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PLOT NO. A7 & A8, BALAJI INDUSTRIAL PARK, TONDRE VILLAGE, BEHIND HINDALCO INDUSTRIES, TALOJA MIDC, PANVEL, RAIGAD- 410 208

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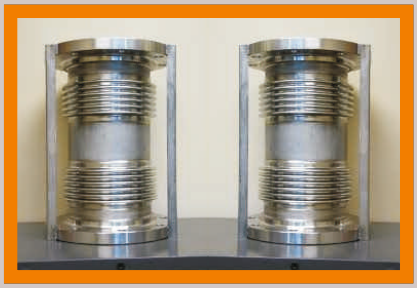

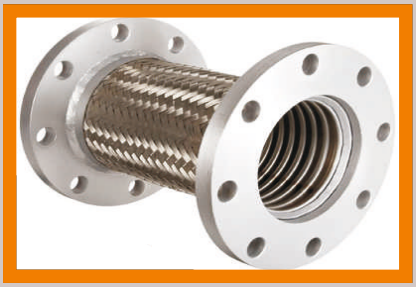

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The Range

METALLIC EXPANSION JOINTS
Size : 2 to 60 (Larger sizes upon Request)

SEISMIC JOINTS
Size : 1 to 6 (Larger sizes upon Request)

PTFE EXPANSION JOINTS
Size : 1 to 12 (Larger sizes upon Request)

RUBBER EXPANSION JOINTS
Size : 1 1/4 to 24 (Larger sizes upon Request)

FABRIC EXPANSION JOINT
Size : 4 to 80 (Larger sizes upon Request)

Unique Expansion Joint

Construction

Construction: Convoluted, Deep
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy, 316L
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 40
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing axial, angular and small amounts of lateral movement. Pressure thrust will be transmitted onto the pipeline.

Technical Details

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
50	145	218	240	32	12	18	21	1
50	145	218	700	21	8	18	21	3
50	145	218	1400	18	7	18	70	6
65	180	234	240	36	12	18	19	2
65	180	234	700	28	11	18	57	4
65	180	234	1400	22	7	18	102	9
80	180	278	240	34	13	18	12	2
80	180	278	700	34	13	18	36	6
80	180	278	1400	25	8	17	130	12
100	190	278	240	36	13	18	47	3
100	190	278	700	32	10	18	84	9
100	190	278	1400	27	7	14	169	19
125	215	313	240	50	13	18	50	4
125	215	313	700	37	10	18	87	14
125	215	313	1400	27	7	14	169	27
150	215	338	240	50	15	18	50	6
150	215	338	700	39	9	18	72	19
150	215	338	1400	26	6	14	330	39
200	225	330	240	57	16	18	28	11
200	225	330	700	47	9	17	105	33
200	225	330	1400	30	6	13	541	66
250	245	341	240	64	17	18	27	17
250	245	341	700	62	10	18	120	51
250	245	341	1400	44	8	13	289	102

Unique Expansion Joint

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
300	280	400	240	76	18	18	28	24
300	280	400	700	68	12	17	119	70
300	280	400	1400	43	8	13	290	141
350	270	418	240	88	15	18	59	29
350	270	418	700	69	10	15	126	85
350	270	418	1400	43	6	12	711	170
400	270	418	240	84	10	17	86	37
400	270	418	700	49	5	12	433	108
400	270	418	1400	35	4	10	1013	217
450	270	436	240	83	8	15	97	46
450	270	436	700	48	5	11	490	135
450	270	436	1400	36	4	8	1136	170
500	270	436	240	92	9	14	74	57
500	270	436	700	58	6	12	375	167
600	290	450	240	88	8	12	90	80
650	395	490	240	105	15	17	92	93
650	395	490	700	62	10	13	441	271
650	395	490	1400	58	9	10	1126	542
700	395	490	240	103	15	17	131	107
700	395	490	700	61	10	13	463	312
700	395	490	1400	58	9	10	1322	624
750	395	490	240	114	13	16	89	124
750	395	490	700	69	9	12	498	362
750	395	490	1400	65	8	11	1438	724
800	395	490	240	116	13	14	98	140
800	395	490	700	70	8	10	672	408
850	395	490	240	110	11	13	107	156
850	395	490	700	70	7	9	1291	455
900	430	500	240	108	10	12	115	174
900	430	500	700	67	6	8	1332	508
950	430	500	240	110	11	13	122	196
950	430	500	700	68	7	9	1406	572
1000	395	490	240	102	8	11	101	214
1000	395	490	700	57	4	6	1510	624

Twin Axial Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Standard Flow Liner
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing large amounts of axial movement. Pressure thrust will be transmitted onto the pipeline. Correct anchoring and guiding must be used. Internal flow liner for eliminating velocity and flow problems is fitted as standard.

Technical Details

Nom Bore	Length		Max. Working Pressure	Axial Movement	Spring Rate	Pressure Thrust
	Flanged	Weld Ends				
(mm)	(mm)	(mm)	kPa	(mm)	N/MM	KN
50	380	440	240	64	11	1
50	380	440	700	42	35	3
50	380	440	1400	36	35	6
65	450	440	240	72	10	2
65	450	440	700	56	29	4
65	450	440	1400	44	51	9
80	450	440	240	68	6	2
80	450	440	700	68	18	6
80	450	440	1400	50	65	12
100	450	580	240	72	24	3
100	450	580	700	64	42	9
100	450	580	1400	46	85	19
125	450	580	240	100	25	4
125	450	580	700	72	44	14
125	450	580	1400	52	85	27
150	450	580	240	102	21	6
150	450	580	700	78	36	19
150	450	580	1400	52	165	39
200	450	580	240	114	14	11
200	450	580	700	94	53	33
200	450	580	1400	60	271	66
250	470	582	240	128	14	17
250	470	582	700	124	60	51
250	470	582	1400	88	145	102

Twin Axial Expansion Joint

Nom	Length		Max. Working Pressure	Axial Movement	Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends				
(mm)	(mm)	(mm)	kPa	(mm)	N/MM	KN
300	555	700	240	152	14	24
300	555	700	700	136	60	70
300	555	700	1400	94	145	141
350	520	736	240	176	30	29
350	520	736	700	138	63	85
350	520	736	1400	86	355	170
400	540	736	240	168	43	37
400	540	736	700	98	217	108
400	540	736	1400	70	507	217
450	540	772	240	166	49	46
450	540	772	700	96	245	135
450	540	772	1400	72	568	170
500	540	772	240	184	37	57
500	540	772	700	116	188	167
500	540	772	1400	78	634	335
600	580	854	240	148	45	80
600	580	854	700	116	230	235
600	580	845	1400	78	771	470

Universal Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 60
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing large amounts of axial, angular and lateral movement in low pressure pipelines. Pressure thrust will be transmitted onto the pipeline.

Technical Details

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
50	380	460	200	64	76	18	11	0.8
65	380	460	200	64	76	18	10	1.4
80	380	460	200	70	76	18	6	1.8
100	430	526	200	72	76	18	24	2.8
125	430	526	200	106	130	18	25	4.0
150	430	576	200	106	120	18	21	5.6
200	450	560	200	114	98	18	14	9.4
250	485	582	200	112	98	18	14	14.8
300	555	700	200	152	114	18	14	20
350	540	736	200	178	114	18	30	24
400	540	736	200	178	114	18	43	30
450	540	772	200	182	102	18	49	38
500	540	772	200	182	102	16	37	46
600	540	772	200	148	86	16	45	66
650	690	790	200	108	72	15	72	76
700	690	790	100	111	72	15	82	43
750	690	790	100	119	70	15	71	50
800	690	790	100	122	64	15	74	58
850	690	790	100	112	60	15	79	64
900	690	790	100	112	59	15	87	71
950	690	790	100	120	57	15	93	79
1000	1190	1290	100	120	54	14	121	85
1050	1190	1290	100	78	68	14	127	96
1100	1190	1290	100	78	61	14	137	116

Universal Expansion Joint

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
1150	1190	1290	100	74	63	12	262	125
1200	1190	1290	100	84	64	10	209	131
1250	1290	1380	100	122	82	12	332	143
1300	1290	1380	100	122	82	12	348	155
1350	1290	1380	100	120	81	12	362	167
1400	1290	1380	100	120	75	12	376	179
1450	1290	1380	100	120	73	15	389	183
1500	1290	1380	100	118	70	15	398	202

Diesel Poly-ply Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Standard Flow Liner
Size Available: 2- 60
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for vibration and absorbing thermal expansion in exhaust, gas ducting and low pressure systems. Relieves stresses caused by vibration. Specially designed multi ply element. Internal flow liners for eliminating velocity and flow problems fitted as standard.

Technical Details

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
50	145	218	100	16	4	12	59	0.4
65	180	234	100	29	5	14	36	0.7
80	180	240	100	26	6	14	26	0.9
100	190	278	100	28	6	14	63	1.4
125	215	313	100	28	7	14	69	2.0
150	215	338	100	26	8	14	78	2.8
200	225	330	100	39	8	13	106	4.7
250	330	400	100	84	10	14	38	7.4
300	330	400	100	86	11	14	44	10
350	330	400	100	88	11	14	46	12
400	330	400	100	76	10	13	64	15
450	330	400	100	78	11	13	68	19
500	330	400	100	81	12	13	75	23
600	330	400	100	84	10	12	88	33
650	400	460	100	84	10	14	132	38
700	400	460	100	84	10	14	136	43
750	400	490	100	96	12	14	123	50
800	400	490	100	96	12	14	129	58
850	400	490	100	98	11	13	139	64
900	400	490	100	98	10	13	146	71
950	400	490	100	90	10	13	153	79
1000	400	490	100	90	9	10	166	85
1050	400	490	100	90	8	10	164	96
1100	400	490	100	96	9	9	171	116

Diesel Poly-ply Expansion Joint

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
1150	400	490	100	96	9	9	177	125
1200	490	490	100	106	8	9	267	131
1250	490	600	100	106	8	8	290	143
1300	490	600	100	111	10	8	303	155
350	490	600	100	113	10	6	318	167
1400	490	600	100	113	10	6	322	179
1450	490	600	100	127	9	5	347	183
1500	490	600	100	127	9	5	371	202

Diesel Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / Low Pressure
Liner: Standard Flow Liner
Size Available: 2- 60
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing thermal expansion in exhaust, gas ducting and low pressure systems. Pressure thrust will be transmitted onto pipeline. Internal flow liners for eliminating velocity and flow problems fitted as standard.

Technical Details

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
50	145	218	100	36	12	18	21	0.4
65	180	234	100	39	12	18	19	0.7
80	180	240	100	44	13	18	12	0.9
100	190	278	100	44	13	18	47	1.4
125	215	313	100	50	13	18	50	2.0
150	215	338	100	54	15	18	42	2.8
200	225	330	100	59	16	18	28	4.7
250	245	341	100	70	17	18	27	7.4
300	280	400	100	82	18	18	28	10
350	270	418	100	89	15	18	59	12
400	270	418	100	96	10	17	86	15
450	270	436	100	96	8	15	97	19
500	270	436	100	98	9	14	74	23
600	270	436	100	96	7	12	90	33
650	385	460	100	107	12	15	76	38
700	385	460	100	107	12	15	81	43
750	385	460	100	107	12	15	65	50
800	385	460	100	104	11	15	71	58
850	385	460	100	104	11	14	73	64
900	385	460	100	100	10	14	81	71
950	385	460	100	100	9	12	84	79
1000	330	415	100	96	6	10	108	85
1100	330	415	100	96	5	9	113	116
1050	330	415	100	96	6	10	109	96

Diesel Expansion Joint

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
1150	305	415	100	94	5	9	138	125
1200	330	415	100	94	8	9	171	131
1250	480	590	100	127	11	10	343	143
1300	480	590	100	127	11	10	351	155
1350	480	590	100	124	10	9	362	167
1400	480	590	100	124	10	9	377	179
1450	480	590	100	120	9	8	385	183
1500	480	590	100	120	9	8	396	202

Double Diesel Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / Low Pressure
Liner: Standard Flow Liner
Size Available: 2- 60
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing large amounts of axial angular and lateral movements in low pressure pipelines. Pressure thrust will be transmitted onto pipeline. Internal flow liners for eliminating velocity & flow problems fitted as standard.

Technical Details

Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
50	380	460	100	36	12	18	21	0.4
65	380	460	100	39	12	18	19	0.7
80	380	460	100	44	13	18	12	0.9
100	430	526	100	44	13	18	47	1.4
125	430	526	100	50	13	18	50	2.0
150	430	576	100	54	15	18	42	2.8
200	450	560	100	59	16	18	28	4.7
250	485	582	100	70	17	18	27	7.4
300	555	700	100	82	18	18	28	10
350	540	736	100	89	15	18	59	12
400	540	736	100	96	10	17	86	15
450	540	772	100	96	8	15	97	19
500	540	772	100	98	9	14	74	23
600	540	854	100	96	7	12	90	33
650	690	790	100	107	12	15	76	38
700	690	790	100	107	12	15	81	43
750	690	790	100	107	12	15	65	50
800	690	790	100	104	11	15	71	58
850	690	790	100	104	11	14	73	64
900	690	790	100	100	10	14	81	71
950	690	790	100	100	9	12	84	79
1000	1190	1290	100	96	6	10	108	85
1050	1190	1290	100	96	6	10	109	96
1100	1190	1290	100	96	5	9	113	116

Double Diesel Expansion Joint

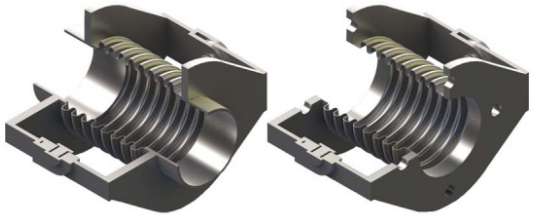
Nom	Length		Max. Working Pressure	Movements			Spring Rate	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	Lateral	Angular		
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	(Deg)	N/MM	KN
1150	1190	1290	100	94	5	9	138	125
1200	1190	1290	100	94	8	9	171	131
1250	1290	1380	100	127	11	10	343	143
1300	1290	1380	100	127	11	10	351	155
1350	1290	1380	100	124	10	9	362	167
1400	1290	1380	100	124	10	9	377	179
1450	1290	1380	100	120	9	8	385	183
1500	1290	1380	100	120	9	8	396	202

Single Hinge Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing angular movement in one plane only, movement of bellows is more controlled. Pressure thrust is restrained by the hinges.



Technical Details

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Degrees	Total Degrees	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	NM/Deg
50	145	218	240	18	36	0.2
50	145	218	700	18	36	0.6
50	145	218	1400	18	36	0.6
65	180	234	240	18	36	0.2
65	180	234	700	18	36	0.7
65	180	234	1400	18	36	1.3
80	180	240	240	18	36	0.2
80	180	240	700	18	36	0.6
80	180	240	1400	17	34	2.2
100	190	278	240	18	36	0.3
100	190	278	700	18	36	2.2
100	190	278	1400	17	34	4.6
125	215	313	240	18	36	1.9
125	215	313	700	18	36	3.4
125	215	313	1400	14	28	6.6
150	215	338	240	18	36	2.3
150	215	338	700	18	36	3.9
150	215	338	1400	14	28	18.2
200	225	330	240	18	36	2.6
200	255	330	700	17	34	9.8
200	255	330	1400	13	26	50
250	245	341	240	18	36	4
250	245	341	700	18	36	17
250	245	341	1400	13	26	42

Single Hinge Expansion Joint

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Degrees	Total Degrees	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	NM/Deg
300	280	400	240	18	36	6
300	280	400	700	17	34	23
300	400	400	1400	13	26	58
350	400	540	240	18	36	14
350	400	540	700	15	30	30
350	400	540	1400	12	24	170
400	400	540	240	17	34	26
400	400	540	700	12	24	132
400	400	540	1400	10	20	308
450	450	590	240	15	30	36
450	450	590	700	11	22	186
450	450	590	1400	8	16	436
500	450	590	240	14	28	35
500	450	590	700	12	24	176
500	450	590	1400	8	16	595
600	450	590	240	12	24	59
600	450	590	700	10	20	303
600	450	590	1400	7	14	1015

Double Hinge Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing large amounts of lateral movement in one plane, Movement of bellows is more controlled. Anchors only required to absorb.

Technical Details

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
50	600	632	240	94	188	0.1
50	600	632	700	94	188	0.4
50	600	632	1400	94	188	0.4
65	600	632	240	81	162	0.3
65	600	632	700	81	162	0.8
65	600	632	1400	81	162	1.3
80	600	632	240	76	152	0.3
80	600	632	700	76	152	1.2
80	600	632	1400	76	152	4.2
100	600	632	240	64	128	1.4
100	600	632	700	64	128	2.5
100	600	632	1400	64	128	5.1
125	600	761	240	88	176	1.6
125	600	761	700	88	176	2.7
125	600	761	1400	88	176	5.2
150	619	813	240	88	176	2.2
150	619	813	700	88	176	3.7
150	619	813	1400	88	176	16.9
200	698	892	240	106	212	1.8
200	698	892	700	106	212	6.8
200	698	892	1400	106	212	35
250	800	994	240	112	224	3
250	800	994	700	112	224	17
250	800	994	1400	112	224	41

Double Hinge Expansion Joint

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
300	800	994	240	115	230	7
300	800	994	700	115	230	22
300	800	994	1400	108	216	42
350	880	1080	240	127	254	8
350	880	1080	700	123	246	23
350	880	1080	1400	87	174	101
400	1105	1320	240	149	298	7
400	1105	1320	700	144	288	19
400	1105	1320	1400	100	200	73
450	1105	1320	240	163	326	7
450	1105	1320	700	146	292	24
450	1105	1320	1400	89	178	96
500	1225	1440	240	164	328	11
500	1225	1440	700	126	252	33
500	1225	1440	1400	118	236	119
600	1435	1650	240	172	344	14
600	1435	1650	700	107	214	92
600	1435	1650	1400	101	202	184

Single Gimbal Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing angular movement in any plane, movement of bellows is more controlled. Anchors only required to absorb spring forces, must be in pairs with another gimbal. Pressure thrust is restrained by the hardware.

Technical Details

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
50	145	218	240	18	36	0.2
50	145	218	700	18	36	0.6
50	145	218	1400	18	36	0.6
65	180	234	240	18	36	0.2
65	180	234	700	18	36	0.7
65	180	234	1400	18	36	1.3
80	180	240	240	18	36	0.2
80	180	240	700	18	36	0.6
80	180	240	1400	17	34	2.2
100	190	278	240	18	36	1.3
100	190	278	700	18	36	2.2
100	190	278	1400	17	34	4.6
125	215	313	240	18	36	1.9
125	215	313	700	18	36	3.4
125	215	313	1400	14	28	6.6
150	215	338	240	18	36	2.3
150	215	338	700	18	36	3.9
150	215	338	1400	14	28	18.2
200	225	330	240	18	36	2.6
200	225	330	700	17	34	9.8
200	225	330	1400	13	26	50
250	245	341	240	18	36	4
250	245	341	700	18	36	17
250	245	341	1400	13	26	42

Single Gimbal Expansion Joint

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
300	280	400	240	18	36	6
300	280	400	700	17	34	23
300	280	400	1400	13	26	58
350	400	540	240	18	36	14
350	400	540	700	15	30	30
350	400	540	1400	12	24	170
400	400	540	240	17	34	26
400	400	540	700	12	24	132
400	400	540	1400	10	20	308
450	450	590	240	15	30	36
450	450	590	700	11	22	186
450	450	590	1400	8	16	436
500	450	590	240	14	28	35
500	450	590	700	12	24	176
500	450	590	1400	8	16	595
600	540	680	240	12	24	59
600	540	680	700	10	20	303
600	540	680	1400	7	14	1015

Double Glimbal Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 24
(Larger sizes upon Request)
Temperature : -196°C +900°C

Application:
Used for absorbing large amounts of lateral movement in one plane. Movement of bellows is more controlled. Anchors only required to absorb.

Technical Details

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
50	600	632	240	94	188	0.1
50	600	632	700	94	188	0.4
50	600	632	1400	94	188	0.4
65	600	632	240	81	162	0.3
65	600	632	700	81	162	0.8
65	600	632	1400	81	162	1.3
80	600	632	240	76	152	0.3
80	600	632	700	76	152	1.2
80	600	632	1400	76	152	4.2
100	600	632	240	64	128	1.4
100	600	632	700	64	128	2.5
100	600	632	1400	64	128	5.1
125	600	761	240	88	176	1.6
125	600	761	700	88	176	2.7
125	600	761	1400	88	176	5.2
150	619	813	240	88	176	2.2
150	619	813	700	88	176	3.7
150	619	813	1400	88	176	16.9
200	760	970	240	109	218	1.8
200	760	970	700	109	218	6.8
200	760	970	1400	109	218	35
250	850	1060	240	114	228	3
250	850	1060	700	114	228	17
250	850	1060	1400	114	228	41

Double Glimbal Expansion Joint

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
300	890	1120	240	115	230	7
300	890	1120	700	115	230	22
300	890	1120	1400	108	216	42
350	1230	1450	240	127	254	8
350	1230	1450	700	123	246	23
350	1230	1450	1400	87	174	101
400	1230	1450	240	149	298	7
400	1230	1450	700	144	288	19
400	1230	1450	1400	100	200	73
450	1570	1780	240	163	326	7
450	1570	1780	700	146	292	24
450	1570	1780	1400	89	178	96
500	1630	1840	240	164	328	11
500	1630	1840	700	126	252	33
500	1630	1840	1400	118	236	119
600	1670	1880	240	172	344	14
600	1670	1880	700	107	214	92
600	1670	1880	1400	101	202	184

Single Tied Expansion Joint

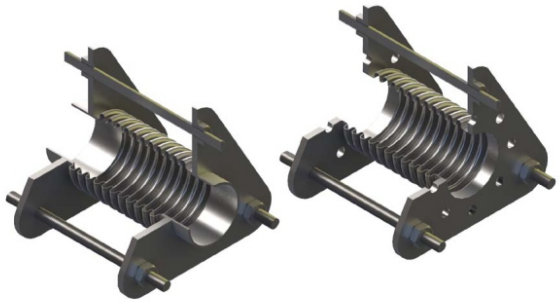
Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
300	280	400	240	18	36	184
300	280	400	700	12	22	797
300	280	400	1400	8	15	1945
350	400	540	240	15	30	537
350	400	540	700	10	19	1142
350	400	540	1400	6	12	3467
400	400	540	240	10	20	544
400	400	540	700	5	10	1841
400	400	540	1400	4	7	4314
450	450	590	240	8	16	477
450	450	590	700	5	9	1574
450	450	590	1400	4	7	5270
500	450	590	240	9	18	843
500	450	590	700	6	11	2288
500	450	590	1400	4	8	5350
600	450	590	240	7	14	1122
600	450	590	700	4	9	4954
600	450	590	1400	3	6	9468

Single Tied Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Optional
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing pump vibration, lateral movement and minor pipeline misalignment. Anchors required to absorb spring rate forces only. Pressure thrust is restrained by the tie rods.



Technical Details

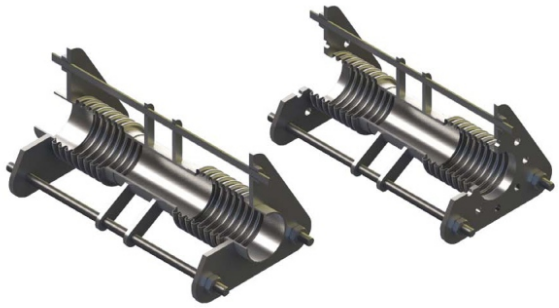
Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
50	145	218	240	12	24	12
50	145	218	700	8	15	88
50	145	218	1400	7	13	88
65	180	234	240	12	24	23
65	180	234	700	11	21	70
65	180	234	1400	7	14	126
80	180	240	240	13	25	18
80	180	240	700	13	25	54
80	180	240	1400	8	16	198
100	190	278	240	12	25	86
100	190	278	700	10	20	152
100	190	278	1400	7	14	309
125	215	313	240	13	26	111
125	215	313	700	10	20	195
125	215	313	1400	7	14	381
150	215	338	240	15	30	131
150	215	338	700	9	18	228
150	215	338	1400	6	11	1048
200	225	330	240	16	32	150
200	225	330	700	9	18	562
200	225	330	1400	6	12	2897
250	245	341	240	17	34	196
250	245	341	700	10	19	855
250	245	341	1400	8	14	2071

Double Tied Expansion Joint

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: Medium Flexibility / High Pressure
Liner: Standard Flow Liner
Size Available: 2- 24
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing large amounts of lateral movement. Internal flow liners for eliminating velocity and flow problems may be fitted. Anchors required to absorb spring rate forces only. Pressure thrust is restrained by the tie rods.



Technical Details

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
50	600	632	240	94	188	0.1
50	600	632	700	94	188	0.4
50	600	632	1400	94	188	0.4
65	600	632	240	81	162	0.3
65	600	632	700	81	162	0.8
65	600	632	1400	81	162	1.3
80	600	632	240	76	152	0.4
80	600	632	700	76	152	1.2
80	600	632	1400	76	152	4.2
100	600	632	240	64	128	1.4
100	600	632	700	64	128	2.5
100	600	632	1400	64	128	5.1
125	600	761	240	88	176	1.6
125	600	761	700	88	176	2.7
125	600	761	1400	88	176	5.2
150	619	813	240	88	176	2.2
150	619	813	700	88	176	3.7
150	619	813	1400	88	176	16.9
200	698	892	240	106	212	1.8
200	698	892	700	106	212	6.8
200	698	892	1400	106	212	35
250	800	994	240	112	224	3
250	800	994	700	112	224	17
250	800	994	1400	112	224	40

Double Tied Expansion Joint

Nom	Length		Max. Working Pressure	Movements		Spring Rate
Bore	Flanged	Weld Ends		± Lateral	Total Lateral	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	N/MM
300	800	994	240	115	230	7
300	800	994	700	115	230	22
300	800	994	1400	108	216	42
350	880	1080	240	127	254	8
350	880	1080	700	123	246	23
350	880	1080	1400	87	174	101
400	1105	1320	240	149	298	7
400	1105	1320	700	144	288	19
400	1105	1320	1400	100	200	73
450	1105	1320	240	163	326	7
450	1105	1320	700	146	292	24
450	1105	1320	1400	89	178	96
500	1225	1440	240	164	328	11
500	1225	1440	700	126	252	33
500	1225	1440	1400	118	236	119
600	1435	1650	240	172	344	14
600	1435	1650	700	107	214	92
600	1435	1650	1400	101	202	184

Metallic Expansion Joints Design

Introduction

Expansion joints are employed in piping systems to absorb different thermal expansion while containing the system pressure. They are successfully utilised in refineries, chemical plants, fossil and nuclear systems, heating and cooling systems, and cryogenic plants.

Any pipe connecting two points is subject to numerous types of action which result in stresses on the pipe.

Some of the causes of these stresses are:

- Internal or external pressure at working temperature
- Weight of the pipe itself and the parts supported
- Movement imposed on the pipe sections by external restraints
- Thermal expansion

The stress on the wall of piping is related to the force or movement exerted on it by external resistance and the flexibility of the pipe itself.

When either the value of the stresses or the value of the external forces or movements exceeds the maximum allowable value(s), the flexibility of the pipe must be increased artificially. This can be done either by altering the layout of the pipe or by inserting high flexibility sections.

This is precisely the function of expansion joints.

Depending on the type of movement to be absorbed, expansion joints can be classified as follows:

- Axial
- Universal
- Angular (hinged)
- Spherical angular (gimbal)
- Lateral
- Spherical lateral
- Pressure balance axial
- Pressure balance universal

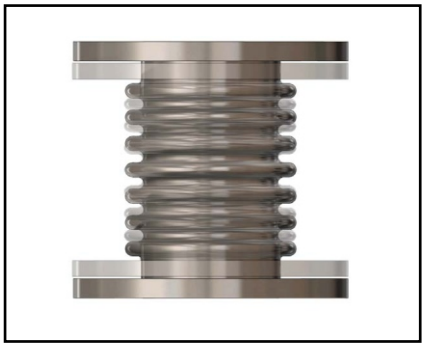
Design and Manufacture

Pacific Hoseflex has a variety of different size expansion joints available from 50 mm to 5000 mm in diameter, with working pressures up to 10,000 kpa. Consideration must be taken into account when elevated temperatures are involved. They reduce both rated movement for a given life cycle and pressure capabilities of the expansion joint.

Bellows operate best at normal pressure ratings temperatures between 70° C to 80° C. The austenitic range of stainless steel is susceptible to high stresses in the presence of corrosive agents, such as chlorides, caustic alkalis, hydrogen sulfide and nitrates.

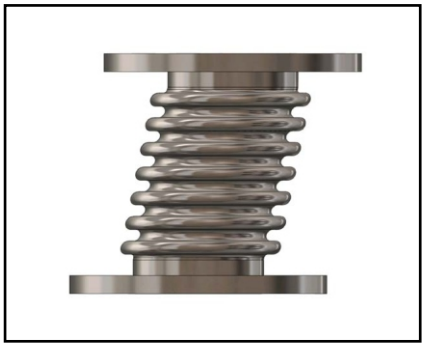
Definition of Movement

Axial Movement



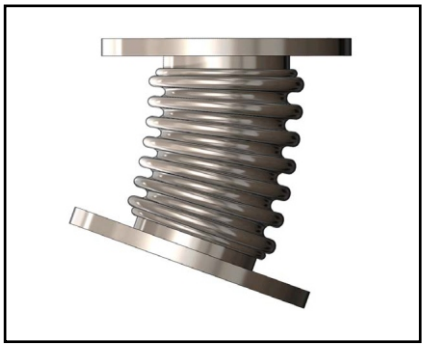
Axial Compression is the dimensional shortening of an Expansion Joint along its longitudinal axis while axial extension is the dimensional lengthening of the expansion joint.

Lateral Movement



Lateral Deflection is the relative displacement of the two ends of an Expansion Joint perpendicular to its longitudinal axis.

Angular Movement



Angular Rotation is the displacement of the longitudinal axis of the Expansion Joint from its initial straight line position into a circular arc.

Cycle Life & Quality Management

Cycle Life

This is the anticipated number of complete expansions and contractions that a bellow can accommodate in its working life. This is an important consideration with bellow design. This consideration is to ensure the correct balance between the pressure containing characteristics and the movement.

The cycle life expectancy of an expansion joint is affected by the flowing various factors:

- operating pressure
- operating temperature
- the material from which the bellows is made
- the movement per convolution
- the thickness of the bellow
- the convolution pitch
- depth and shape of convolution

After installation, any change to any of these factors will impact upon the cycle life.

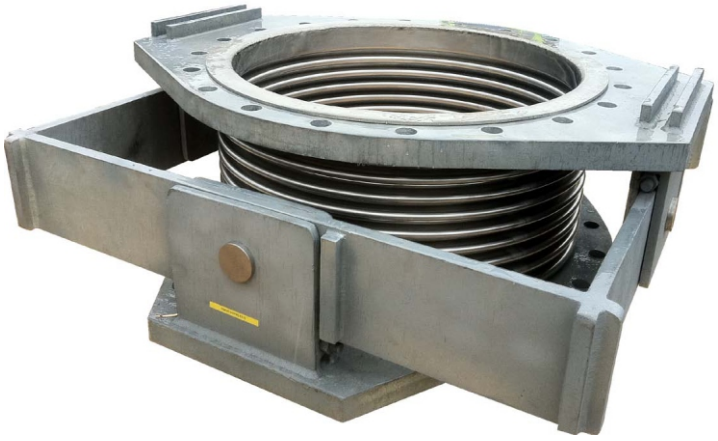
Asset (Hose) Management System

IDA has developed and implemented a Asset (Hose) Management System to offer clients complete traceability. Our system is flexible and can be customized to accommodate the specific needs of individual clients

With accredited Quality Assurance:

- ISO 9001:2015

Pacific Hoseflex quality control measures, inspection and testing procedures include; inwards goods inspection, in-process inspection, final product release inspection and leak detection inspection. There are several different methods for leak detection: dye penetrate examination, X-ray examinations, magnetic particle inspection, hydrostatic test and pneumatic test.



Bellow Forming & Material

Bellows forming

The basic method(s) of bellows manufacture is not complicated. There are two ways that a bellows can be manufactured:

1. Mechanical forming can be done by either rolling the convolutions between external and internal wheels.
2. Hydraulic forming, using internal pressure has a much greater life than bellows formed by the other method(s). Bellows shall be hydraulically formed from a tube having only longitudinal seams. When the ratio of corrugation diameter to shell diameter is large, as in small diameter bellows, the units shall be annealed to remove stresses created by the forming operation.

The number of convolutions depends upon the amount of movement the bellows must accommodate or the force that must be used to accomplish the deflection. Since bellows are unique, there are many design considerations which must be evaluated. The convoluted element must be strong enough circumferentially to withstand the line pressure of the system, yet responsive enough longitudinally to flex. The longitudinal load (pressure thrust) must then be absorbed by some other type of device. These are usually anchors, tie rods, hinges or gimbal structures.

Under pressure a bellows will crave to squirm. This can occur when a bellow is subjected to a pressure greater than 1.5 times the design pressure. Squirm can be considered the same as column buckling in a beam under compressive loading. The convolutions deform and even though there is no leaking, both cycle life and pressure capacity is greatly reduced.

Bellows Material

Stainless Steel 316
Has a better corrosion resistance than 321 SS and can be used as an alte
engine exhaust manifolds, steam and marine services.

Stainless Steel 321
The most common material used for bellow manufacture. It combines excellent mechanical properties with adequate corrosion resistance. Applications include diesel engine exhaust manifolds and steam.

Stainless Steel 304
Is a lower grade material than 321 SS with less resistance to corrosion.
Applications include diesel engine exhaust manifolds and steam.

Nickel 200, 253 MA
This alloy has good mechanical properties and excellent corrosion resistance to alkalis, i.e. sodium hydroxide. It also has good electrical, thermal and magneto-strictive properties. Applications include food and synthetic fibre processing, heat exchangers, chemical and electrical industries.

Inconel 625, 600 and 800
Is a high nickel alloy with good corrosion resistant and temperature capability higher than 425° C.

Incoloy 825, 800
A high nickel alloy specifically designed for use in aggressive environment. It is very resistant to pitting and crevice corrosion and virtually immune to stress corrosion cracking. It can be used up to a maximum temperature of 425° C. Applications include diesel engine exhaust manifolds, steam, crude oil lines and flue gases.

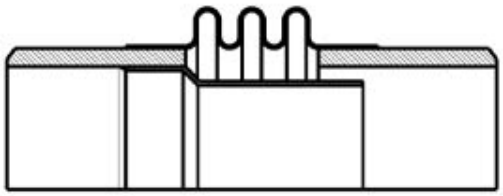
Hastelloy
It has a high-strength, nickel based, corrosion resistant alloy. Other components include molybdenum and chromium. It is well suited for most chemical applications. It has excellent resistance to pitting, stress-corrosion and cracking

254 SMO
This is a very high end austenitic stainless steel that combines impact toughness resistance to chloride stress corrosion cracking, pitting and crevice corrosion with strength nearly twice that of 300 series stainless steels. In some applications it has been found to be a more cost effective substitute for high nickel and titanium alloys.

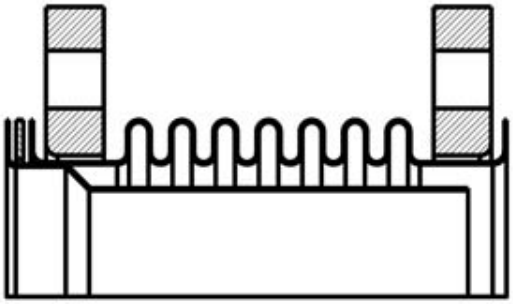
Liners

Single Liners

Liners are used to prevent flow induced vibration or erosion caused by abrasive materials. When lateral movement is required in the expansion joint, the flow liner diameter must be reduced to provide clearance.



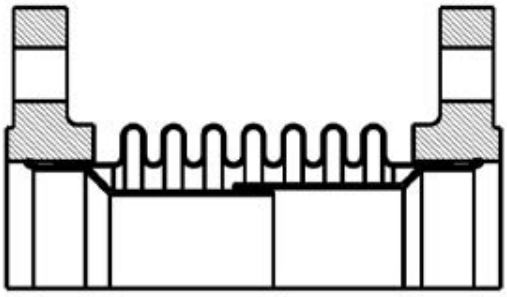
Single Welded Liner
Most common type of internal liner.
Maximum durability.



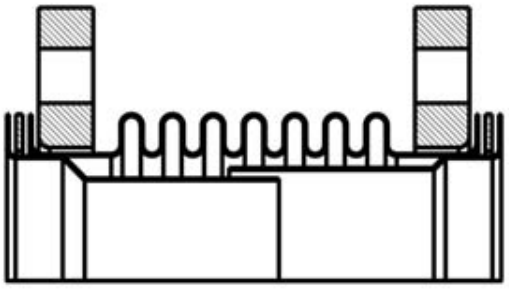
Single Drop-In Liner
Can be removed and cleaned.

Telescopic Liners

Telescoping liners are used on short expansion joints with large axial movements. When fit close together, they can also be used in systems where the flow can be in either direction.



Telescoping Welded Liner
For large axial movements.



Telescoping Drop-In Liner
For large axial movements. Can be removed and cleaned.

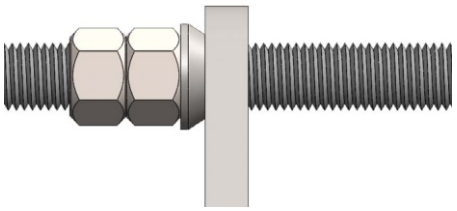
Rods Restraints

Restraints

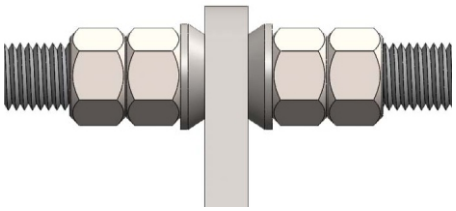
Restraints are used for lateral and angular compensators. The restraints absorb axial reaction force produced by inner pressure. Even so, the connected pipe must be equipped with light fixed points to absorb moving force and moments. Precise rating details and operating parameters of the corresponding machinery or equipment must be known to correctly calculate the degree of restraints.

Rubber Expansion Joint Rod Restraints

There are two types of tie rods restraints for lateral rubber compensators:



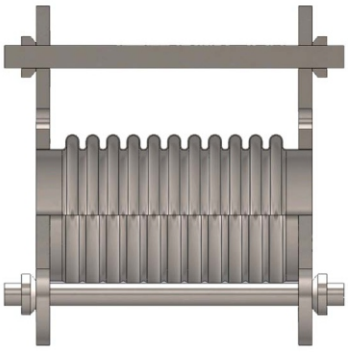
Outer restraints are used to absorb reaction force from internal pressure

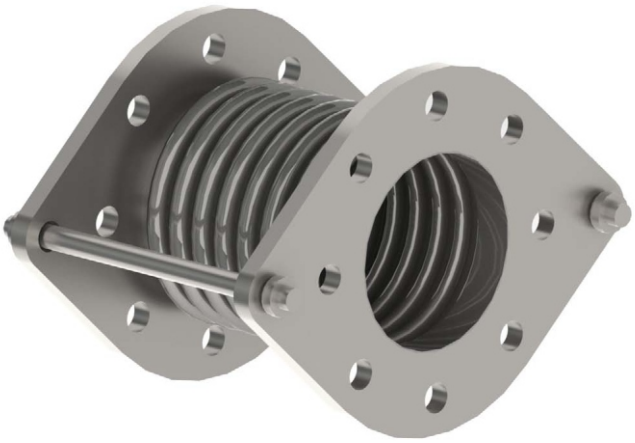


Outer and inner restraints are used to absorb reaction force from internal pressure and vacuum

Metallic Expansion Joint Rod Restraints

Lateral compensators are equipped with adapters for tie rods restraints. The design differs between flanges with welded ears or oval flanges depending on compensator type and size. Tie rods restraints run conical seats.





Metallic Expansion Joints Installation Guide

Storage:

1. Store expansion joints in a dry/cool location such as a warehouse.
2. Store flange face down on a pallet or wooden platform.
3. Do not store other heavy items on top of expansion joint (s).
4. Ten-year shelf life can be expected with ideal conditions.

Handling:

Do not lift with ropes or bars through the bolt holes. If lifting through the bore, use padding or a saddle to distribute the weight. Do not let expansion joints sit vertically on the edges of the flanges for any period of time. Do not lift on the shipping restraints.

Service Conditions:

Make sure the expansion joint rating for temperature, pressure, movements, and selection of materials match the system requirements. Contact the manufacturer if the system requirements exceed those of the expansion joint selected.

Alignment:

Expansion joints are not designed to make up for piping misalignment errors. Check with the manufacturer if piping misalignment is present.

Anchoring:

The main function of expansion joints is to compensate for axial pipe thermal expansion. Metal expansion joints must have the protection of adequate anchoring against the internal and thrust pressures of the media to prevent damage. Anchoring must be installed as close to the down stream end of the expansion joint as possible, with the originating equipment serving as the opposite anchor. Anchors must prevent pipe movement in any direction. Hangers or pipe pedestals cannot be considered to be anchors as they offer no restriction against side or end motion.

When designing an anchor for a metal expansion joint, consult the internal thrust force table from the appropriate expansion joint catalogue. The weight of piping, valves, and media, as well as the resistance of the piping to deflection, must be included as part of the design weight and strength of an anchor.

Anchors are required whenever a piping system changes direction. Expansion joints should be located as close as possible to anchor points. For additional expansion joint protection, it is recommended that control rods be installed on the expansion joint to prevent excessive movements from occurring due to pressure thrust of the line.

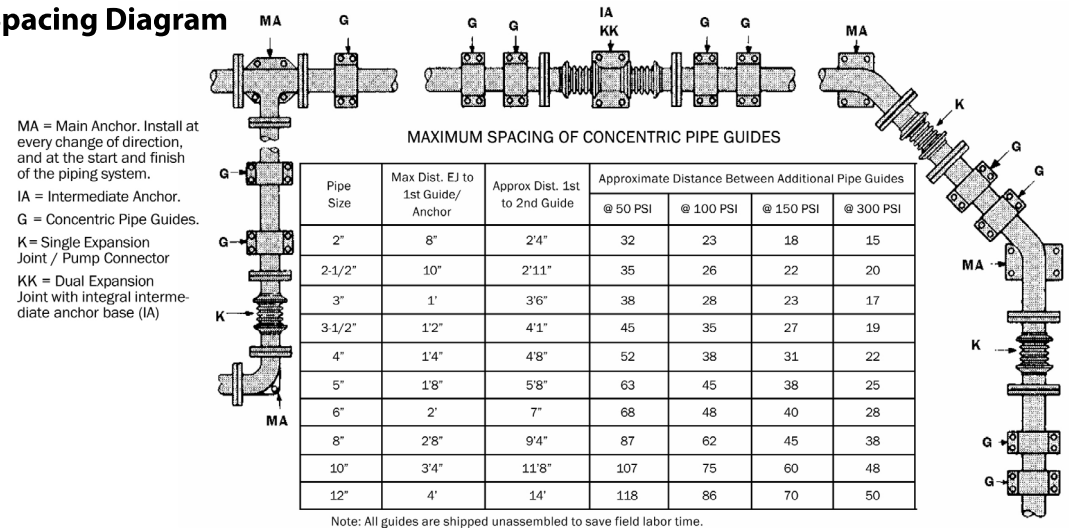
Guides:

Expansion joints must be properly guided and anchored in accordance with EJMA standards.
(Refer to Pipe Guides Spacing Diagram below)

Pipe Support:

Piping must be supported so expansion joints do not carry any pipe weight.

Pipe Guides - Spacing Diagram



MA = Main Anchor. Install at every change of direction, and at the start and finish of the piping system.

IA = Intermediate Anchor.

G = Concentric Pipe Guides.

K = Single Expansion Joint / Pump Connector

KK = Dual Expansion Joint with integral intermediate anchor base (IA)

MAXIMUM SPACING OF CONCENTRIC PIPE GUIDES

Pipe Size	Max Dist. EJ to 1st Guide/ Anchor	Approx Dist. 1st to 2nd Guide	Approximate Distance Between Additional Pipe Guides			
			@ 50 PSI	@ 100 PSI	@ 150 PSI	@ 300 PSI
2"	8"	2'4"	32	23	18	15
2-1/2"	10"	2'11"	35	26	22	20
3"	1'	3'6"	38	28	23	17
3-1/2"	1'2"	4'1"	45	35	27	19
4"	1'4"	4'8"	52	38	31	22
5"	1'8"	5'8"	63	45	38	25
6"	2'	7"	68	48	40	28
8"	2'8"	9'4"	87	62	45	38
10"	3'4"	11'8"	107	75	60	48
12"	4'	14'	118	86	70	50

Note: All guides are shipped unassembled to save field labor time.

Metallic Expansion Joints Installation Guide

Mating Flanges:

Install the expansion joint flange against the mating pipe flanges and install bolts so that the bolt head is against the expansion joint flange. Bolts should be installed from the bellows side (so that the bolt heads are adjacent to the bellows) to insure that the bolts do not interfere with the bellows during periods of compression. Flange-to-flange dimensions of the expansion joint must match the required opening.

Make sure mating flanges are clean and are matched to the type supplied with the expansion joint. Gaskets of appropriate material, size and temperature ratings must be used in all flange-to-flange type installations.

Bolt Torque:

Tighten bolts in stages by alternating around the flange. Never tighten an expansion joint to the point that there is metal-to-metal contact between the expansion joint flange and the mating flange.

Shipping Restraints:
The expansion and compression movements are preset at the factory. The shipping restraints protect the expansion joint in its neutral position prior to installation. Remove the shipping restraints after installation and before hydro-testing the system.

Additional Tips:

1. Insulation or thermal blankets over a metal expansion joint should be supplied by the expansion joint manufacturer to preclude the use of corrosive chloride bearing insulation materials. Insulation should be installed to permit easy access to the flange area, to check bolting.

2. Do not weld in the near vicinity of a non-shrouded expansion joint without protecting the expansion joint from damaging weld splatter.

3. If an expansion joint is to be installed underground, or will be submerged in water, contact the manufacturer for specific guidelines.

4. Consider ordering a spare expansion joint. The cost of downtime of a critical expansion joint far exceeds the cost of a spare unit placed and protected in reserve on-site.

5. Whenever possible, install the expansion joint next to an anchor as indicated below not exceeding maximum distance to the 1st guide with at least two concentric pipe guides on the opposite side of the joint. Added guides are required to prevent bowing or bending of the pipe.

6. When an expansion joint is placed elsewhere in the line, at least two concentric guides must be used on each side of the joint with added joints installed as recommended in pipe guide spacing diagram.

7. The inside of all piping must be clean before installing and testing the expansion joints. Expansion joints should not be subjected to hydrostatic pressure tests beyond their rated working pressure.

8. Secure all anchors and guides before testing. Remove shipping bars prior to testing.

9. Expansion joints must be removed from the lines while the system is being tested hydrostatically at pressure exceeding allowable working pressure.

10. Expansion Joints fabricated with flow liners must be installed with the flow arrow pointing in the same direction of the media flow.

11. Single externally pressurized expansion joints must be installed with the moving end adjacent to the moving end of the pipe responding to the thermal expansion induced during system heat-up.

12. Failure to install according to instructions will void warranty.

Pipe Supports & Hangers

Insulated Pipe Clamps

Made from thicker material and can withstand greater loads and movement/ strong vibrations making it a safe and reliable solution for supporting emergency high pressure fire sprinkler system pipework. The weld nut on all sizes is designed for M12 threaded rod. Zinc Plated to AS1789:2003 to meet grade Fe/Zn12 as a standard material finish.

Clevis Hanger

Recommended for the suspension of stationary non-insulated pipe lines. Also commonly used for the suspension of insulated pipe lines, Flared edges help prevent sharp surfaces from coming into contact with the pipe. Clevis bottom pivots to allow pipe to be fed from either direction.

U Bolt Support

Heavy duty insulated U bolt that is supplied with a 10mm thick cork and neoprene base. It is designed to provide support for large heavy weight pipes made out of stainless steel, duplex/super duplex or other materials.

Clamped Pipe Support

Clamped Pipe Shoe supports pipe nominal bores from 25NB through to 1150NB are manufactured from material to meet AS/NZS1594:2002 and either Hot Dip Galvanised to AS4680:2006 or available in Stainless Steel.

Saddle Pipe Support

Saddle Clamps to suit Steel Pipe for general plumbing are manufactured from material to meet AS/NZS1594:2002, and Hot Dip Galvanised to meet AS/NZS4680:2006 or available in Stainless Steel.

Chain

Strong and durable, use this heat-treated chain when using fittings with chain. You must match the chain size and meet or exceed the chains grade.

Channel and Struts

Can be supplied in lengths of 41mm wide channel/strut with a choice of thicknesses, heights and materials.Channel provides an ideal mechanical support frame for a range of applications, and is a great starting point for installing electrical cable or pipe management systems. It can be provided in plain style, slotted with evenly spaced slots along its length, or in a range of different welded combinations. Other variants allow for easy installation/ securing of the product into concrete.

V Shape

Construction

Construction: Annular / Close Pitch
Profile: High Flexiblity / High Pressure
Material Available: 304 / 316 Stainless Steel
Braid Available: 304 / 316 Stainless Steel
Size Available: 1 - 16
(Larger sizes upon Request)
Max Temp: 700°C

Application:
Used in a variety of applications and locations where subject to seismic conditions or large amounts of pipework movement. The random motion common to earthquakes requires that seismic expansion joints to be capable of movement in any direction.

Standards:
ISO 10380
AGA Approved: AS 4631:2005 (upon requirement)
Watermark Approved (upon requirement)

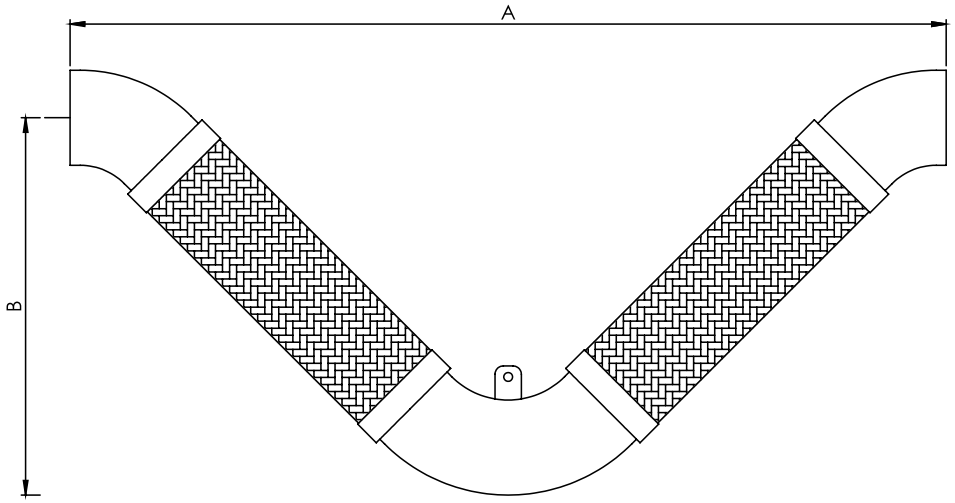
Technical Details

Size	DIM A	DIM B	Working Pressure	Movement
mm	mm	mm	kPa	mm
25	367	167	4500	50
32	436	198	3500	50
38	484	218	3000	50
50	549	243	2500	50
65	684	302	2000	50
75	776	341	2000	50
100	920	397	1600	50
125	467	467	1506	50
150	1230	520	1506	50
25	428	198	4500	75
32	506	233	3500	75
38	560	256	3000	75
50	626	281	2500	75
65	779	350	2000	75
75	880	393	2000	75
100	1032	453	1600	75
125	1218	530	1506	75
150	1363	587	1506	75

V Shape

Size	DIM A	DIM B	Working Pressure	Movement
mm	mm	mm	kPa	mm
25	481	225	4500	100
32	567	264	3500	100
38	624	288	3000	100
50	692	315	2500	100
65	860	391	2000	100
75	968	437	2000	100
100	1126	500	1600	100
125	1325	584	1506	100
150	1475	643	1506	100
25	574	271	4500	150
32	672	316	3500	150
38	735	344	3000	150
50	807	372	2500	150
65	999	460	2000	150
75	1119	512	2000	150
100	1288	581	1600	150
125	1507	674	1506	150
150	1665	738	1506	150

Note :
- Dimension A and B are approx dimensions without Fitting only and are subject to change without notice.



U Shape

Construction

Construction: Annular / Close Pitch
Profile: High Flexiblity / High Pressure
Material Available: 304 / 316 Stainless Steel
Braid Available: 304 / 316 Stainless Steel
Size Available: 1 - 16
(Larger sizes upon Request)
Max Temp: 700°C

Application:
Used in a variety of applications and locations where subject to seismic conditions or large amounts of pipework movement. The random motion common to earthquakes requires that seismic expansion joints be capable of movement in any direction.
Standards:
ISO 10380
AGA Approved: AS 4631:2005 (upon requirement)
Watermark Approved (upon requirement)

Technical Details

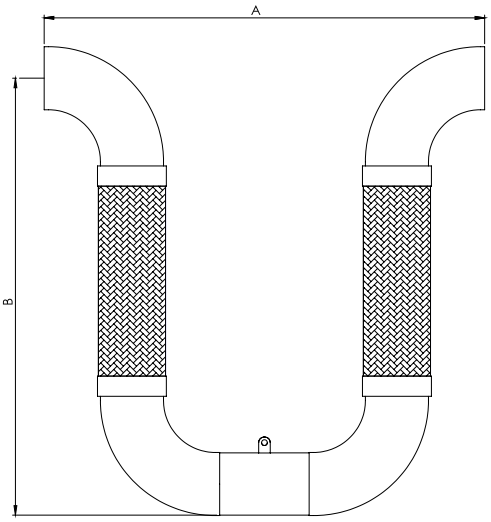
Size	DIM A	DIM B	Working Pressure	Movement
mm	mm	mm	kPa	mm
25	202	276	4500	50
32	230	329	3500	50
38	269	367	3000	50
50	305	418	2500	50
65	381	522	2000	50
75	457	594	2000	50
100	610	708	1600	50
125	276	842	1506	50
150	914	952	1506	50
25	227	320	4500	75
32	240	379	3500	75
38	279	420	3000	75
50	345	473	2500	75
65	381	589	2000	75
75	457	667	2000	75
100	610	787	1600	75
125	762	932	1506	75
150	914	1046	1506	75

U Shape

Size	DIM A	DIM B	Working Pressure	Movement
mm	mm	mm	kPa	mm
25	252	357	4500	100
32	280	422	3500	100
38	309	466	3000	100
50	365	520	2500	100
65	421	646	2000	100
75	457	729	2000	100
100	610	854	1600	100
125	762	1007	1506	100
150	914	1126	1506	100
25	292	423	4500	150
32	320	469	3500	150
38	349	544	3000	150
50	405	601	2500	150
65	461	744	2000	150
75	497	836	2000	150
100	650	968	1600	150
125	762	1135	1506	150
150	914	1260	1506	150

Note :

- Dimension A and B are approx dimensions without Fitting only and are subject to change without notice.



Double Tied Expansion Joint

Double Tied Expansion Joint

The double tied expansion joint is well suited to allow lateral deflection in the low to medium pressure range. Used in this manner the tie rods will absorb the pressure thrust. The design may also be used to absorb axial movement but this would result in the pressure thrust being taken from the tie rods and transmitted to the anchors or adjacent equipment.

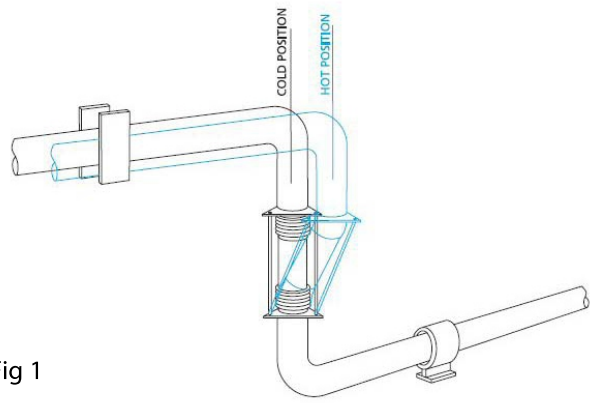


Fig 1

Fig 1 shows a double tied expansion joint used to absorb lateral deflection in a single plane. Wherever feasible the expansion joint should be designed to fill the entire leg so that the expansion of this leg is absorbed within the tie rods as axial movement.

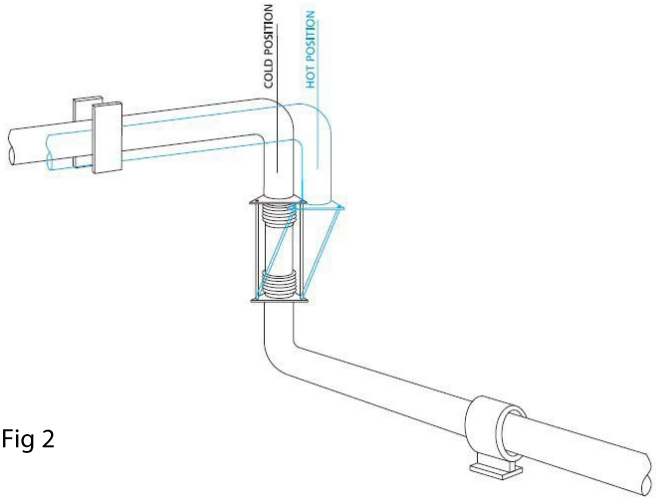


Fig 2

Fig 2 shows a double tied expansion joint used to absorb lateral deflection in a threeplane configuration. As the expansion joint will absorb lateral deflection in any direction, the two horizontal piping legs may lay at any angle in the horizontal plane.

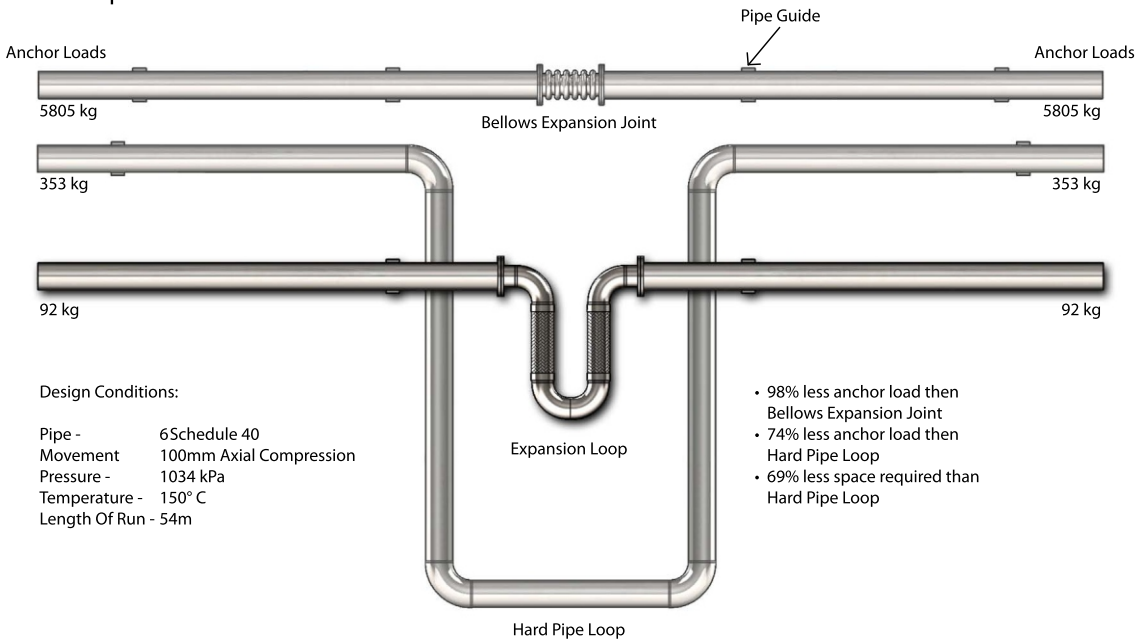
To ensure that this style of joint is correctly installed without any thrust being transmitted to adjacent equipment, it may be necessary to utilize either double hinged or double gimbal expansion joints.

Seismic Joints and Expansion Loops

Seismic Joints and Expansion Loops

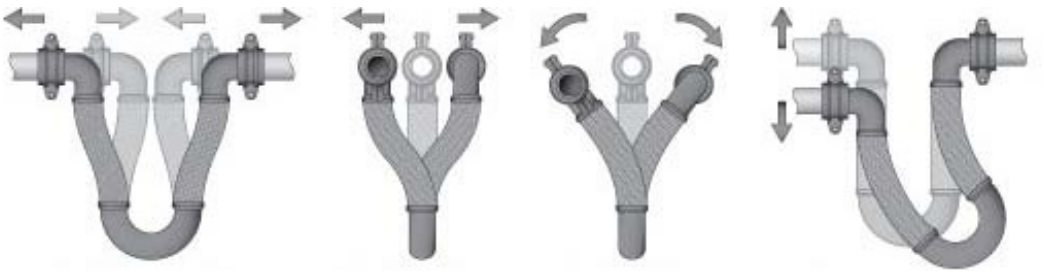
Flexible loop applications that include thermal expansion and contraction, and/or building expansion and contraction (singularly or in combination with seismic considerations), are engineered by the system designer to account for the cumulative movement(s) of each individual system.

Piping used in applications and locations subject to seismic conditions have their own set of unexpected random movements. The random motion common to earthquakes requires that seismic expansion joints be capable of movement in any direction. Of the 6 possible directions, PHF sees axial movement of the hose in only two of them compared to four in an L shaped assembly. Seismic expansion joints orientation can be changed relative to the piping, further minimizing the likelihood of compressive movement.



Significant cost and safety benefits found in Pacific Hoseflex seismic expansion joints.

- It is an inexpensive alternative to dual-tied bellows expansion joints and especially ball joints.
- During an earthquake, it protects equipment by allowing boilers, chillers, fan-coil units and other systems to move independently of the building, Hospitals, high rises and commercial plumping applications.
- Installed at the connection also prevents nozzles from cracking or shearing off.
- A break in the gas pipe work could start a fire, which can of course be devastating. This Australian Gas Approval (AGA) certified seismic expansion joint will compensate for the movement that occurs during any seismic activity such as an earthquake.
- Watermark Approved. (Available On Request)



Axial Compression and Extension | Parallel Offset Z Axis | Parallel Offset with X Axis Rotation | Non-parallel Offset Y Axis

External Pressurised Expansion Joints

External Pressurised Expansion Joints

The XT Externally Pressurized Expansion Joint is designed so that the pressure is external to the bellows whilst the inside is at atmospheric pressure. With this design, when a pipeline expands, the expansion joint compresses, but in doing so it stretches the bellows. The result of this is that many convolutions act together to allow a large amount of axial movement because under external pressure the bellows is completely stable.

The XT style of the joint is relatively inexpensive and is designed primarily to fit the following applications:

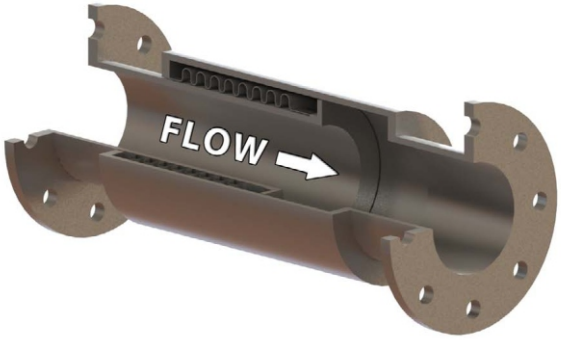
a) In tunnels or locations where articulated joints can not be used but where large amounts of axial expansion have to be absorbed. It would normally be less expensive to install one XT joint than to divide the pipeline up into several sets of expansion joint(s), anchors and guides. It is impractical to use more than two normal bellows together because of the tendency of the bellows to squirm once a certain length diameter ratio is exceeded.

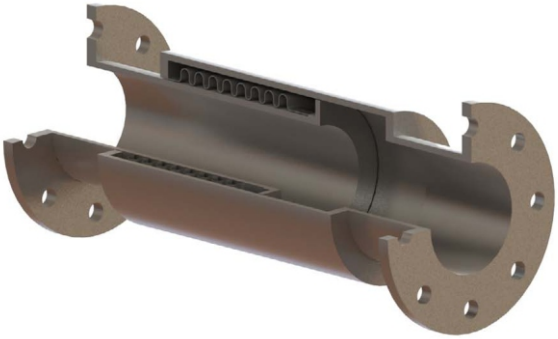
b) At extremely high pressure even short bellows can become unstable under internal pressure. This can be overcome by the use of an XT type joint, which has the bellows under tension and therefore stabilised.

c) Where it is undesirable to have solids accumulate in the convolutions of an expansion joint, the XT can be fitted with drains or manholes to facilitate the regular cleaning out of these areas.

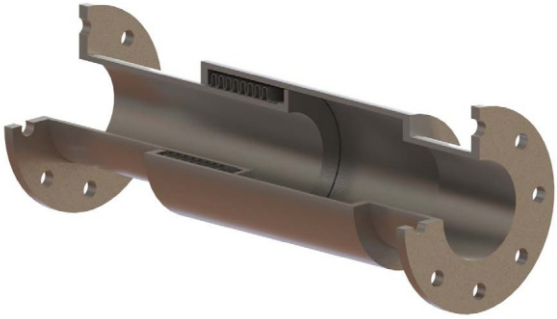
Definition of Movement

Axial Compression





Pressure is external to the bellows for maximum stability.



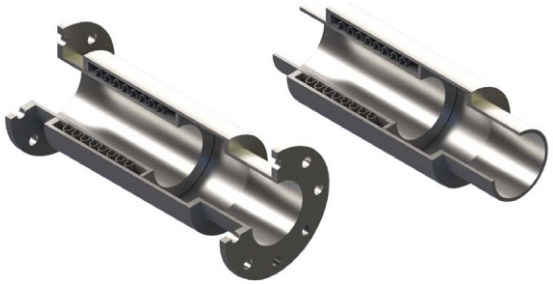
When the pipe expands, it compresses the expansion joint but extends the bellows. The bellows element remains stable due to the external pressure actin upon it.

External Pressurised Expansion Joints

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: High Flexibility / High Pressure
Liner: Standard Flow Liner
Size Available: 1 - 10
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing thermal expansion in exhaust, gas ducting and low pressure systems. Pressure thrust will be transmitted onto pipeline. Internal flow liners for eliminating velocity and flow problems fitted as standard.



Technical Details

Nom	Length		Max. Working Pressure	Movements	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	
(mm)	(mm)	(mm)	kPa	(mm)	KN
25	660	660	1000	100	5.4
25	914	914	1000	150	5.4
25	1168	1168	1000	200	5.4
25	660	660	2000	100	11.5
25	914	914	2000	150	11.5
25	1168	1168	2000	200	11.5
40	660	660	1000	100	7.9
40	914	914	1000	150	7.9
40	1168	1168	1000	200	7.9
40	660	660	2000	100	16.6
40	914	914	2000	150	16.6
40	1168	1168	2000	200	16.6
50	660	660	1000	100	9.5
50	914	914	1000	150	9.5
50	1168	1168	1000	200	9.5
50	660	660	2000	100	19.9
50	914	914	2000	150	19.9
50	1168	1168	2000	200	19.9
65	660	660	1000	100	12.2
65	914	914	1000	150	12.2
65	1168	1168	1000	200	12.2
65	660	660	2000	100	24.6
65	914	914	2000	150	24.6
65	1168	1168	2000	200	24.6

External Pressurised Expansion Joints

Nom Bore	Length		Max. Working Pressure	Movements	Pressure Thrust
	Flanged	Weld Ends		Axial	
(mm)	(mm)	(mm)	kPa	(mm)	KN
80	660	660	1000	100	16.7
80	914	914	1000	150	16.7
80	1168	1168	1000	200	16.7
80	660	660	2000	100	34.1
80	914	914	2000	150	34.1
80	1168	1168	2000	200	34.1
100	660	660	1000	100	23.4
100	914	914	1000	150	23.4
100	1220	1220	1000	200	23.4
100	660	660	2000	100	47.4
100	914	914	2000	150	47.4
100	1168	1168	2000	200	47.4
150	660	660	1000	100	41.4
150	940	940	1000	150	41.4
150	1220	1220	1000	200	41.4
150	660	660	2000	100	84.7
150	910	910	2000	150	84.7
150	1220	1220	2000	200	84.7
200	660	660	1000	100	76.1
200	940	940	1000	150	76.1
200	1220	1220	1000	200	76.1
200	660	660	2000	100	154.1
200	940	940	2000	150	154.1
200	1220	1220	2000	200	154.1
250	660	660	1000	100	93.2
250	940	940	1000	150	93.2
250	1220	1220	1000	200	93.2
250	660	660	2000	100	189.1
250	940	940	2000	150	189.1
250	1270	1270	2000	200	189.1

Double External Pressurised Expansion Joints

Construction

Construction: Convoluted
Material: 304, 321, 316, Incoloy, Inconel, Nickel, Hastelloy
Profile: High Flexibility / High Pressure
Liner: Standard Flow Liner
Size Available: 1 - 10
(Larger sizes upon Request)
Temperature: -196°C +900°C

Application:
Used for absorbing thermal expansion in exhaust, gas ducting and low pressure systems. Pressure thrust will be transmitted onto pipeline. Internal flow liners for eliminating velocity and flow problems fitted as standard.

Technical Details

Nom	Length		Max. Working Pressure	Movements	Pressure Thrust
Bore	Flanged	Weld Ends		Axial	
(mm)	(mm)	(mm)	kPa	(mm)	KN
25	1220	1220	1000	200	5.4
25	1727	1727	1000	300	5.4
25	1220	1220	2000	200	11.5
25	1727	1727	2000	300	11.5
40	1220	1220	1000	200	7.9
40	1727	1727	1000	300	7.9
40	1220	1220	2000	200	16.6
40	1727	1727	2000	300	16.6
50	1220	1220	1000	200	9.5
50	1727	1727	1000	300	9.5
50	2235	2235	1000	400	9.5
50	1220	1220	2000	200	19.9
50	1727	1727	2000	300	19.9
50	2235	2235	2000	400	19.9
65	1220	1220	1000	200	12.2
65	1727	1727	1000	300	12.2
65	2235	2235	1000	400	12.2
65	1220	1220	2000	200	24.6
65	1727	1727	2000	300	24.6
65	2235	2235	2000	400	24.6
80	1220	1220	1000	200	16.7
80	1727	1727	1000	300	16.7
80	2235	2235	1000	400	16.7
80	1220	1220	2000	200	34.1

Double External Pressurised Expansion Joints

Nom Bore	Length		Max. Working Pressure	Movements	Pressure Thrust
	Flanged	Weld Ends		Axial	
(mm)	(mm)	(mm)	kPa	(mm)	KN
80	1727	1727	2000	300	34.1
80	2235	2235	2000	400	34.1
100	1220	1220	1000	200	23.4
100	1727	1727	1000	300	23.4
100	2235	2235	1000	400	23.4
100	1220	1220	2000	200	47.7
100	1727	1727	2000	300	47.7
100	2235	2235	2000	400	47.7
150	1220	1220	1000	200	41.4
150	1778	1778	1000	300	41.4
150	2337	2337	1000	400	41.4
150	1220	1220	2000	200	84.7
150	1778	1778	2000	300	84.7
150	2337	2337	2000	400	84.7
200	1220	1220	1000	200	76.1
200	1778	1778	1000	300	76.1
200	2337	2337	1000	400	76.1
200	1220	1220	2000	200	154.1
200	1778	1778	2000	300	154.1
200	2337	2337	2000	400	154.1
250	1220	1220	1000	200	93.2
250	1778	1778	1000	300	93.2
250	2337	2337	1000	400	93.2
250	1220	1220	2000	200	189.1
250	1778	1778	2000	300	189.1
250	2337	2337	2000	400	189.1

Single Sphere Rubber Expansion Joint

Construction

Material: EPDM, Neoprene (CR), Viton, Buna/Nitrile, Hyperlon, Natural Rubber
Food Grade: White Nitrile (NBR) (Upon Request)
Liner: PTFE, Metallic (Upon Request)
Construction: Smoothbore Sphere
Profile: Medium Flexibility / Medium Pressure
Vacuum Ring: Available on Request
Size Available: 1 1/4- 24 (Larger sizes upon Request)
Temperature: -30°C +105°C

Application:
Rubber expansion joints are designed to alleviate piping stress, absorb pipe misalignment, compression and extension, noise and vibration, in a relatively short space.

Temperature Correction Factor					
80 °C	85 °C	90 °C	95 °C	100 °C	105 °C
x 1.0	x 0.92	x 0.83	x 0.75	x 0.67	x 0.60

Technical Details

Nom Bore	Length	Max. Working Pressure	Movements				Vacuum
			Axial Compression	Axial Elogation	Lateral Deflection	Angular Deflection	
(mm)	(mm)	kPa	(mm)	(mm)	(mm)	(Deg)	Hg
32	95	1550	8	4	4	15°	600
40	95	1550	8	4	4	15°	600
50	105	1550	8	5	5	15°	600
65	115	1550	12	6	6	15°	600
80	130	1550	12	6	6	15°	600
100	135	1550	18	10	10	15°	600
125	170	1550	18	10	10	15°	600
150	180	1550	18	10	10	15°	600
200	205	1550	25	14	14	15°	600
250	240	1550	25	14	14	15°	600
300	260	1550	25	14	14	15°	600
350	265	1034	25	14	14	15°	600
400	265	860	25	14	14	15°	600
450	265	860	25	14	14	15°	600
500	265	860	25	14	14	15°	600
600	265	860	25	14	14	15°	600

Twin Sphere Rubber Expansion Joints

Construction

Material: EPDM, Neoprene (CR), Viton, Buna/Nitrile, Hyperlon, Natural Rubber
Food Grade: White Nitrile (NBR) (Upon Request)
Liner: PTFE, Metallic (Upon Request)
Construction: Smoothbore Sphere
Profile: Medium Flexibility / Medium Pressure
Vacuum Ring: Available on Request
Size Available: 1 1/4- 24 (Larger sizes upon Request)
Temperature: -30°C +105°C

Application:
Rubber expansion joints are designed to alleviate piping stress, absorb pipe misalignment, compression and extension, noise and vibration, in a relatively short space.

Temperature Correction Factor					
80 °C	85 °C	90 °C	95 °C	100 °C	105 °C
x 1.0	x 0.92	x 0.83	x 0.75	x 0.67	x 0.60

Technical Details

Nom Bore	Length	Max. Working Pressure	Movements				Vacuum
			Axial Compression	Axial Elogation	Lateral Deflection	Angular Deflection	
(mm)	(mm)	kPa	(mm)	(mm)	(mm)	(Deg)	Hg
32	175	1550	53	27	45	40°	600
40	175	1550	53	27	45	40°	600
50	175	1550	53	27	45	40°	600
65	175	1550	53	27	45	40°	600
80	175	1550	53	27	45	40°	600
100	225	1550	53	31	40	35°	600
125	225	1550	53	31	40	35°	600
150	225	1550	53	31	40	35°	600
200	325	1550	65	30	35	30°	600
250	325	1550	65	30	35	30°	600
300	325	1550	65	30	35	30°	600
350	350	1034	43	30	30	20°	600
400	350	860	43	30	30	20°	600
450	350	860	43	30	30	20°	600
500	350	860	43	30	30	20°	600
600	350	758	43	30	30	20°	600

Twin Sphere Union Rubber Expansion Joints

Construction

Material: EPDM, Neoprene, Viton, Buna/Nitrile, Hyperlon, Natural Rubber
Construction: Smoothbore Sphere
Profile: Medium Flexibility / Medium Pressure
Vacuum Ring: Available on Request
Size Available: 5/8- 3
(Larger sizes upon Request)
Temperature: -30°C +105°C

Application:
Rubber expansion joints are designed to alleviate piping stress, absorb pipe misalignment, compression and extension, noise and vibration, in a relatively short space.

Temperature Correction Factor					
80 °C	85 °C	90 °C	95 °C	100 °C	105 °C
x 1.0	x 0.92	x 0.83	x 0.75	x 0.67	x 0.60

Technical Details

Nom Bore	Length	Max. Working Pressure	Movements				Vacuum
			Axial Compression	Axial Elogation	Lateral Deflection	Angular Deflection	
(mm)	(mm)	kPa	(mm)	(mm)	(mm)	(Deg)	Hg
15	203	1034	22	6	22	32	660
20	203	1034	22	6	22	32	660
25	203	1034	22	6	22	25	660
32	203	1034	22	6	22	25	660
38	203	1034	22	6	22	20	660
50	203	1034	22	6	22	15	660
65	240	1034	22	6	22	12	660
80	240	1034	22	6	22	10	660

* Union Is Available With BSP or NPT Thread

Rubber Expansion Joints Design

Introduction

Rubber expansion bellows can be used for both suction and delivery (discharge) due to its excellent stability and pressure capacity. Rubber Expansion Joints are generally used as connectors between vessels operating at widely different temperatures ranging up to 115°C. The sizes range from 32 mm to 500 mm including a wide variety of different flanges and materials. Most common available materials are; EPDM ,Neoprene, Buna/Nitrile, Hypalon, Butyl and natural rubber.

Rubber expansion joints are generally used in heating and air conditioning systems, marine environments, sewage plants, industrial systems and for mild chemicals and oils. Rubber expansion joints permit the necessary motion and flexibility in a working ships piping system. The compactness, resilience and low stress features make them ideally suited for shipboard piping systems. Sewage treatment plants, water treatment plants and air scrubber systems all employ the use of general rubber expansion joints. Sludge pumps, raw and secondary sewage lines, centrifugal air blowers and scrub stacks use expansion joints due to their resistance to abrasion and corrosion, as well as their flexibility, making them well suited for these applications.

Nuclear and fossil fuel plants use rubber expansion joints to compensate for thermal expansion and contraction on condense lines, steam turbine exhaust lines, condensate lines, cooling water lines and aeration systems.

They have been also successfully installed in demanding industrial ducting systems where flutter, heavy vibration, wet or dry corrosive materials are encountered. Rubber expansion joints reduce noise and vibration caused by forces in pumps or centrifuges by acting as a shock absorber in systems.

Thermal movement is also an important consideration in a piping system. Depending on the temperature change and length of pipe, thermal movement can easily be great enough to exceed the allowable pipe stress.

Rubber expansion joints are designed to alleviate piping stress, absorb pipe misalignment, compression and extension, noise and vibration, in a relatively short space. Standard stock items are the single arch and the twin-sphere joints. The spherical shape arch of the connector and excellent original structural design contribute to the great success of the joint.

Combined with its internally laid tough flexible fibres and its moulding technique, rubber expansion joints have great ability to withstand the force of a creating vacuum. Internal reinforced rings can be inserted to increase the suction capabilities of the bellows.

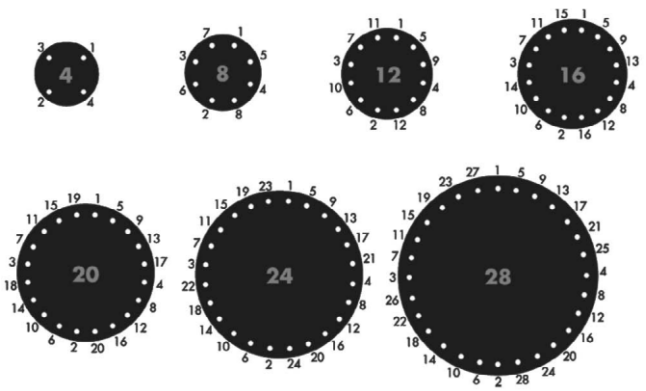
Temperature Correction Factor					
80 °C	85 °C	90 °C	95 °C	100 °C	105 °C
x 1.0	x 0.92	x 0.83	x 0.75	x 0.67	x 0.60

Rubber Expansion Joints Installation Guide

BOLT TORQUE:

Below are the minimum recommended torque values for non-metallic expansion joints with beaded end type flanges to achieve an adequate seal:

SIZES	RECOMMENDED TORQUE
1 - 6	10 ft./lbs.
8 - 12	20 ft./lbs.
16 - 24	30 ft./lbs.



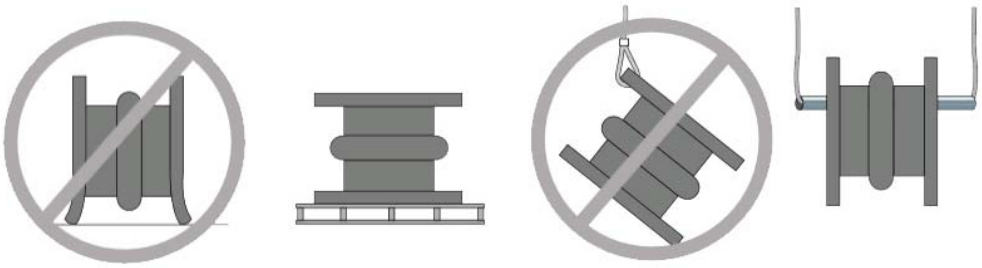
NOTE:
Over torquing bolts can cause deformation of the rubber expansion joint flanges, thus resulting in possible premature failure.

Tighten bolts in stages by alternating around the flange. Use recommended torque values above to achieve a good seal. Never tighten an expansion joint to the point that there is metal-to-metal contact between the expansion joint flange and the mating flange.

STORAGE / HANDLING:

Store expansion joints in a dry/cool location such as a warehouse. Store flange face down on a pallet or wooden platform. Do not store other heavy items on top of expansion joint(s). Ten-year shelf life can be expected with ideal conditions.

Do not lift with ropes or bars through the bolt holes. If lifting through the bore, use padding or a saddle to distribute the weight. Do not let expansion joints sit vertically on the edges of the flanges for any period of time.



ADDITIONAL TIPS:

Insulation over a non-metallic rubber expansion joint is not recommended; however, if the insulation is required, it should be made removable to permit easy access to the flange area to check bolting.

It is acceptable (but not necessary) to lubricate the expansion joint flanges with a thin film of graphite dispersed in glycerin or water for ease of disassembly at a later time.

Do not weld in near vicinity of a non-metallic expansion joint.

If an expansion joint is to be installed underground, or will be submerged in water, contact the manufacturer for specific guidelines.

If the expansion joint will be installed outdoors, make sure the cover material will withstand ozone, sunlight, etc. Materials such as Neoprene and Chlorobutyl are recommended. Materials painted with weather resistant paint will provide additional ozone and sunlight protection.

Check the tightness of retaining rings two or three weeks after installation and retighten as necessary.

Rubber Expansion Joints Installation Guide

WARNING:

Expansion joints may operate in pipelines or equipment carrying fluids and/or gases at elevated temperatures and pressures and may transport hazardous materials. Precautions should be taken to protect personnel in the event of leakage or splash. Rubber expansion joints should not be installed in inaccessible areas where inspection is impossible

RESTRAINTS

Restraints are used for lateral and angular compensators. The restraints absorb axial reaction force produced by inner pressure. Even so, the connected pipe must be equipped with light fixed points to absorb moving force and moments.

Precise rating details and operating parameters of the corresponding machinery or equipment must be known to correctly calculate the degree of restraints:

- Recommended on most applications to prevent damage due to excessive pipe movements

- Consists of two or more tie rods connected between pipe flanges

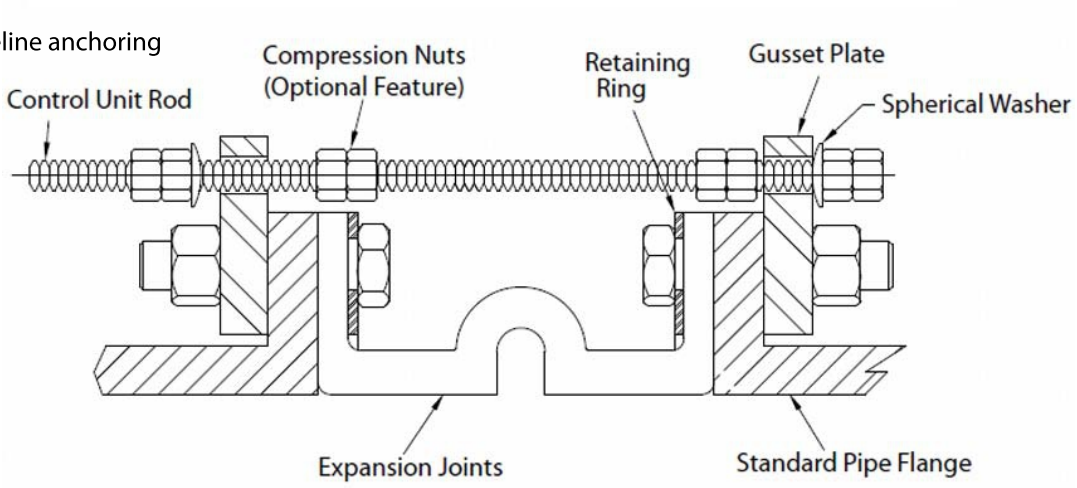
- Triangular end plates (gussets) have two holes for bolting securely to flange, and one hole to accommodate the connecting tie rod

- Spherical washers are incorporated to accommodate moderate piping alignments, but also assists with angular, torsional and lateral movements

- Each rod incorporates double nuts on each end to keep the expansion joint from over-elongating

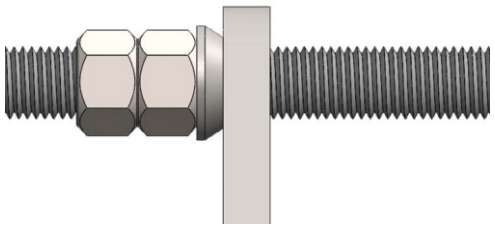
- When excessive axial compression is a concern, compression nuts can be incorporated to restrict movements as needed and to protect the expansion joint from damage

- NOT designed to replace pipeline anchoring

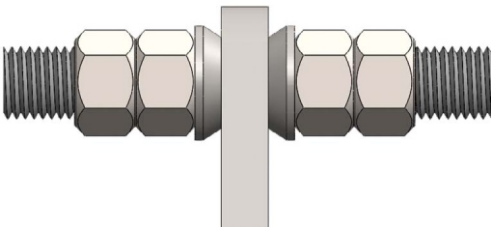


RUBBER EXPANSION JOINT ROD RESTRAINTS

There are two types of tie rods restraints for lateral rubber compensators:



Outer restraints are used to absorb reaction force from internal pressure



Outer and inner restraints are used to absorb reaction force from internal pressure and vacuum

Definition of Movement

Axial Compression

The dimensional reduction or shortening of the face-to-face parallel length of the joint measured along the longitudinal axis.

Axial Elongation

The dimensional increase or lengthening of the face-to-face parallel length of the joint measured along the longitudinal axis.

Lateral Deflection

Lateral deflection is movement perpendicular to the axial plane of the expansion joint. It is a shear motion on the bellows.

Vibration

The movement of the joint due to vibrations which are effectively intercepted and insulated against transmission to the remainder of the system.

Angular Movement

The displacement of the longitudinal axis of the joint from its initial straight line position (a combination of axial elongation and axial compression).

Torsional Movement

The twisting of one end of the expansion joint with respect to the other end about its longitudinal axis.

Concurrent Movements

Concurrent movements are developed when two or more movements in a pipe system occur at the same time.
If multiple movements exceed single arch design there may be a need for additional arches.
To perform calculation for concurrent movement when a pipe system design has more than one movement, please use the following formula:

$$\frac{\text{Actual Axial Compression} + \text{Actual Axial Extension} + \text{Actual Lateral (X)} + \text{Actual Lateral (Y)}}{\text{Rated Axial Compression} + \text{Rated Axial Extension} + \text{Rated Lateral (X)} + \text{Rated Lateral (Y)}} = / < 1$$

Calculation must be equal to or less than 1 for expansion joint to operate within concurrent movement capability.

PTFE Expansion Joint Design

Introduction

IDA expansion joints are made of contour moulded PTFE (white or black), providing exceptional corrosion resistance resistance and flex-life. The flexible liner is moulded over the metallic sealing face which eliminates troublesome separate gaskets and reduces the chances of bacteria build up. Different numbers of convolutions accommodate varying degrees of misalignment, axial travel and angular deflection between components.

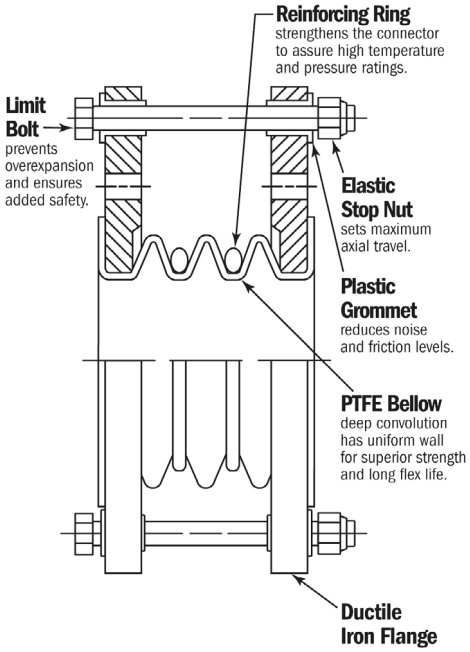
These expansion joints have found widespread acceptance in the chemical processing industry and commercial heating and air-conditioning systems as pump connectors and at strategic points throughout systems. Because of their established record of long service life, they are the most economical vibration and sound absorbers available.

They are manufactured with integral steel limit bolts and reinforcing rings enabling the bellows to absorb vibration and allow for thermal movement and misalignment in piping. They also provide resistance to rotational forces which can lead to joint failure, offering long life in coastal, marine, and chlorine rich environments.

They are available in 2, 3 and 5 Convolution models, with varying amounts of allowed movement.

PTFE expansion joints are capable of handling all of the following movements:

- Angular misalignment - called angular deflection and angular rotation, is the displacement of one flange in relation to the other causing them to lie in non-parallel planes.
- Vibration - Absorbing movement caused by generators or pumps that may result in pipe work cracking.
- Longitudinal - also called travel or axial compression and extension.
- Parallel misalignment - called offset or lateral deflection, is the displacement of one flange in relation to the other while they lie in parallel planes.
- Maximum travel is based on installation with no misalignment or angular deflection.
- Maximum Misalignment is based on installation with no Travel or Angular Deflection.
- Combined travel and misalignment are proportionately lower for each type of deflection according to the percentage of the “maximum” that is required for the other.

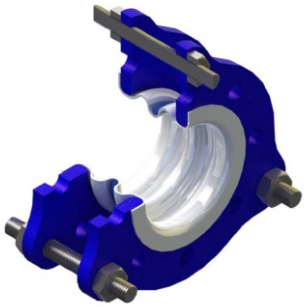


PTFE Expansion Joint 2 - Convoluted

Construction

Construction: Convoluted
Profile: High Flexibility / Medium Pressure
Liner: Optional
Size Available: 1 - 12
(Larger sizes upon Request)
Temperature: 10°C +204°C

Application:
PTFE bellows are specifically designed to compensate for pipe expansion, vibration and misalignment in process piping and vessels. PTFE bellows are constructed from uniform-walled isostatically molded PTFE and demonstrate a high level of design consistency throughout the product line.



Technical Details

Nom Bore	Length	Flare Diameter	Max. Working Pressure (10°c)	Movements		Weight
				± Maximum Travel	Maximum Misalignment	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	kg
25	34	50	1378	6	3	1.17
38	38	73	1378	6	3	1.63
50	48	92	1378	6	3	3.53
65	50	104	1378	8	3	4.89
80	67	127	1378	10	4	5.94
100	67	157	1378	12	6	8.25
125	72	185	1378	17	6	10.16
150	72	216	1378	12	6	12.56
200	94	269	1170	20	6	18.59
250	102	323	1170	25	6	27.26
300	105	381	1034	25	6	40.68

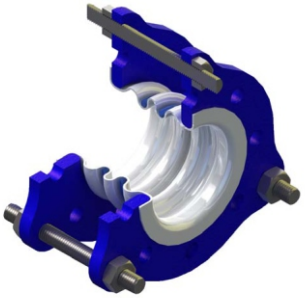
*See Operating Pressure vs. Temperature graph for correction factors. Page 101

PTFE Expansion Joint 3 - Convoluted

Construction

Construction: Convoluted
Profile: High Flexibility / Medium Pressure
Liner: Optional
Size Available: 1 - 8
(Larger sizes upon Request)
Temperature: 10°C +204°C

Application:
PTFE bellows are specifically designed to compensate for pipe expansion, vibration and misalignment in process piping and vessels. PTFE bellows are constructed from uniform-walled isostatically molded PTFE and demonstrate a high level of design consistency throughout the product line.



Technical Details

Nom Bore	Length	Flare Diameter	Max. Working Pressure (10°c)	Movements		Weight
				± Maximum Travel	Maximum Misalignment	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	kg
25	46	50	1034	12	6	1.22
38	50	73	1034	12	6	1.85
50	70	92	1034	20	10	3.67
65	76	104	1034	25	10	5.08
80	92	127	1034	25	12	6.16
100	95	157	1034	28	12	8.57
125	101	185	1034	28	12	10.61
150	101	216	1034	28	4	13.19
200	138	269	965	42	4	19.50

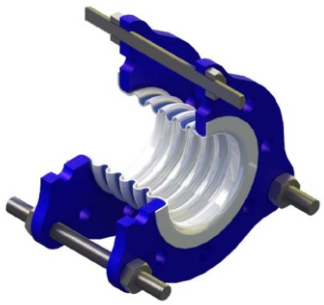
*See Operating Pressure vs. Temperature graph for correction factors. Page 101

PTFE Expansion Joint 5 - Convoluted

Construction

Construction: Convoluted
Profile: High Flexibility / Medium Pressure
Liner: Optional
Size Available: 1 - 6
(Larger sizes upon Request)
Temperature: 10°C +204°C

Application:
PTFE bellows are specifically designed to compensate for pipe expansion, vibration and misalignment in process piping and vessels. PTFE bellows are constructed from uniform-walled isostatically molded PTFE and demonstrate a high level of design consistency throughout the product line.



Technical Details

Nom Bore	Length	Flare Diameter	Max. Working Pressure (10°C)	Movements		Weight
				± Maximum Travel	Maximum Misalignment	
(mm)	(mm)	(mm)	kPa	(mm)	(mm)	kg
25	68	50	703	21	12	1.31
38	81	73	703	27	12	1.95
50	100	92	703	27	12	3.94
80	125	127	703	27	12	6.71
100	132	157	703	33	15	9.25
150	144	216	703	39	15	14.42

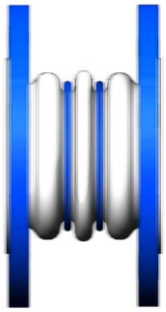
*See Operating Pressure vs. Temperature graph for correction factors. Page 101

Definition of Movement

ANGULAR DEFLECTION

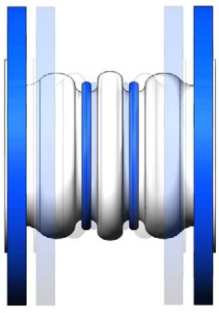
Maximum Angular Deflection may be called angular rotation. It is based on installation with no axial travel or lateral offset.

VIBRATION



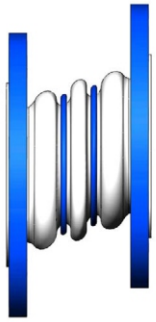
In addition to noise, vibration transmitted through piping can cause leaks, premature equipment wear and cracked welds. Expansion joints drastically reduce vibration transmission, thereby solving many of these issues.

AXIAL TRAVEL



Maximum Axial Travel may be called longitudinal movement or axial compression and extension. It is based on installation with no misalignment or angular deflection.

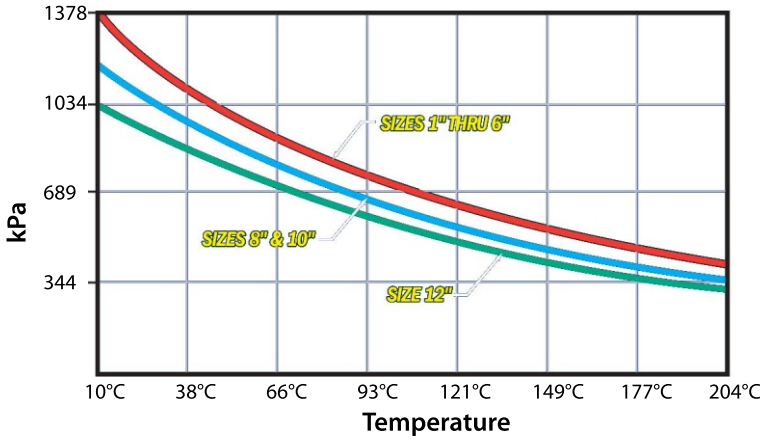
MISALIGNMENT



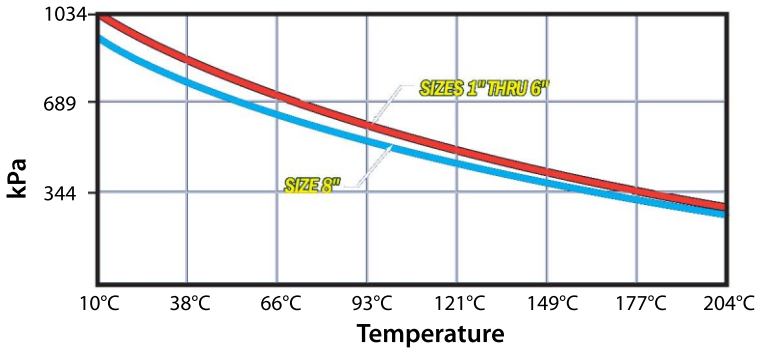
Maximum Misalignment may also be referred to as lateral offset or deflection. It is based on installation with no axial travel or angular deflection.

Operating Pressure vs. Temperature

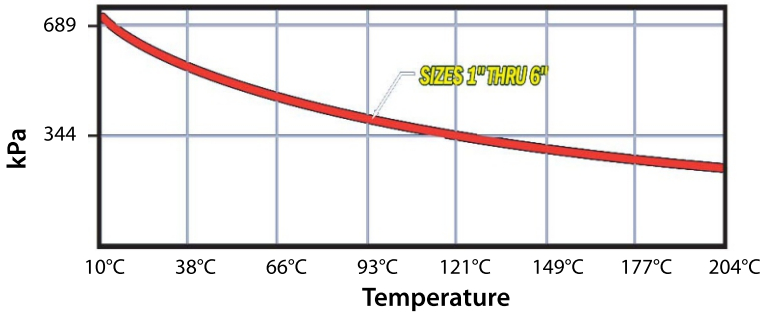
(PEJ2) 2-Convoluted PTFE Expansion Joint



(PEJ3) Convoluted PTFE Expansion Joints



(PEJ5) Convoluted PTFE Expansion Joints



Fabric Expansion Joints

Construction

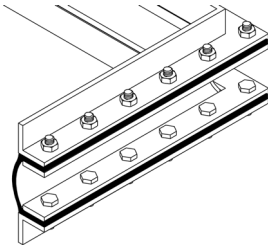
Construction: Smoothbore
Material: PVC, Neoprene, Hypalon, Butyl, Silicone, Viton, PTFE, Polyester
Cuff Styles: Rectangular, Circular
Size Available: 4to 80
(Larger sizes upon Request)
Temperature: -45°C +1200°C

Application:
Non-metallic expansion joints are flexible connectors designed to provide stress relief in ducting systems by absorbing movement caused by thermal changes. They also act as vibration isolators, stock absorbers and in some instances to make up for minor misalignment of adjoining ducting or equipment. Non-metallic expansion joints solve problems caused by the thermal and mechanical stresses generated in these complex systems.

Technical Details

Fabric expansion joints are widely used for a large number of industrial applications including:

Power Plants
Boiler Systems
Flue Gas
Nitrogen Oxide Reduction
Gas Turbines
Nuclear Power Plants
Incinerator Plants
Cement Industry
Filter Systems
Ventilators
Ventilation Systems
Dust Extraction Systems
Offshore Installations
Chemical Industry



The implementation of fabric expansion joints provides a number of advantages, which are technically and economically important:
Extremely flexible absorbing large movements
Absorbing different movements simultaneously
Only requiring a limited building length
Lightweight
Easy to handle, store, install, repair and replace
- Does not transmit noise or vibrations.

Reducing the necessary strength of fix-points and supports
Non corroding
Dimensionally stable
Cost effective

Notes