)

- **Temperature**

  −40℃~160℃





Allowable Movement

SIZE	Length (in.)	Comp. (in.)	Ext. (in.)	Lateral (in.)	Angular (˚)
50 (2)	6	1-3/4	3/4	3/4	35
65 (2½)	6	1-3/4	3/4	3/4	30
80 (3)	6	1-3/4	3/4	3/4	30
100 (4)	6	1-3/4	3/4	3/4	25
125 (5)	6	1-3/4	3/4	3/4	25
150 (6)	6	1-3/4	3/4	1	20
200 (8)	6	1-3/4	3/4	1	20
250 (10)	8	1-3/4	3/4	1	15
300 (12)	8	1-3/4	3/4	1	15
350 (14)	8	2	7/8	1-1/8	12
400 (16)	8	2	7/8	1-1/8	12
450 (18)	8	2	7/8	1-1/8	9
500 (20)	8	2	7/8	1-1/8	9
600 (24)	10	2-1/4	1	1-1/8	9
750 (30)	10	2-1/4	1	1-1/8	6
900 (36)	10	2-1/4	1	1-1/8	5

• Flange : ks 5kgf/㎠, 10kgf/㎠, 20kgf/㎠, ANSI150, DIN
• Rubber Material : Neoprene, EPDM, IIR, Hypalon,..

▪ STRAIGHT TYPE

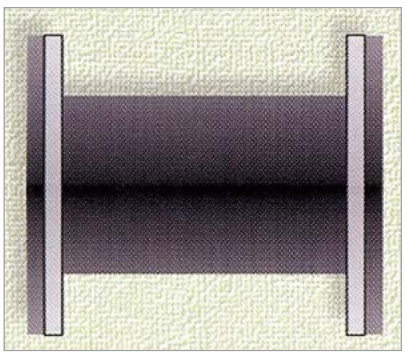
Design condition

- **Pressure**

  50A~250A
  (−760mmHg~10kgf/㎠)

- **Temperature**

  −40℃~160℃
  (Max. 100℃)



Allowable Movement

SIZE	Length (in.)	Ext. (mm)	Comp. (mm)	Lateral (mm)	Angular (˚)
20A	5	7	7	80	15
25A	5	7	7	80	15
32A	5	7	7	80	15
40A	5	7	7	80	15
50A	6	7	7	80	15
65A	6	5	5	50	15
80A	6	5	5	50	10
100A	6	6	6	45	10
125A	6	6	6	40	10
150A	6	8	8	40	10
200A	6	8	8	30	5
250A	8	8	8	25	5
300A	8	10	10	25	5
350A	8	10	10	20	3
400A	8	12	12	20	3
450A	8	12	12	15	3
500A	8	14	14	15	3

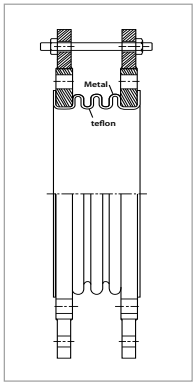
• Flange : ks 5kgf/㎠, 10kgf/㎠, 20kgf/㎠, ANSI150, DIN
• Rubber Material : Neoprene, EPDM, IIR, Hypalon,..

TEFLON EXPANSION JOINT H-type

Patent No. 10-0963408

H-type

Dmtflex' s H-type expansion joint system is an engineered product that was specifically designed to provide high pressure/ temperature transfer containment of highly corrosive medias that could not be safely handled by conventional metallic, elastomeric or teflon expansion joint, Dmtflex' s Hot-flex combines the high pressure rating of a metallic expansion joint with the high temperature corrosion resistance of teflon, creating a product that will outperform them both. Engineering data shown is just a sample of Dmtflex' s H-type capabilities. Each H-type expansion joint can be custom engineered to your specific application : pressure/temperature rating, spring rate movement(axial, lateral and angular) metallic carcass(stainless steel, monel, inconel, hasteloy, etc) various lengths.



size	H-DMTFLEX							Weight	
	Operating pressure		Neutral length	Axial mov.		Movement			
	Pmax. @20℃	Pmax. @200℃		Min.	Max.	Lateral	Angular	DIN	ANSI
40	16	12.8	130	121	139	4	3	1.7	2.1
40	16	12.8	225	210	240	10	5	1.8	2.3
50	16	12.8	125	116	134	4	3	2	3
50	16	12.8	215	200	230	8	4	2.2	2.8
65	16	12.8	135	126	144	4	2	3.3	4.1
65	16	12.8	225	207	243	8	4	3.7	4.6
80	16	12.8	130	120	140	4	2	5	6
80	16	12.8	220	201	239	8	4	9	11
100	16	12.8	160	150	170	4	2	12	15
100	16	12.8	260	239	281	8	4	13	16
125	16	12.8	175	164	186	4	2	16	20
125	16	12.8	270	247	293	8	3	18	22
150	16	12.8	165	154	176	4	1	14	17
150	16	12.8	300	274	326	10	3	17	20
200	16	12.8	180	168	192	4	1	20	24
200	16	12.8	325	292	358	10	3	24	29
250	16	12.8	200	186	214	5	1	29	35
250	16	12.8	330	296	364	10	3	33	40
300	16	12.8	210	193	227	5	1	38	46
300	16	12.8	350	310	390	10	3	44	53
350	16	12.8	175	157	193	5	1	54	65
350	16	12.8	254	223	285	10	2	63	69
350	16	12.8	315	271	359	10	3	66	76
400	16	12.8	300	257	343	10	2	126	151
450	16	12.8	280	240	320	5	2	138	166
500	16	12.8	300	257	343	5	2	183	220
600	16	12.8	320	272	368	5	2	244	293

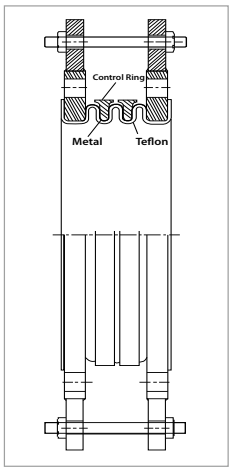
*Operating temperature range:-10℃ up to +250.

TEFLON EXPANSION JOINT P-type

Patent No. 10-0963407

P-type

Dmtflex' s teflon expansion joints are used primarily in fluid conducting systems as resilient connectors and tremor barriers. They are designed to compensate for mis-alignment, to absorb expansion and contraction and to isolate vibrationand shock. They are also frequently used to reduce stress on fragile mating flange.



Size	P-DMTFLEX-3COR'						
	Operating pressure		neutral length	Axial mov.		Movement	
	Pmax. 20℃	Pmax. 200℃		Min.	Max.	Lateral	Angular
25	15.8	5.6	70	55	80	5	6
32	15.8	5.6	75	55	85	5	6
40	15.8	5.6	80	60	95	5	6
50	15.8	5.6	85	65	100	8	8
65	13.7	5	100	70	120	8	8
80	13.7	5	110	80	130	8	10
100	13.7	5	110	80	135	12	10
125	11.6	4.1	120	85	145	12	10
150	11.6	4.1	130	95	155	12	8
200	8.9	3.4	140	105	170	14	8
250	8.9	3.4	165	125	195	14	6
300	8.9	3.4	175	131	205	14	6
350	6.3	2.4	190	146	225	18	6
400	6.3	2.4	190	146	225	18	6
450	6.3	2.4	190	146	225	18	5
500	4.2	1.8	190	146	225	20	5
600	4.2	1.8	190	146	225	20	4
700	4.2	1.8	190	146	225	20	4
800	3.1	1.1	190	155	225	20	3

P-DMTFLEX-4COR'						
Operating Pressure		Neutral length	Axial mov.		Movement	
Pmax. 20℃	Pmax. 200℃		Min.	Max.	Lateral	Angular
13.5	4.8	85	65	97	6	8
13.5	4.8	90	68	104	6	8
13.5	4.8	98	70	115	6	8
13.5	4.8	105	77	125	10	9
11.6	4.2	122	86	147	10	10
11.6	4.2	135	85	162	12	11
11.6	4.2	137	97	169	15	13
9.9	3.6	145	100	177	15	13
9.9	3.6	155	110	187	15	12
7.6	3	175	130	210	18	10
7.6	3	195	150	235	18	10
7.6	3	215	165	255	18	9
5.4	2	235	175	277	22	8
5.4	2	235	175	277	22	8
5.4	2	235	175	277	22	7
3.6	1.6	235	175	277	22	6
3.6	1.6	235	175	277	22	6
3.6	1.6	235	175	277	22	5
2.6	0.9	235	191	277	22	4

P-DMTFLEX-5COR'						
Operating pressure		Neutral length	Axial mov.		Movement	
Pmax. 20℃	Pmax. 200℃		Min.	Max.	Lateral	Angular
11.9	4.2	100	77	115	8	10
11.9	4.2	105	77	120	8	10
11.9	4.2	115	80	135	8	12
11.9	4.2	125	90	150	12	12
10.3	3.7	145	95	175	12	14
10.3	3.7	160	110	195	15	16
10.3	3.7	165	115	205	18	16
8.7	3.1	170	120	210	18	14
8.7	3.1	180	130	220	18	13
6.7	2.6	210	148	250	22	13
6.7	2.6	240	178	290	22	12
6.7	2.6	250	188	300	22	10
4.7	1.7	265	203	315	25	10
4.7	1.7	265	203	315	25	8
4.7	1.7	280	205	330	25	8
3.2	1.4	280	205	330	25	7
3.2	1.4	280	205	330	25	6
3.2	1.4	280	205	330	25	5
2.3	0.7	280	225	330	25	5

*Operating temperature range:-10℃ up to +250.

TEFLON EXPANSION JOINT “RF” “VF”

RF-FLEX “RF” TEFLON LINED RUBBER EXPANSION JOINT

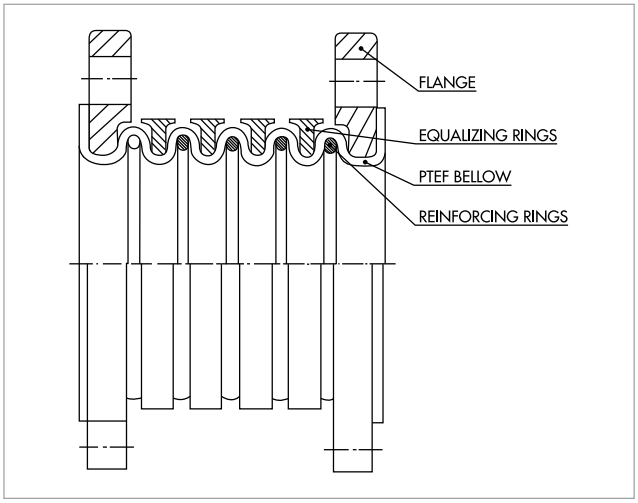
DMTflex Mighty-Spool model “RF” teflon lined rubber expansion joints wee specifically designed to resist corrosive attack at elevated temperatures and pressure where metallic, Plastic or elastomeric expansion joints would be inadequate.
DMTflex “RF” teflon lined expansion joints are installed next to mechanical equipment or between anchor points in your process piping system and will provide the following advantages.

*NOMINAL DIAMETER : Max 50A~400A
*OVERALL LENGTH : 400㎜
*USED PRESSURE : Max 20kg/㎠
* USED TEMPERATURE : 120℃

VF-FLEX “VF” VACUUM RATING FOR TEFLON EXPANSION JOINT

The vacuum rating of DMTflex “VF” teflon expansion joints decreases with increasing temperature, diameter and number of convolutions. Vacuum rings enable DMTflex through 24” diameter to be rated for full vacuum at temperature to 200℃.
The vacuum ring is a metal hoop, inserted into the root of theconvolution. Metal selection is based on the customer’s specification. Tantalum, Hastelloy, Monel, Stainless steel, Nickel and Zirconium vacuum rings have been used to date. Also available PTFE coated.

*NOMINAL DIAMETER : Max 50A~600A
*OVERALL LENGTH : 500㎜
*USED PRESSURE : -1kg/㎠~5kg/㎠
*USED TEMPERATURE : 200℃



APPLICATION ENGINEERING :
Single Bellows Assembly

Figure 1

This diagram shows the most basic application of a single bellows unrestrained type expansion joint. Installation sequence is as follows:

1. Install one expansion joint between main anchor (MA).
2. Locate main anchors at change indirection of piping.
3. Locate expansion joint immediately adjacent to a main anchor.
4. Space first pipe alignment guide (G1) Within four pipe diameters of expansion joint.
5. Space second pipe alignment guide (G2) Within 14 pipe diameters of (G1)
6. The remaining guides (G) should be spaced in accordance With the pipe guide spacing chart as sown on page 64.

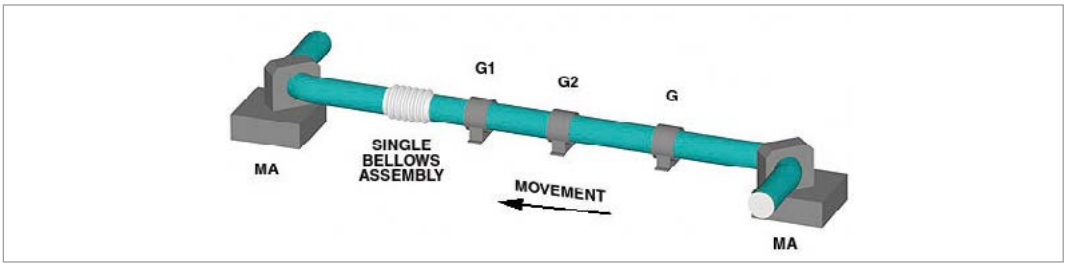


Figure 2

When thermal expansion between the main anchors (MA) exceeds the capacity of a Single bellows Assembly, then the pipe system must be divided into smaller sections. The use of an intermediate anchor (IA) located between two Single Bellows Assemblies or as an integral part of a Universal Bellows Assembly provides the best solution. Intermediate anchors, unlike main anchors, are designed to Withstand spring resistance and frictional forces only. Pressure thrust at this juncture is canceled out because the effective areas of each of the bellows in the piping system are equal. Pipe alignment guides must be installed in accordance with the guidelines established above.

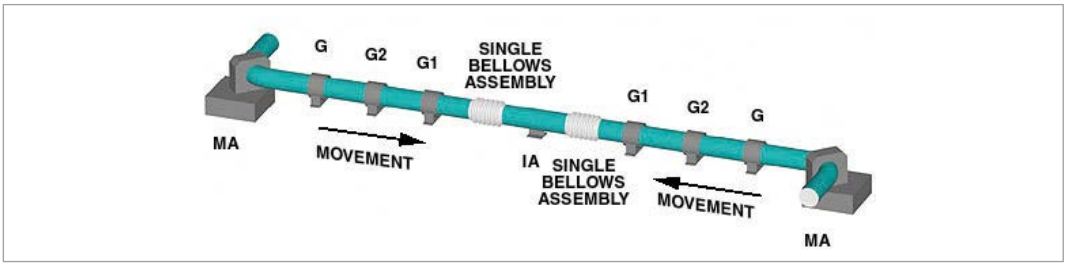
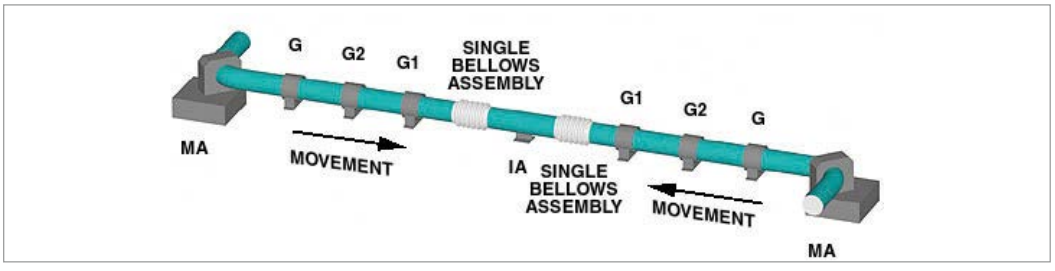


Figure 3

If two expansion joints of different pipe diameters are used in the same section of pipe, such as a line containing a reducer, the pressure thrusts are no longer equal. In this case, the anchor dividing the expansion joints must be a main anchor designed to withstand the difference in pressure thrust generated by the different size expansion joints. Pipe alignment guides (G1) and (G2) and intermediate guides must be provided in the locations as shown in the diagram.



APPLICATION ENGINEERING :
Tied Single Assembly / Tied Universal Assembly

Figure 1
Tied Single Assemblies are often used to protect rotating equipment from the effects of thermal expansion in a piping system as shown. The tie rod restraint is designed to absorb pressure thrust, which in turn, allows the use of intermediate anchors rather than main anchors. A planer pipe guide or spring support hanger is used in the system as shown, allowing the thermal growth present in the vertical pipe leg to be taken as natural flexibility in the long horizontal pipe run.

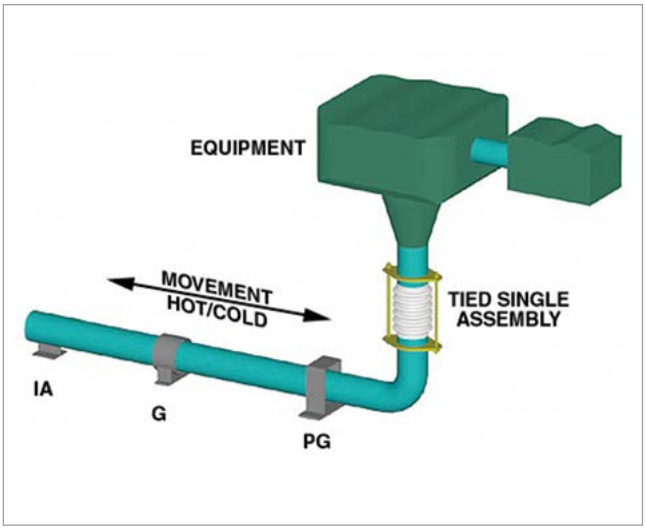


Figure 2
There are many applications where thermal movement in the piping system is too great for a Tied Single Assembly. In these instances, a Tied Universal Assembly is the correct choice. The expansion joint assembly should be designed to fill the offset leg as shown so that axial movement within this pipe leg is absorbed by the bellows assembly. It is good practice to keep the maximum distance passible between the bellows. This results in low offset forces on adjacent by the tie rods or spring angers when center spools are long and diameters large.

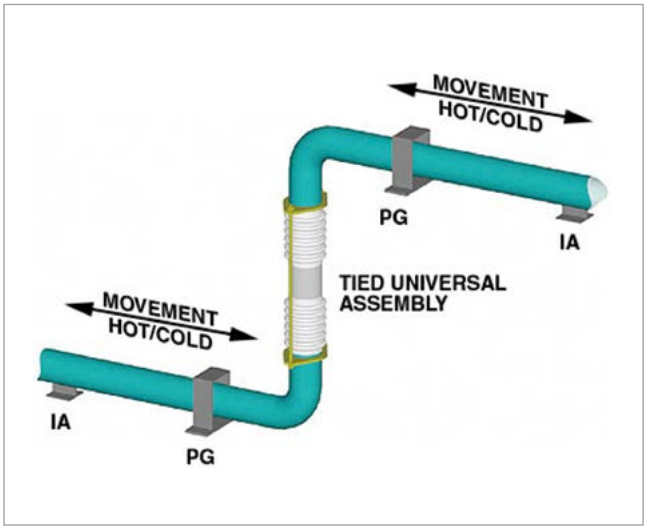
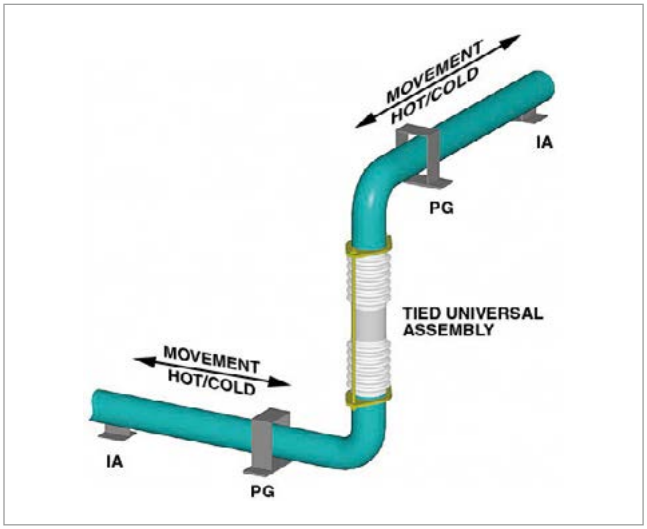


Figure 3
A Tied Universal Assembly is often used to absorb thermal expansion in a multi-planer piping system as shown. This feature allows their use in a wide variety of different installations where main anchors and pipe alignment guides cannot be provided. The same design requirements as mentioned above also apply in this case. Tied Universal Assemblies are generally used to protect compressors, pumps, and turbines. They are also used to absorb thermal expansion in elevated piping systems found in oil refineries, power plants, and petro-chemical installations.



APPLICATION ENGINEERING :
Hinged bellows Assembly

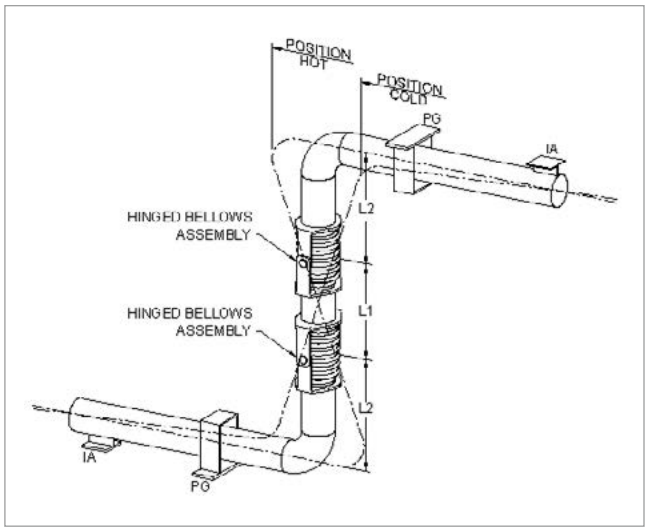


Figure 1
When two Hinged Bellows Assemblies are installed in a "Z" offset as shown, they can absorb large amounts of thermal movement in a deflected position joints can be cold sprung (pre-set in a deflected position) in order to maximize their movement capability. The thermal expansion in the offset leg is absorbed by the natural flexibility of the horizontal pipe runs. Pressure thrust is contained by the hinge restraint, allowing intermediate type anchors to be used. Planer pipe guides will permit the offset leg to swing through its movement arc as shown. It is good practice to make (L1) the maximum possible and (L2) a minimum.

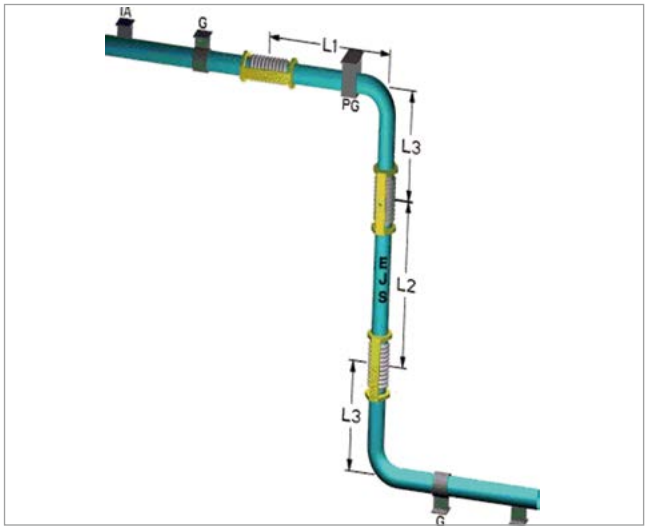


Figure 2
This system of Hinged Bellows Assemblies is designed to absorb thermal movement in both the horizontal leg and vertical offset leg. Location of the expansion joints should be as follows: Make distance (L1) and (L2) the maximum possible, with (L3) the minimum possible. The hinge restraint is restraint is designed to absorb pressure thrust and weight of the pipe between the two Hinge Units. Forces on anchors and equipment connections are reduced to friction and low offset forces.

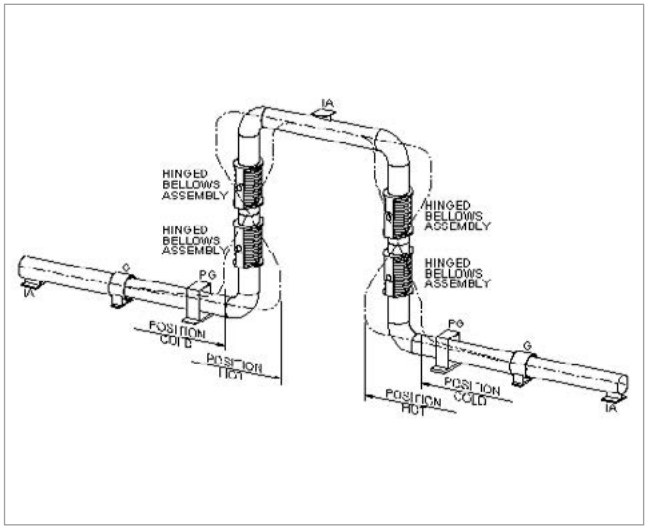


Figure 3
In a long piping system, the number of expansion joints can be reduced by incorporating four Hinged Bellows Assemblies in a "U" bend system as shown. Pressure drop in the system is kept to a minimum, and pipe supports reduced in number when compared to a system using pipe loops. An intermediate anchor at the "U" bend divides the system in two equal expanding pipe sections. Cold springing is used to increase the movement capability of the expansion joints.

APPLICATION ENGINEERING :
Hinged bellows Assembly / Gimbal bellows Assembly

Figure 4
The Two-Hinged bellows Assembly system shown is often used where a pipeline crosses a roadway or rail line that is supported by a pipe bridge or trellis. The hinge restraint is designed to support the center spool between the expansion joints in addition to the pressure thrust generated by the system pressure. The Hinged Bellows Assemblies can be cold sprung, which further increases the overall movement capability of the expansion joints. Offset forces are usually low, hence loads on the bridge structure are kept to a minimum.

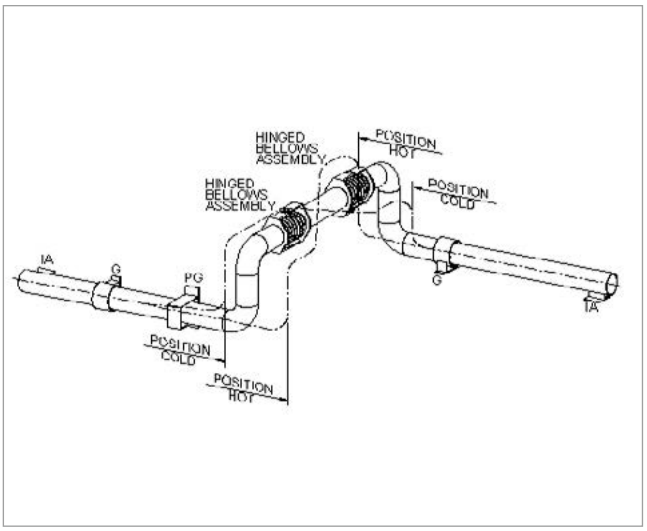


Figure 5
In a multi-planer piping system the use of two Gimbals Bellows Assemblies in a multi-plane "Z" bend is the best solution. The gimbals restraint allows thermal expansion in two planes as shown, while still absorbing the pressure thrust. The thermal expansion in the offset leg is taken by the flexibility in the long horizontal pipe runs. The planer pipe guides shown control the direction of this vertical movement. Intermediate anchors are used to contain the resultant low offset forces.

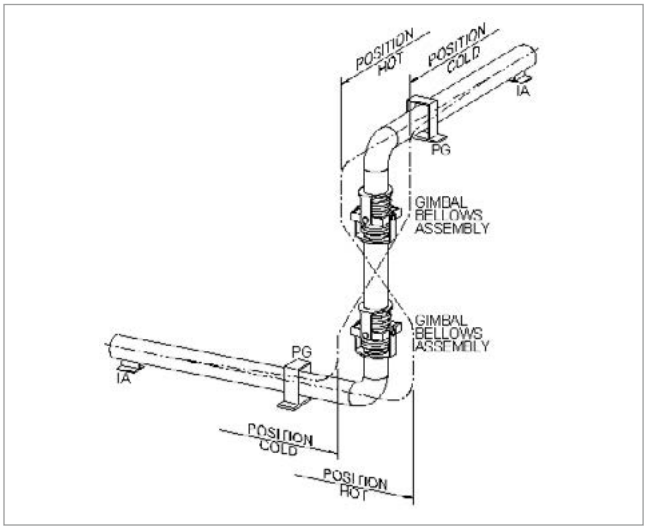
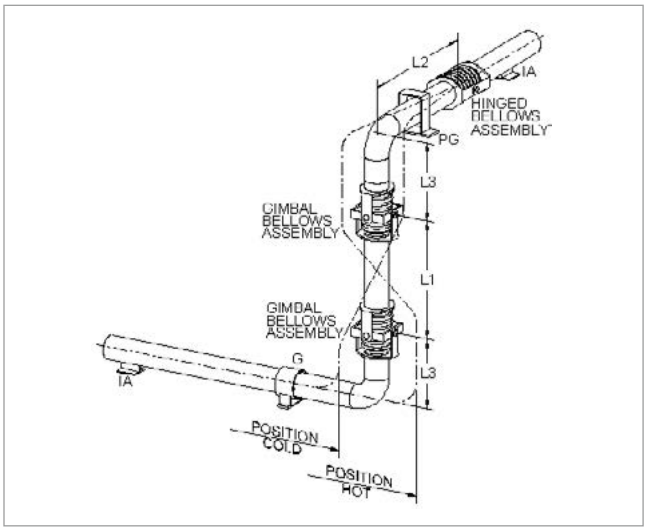


Figure 6
There are many applications in a multi-planer piping system that the horizontal pipe leg is insufficiently flexible to absorb the thermal expansion in the offset leg. To accommodate this movement, A Single Hinged Bellows Assembly is used in conjunction with the two Gimbals bellows Assemblies in the locations shown. It is good practice to make (L1) and (L2) the maximum dimensions possible with (L3) the minimum possible. A regular pipe guide must be used on the lower pipe leg, while a planer pipe guide is used on the upper leg.



APPLICATION ENGINEERING :
Pressure Balanced Elbow Assembly

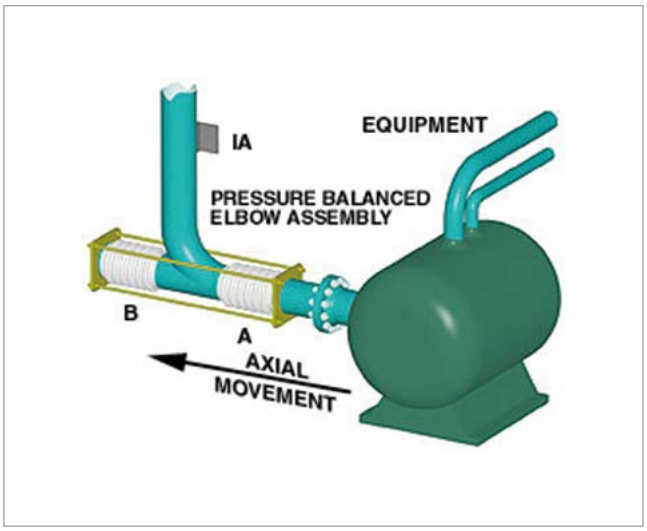


Figure 1
This example shows a single Pressure Balanced Elbow Assembly used to protect rotating equipment from the effects of thermal expansion between an intermediate anchor (A) and the equipment. In operation, the thermal growth in the system compresses the line bellows (A). Internal pressure acting through the tie rods instantaneously elongates the balanced system. If no lateral movement is present, the number of convolutions in bellow (A) and (B) are equal. Pressure Balanced Elbow Assembles are frequently used on gas and steam turbines, pumps, and condenser installations.

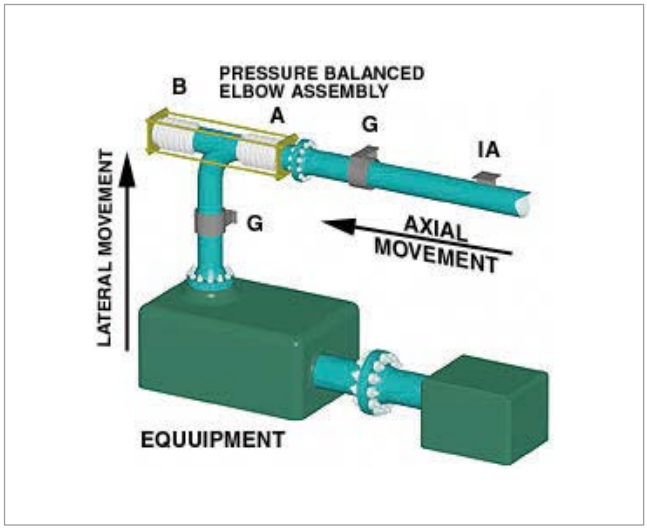


Figure 2
A Single Pressure Balanced Elbow Assembly can be used to absorb lateral and axial movement. In the example shown, bellows (A) has sufficient convolutions to absorb both the axial and lateral movement present in the piping system. The balancing bellows (B) requires only sufficient convolutions to compensate for the axial movement present in the horizontal line. Intermediate anchors (IA) and pipe alignment guides (G) should be installed in the locations shown.

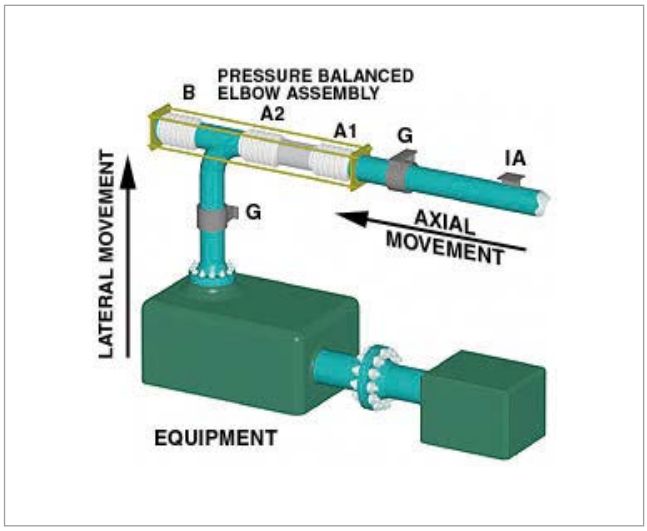


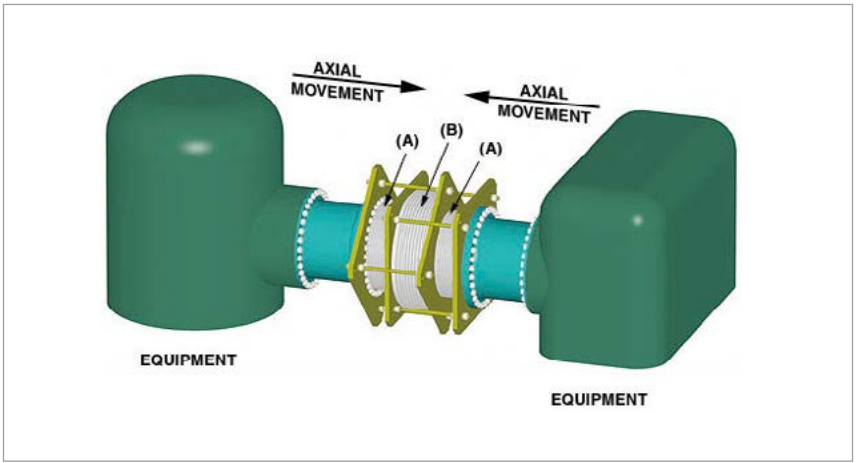
Figure 3
There are many installations where the lateral movement present in the system exceeds the capability of a single Pressure Balanced Elbow Assembly. This problem is best overcome by the use of a Universal Pressure Balanced Elbow Assembly as shown. The line bellows (A1) and (A2) are linked by a section of pipe that allows greater lateral movement in addition to the required axial movement present. The balancing bellows (B) is designed to compensate for axial movement only. Tie rods link both sets of bellows and absorb the pressure thrust, resulting in low forces on adjacent equipment and structures. This design finds wide application on turbine/condenser crossovers, boiler feed water pumps, and other critical applications.

APPLICATION ENGINEERING :
In-Line Pressure Balanced Assembly
Externally Pressurized Pressure Balanced Assembly

In-Line Pressure Balanced Assembly

Figure 1

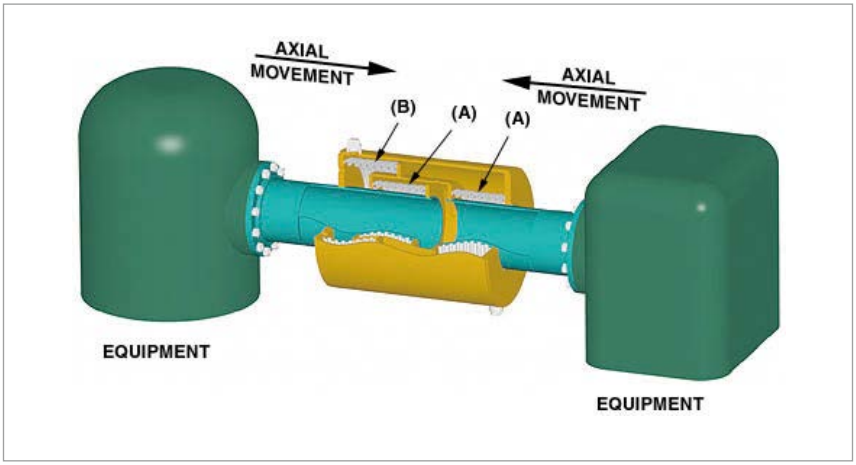
This example shows an In-Line Pressure Balanced unit in a typical installation. The two pieces of equipment are load sensitive requiring very low forces and moments at the flagged attachments. Both pieces of equipment are allowed to expand due to temperature while the In-Line Pressure Balanced Assembly absorbs all the axial growth. This style of expansion joint should be guided if the lengths of pipe between the equipment and the expansion joint exceed four times the diameter of the pipe. Refer to pipe guide spacing on page 18.



Externally Pressurized Pressure Balanced Assembly

Figure 2

This example shows an Externally Pressurized Pressure Balanced Assembly in a typical installation. The two pieces of equipment are load sensitive requiring very low forces and moments at the flagged attachments. Both Pieces of equipment are allowed to expand due to temperature while the Externally Pressurized Pressure Balanced Assembly absorbs all the axial growth. The first pipe guide is internal to the expansion joint so the next set of guides start at 14 times the diameter of the line pipe (Guide Spacing page 18). This type of system can absorb much lager amounts of axial growth than the In-Line Pressure Balanced Assembly



SPECIAL NOTE OF EXPANSION JOINT

Spring Rate
The spring rate is the force or moment required to move a bellows in the axial, lateral or angular direction. The data units are specified in pounds/inch for axial and lateral movements and foot-pounds/degree for angular movements.

Spring Force / Moment
The spring force or moment is the force required to move a bellows through the total required axial. lateral or angular movement.

Bellows Effective Area
The bellows effective area determines the pressure thrust when a bellows is subjected to pressure. This area is specified in square-inches.

Pressure Thrust
Pressure Thrust is the force that is exerted when a bellows is pressurized. The pressure thrust is the result of the bellows effective area multiplied by the pressure. Always use the maximum possible pressure (typically the test pressure) when determining the pressure thrust.

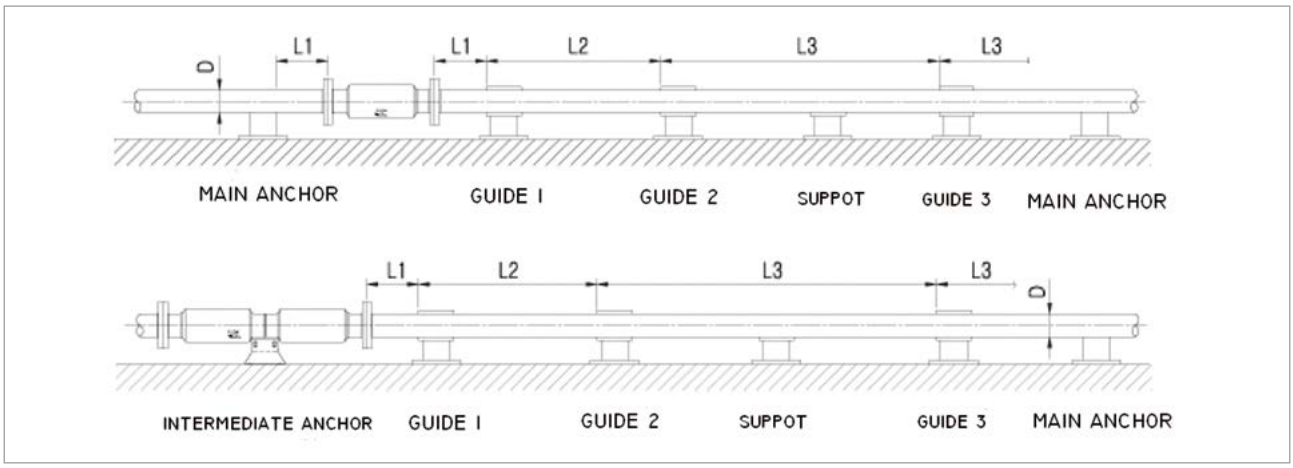
Pressure thrust [lbs.] = bellows effective area [in]X maximum pressure [lbs./in]

The pressure thrust must be restrained either by means of pipe anchors or by the equipment itself to which the expansion joint or pipe section is attached. If this cannot be achieved or proves expensive, the pressure thrust must be restrained by suitable expansion joint hardware, (i.e., hinges, gimbals or tie-rods). Consult with American BOA for the selection of the most economic expansion joint design.

Pipe Anchor
A pipe anchor is the point along the piping system where the pipe is fixed. The anchor must restrain the pressure thrust, the spring forces of the bellows and the friction of the pipe guides. The distance between the pipe anchors determines the thermal expansion.

Anchor force [lbs.] = pressure thrust + spring force = friction

Pipe Guides / support
pipe guides prevent pipe instability (squirm, buckling) and control bellows movements. Pipe supports must support the weight so it does not aversively affect the bellows. It is recommended that an expansion joint be installed near a pipe anchor and two pipe guides be located on the opposite side of the expansion joint. If this is not possible, two pipe guides are required on each side of the expansion joint. Refer to the figures below for orientation and EJMA for appropriate.



SPECIAL NOTE OF EXPANSION JOINT

Fatigue Cycle

A fatigue cycle is defined as one complete movement from the initial position in the piping system to the operating position and back to the initial position.

The movement capacity (rated movement) of expansion joints and expansion compensators stated in this brochure refer to 1000 full fatigue cycles. If more than 1000 fatigue cycles are necessary to meet special plant design requirements, the permissible movement shall be determined as follow:

Fatigue Cycle Table A

No of Cycles	Permissible movement
1000	100%
5000	63%
10000	52%

Temperature (rated)

The rated temperature is the maximum temperature to which rated pressures and movements can be utilized. Refer to the data sheets for the temperature to which rated pressures and compensators.

Pressure (rated)

The rated temperature is the maximum temperature to which rated pressures and movements can be utilized. Refer to the data sheets for the temperature rating of the individual expansion joints / compensators.

Movement (rated)

The rated movement is the amount of thermal expansion a bellows can absorb at the rated temperature, pressure and fatigue cycles. The movements specified in this catalogue are non-concurrent. Refer to the table below to determine the affect of movement on fatigue cycles.

Fatigue Cycle Table (B)

Percentage of movement utilized	Expected no. of fatigue cycles
100%	1,000
75%	2,700
50%	10,600
25%	〉100,000

EXPANSION JOINT SPECIFICATION SHEET

Customer's Name			Date		Page of	
Address			Project Name		Delivery On-Site	
			Specification #		Inquiry #	
Contact Name	Phone # Fax			Item # / Tag #	Item # / Tag #	Item # / Tag #
			Quantity per Tag			
Please give careful thought to the figures you give -for superior design and service life.						
Expansion Joint Frame & Belt Style Selection (Others available): is unsure of syule. Please check here __ (Attach Sketck___)						
SIZE	DUCT SIZE (Inside Dimensons or Diameter) feet-Inches / mm					
	FACE TO FACE DIMENSION (to replace original or required dimension) Inches / mm					
SERVICE/GAS	LOCATION (Nearest Equipement - FD Fan Outlet, Precip Inlet, Stack, Etc)					
	FLOWING MEDIUM (Air, Flue Gas, Tail Gas, Air & Abrasive Dust, etc. - see Note)					
	DUST LOAD Static: Lb / Sq foot or Flowing: Grains / SCF					
	VELOCITY Feet per Second					
	Flow DIRECTION (Up, Down, Horizontal, Angled Down)					
	DESIGN PRESSURE	MAXIMUM (5 psig) Inches Water Column / kPag				
		NORMAL (standard continuous) Inches Water column / kPag				
TEMPERATURE	GAS TEMPERATURE	NORMAL CONTINUOUS ℉ / ℃				
		MAX (Upset)	TEMPERATURE ℉ / ℃			
			DURATION PER EVENT Hours			
			CUMULATIVE DURATION Hours			
	AMBIENT TEMPERATURE	MAXIMUM (also due to nearby equipment) ℉ / ℃				
		MINIMUM ℉ / ℃				
MOVEMENTS	NUMBER OF CYCLES (START-UP &SHUTDOWN) PER YEAR -Note Vibration					
	AXIAL COMPRESSION (x Plane) Inches / mm					
	AXiAL EXTENSION Inches / mm					
	LATERAL DEFLECTON (EACH PLANE Y - Z) Inches / mm					
	LATERAL PRESET - Note Direction(s) Inches / mm					
	ANGULATION / IN-PLANE OF LATERAL(Yes/No) Degrees					
	TORSON Degrees					
DUCT	DUCT MATERIAL - (Special paint specfication - Yes /No - standard prmer is OK					
	DUCT THICKNESS / Internal or External insulation thickness Inche / mm					
	DUCT MATING FLANGE PATTERN(S) - Attached Reference #					
	DUCT CORNER Radius or Square					
	DUST BARRIER PILLOW Yes / No Retaned by Pins[] or Tabs[]					
	INTERNAL LINERS Integral / Shipped Loose / Abrasion plate / Single overlap / other					
NOTES: Gas & Dust data / Dew point / Refractory / Vibration / Exteral Loads / Gas Turbine - Hot or Cold Walls / etc.						

DMT CO., LTD

Expansion Joint & Flexible Joint Design & Manufacture,
No-Leak Type Non-Metallic Expansion Joint, Rubber Joint, Teflon Joint

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