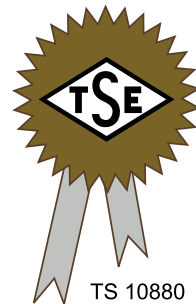


**politeknik**





BUREAU  
VERITAS





First of the **POLİTEKNİK** Group of companies was founded in 1976 in Ankara as an engineering company. It focused on the design and manufacturing of large diameter expansion joints and electrostatic precipitators.

**POLİTEKNİK** Group founded his second company in İstanbul and opened a new production facility for manufacturing a wide selection of metal expansion joints in 1988 to serve domestic market and various sectors abroad.

We manufacture more than 50.000 pieces of expansion joints and 1.200.000 meters of flexible metal hoses annually.

We are proud of working with our customers together to provide high quality products and economical solutions that serve their needs. Industry leading computer software and state of the art manufacturing technology is used for designing and manufacturing of our products.

## CAPABILITIES

**Politeknik** manufactures mainly two types of expansion joints:

- **EJMA** type U shape bellows from DN32 (1 1/4") up to DN6000 (236")
- **Lens** (Flanged and Flued) type of expansion joints from DN300 (12") to DN7000 (276")

We can manufacture bellows from various grades of 300 series stainless steels such as 321ss, 304ss, 316ss, 309s, 310s, 904L, Alloy 625 and other nickel alloys.

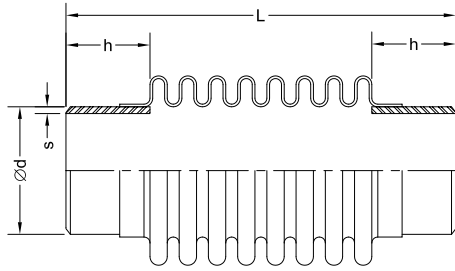
**U-shape** bellows are designed and manufactured in accordance with latest **EJMA** standards.

**Lens** (Flanged and Flued) type of expansion joints are designed and manufactured in accordance with industry standards and our decades long experience.

We use industry leading design and CAD software, and various proprietary software based on our experience and testing.

We specialize in multi-ply bellows design and manufacturing. We can manufacture bellows as thin as 0.2mm (0.008") and as many as 10 plies.

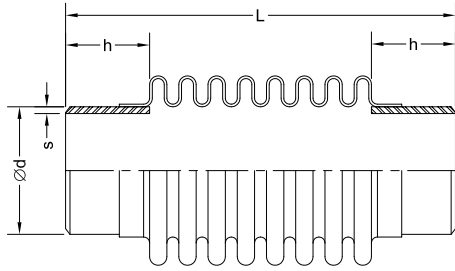
# WELD END TYPE - PN6



Standard Bellows Material: **304ss**  
 Design Pressure: **6 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		d (mm)	h (mm)	s (mm)	Effective Area (cm <sup>2</sup> )	
	Compression	Lateral (+/-)		Axial	Lateral					
25	1"	30	6	180	62	31	33,7	50	3	18
32	1 1/4"	30	6	180	62	31	42,4	50	3	18
40	1 1/2"	30	7	185	54	31	48,3	50	3	23
50	2"	30	6	170	32	43	60,3	50	4	37
		45	10	225	50	26				
65	2 1/2"	30	6	175	34	60	76,1	50	4	58
		60	11	230	53	32				
80	3"	30	3	160	41	145	88,9	50	4	80
		60	12	260	66	37				
100	4"	30	3	190	71	301	114,3	60	5	129
		60	9	260	72	82				
125	5"	30	3	190	84	511	139,7	60	5	185
		60	8	265	78	121				
150	6"	30	2	235	105	814	165	80	5	268
		60	7	285	63	187				
200	8"	30	2	250	146	1279	219,1	80	5	451
		60	7	310	91	310				
250	10"	30	2	290	154	2049	273	100	6	682
		60	7	365	86	369				
		75	8	385	77	267				
300	12"	30	2	320	355	4380	323,9	100	6	945
		60	6	400	197	800				
		75	9	450	162	428				
350	14"	30	2	310	386	5669	355,6	100	6	1127
		60	6	400	214	1036				
		75	8	450	175	554				
400	16"	30	2	320	250	4046	406,4	100	7	1479
		60	5	370	178	1520				
		75	8	420	139	728				
450	18"	30	2	320	307	6177	457	100	8	1839
		60	4	370	219	2321				
		75	6	420	170	1111				
500	20"	30	2	320	279	6909	508	100	8	2264
		60	4	370	199	2596				
		75	6	420	155	1243				
600	24"	30	2	320	530	18745	610	100	8	3227
		60	4	390	331	5003				
		75	6	450	265	2379				
700	28"	30	2	340	419	14565	711	100	8	4372
		60	5	425	262	3797				
		75	5	440	262	3363				
800	32"	30	1	320	755	45102	813	100	8	5705
		60	3	380	503	14411				
		75	3	410	431	9278				
900	36"	30	1	335	1194	70128	914	100	8	7201
		60	3	405	796	22008				
		75	4	450	682	13061				
1000	40"	30	1	340	1037	70455	1016	100	8	8885
		60	2	380	829	35891				
		75	4	450	592	13993				

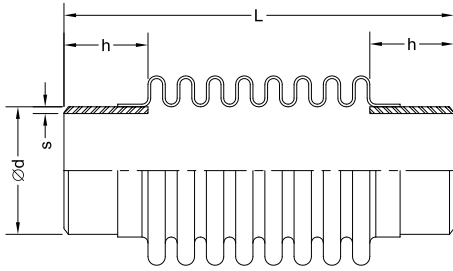
# WELD END TYPE - PN10



Standard Bellows Material: **304ss**  
 Design Pressure: **10 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		d (mm)	h (mm)	s (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral				
25 1"	30	6	180	62	31	33,7	50	3	18
32 1 1/4"	30	6	180	62	31	42,4	50	3	18
40 1 1/2"	30	7	225	93	30	48,3	50	3	23
50 2"	30	5	185	62	57	60,3	50	4	38
	45	8	215	106	55				
65 2 1/2"	30	4	185	68	95	76,1	50	4	58
	45	6	215	98	77				
	60	10	240	105	56				
80 3"	30	4	185	66	124	88,9	50	4	80
	45	6	215	90	95				
	60	10	235	90	70				
100 4"	30	3	200	113	333	114,3	60	5	129
	45	5	230	88	159				
	60	7	265	109	118				
125 5"	30	2	200	134	641	139,7	60	5	187
	45	4	230	104	274				
	60	7	265	107	169				
150 6"	30	3	245	152	936	165	80	5	268
	45	4	270	118	448				
	60	6	315	127	245				
200 8"	30	3	265	211	1422	219,1	80	5	460
	45	5	305	158	584				
	60	7	330	140	385				
250 10"	30	2	310	292	2687	273	100	6	683
	45	5	360	195	888				
	60	7	395	159	499				
300 12"	30	2	310	355	4380	323,9	100	6	945
	45	3	360	254	1567				
	60	6	395	197	840				
350 14"	30	2	320	582	8653	355,6	100	6	1141
	45	4	370	364	2417				
	60	5	405	323	1509				
400 16"	30	2	320	474	7707	406	100	7	1483
	45	3	360	339	3242				
	60	5	400	296	1867				
450 18"	30	1	330	587	11842	457	100	8	1841
	45	3	375	714	7176				
	60	4	420	555	3626				
500 20"	30	2	340	758	14195	508	100	8	2268
	45	3	385	649	8039				
	60	4	430	505	3733				

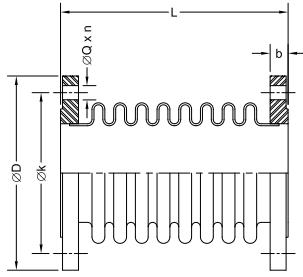
# WELD END TYPE - PN16



Standard Bellows Material: **304ss**  
 Design Pressure: **16 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		d (mm)	h (mm)	s (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral				
50 2"	30	4	185	117	109	60,3	50	4	38
	45	4	215	126	64				
65 2 1/2"	30	3	185	128	179	76,1	50	4	58
	45	7	215	124	97				
	60	8	240	182	99				
80 3"	30	3	185	124	231	88,9	50	4	80
	45	7	215	123	129				
	60	9	245	166	121				
100 4"	30	3	200	145	484	114,3	60	5	129
	45	4	230	146	266				
	60	8	265	161	173				
125 5"	30	3	200	168	808	139,7	60	5	186
	45	5	230	126	333				
	60	7	265	171	267				
150 6"	30	2	245	350	2166	165	80	5	268
	45	4	270	171	648				
	60	7	315	191	379				
200 8"	30	2	265	513	3132	219,1	80	5	456
	45	4	305	338	1242				
	60	5	340	300	817				
250 10"	30	2	310	559	5149	273	100	6	684
	45	4	360	372	1517				
	60	5	395	335	1051				
300 12"	30	2	335	675	5823	323,9	100	6	964
	45	6	430	405	1282				
	60	10	510	347	616				
350 14"	30	1	335	739	7601	355,6	100	6	1155
	45	4	410	850	3840				
	60	7	480	638	1661				
400 16"	30	1	320	1545	25149	406,4	100	7	1486
	45	4	430	858	4157				
	60	6	490	702	2184				
450 18"	30	3	350	869	11727	457	100	8	1856
	45	6	430	579	3504				
	60	11	530	434	1316				
500 20"	30	2	330	1048	22570	508	100	8	2274
	45	3	390	749	7967				
	60	6	440	582	3981				

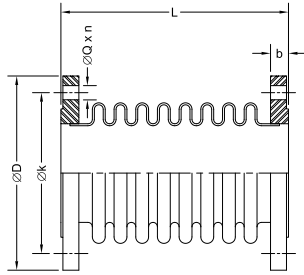
# FIXED FLANGED TYPE - PN6



Standard Bellows Material: **304ss**  
 Design Pressure: **6 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN6  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )	
	Compression	Lateral (+/-)		Axial	Lateral							
25	1"	30	6	120	62	31	100	75	14	4	11	18
32	1 1/4"	30	6	120	62	31	120	90	14	4	14	18
40	1 1/2"	30	7	125	54	31	130	100	14	4	14	23
50	2"	30	6	110	32	43	140	110	14	4	14	37
		45	10	155	50	26						
65	2 1/2"	30	6	120	34	60	160	130	14	4	14	58
		60	11	170	53	32						
80	3"	30	3	105	41	145	190	150	16	4	18	80
		60	12	205	66	37						
100	4"	30	3	115	71	301	210	170	16	4	18	129
		60	9	185	72	82						
125	5"	30	3	120	84	511	240	200	18	8	18	185
		60	8	200	78	121						
150	6"	30	2	120	105	814	265	225	18	8	18	268
		60	7	175	63	187						
200	8"	30	2	145	146	1279	320	280	20	8	18	451
		60	7	200	91	310						
250	10"	30	2	145	154	2049	375	335	22	12	18	682
		60	7	220	86	369						
		75	8	240	77	267						
300	12"	30	2	170	355	4380	440	395	22	12	22	945
		60	6	260	197	800						
		75	9	310	162	428						
350	14"	30	2	165	386	5669	490	445	22	12	22	1127
		60	6	260	214	1036						
		75	8	310	175	554						
400	16"	30	2	180	250	4046	540	495	22	16	22	1479
		60	5	230	178	1520						
		75	8	280	139	728						
450	18"	30	2	180	307	6177	595	550	24	16	22	1839
		60	4	230	219	2321						
		75	6	280	170	1111						
500	20"	30	2	180	279	6909	645	600	24	20	22	2264
		60	4	230	199	2596						
		75	6	280	155	1243						
600	24"	30	2	170	530	18745	755	705	24	20	26	3227
		60	4	240	331	5003						
		75	6	310	265	2379						
700	28"	30	2	190	419	14565	860	810	24	24	26	4372
		60	5	270	262	3797						
		75	5	310	262	3363						
800	32"	30	1	170	755	45102	975	920	24	24	30	5705
		60	3	230	503	14411						
		75	3	280	431	9278						
900	36"	30	1	190	1194	70128	1075	1020	26	24	30	7201
		60	3	255	796	22008						
		75	4	330	682	13061						
1000	40"	30	1	165	1037	70455	1175	1120	26	28	30	8885
		60	2	205	829	35891						
		75	4	330	592	13993						

# FIXED FLANGED TYPE - PN10

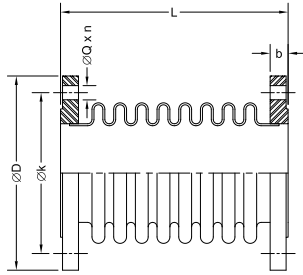


Standard Bellows Material: **304ss**  
 Design Pressure: **10 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN10  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral						
25 1"	30	6	125	62	31	115	85	16	4	14	18
32 1 1/4"	30	6	125	62	31	140	100	16	4	18	18
40 1 1/2"	30	7	155	93	30	150	110	16	4	18	23
50 2"	30	5	130	62	57	165	125	18	4	18	38
	45	8	155	106	55						
65 2 1/2"	30	4	130	68	95	185	145	18	4	18	58
	45	6	160	98	77						
	60	10	185	105	56						
80 3"	30	4	130	66	124	200	160	20	8	18	80
	45	6	165	90	95						
	60	10	185	90	70						
100 4"	30	3	135	113	333	220	180	20	8	18	129
	45	5	165	88	159						
	60	7	205	109	118						
125 5"	30	2	140	134	641	250	210	22	8	18	187
	45	4	170	104	274						
	60	7	210	107	169						
150 6"	30	3	145	152	936	285	240	22	8	22	268
	45	4	170	118	448						
	60	6	210	127	245						
200 8"	30	3	175	211	1422	340	295	24	8	22	460
	45	5	210	158	584						
	60	7	230	140	385						
250 10"	30	2	180	292	2687	395	350	26	12	22	683
	45	5	235	195	888						
	60	7	275	159	499						
300 12"	30	2	165	355	4380	445	400	26	12	22	945
	45	3	205	254	1567						
	60	6	245	197	840						
350 14"	30	2	170	582	8653	505	460	26	16	22	1141
	45	4	215	364	2417						
	60	5	255	323	1509						
400 16"	30	2	170	474	7707	565	515	26	16	26	1483
	45	3	210	339	3242						
	60	5	255	296	1867						
450 18"	30	1	185	587	11842	615	565	28	20	26	1841
	45	3	230	714	7176						
	60	4	270	555	3626						
500 20"	30	2	195	758	14195	670	620	28	20	26	2268
	45	3	235	649	8039						
	60	4	285	505	3733						



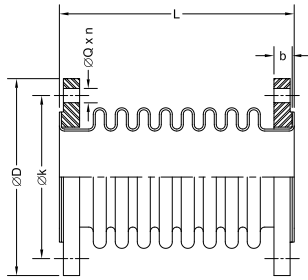
# FIXED FLANGED TYPE - PN16



Standard Bellows Material: **304ss**  
 Design Pressure: **16 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN16  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral						
50 2"	30	4	120	117	109	165	125	18	4	18	38
	45	4	150	126	64						
65 2 1/2"	30	3	120	128	179	185	145	18	4	18	58
	45	7	150	124	97						
	60	8	180	182	99						
80 3"	30	3	120	124	231	200	160	20	8	18	80
	45	7	150	123	129						
	60	9	180	166	121						
100 4"	30	3	120	145	484	220	180	20	8	18	129
	45	4	150	146	266						
	60	8	185	161	173						
125 5"	30	3	125	168	808	250	210	22	8	18	186
	45	5	155	126	333						
	60	7	190	171	267						
150 6"	30	2	130	350	2166	285	240	22	8	22	268
	45	4	155	171	648						
	60	7	200	191	379						
200 8"	30	2	150	513	3132	340	295	24	12	22	456
	45	4	190	338	1242						
	60	5	230	300	817						
250 10"	30	2	165	559	5149	405	355	26	12	26	684
	45	4	205	372	1517						
	60	5	245	335	1051						
300 12"	30	2	200	675	5823	460	410	28	12	26	964
	45	6	300	405	1282						
	60	10	380	347	616						
350 14"	30	1	210	739	7601	520	470	30	16	26	1155
	45	4	290	850	3840						
	60	7	370	638	1661						
400 16"	30	1	210	1545	25149	580	525	32	16	30	1486
	45	4	310	858	4157						
	60	6	365	702	2184						
450 18"	30	3	240	869	11727	640	585	32	20	30	1856
	45	6	320	579	3504						
	60	11	405	434	1316						
500 20"	30	2	215	1048	22570	715	650	34	20	33	2274
	45	3	270	749	7967						
	60	6	330	582	3981						

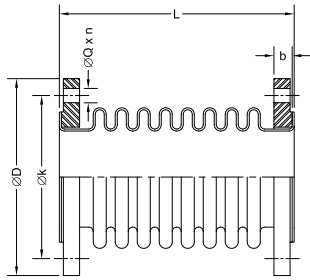
# FLOATING FLANGED TYPE - PN6



Standard Bellows Material: **304ss**  
 Design Pressure: **6 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN6  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )	
	Compression	Lateral (+/-)		Axial	Lateral							
25	1"	30	6	120	62	31	100	75	14	4	11	18
32	1 1/4"	30	6	120	62	31	120	90	14	4	14	18
40	1 1/2"	30	7	125	54	31	130	100	14	4	14	23
50	2"	30	6	110	32	43	140	110	14	4	14	37
65	2 1/2"	45	10	155	50	26						
		30	6	120	34	60	160	130	14	4	14	58
80	3"	60	11	170	53	32						
		30	3	105	41	145	190	150	16	4	18	80
100	4"	60	12	205	66	37						
		30	3	115	71	301	210	170	16	4	18	129
125	5"	60	9	185	72	82						
		30	3	120	84	511	240	200	18	8	18	185
150	6"	60	8	200	78	121						
		30	2	120	105	814	265	225	18	8	18	268
200	8"	60	7	175	63	187						
		30	2	145	146	1279	320	280	20	8	18	451
250	10"	60	7	200	91	310						
		30	2	145	154	2049						
		75	8	240	77	267	375	335	22	12	18	682
300	12"	30	2	170	355	4380						
		60	6	260	197	800	440	395	22	12	22	945
		75	9	310	162	428						
350	14"	30	2	165	386	5669						
		60	6	260	214	1036	490	445	22	12	22	1127
		75	8	310	175	554						
400	16"	30	2	180	250	4046						
		60	5	230	178	1520	540	495	22	16	22	1479
		75	8	280	139	728						
450	18"	30	2	180	307	6177						
		60	4	230	219	2321	595	550	24	16	22	1839
		75	6	280	170	1111						
500	20"	30	2	180	279	6909						
		60	4	230	199	2596	645	600	24	20	22	2264
		75	6	280	155	1243						
600	24"	30	2	170	530	18745						
		60	4	240	331	5003	755	705	24	20	26	3227
		75	6	310	265	2379						
700	28"	30	2	190	419	14565						
		60	5	270	262	3797	860	810	24	24	26	4372
		75	5	310	262	3363						
800	32"	30	1	170	755	45102						
		60	3	230	503	14411	975	920	24	24	30	5705
		75	3	280	431	9278						
900	36"	30	1	190	1194	70128						
		60	3	255	796	22008	1075	1020	26	24	30	7201
		75	4	330	682	13061						
1000	40"	30	1	165	1037	70455						
		60	2	235	829	35891	1175	1120	26	28	30	8885
		75	4	330	592	13993						

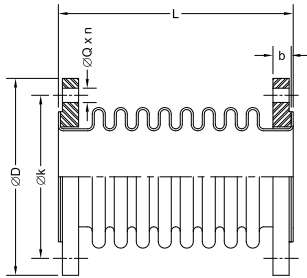
# FLOATING FLANGED TYPE - PN10



Standard Bellows Material: **304ss**  
 Design Pressure: **10 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN10  
 Movements are non-concurrent

Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral						
25 1"	30	6	125	62	31	115	85	16	4	14	18
32 1 1/4"	30	6	125	62	31	140	100	18	4	18	18
40 1 1/2"	30	7	155	93	30	150	110	18	4	18	23
50 2"	30	5	130	62	57	165	125	20	4	18	38
	45	8	155	106	55						
65 2 1/2"	30	4	130	68	95	185	145	20	8	18	58
	45	6	160	98	77						
	60	10	185	105	56						
80 3"	30	4	130	66	124	200	160	20	8	18	80
	45	6	165	90	95						
100 4"	60	10	185	90	70	220	180	22	8	18	129
	30	3	135	113	333						
	45	5	165	88	159						
125 5"	60	7	205	109	118	250	210	22	8	18	187
	30	2	140	134	641						
	45	4	170	104	274						
150 6"	60	7	210	107	169	285	240	24	8	22	268
	30	3	145	152	936						
	45	4	170	118	448						
200 8"	60	6	210	127	245	340	295	24	8	22	460
	30	3	175	211	1422						
	45	5	210	158	584						
250 10"	60	7	230	140	385	395	350	26	12	22	683
	30	2	180	292	2687						
	45	5	235	195	888						
300 12"	60	7	275	159	499	445	400	26	12	22	945
	30	2	165	355	4380						
	45	3	205	254	1567						
350 14"	60	6	245	197	840	505	460	26	16	22	1141
	30	2	170	582	8653						
	45	4	215	364	2417						
400 16"	60	5	255	323	1509	565	515	26	16	26	1483
	30	2	170	474	7707						
	45	3	210	339	3242						
450 18"	60	4	270	555	3626	615	565	28	20	26	1841
	30	1	185	587	11842						
	45	3	230	714	7176						
500 20"	60	4	285	505	3733	670	620	28	20	26	2268
	30	2	195	758	14195						
	45	3	235	649	8039						

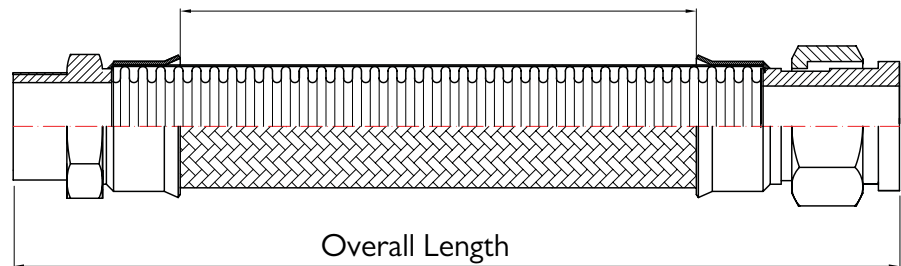
# FLOATING FLANGED TYPE - PN16



Standard Bellows Material: **304ss**  
 Design Pressure: **16 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flange drilling is per PN16  
 Movements are non-concurrent

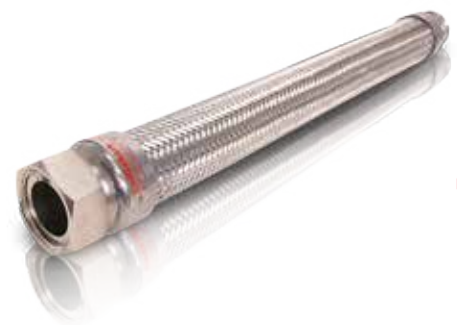
Nominal Diameter (DN)	Movements (mm)		Length (L) (mm)	Spring Rates (N/mm)		D (mm)	k (mm)	b (mm)	n	Q (mm)	Effective Area (cm <sup>2</sup> )
	Compression	Lateral (+/-)		Axial	Lateral						
50 2"	30	4	120	117	109	165	125	18	4	4	38
	45	4	150	126	64						
65 2 1/2"	30	3	120	128	179	185	145	18	4	4	58
	45	7	150	124	97						
	60	8	180	182	99						
80 3"	30	3	120	124	231	200	160	20	8	8	80
	45	7	150	123	129						
	60	9	180	166	121						
100 4"	30	3	120	145	484	220	180	20	8	8	129
	45	4	150	146	266						
	60	8	185	161	173						
125 5"	30	3	125	168	808	250	210	22	8	8	186
	45	5	155	126	333						
	60	7	190	171	267						
150 6"	30	2	130	350	2166	285	240	22	8	8	268
	45	4	155	171	648						
	60	7	200	191	379						
200 8"	30	2	150	513	3132	340	295	24	12	12	456
	45	4	190	338	1242						
	60	5	230	300	817						
250 10"	30	2	165	559	5149	405	355	26	12	12	684
	45	4	205	372	1517						
	60	5	245	335	1051						
300 12"	30	2	200	675	5823	460	410	28	12	12	964
	45	6	300	405	1282						
	60	10	380	347	616						
350 14"	30	1	210	739	7601	520	470	30	16	16	1155
	45	4	290	850	3840						
	60	7	370	638	1661						
400 16"	30	1	210	1545	25149	580	525	32	16	16	1486
	45	4	310	858	4157						
	60	6	365	702	2184						
450 18"	30	3	240	869	11727	640	585	32	20	20	1856
	45	6	320	579	3504						
	60	11	405	434	1316						
500 20"	30	2	215	1048	22570	715	650	34	20	20	2274
	45	3	270	749	7967						
	60	6	330	582	3981						

# BRAIDED/FAN-COIL FLEXIBLE METAL HOSE CONNECTORS



Braided flexible connectors are used as flexible connections for steam, water, gas and oil line applications to provide flexibility.

- \* Flexible Hose Materials : AISI 316 L / AISI 321 Stainless Steel
- \* Braid Material : AISI 304 Stainless Steel
- \* Fitting Types : Union, nipple, weld-ended, flanged
- \* Fitting Materials : St 37 Carbon Steel / AISI 304 / AISI 316
- \* From 2 1/2" diameter weld-ended and flanged connections are used.
- \* Fittings are welded by TIG welding.
- \* For additional information, please consult with our Technical Services.



11  
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Dimension Table			
Fittings Diameter	Hose Diameter	Insulation Diameter	Insulation Thickness
1/2"-1/2"	12 mm	18 mm	6 mm
1/2"-3/4"	12 mm	18 mm	6 mm
1/2"-3/4"	16 mm	18 mm	6 mm
3/4"-3/4"	16 mm	22 mm	6 mm
3/4"-1"	16 mm	22 mm	6 mm
1"-1"	20 mm	28 mm	6 mm

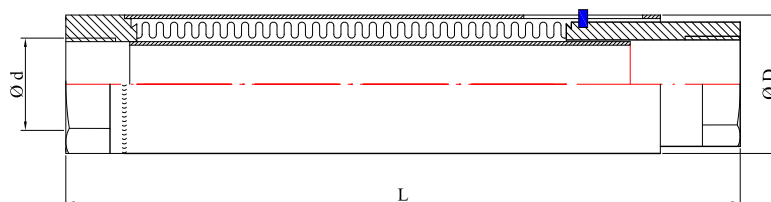
Fan-coil connectors are used for flexible connections of fan-coil units to the heating / cooling system distribution piping.

- \* Design data : 10 bar / 450 °C
- \* Flexible hose material : AISI 316 L Stainless Steel
- \* Fittings material (nipples/unions) : St 37 Carbon Steel (Cr-Ni coated)
- \* Fitting Connection : TIG- Argon welding
- \* Insulation Material : Polyethylene closed cell foam (At 0°C  $\lambda = 0,035$  W/mK/Class 0)
- \* All hoses are tested for tightness, testing is done with Nitrogen gas.
- \* For special diameters, lengths and fitting types, please consult with our Technical Services



# CENTRAL HEATING SYSTEM PIPE EXPANSION JOINTS

Standard Bellows Material: **304ss**  
 Balance of materials: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Connection type is threaded inside for diameters up to DN50 (2")  
 Design pressure: **16 barg**  
 Design movement: **50 mm axial**



12

Nominal Diameter (DN)	DN15 (1/2")	DN20 (3/4")	DN25 (1")	DN32 (1 1/4")	DN40 (1 1/2")	DN50 (2")	DN65 (2 1/2")	DN80 (3")	DN100 (4")
Outside Diameter D (mm)	35	42	51	60	63	70	99	114	139
Length L (mm)	260	260	260	260	260	260	260	260	260



Significant displacements due to thermal movements on central heating pipes create thermal stresses resulting in bending of pipes and irritating noise

Advantages of using expansion joints in central heating systems:

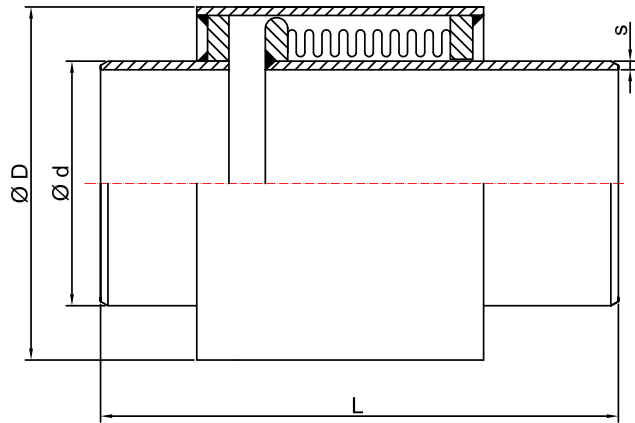
- Deformations and noise resulting from thermal stresses are prevented
- Minimum and maximum limits and pretension are observed easily with the help of limiting pin
- Internal cover prevents pressure losses and misalignments while external cover prevents external damages
- Installation is easy and quick

They can be used for indoor applications where aesthetic appearance is important.

Bellows can be manufactured from 316ss or 321ss

# EXTERNALLY PRESSURIZED EXPANSION JOINTS

Standard Bellows Material: **304ss**  
 Weld end and ring materials: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Flanged connections are available upon request



Nominal Diameter (DN)	Design Pressure (barg)	Length (L) (mm) Compression (mm)				d (mm)	s (mm)	D (mm)	Effective Area (cm <sup>2</sup> )
		30	60	90	120				
25 1"	40	275	395	520	-	33,7	2,6	88,9	54
32 1 1/4"		285	405	530	-	42,4	3,2	88,9	54
40 1 1/2"		295	415	535	-	48,3	3,2	88,9	54
50 2"		300	420	555	710	60,3	3,6	114,3	89
65 2 1/2"		315	430	560	715	76,1	3,6	114,3	91
80 3"	25	315	435	585	725	88,9	4,0	139,7	141
100 4"		320	450	585	750	114,3	4,5	165,0	196
125 5"		335	465	595	765	139,7	5,0	193,7	272
150 6"		345	475	615	790	165,0	5,0	219,1	346
200 8"		395	520	685	860	219,1	4,5	323,9	572
250 10"		420	585	760	950	273,0	5,6	355,6	829

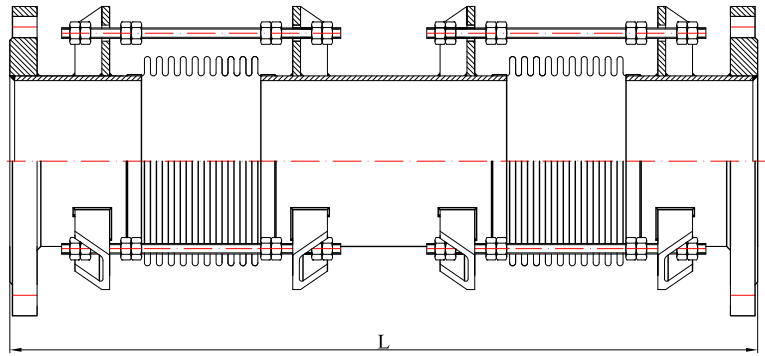
Externally pressurized expansion joints are used where there are large axial movements. This type of design pressurizes the bellows externally, eliminating column instability concerns for the bellows.

This type of configuration provides an outside cover protecting bellows from external elements and inside pipe acts as a liner protecting bellows from flow medium and streamlining the flow



# SEISMIC EXPANSION JOINTS WITH LIMIT RODS

Standard Bellows Material: **304ss**  
 Balance of materials: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Design pressure: **16 barg**  
 Movements are non-concurrent



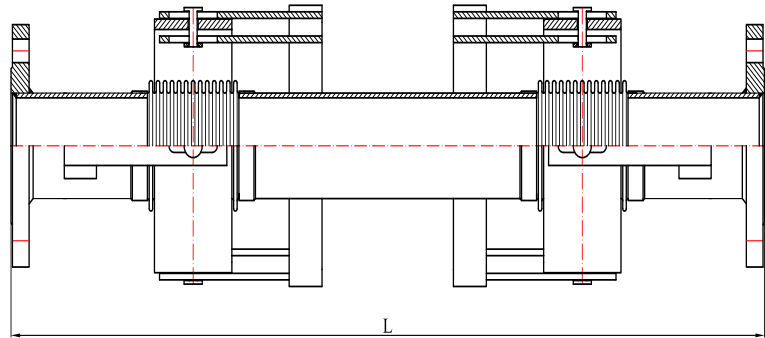
Nominal Diameter (DN)	Type 1			Type 2			Type 3		
	Axial (+/-)	Lateral (+/-)	Length (L) (mm)	Axial (+/-)	Lateral (+/-)	Length (L) (mm)	Axial (+/-)	Lateral (+/-)	Length (L) (mm)
32 1 1/4"	15	25	595	15	50	620	15	75	690
40 1 1/2"	15	25	620	15	50	650	15	75	720
50 2"	15	25	580	15	50	615	15	75	690
65 2 1/2"	15	25	620	15	50	660	15	75	735
	23	25	665	23	50	705	23	75	780
80 3"	30	25	710	30	50	750	30	75	825
	15	25	700	15	50	730	15	75	790
100 4"	23	25	750	23	50	780	23	75	835
	30	25	795	30	50	830	30	75	885
125 5"	15	25	750	15	50	790	15	75	825
	23	25	805	23	50	840	23	75	860
150 6"	30	25	860	30	50	895	30	75	915
	15	25	765	15	50	810	15	75	865
200 8"	23	25	810	23	50	875	23	75	910
	30	25	875	30	50	920	30	75	950
250 10"	15	25	840	15	50	890	15	75	945
	23	25	890	23	50	940	23	75	995
300 12"	30	25	940	30	50	985	30	75	1040
	15	25	885	15	50	960	15	75	1050
350 14"	23	25	935	23	50	1015	23	75	1100
	30	25	990	30	50	1065	30	75	1150
400 16"	15	25	885	15	50	930	15	75	1040
	23	25	930	23	50	985	23	75	1095
450 18"	30	25	985	30	50	1040	30	75	1150





# SEISMIC EXPANSION JOINTS WITH GIMBALS

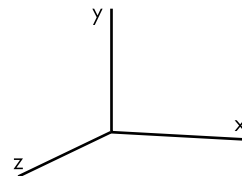
Standard Bellows Material: **304ss**  
 Balance of materials: **Carbon Steel**  
 Design Temperature: **400 °C**  
 Design pressure: **16 barg**  
 Movements are non-concurrent



Nominal Diameter (DN)	Type 1				Type 2			
	Axial x (+/-)	Lateral y (+/-)	Lateral z (+/-)	Length (L) (mm)	Axial x (+/-)	Lateral y (+/-)	Lateral z (+/-)	Length (L) (mm)
32 1 1/4"	50	100	100	750	50	200	200	750
40 1 1/2"	50	100	100	790	50	200	200	790
50 2"	50	100	100	790	50	200	200	790
65 2 1/2"	50	100	100	940	50	200	200	940
80 3"	50	100	100	940	50	200	200	940
100 4"	50	100	100	940	50	200	200	990
125 5"	50	100	100	940	50	200	200	1090
150 6"	50	100	100	1100	50	200	200	1200
200 8"	50	100	100	1130	50	200	200	1330
250 10"	50	100	100	1130	50	200	200	1430

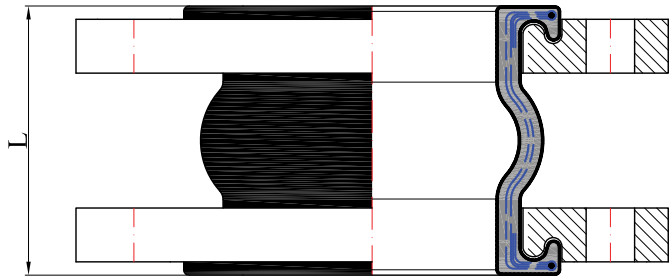
In addition to thermal movements in pipe lines, there are mechanical movements due to earthquakes, ground settlements and landslides. These type of movements can cause significant damage, even damage the piping systems in dilatation points of buildings, pipe junctions between vessels and boilers.

These mechanical movements should be absorbed by using seismic expansion joints.

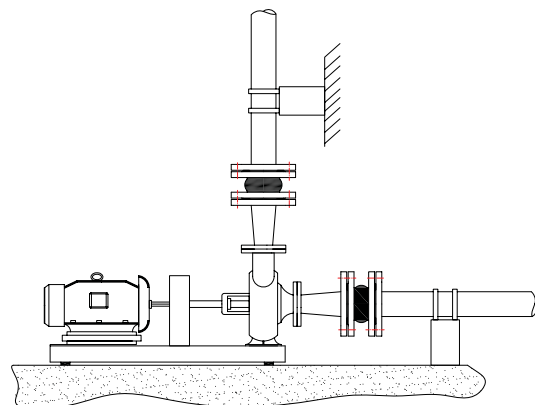
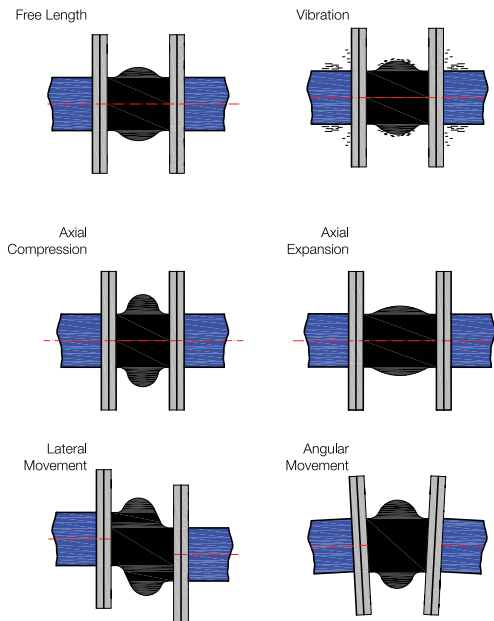


# RUBBER EXPANSION JOINTS

- \* Best solution to vibration, noise and misalignments problems.
- \* Up to 16 bar pressure and 110°C temperature working conditions
- \* Nylon-cord carcassed rubber construction.
- \* Flanged construction with integral self-sealing profile.
- \* Flanges are electro galvanised carbon steel material



Nominal Diameter (DN)		Length (L) (mm)
25	1"	100
32	1 1/4"	100
40	1 1/2"	100
50	2"	100
65	2 1/2"	100
80	3"	100
100	4"	100
125	5"	120
150	6"	120
200	8"	120
250	10"	130
300	12"	210
350	14"	210
400	16"	220
450	18"	220
500	20"	270
600	24"	300
700	28"	300



# VIBRATION ABSORBERS

Standard Bellows Material: **2 ply 304ss**

Flange Material: **Carbon Steel**

Design pressure: **16 barg**

Design Temperature: **400 °C**

Movements are small vibrational movements

Flange drilling is per PN16

Nominal Diameter (DN)	Length (L) (mm)	Effective Area (cm <sup>2</sup> )	D (mm)	k (mm)	b (mm)	n	Q (mm)
50 2"	120	38	165	125	18	4	18
65 2 1/2"	120	58	185	145	18	4	18
80 3"	120	80	200	160	20	8	18
100 4"	120	129	220	180	20	8	18
125 5"	125	186	250	210	22	8	18
150 6"	130	268	285	240	22	8	22
200 8"	150	456	340	295	24	12	22
250 10"	165	684	405	355	26	12	26
300 12"	165	964	460	410	28	12	26

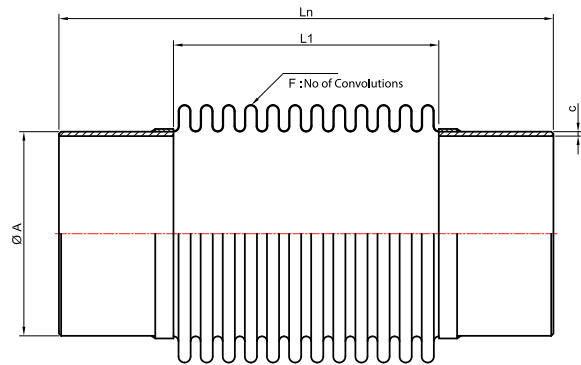
Vibration absorbing expansion joints are manufactured from 2 plies where it is needed to absorb vibrational movements. They are ideal for pump connections, engine exhaust lines.



# BALANCE I



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-001-BAL.0**  
 Expansion joints DN450 thru DN1000 have 1mm thick liners

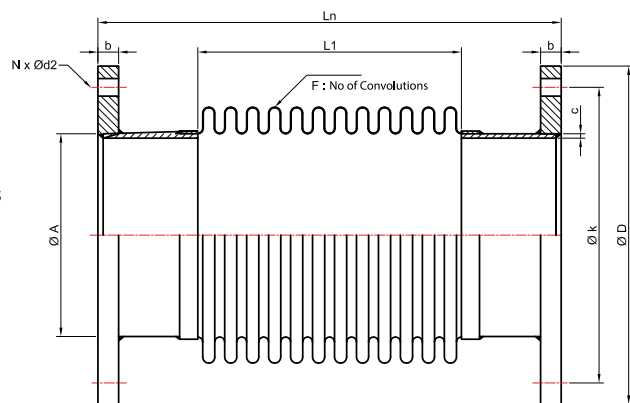


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows					Pipe		
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L1 (mm)	OD (mm)	A (mm)	c (mm)	
32	1 1/4"	205	26	1	0,3	105	52	42,4	2,6
40	1 1/2"	205	22	1	0,3	105	60	48,3	2,6
50	2"	245	13	2	0,3	120	78	60,3	2,9
65	2 1/2"	245	13	2	0,3	120	96	76,1	2,9
80	3"	245	13	2	0,3	120	110	88,9	3,2
90	3.5"	245	13	2	0,3	120	122	101,6	3,2
100	4"	245	11	2	0,3	120	140	114,3	3,6
125	5"	245	11	2	0,3	120	166	139,7	3,6
150	6"	245	9	2	0,3	120	200	168,3	4,0
175	7"	245	9	2	0,3	120	226	193,7	4,5
200	8"	245	9	2	0,3	120	251	219,1	4,5
250	10"	245	9	2	0,3	120	305	273	5,0
300	12"	295	9	2	0,3	145	361	323,9	5,6
350	14"	295	9	2	0,3	145	393	355,6	5,6
400	16"	295	9	2	0,3	145	443	406,4	5,6
450	18"	300	8	2	0,4	176	509	457	8,0
500	20"	340	9	2	0,4	216	564	508	8,0
600	24"	340	9	2	0,4	216	669	609	10,0
700	28"	380	6	2	0,4	168	779	711	10,0
800	32"	380	6	2	0,4	180	888	812	10,0
900	36"	380	5	2	0,5	170	998	914	10,0
1000	40"	380	5	2	0,5	190	1108	1016	10,0

# BALANCE I F



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Expansion joints DN450 thru DN1000 have 1mm thick liners  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-007-BALF.0**  
 Expansion joints DN450 thru DN1000 have 1mm thick liners

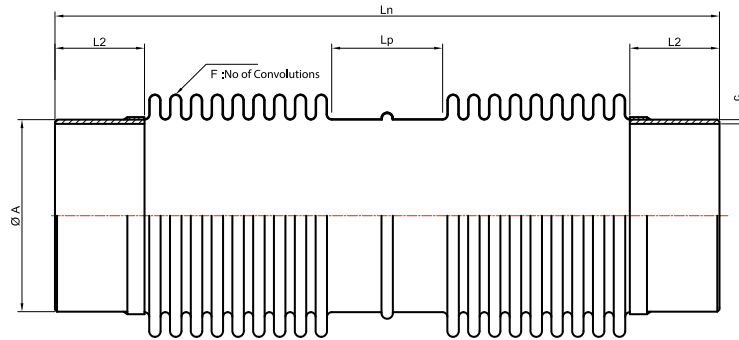


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows					Pipe		Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L1 (mm)	OD (mm)	A (mm)	c (mm)	D (mm)	b (mm)	k (mm)	N x d2	
32	1 1/4"	205	26	1	0,3	105	52	42,4	2,6	140	16	100	4 x 18
40	1 1/2"	205	22	1	0,3	105	60	48,3	2,6	150	16	110	4 x 18
50	2"	245	13	2	0,3	120	78	60,3	2,9	165	16	125	4 x 18
65	2 1/2"	245	13	2	0,3	120	96	76,1	2,9	185	16	145	4 x 18
80	3"	245	13	2	0,3	120	110	88,9	3,2	200	16	160	8 x 18
90	3.5"	245	13	2	0,3	120	122	101,6	3,2	220	16	180	8 x 18
100	4"	245	11	2	0,3	120	140	114,3	3,6	220	16	180	8 x 18
125	5"	245	11	2	0,3	120	166	139,7	3,6	250	16	210	8 x 18
150	6"	245	9	2	0,3	120	200	168,3	4,0	285	16	240	8 x 22
175	7"	245	9	2	0,3	120	226	193,7	4,5	315	16	270	8 x 22
200	8"	245	9	2	0,3	120	251	219,1	4,5	320	16	280	8 x 18
250	10"	245	9	2	0,3	120	305	273	5,0	375	16	335	12 x 18
300	12"	295	9	2	0,3	145	361	323,9	5,6	440	16	395	12 x 22
350	14"	295	9	2	0,3	145	393	355,6	5,6	490	16	445	12 x 22
400	16"	295	9	2	0,3	145	443	406,4	5,6	540	16	495	16 x 22
450	18"	300	8	2	0,4	176	509	457	8,0	595	16	550	16 x 22
500	20"	340	9	2	0,4	216	564	508	8,0	645	16	600	20 x 22
600	24"	340	9	2	0,4	216	669	609	10,0	754	20	700	20 x 22
700	28"	380	6	2	0,4	168	779	711	10,0	856	20	800	24 x 22
800	32"	380	6	2	0,4	180	888	812	10,0	958	20	900	24 x 22
900	36"	380	5	2	0,5	170	998	914	10,0	1060	20	1010	28 x 22
1000	40"	380	5	2	0,5	190	1108	1016	10,0	1162	20	1110	32 x 22

# BALANCE II



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-002-BAL2.0**

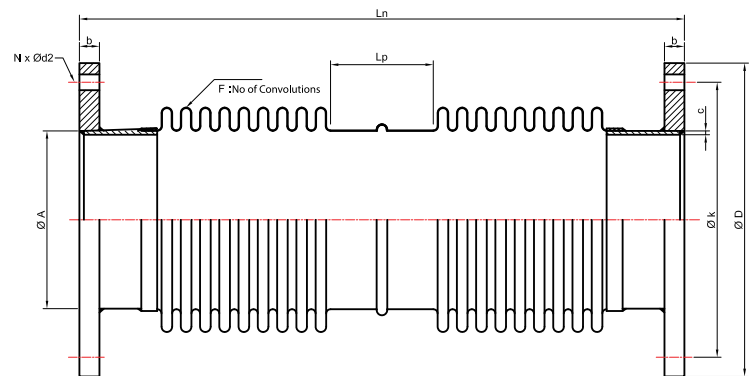


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Pipe				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	A (mm)	c (mm)	L2 (mm)	Lp (mm)	
40	1 1/2"	375	20 x 2	1	0,3	61	48,3	2,6	40	101
50	2"	375	17 x 2	2	0,3	77	60,3	2,9	40	100
65	2 1/2"	345	11 x 2	2	0,3	95	76,1	3,2	40	111
80	3"	380	13 x 2	2	0,3	111	88,9	3,2	40	115
100	4"	330	9 x 2	2	0,3	140	114,3	3,6	40	113
125	5"	320	9 x 2	2	0,3	168	139,7	3,6	40	100
150	6"	395	10 x 2	2	0,3	200	168,3	4,0	50	107
175	7"	395	10 x 2	2	0,3	228	193,7	4,5	50	107
200	8"	405	8 x 2	2	0,3	255	219,1	4,5	50	116
250	10"	405	7 x 2	2	0,3	315	273	5,0	50	116
300	12"	415	6 x 2	2	0,3	372	323,9	6,0	70	88
350	14"	415	6 x 2	2	0,3	406	355,6	6,0	70	88
400	16"	485	6 x 2	2	0,3	459	406,4	6,0	70	115
450	18"	490	5 x 2	2	0,4	511	457	6,0	70	120
500	20"	460	5 x 2	2	0,4	564	508	6,0	70	115

# BALANCE II F



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-008-BAL2F.0**

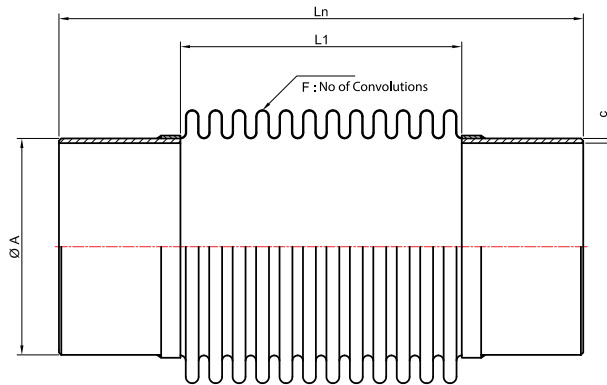


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Pipe			Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	A (mm)	c (mm)	Lp (mm)	D (mm)	b (mm)	k (mm)	N x d2	
40	1 1/2"	375	20 x 2	1	0,3	60,5	48,3	2,6	101	150	16	110	4 x 18
50	2"	375	17 x 2	2	0,3	77	60,3	2,9	100	165	16	125	4 x 18
65	2 1/2"	345	11 x 2	2	0,3	95	76,1	3,2	111	185	16	145	4 x 18
80	3"	380	13 x 2	2	0,3	111	88,9	3,2	115	200	16	160	8 x 18
100	4"	330	9 x 2	2	0,3	140	114,3	3,6	113	220	16	180	8 x 18
125	5"	320	9 x 2	2	0,3	168	139,7	3,6	100	250	16	210	8 x 18
150	6"	395	10 x 2	2	0,3	200	168,3	4,0	107	285	16	240	8 x 22
175	7"	395	10 x 2	2	0,3	228	193,7	4,5	107	315	16	270	8 x 22
200	8"	405	8 x 2	2	0,3	255	219,1	4,5	116	320	16	280	8 x 18
250	10"	405	7 x 2	2	0,3	315	273	5,0	116	375	16	335	12 x 18
300	12"	415	6 x 2	2	0,3	372	323,9	6,0	88	440	16	395	12 x 22
350	14"	415	6 x 2	2	0,3	406	355,6	6,0	88	490	16	445	12 x 22
400	16"	485	6 x 2	2	0,3	458,5	406,4	6,0	115	540	16	495	16 x 22
450	18"	490	5 x 2	2	0,4	511	457	6,0	120	595	16	550	16 x 22
500	20"	460	5 x 2	2	0,4	564	508	6,0	115	645	16	600	20 x 22

# BALANCE III



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-003-BAL3.0**



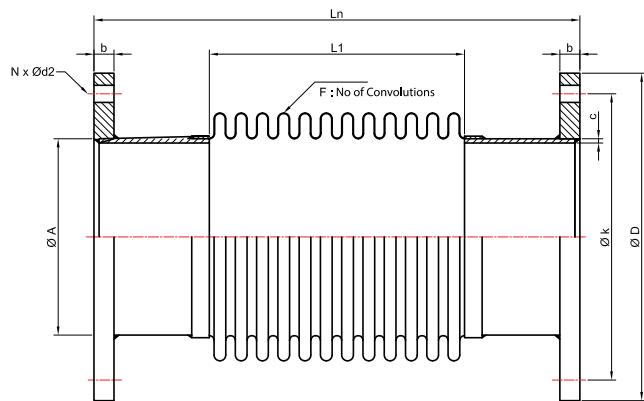
Nominal Diameter (DN)	Length ( $L_n$ ) (mm)	Bellows					Pipe	
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L1 (mm)	OD (mm)	A (mm)	c (mm)
100 4"	285	15	2	0,3	165	140	114,3	3,6
125 5"	295	15	2	0,3	165	166	139,7	3,6
150 6"	295	13	2	0,3	175	200	168,3	4,0
200 8"	315	13	2	0,3	175	251	219,1	4,5
250 10"	315	13	2	0,3	175	305	273	5,0
300 12"	345	13	2	0,3	210	361	323,9	5,6
350 14"	345	13	2	0,3	210	393	355,6	5,6



# BALANCE III F



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-009-BAL3F.0**

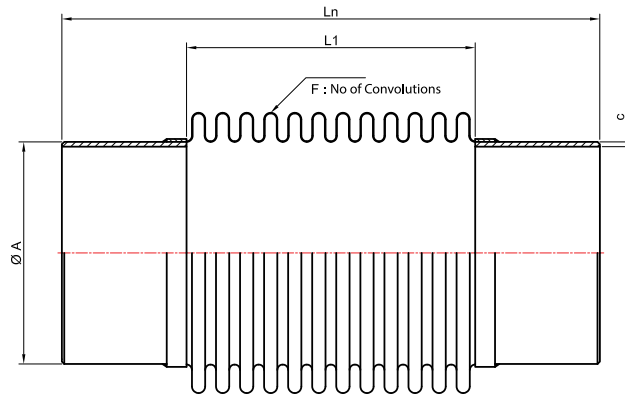


Nominal Diameter (DN)	Length (L <sub>n</sub> ) (mm)	Bellows					Pipe		Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L <sub>1</sub> (mm)	OD (mm)	A (mm)	c (mm)	D (mm)	b (mm)	k (mm)	N x d2	
100	4"	285	15	2	0,3	165	140	114,3	3,6	220	16	180	8 x 18
125	5"	295	15	2	0,3	165	166	139,7	3,6	250	16	210	8 x 18
150	6"	295	13	2	0,3	175	200	168,3	4,0	285	16	240	8 x 22
200	8"	315	13	2	0,3	175	251	219,1	4,5	320	16	280	8 x 18
250	10"	315	13	2	0,3	175	305	273	5,0	375	16	335	12 x 18
300	12"	345	13	2	0,3	210	361	323,9	5,6	440	16	395	12 x 22
350	14"	345	13	2	0,3	210	393	355,6	5,6	490	16	445	12 x 22

# BALANCE IV



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-004-BAL4.0**

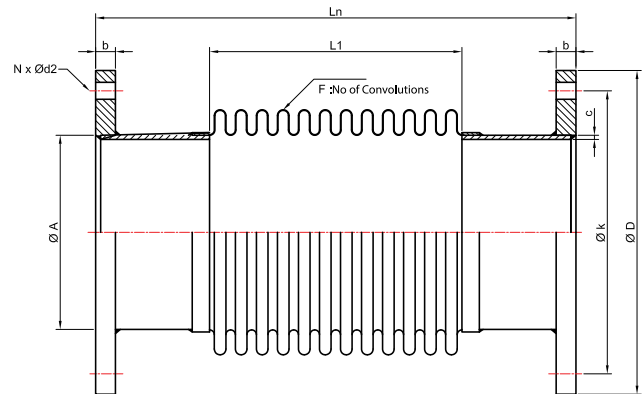


Nominal Diameter (DN)	Length ( $L_n$ ) (mm)	Bellows					Pipe	
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L1 (mm)	OD (mm)	A (mm)	c (mm)
40 1 1/2"	150	18	1	0,3	90	60	48,3	2,6
50 2"	150	10	2	0,3	90	78	60,3	2,9
65 2 1/2"	150	10	2	0,3	90	96	76,1	2,9
80 3"	150	10	2	0,3	90	110	88,9	3,2
100 4"	150	7	2	0,3	77	140	114,3	3,6
125 5"	150	7	2	0,3	77	166	139,7	3,6
150 6"	150	6	2	0,3	80	200	168,3	4,0
200 8"	150	6	2	0,3	80	251	219,1	4,5
250 10"	150	6	2	0,3	80	305	273	5,0
300 12"	150	5	2	0,3	80	361	323,9	5,6

# BALANCE IV F



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-004-BAL4.0**

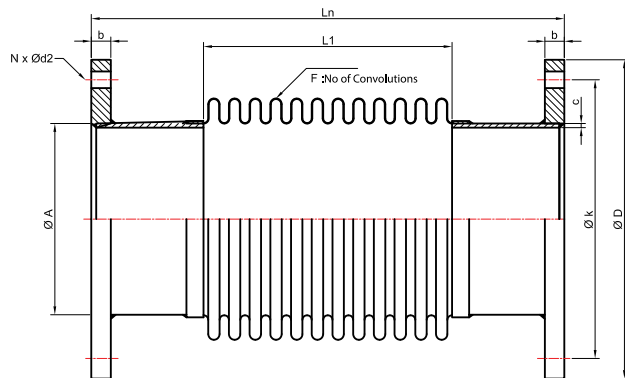


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Pipe		Flange					
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L1 (mm)	OD (mm)	A (mm)	c (mm)	D (mm)	b (mm)	k (mm)	N x d2	
40	1 1/2"	150	18	1	0,3	90	60	48,3	2,6	150	16	100	4 x 18
50	2"	150	10	2	0,3	90	78	60,3	2,9	165	16	125	4 x 18
65	2 1/2"	150	10	2	0,3	90	96	76,1	2,9	185	16	145	4 x 18
80	3"	150	10	2	0,3	90	110	88,9	3,2	200	16	160	8 x 18
100	4"	150	7	2	0,3	77	140	114,3	3,6	220	16	180	8 x 18
125	5"	150	7	2	0,3	77	166	139,7	3,6	250	16	210	8 x 18
150	6"	150	6	2	0,3	80	200	168,3	4,0	285	16	240	8 x 22
200	8"	150	6	2	0,3	80	251	219,1	4,5	320	16	280	8 x 18
250	10"	150	6	2	0,3	80	305	273	5,0	375	16	335	12 x 18
300	12"	150	5	2	0,3	80	361	323,9	5,6	440	16	395	12 x 22

# BALANCE V



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Material: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-005-BAL5.0**

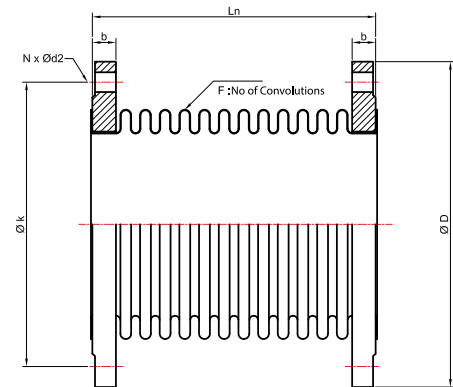


Nominal Diameter (DN)	Length (L <sub>n</sub> ) (mm)	Bellows					Pipe		Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	L <sub>1</sub> (mm)	OD (mm)	A (mm)	c (mm)	D (mm)	b (mm)	k (mm)	N x d2	
40	1 1/2"	215	22	1	0,3	105	60	48,3	2,6	150	18	110	4 x 18
50	2"	255	13	2	0,3	120	78	60,3	2,9	165	18	125	4 x 18
65	2 1/2"	255	13	2	0,3	120	96	76,1	2,9	185	18	145	4 x 18
80	3"	255	13	2	0,3	120	110	88,9	3,2	200	20	160	8 x 18
90	3.5"	255	13	2	0,3	120	122	101,6	3,2	220	20	180	8 x 18
100	4"	255	11	2	0,3	120	140	114,3	3,6	220	20	180	8 x 18
125	5"	255	11	2	0,3	120	166	139,7	3,6	250	22	210	8 x 18
150	6"	255	9	2	0,3	120	200	168,3	4,0	285	22	240	8 x 22
175	7"	255	9	2	0,3	120	226	193,7	4,5	315	24	270	8 x 22
200	8"	255	9	2	0,3	120	251	219,1	4,5	340	24	295	8 x 22
250	10"	255	9	2	0,3	120	305	273	5	395	26	350	12 x 22
300	12"	305	9	2	0,3	145	361	323,9	5,6	445	26	400	12 x 22
350	14"	305	9	2	0,3	145	393	355,6	5,6	505	26	460	16 x 22
400	16"	305	9	2	0,3	145	443	406,4	5,6	565	26	515	16 x 26

# BALANCE VI



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **PT-006-BAL6.0**

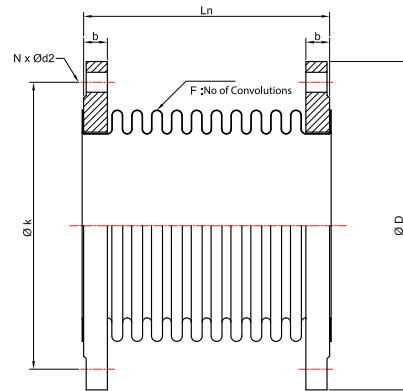


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Flange			
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	D (mm)	b (mm)	k (mm)	N x d2
40 1 1/2"	130	20	1	0,3	60,5	150	16	110	4 x 18
50 2"	130	16	2	0,3	77	165	18	125	4 x 18
65 2 1/2"	130	14	2	0,3	95	185	18	145	4 x 18
80 3"	130	13	2	0,3	111	200	20	160	8 x 18
100 4"	130	12	2	0,3	140	220	20	180	8 x 18
125 5"	130	12	2	0,3	168	250	22	210	8 x 18
150 6"	130	12	2	0,4	200	285	22	240	8 x 22
200 8"	130	8	2	0,4	255	340	24	295	12 x 22
250 10"	130	7	2	0,4	315	395	26	355	12 x 26
300 12"	130	6	2	0,4	372	460	28	410	12 x 26

# RF 30 AXIAL - RF 60 AXIAL



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**



Design No: **PT-011-RF30.0**

Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	D (mm)	b (mm)	k (mm)	N x d2	
40	1 1/2"	120	18	1	0,3	60,5	150	16	110	4 x 18
50	2"	120	14	1	0,4	77	165	18	125	4 x 18
65	2 1/2"	120	12	1	0,4	95	185	18	145	4 x 18
80	3"	120	11	1	0,5	111	200	20	160	8 x 18
100	4"	120	10	1	0,5	140	220	20	180	8 x 18
125	5"	125	10	1	0,6	168	250	22	210	8 x 18
150	6"	130	10	1	0,6	200	285	22	240	8 x 22
200	8"	150	8	1	0,8	255	340	24	295	12 x 22
250	10"	165	8	1	0,8	315	405	26	355	12 x 26
300	12"	170	7	1	0,8	372	460	28	410	12 x 26

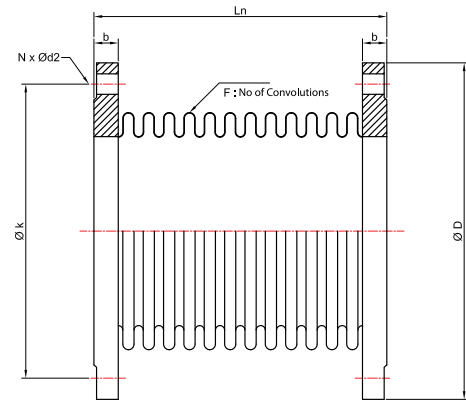
Design No: **PT-012-RF60.0**

Nominal Diameter (DN)	Length (L)	Bellows				Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	D (mm)	b (mm)	k (mm)	N x d2	
65	2 1/2"	180	20	1	0,4	95	185	18	145	4 x 18
80	3"	180	19	1	0,5	111	200	20	160	8 x 18
100	4"	185	18	1	0,5	140	220	20	180	8 x 18
125	5"	190	18	1	0,6	168	250	22	210	8 x 18
150	6"	200	18	1	0,6	200	285	22	240	8 x 22
200	8"	230	14	1	0,8	255	340	24	295	12 x 22
250	10"	245	14	1	0,8	315	405	26	355	12 x 26
300	12"	250	12	1	0,8	372	460	28	410	12 x 26

# FF 30 AXIAL - FF 60 AXIAL



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**



Design No: **PT-013-FF30.0**

Nominal Diameter (DN)	Length (Ln) (mm)	Bellows				Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	D (mm)	b (mm)	k (mm)	N x d2	
40	1 1/2"	120	18	1	0,3	60,5	150	16	110	4 x 18
50	2"	120	14	1	0,4	77	165	18	125	4 x 18
65	2 1/2"	120	12	1	0,4	95	185	18	145	4 x 18
80	3"	120	11	1	0,5	111	200	20	160	8 x 18
100	4"	120	10	1	0,5	140	220	20	180	8 x 18
125	5"	125	10	1	0,6	168	250	22	210	8 x 18
150	6"	130	10	1	0,6	200	285	22	240	8 x 22
200	8"	150	8	1	0,8	255	340	24	295	12 x 22
250	10"	165	8	1	0,8	315	405	26	355	12 x 26
300	12"	170	7	1	0,8	372	460	28	410	12 x 26

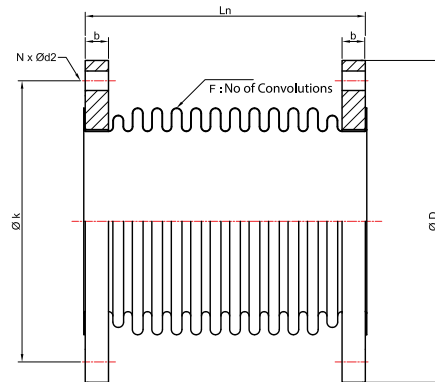
Design No: **PT-014-FF60.0**

Nominal Diameter (DN)	Length (L) (mm)	Bellows				Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	OD (mm)	D (mm)	b (mm)	k (mm)	N x d2	
65	2 1/2"	180	20	1	0,4	95	185	18	145	4 x 18
80	3"	180	19	1	0,5	111	200	20	160	8 x 18
100	4"	185	18	1	0,5	140	220	20	180	8 x 18
125	5"	190	18	1	0,6	168	250	22	210	8 x 18
150	6"	200	18	1	0,6	200	285	22	240	8 x 22
200	8"	230	14	1	0,8	255	340	24	295	12 x 22
250	10"	245	14	1	0,8	315	405	26	355	12 x 26
300	12"	250	12	1	0,8	372	460	28	410	12 x 26

# BALANCE VIII



Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **USIBU-03**

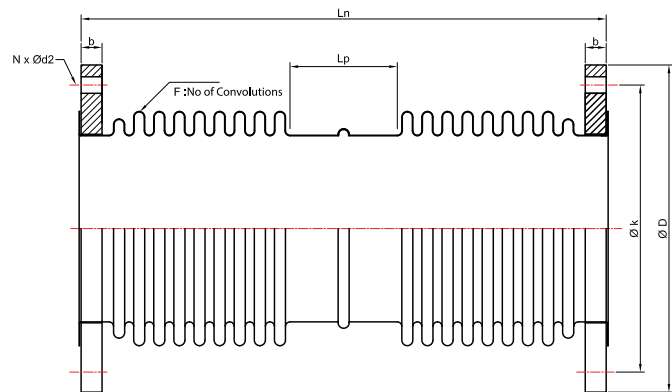


Nominal Diameter (DN)	Length (Ln) (mm)	Bellows			Flange				
		Number of Convolutions	Number of Plies	Ply Thickness (mm)	D (mm)	b (mm)	k (mm)	N x d2	
200	8"	185	12	2	0,3	320	16	280	8 x 18
250	10"	185	11	2	0,4	375	16	335	12 x 18
300	12"	180	9	2	0,4	440	16	395	12 x 22
350	14"	180	9	2	0,4	490	16	445	12 x 22
400	16"	220	11	2	0,4	540	16	495	16 x 22
450	18"	180	8	2	0,4	595	16	550	16 x 22
500	20"	230	9	2	0,4	645	16	600	20 x 22
550	22"	240	9	2	0,4	703	20	650	20 x 22
600	24"	230	8	2	0,4	754	20	700	20 x 22
700	28"	230	7	2	0,4	856	20	800	24 x 22
800	32"	230	7	2	0,5	958	20	900	24 x 22
900	36"	230	6	2	0,5	1060	20	1010	28 x 22
1000	40"	230	5	2	0,5	1162	20	1110	32 x 22
1100	44"	230	5	2	0,6	1266	20	1210	32 x 22
1200	48"	230	5	2	0,6	1366	20	1310	36 x 22



# BALANCE IX

Bellows Material: **321ss**  
 Design Pressure: **2.5 barg**  
 Weld end Flange: **Carbon Steel**  
 Design Temperature: **550 °C**  
 Design No: **US3BU-03**



Nominal Diameter (DN)	Length (Ln) (mm)	LP (mm)	Bellows				Flange			
			Number of Convolutions	Number of Plies	Ply Thickness (mm)	D (mm)	b (mm)	k (mm)	N x d2	
200	8"	335	116	2 x 7	2	0,4	320	16	280	8 x 18
250	10"	335	116	2 x 7	2	0,4	375	16	335	12 x 18
300	12"	310	88	2 x 6	2	0,4	440	16	395	12 x 22
350	14"	310	88	2 x 6	2	0,4	490	16	445	12 x 22
400	16"	375	115	2 x 7	2	0,5	540	16	495	16 x 22
450	18"	380	120	2 x 6	2	0,5	595	16	550	16 x 22
500	20"	350	115	2 x 5	2	0,5	645	16	600	20 x 22
550	22"	360	115	2 x 5	2	0,5	703	20	650	20 x 22
600	24"	440	144	2 x 6	2	0,5	754	20	700	20 x 22
700	28"	465	169	2 x 5	2	0,5	856	20	800	24 x 22
800	32"	465	169	2 x 5	2	0,5	958	20	900	24 x 22
900	36"	465	169	2 x 4	2	0,5	1060	20	1010	28 x 22
1000	40"	465	169	2 x 3	2	0,5	1162	20	1110	32 x 22
1100	44"	465	169	2 x 3	2	0,6	1266	20	1210	32 x 22
1200	48"	465	169	2 x 3	2	0,6	1366	20	1310	36 x 22

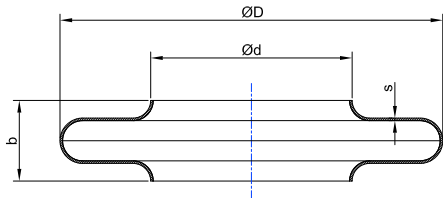


Dents and gouges create stress risers in thin ply bellows which result in fatigue cracks over time. Lens bellows have the advantage of holding up to mechanical damage better than thin wall bellows. Other advantages of lens bellows are:

- Weld repair can be performed by plant maintenance staff on thick walled bellows.
- Thicker wall of lens bellows holds up better to corrosion attacks
- Common use of carbon steel material
- Drain couplings can be added to the bottom of the convolution to prevent condensate build up

Thick walled, high convolution is durable and lasts for a long time.

# LENS (FLANGED AND FLUED) TYPE EXPANSION JOINTS



Nominal Diameter (DN)	d (mm)	D (mm)	b (mm)	Thickness (s) (mm)	
300	12"	323,9	600	120	2-4
350	14"	355,6	650	120	2-4
400	16"	406,4	700	120	2-4
450	18"	457,2	750	120	2-4
500	20"	508	800	120-160	2-4
600	24"	610	900	120-160	2-4
700	28"	711	1000	120-160	2-4
800	32"	813	1100	120-160	2-4
900	36"	914	1200	120-160	2-4
1000	40"	1016	1300	120-160	2-4
1100	44"	1120	1480	160	2-4
1200	48"	1220	1580	160	2-4
1300	52"	1320	1680	160	2-4
1400	56"	1420	1780	160	2-4
1500	60"	1520	1880	160	2-4
1600	64"	1620	2020	160	2-4
1700	68"	1720	2120	160	2-4
1800	72"	1820	2220	160	2-4
1900	76"	1920	2320	160	2-4
2000	80"	2020	2500	160	2-6
2100	84"	2120	2600	160	2-6
2200	88"	2220	2700	160	2-6
2300	92"	2320	2800	160	2-6
2400	96"	2420	2900	160	2-6
2500	100"	2520	3000	160	2-6
2600	104"	2620	3100	160	2-6
2700	108"	2720	3200	160	2-6
2800	112"	2820	3300	160	2-6
2900	116"	2920	3400	160	2-6
3000	120"	3020	3500	160	2-6



# FABRIC AND RECTANGULAR EXPANSION JOINTS



They can be designed and manufactured in various types in accordance with required operating conditions.

## Layers of Fabric Expansion Joints

- 1- Reinforcing layer for flange.
- 2- Flexible outer layer.
- 3- Sealing layer.
- 4- High temperature heat insulation layer.
- 5- Heat insulation layer.
- 6- Strength and resistance layer.



Rectangular expansion joints are used when duct cross sections are rectangular. They are common in gas turbine exhaust systems, flue gas ducts and hot gas, large volume duct systems.

Politeknik manufactures rectangular expansion joints with a “U” profile convolution and with three different corner configurations: Single Miter, Camera Corner and Rounded Corners.

Single Mitered Corners are the most common and economical type to manufacture. They are usually preferred in vibration free applications.

Oversized assemblies can be shipped in sections for field installation.

Rectangular expansion joints can be manufactured from 300 series stainless steels and various carbon steel grades.

### Advantages

- High vibration and noise elimination
- Compensation on thermal expansion
- High flexibility
- Working temperature up to 850°C
- Minimum reaction force





# politeknik

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## politeknik

Expansion Joints



## politeknik

Electrostatic Filters

This company was established in 1976, and it specializes in electrostatic precipitators.

Factory and Offices are located in Istanbul.



## intermetalflex

Flexible Metal Hoses

Intermetalflex A.S. which is a German-Turkish partnership started the production of flexible metal hoses in 2003.

Factory and Offices are located in Istanbul.

Ninety percent of the production is exported to EU and U.S.A.

ISO 9001:2008 TÜV SÜD Certificate is available.