



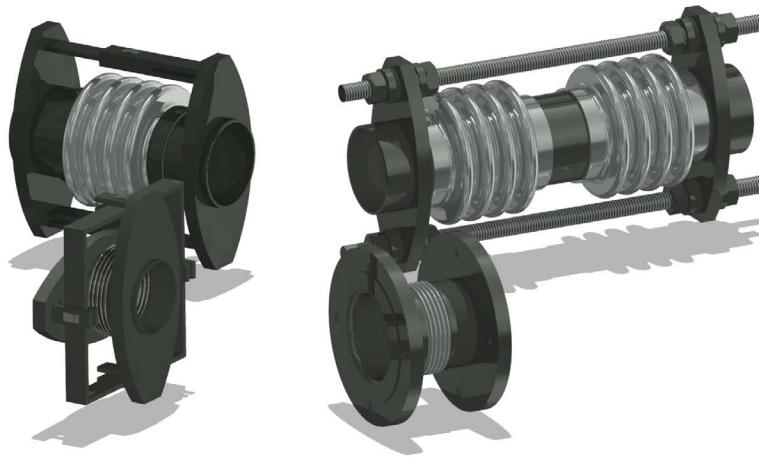
STEEL EXPANSION JOINTS



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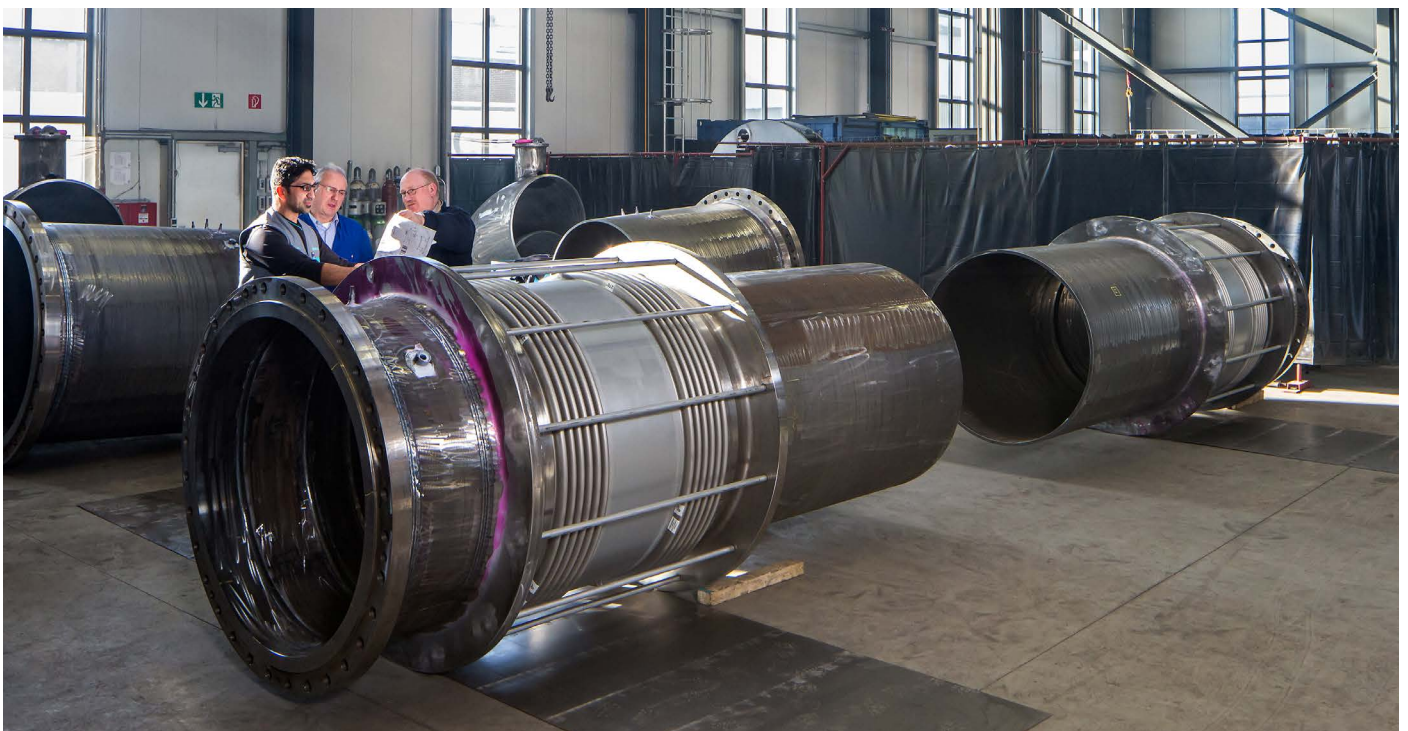
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1.1 Expansion Joints Overview



Hatec Flex provides expansion joints and compensation systems for the following applications:

- Compensation for thermal expansion
- Reduction of forces on equipment connections
- Vibration Absorber
- Compensation of assembly inaccuracies
- Sealing of pipe penetrations
- Easier assembly and disassembly of valves
- The standardized as well as and tailor made products are manufactured according to the customer requirements. The products are used in all areas of industry, for example the chemical and petrochemical industry, plant construction as well as heat supply.



1.2 Product Range

The overview below provides an idea of the available products within the Hatec Group.

Deformation styles bellows::	Hydraulic or mechanical forming
Types:	Axial, Angular, Kardan, Lateral, Special Types
Bellow Materials:	Stainless steel and special alloys
Bellow layers:	Single or multiple layers
Nominal Width:	DN 15 to DN 2300
Bellow wall thickness:	to 7.5 mm total wall thickness, depending on nominal diameter
Calculation Methods:	AD2000-B13, EJMA, DIN EN 13445, DIN EN 14917
Jigs:	Pressure test, helium leak test, endurance test

Possible Expansion Joint designs:

- Wetted parts or all stainless steel / special materials
- Inner sleeve and / or outer protective tube (depending on model)
- Special types (pressure Relieves, and corner-relieved, Lined)
- Complete assemblies and piping systems
- Customized documentation, audits, inspections
- Foreign standards
- etc.

1.3 Reduction Factors

The expansion values listed in the technical data and permissible pressures relate to a temperature of 20 ° C at 1000 load cycles and load cycles safety 1. At higher temperatures and required load cycles following reduction factors are to be used.

Reduction factors for pressure and movement capacity depends on the
Operating / design temperature

Temperature (°C)	-10 to 20	100	200	300	400	500
K _p	1,0	0,90	0,80	0,67	0,61	0,57
K _{delta}	1,0	1,00	0,90	0,85	0,80	0,75

Intermediate values can be interpolated.

Reduction factor for load cycles (Reduction of movement)

Allowable Loads N _{zul}	1.000	2.000	5.000	10.000	50.000	100.000	1.000.000
K _L	1,00	0,82	0,51	0,51	0,32	0,26	0,14

$$K_L = (1000 / N_{zul})^{0,29}$$

1.4 Overview Steel Expansion Joints

Technical Details see Chapter 2.1 -5.3 (With reservation for dimensional and design changes).

Other dimensions and designs are available on request.



Vibration Absorbers

Type Hatec-Vibra

Bellows made of 1.4571/1.4541,
Welded collar made of 1.4301/1.4541/1.4571,
Flanges made of C-Steel, galvanized



Vibration Absorbers

Type Hatec-Versa

Bellows made of 1.4404,
Collar made of 1.4404,
Flanges made of Steel, galvanized
Tie Rods made of C-Steel, with rubber buffers



Hatec Axial Expansion Joint

Type Hatec-AE

All parts stainless steel 1.4571/1.4541/ 1.4301
Multi-ply bellows
Both sides welding ends
With inner sleeve and outer protective tube
Prestressed design



Hatec Axial Expansion Joint

Type Hatec-AG

All parts stainless steel 1.4571/1.4541/ 1.4301
Multi-ply bellows
Both side conical thread according to EN 10226
With inner sleeve and outer protective tube
Prestressed design



Axial Expansion Joint

Type Hatec-ALS - H / PN16

Multi-ply bellows of stainless steel 1.4541 / 1.4571

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel



Axial Expansion Joint

Type Hatec-ANS

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel



Axial Expansion Joint

Type Hatec-ALS

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel



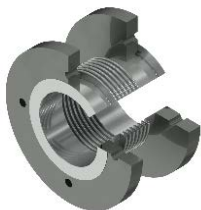
Axial Expansion Joint

Type Hatec-ANL

Multi-ply bellows of stainless steel 1.4541

Both sides welded collar of 1.4541

Both sides loose flanges drilled acc to PN of carbon steel



Axial Expansion Joint

Type Hatec-ANB

Multi-ply bellows with both sides collar of stainless steel 1.4541

Both sides loose flanges drilled acc to PN of carbon steel,
galvanized



Axial Expansion Joint

Type Hatec-DX1S

Multi-ply bellows of stainless steel 1.4541,

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

Outer protective tube made of carbon steel

Prestressed design



Axial Expansion Joint, externally pressurized

Type Hatec-RXA

Multi-ply bellows of stainless steel 1.4541,

Externally pressurized

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

Outer protective tube made of carbon steel



Angular Expansion Joint

Type Hatec-WHS

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Outer gimbal restraints of carbon steel

With or without inner sleeve made of stainless steel

Suitable for angular movement around one axis



Kardan Expansion Joint

Type Hatec-WRS

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Outer cardanic restraints made of carbon steel

With or without inner sleeve made of stainless steel

Suitable for angular movement around two axes



Lateral Expansion Joint

Type Hatec-LZS

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Welded intermediate pipe of carbon steel

Outer ball joint restrains of carbon steel

With 2 tie rods

With or without inner sleeve made of stainless steel

Suitable for lateral circular movements

2.1 Hatec Vibration Absorber Vibra PN16

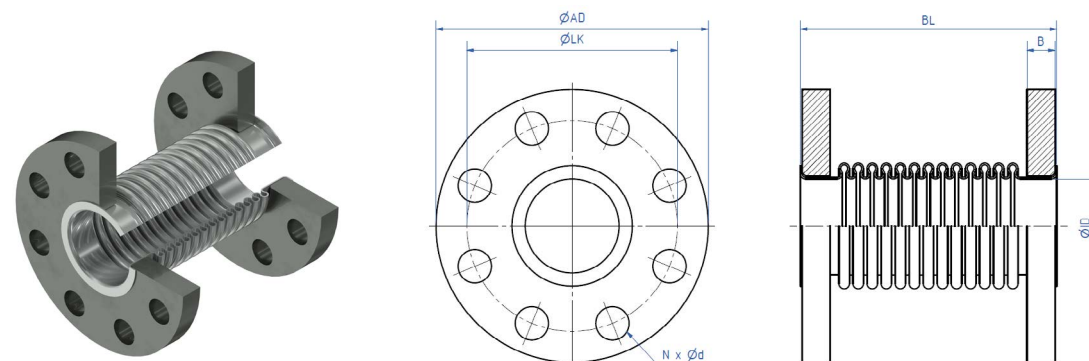
For heating installations, compensation of assembly inaccuracies, damping vibrations

Bellows made of 1.4571 / 1.4541

Welded collar made of 1.4301 / 1.4541 / 1.4571

Flanges of galvanized steel

Max. Operating temperature -30 ° C to + 300 ° C, max. Operating pressure 16 bar at 120 ° C (from + 120 ° C Note Pressure reduction)



DN	PN	Length	Flanges				Bellows		Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		BL	AD	LK	N x d	B	Di	Da	Ca	AB		
mm	bar	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
40	16	130	150	110	4 x 18	18	41,1	59,1	65,6	19,8	4.6	HES000136
50	16	130	165	125	4 x 18	20	50,5	70,3	79,6	28,7	5.8	HES000128
65	16	130	185	145	4 x 18	20	65,6	87,9	86,7	46,3	7.1	HES000129
80	16	130	200	160	8 x 18	20	90	117	120	84,5	8,4	HES000130
100	16	130	220	180	8 x 18	22	112	W142	101	126,5	10,2	HES000131
125	16	130	250	210	8 x 18	22	136	176	134,2	290,4	13	HES000137
150	16	130	285	240	8 x 22	24	162	199	205,5	255,0	17	HES000172
200	16	130	340	295	12 x 22	26	214	253	508,7	428,2	23,9	HES000173

2.2 Hatec Vibration Absorber Versa PN 6

For heating installations, compensation of assembly inaccuracies, damping vibrations

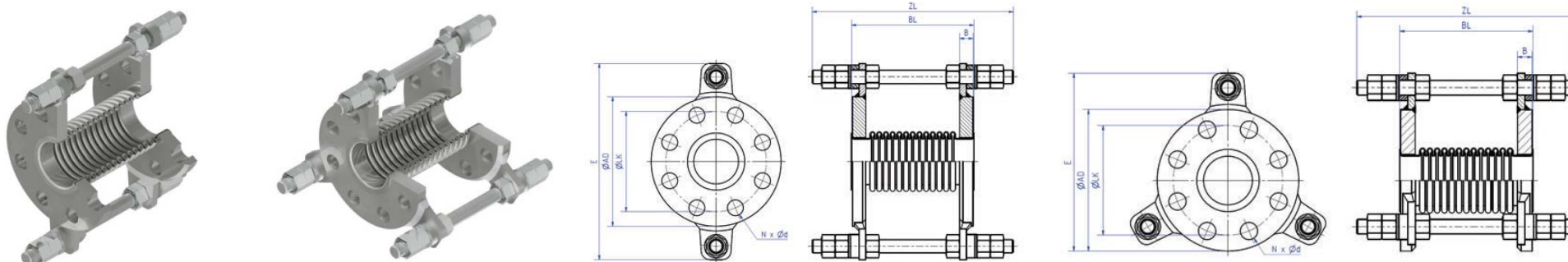
Bellows made of 1.4404

Collar made of 1.4404

Flange galvanized steel

Tie rods made of carbon steel, with rubber buffers

Max. Operating temperature 0 ° C to + 80 ° C, max. Operating pressure 16 bar at 80 ° C, higher temperatures on request



DN	PN	Length	Flanges					Tie Rods		Bellows		Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		BL	AD	LK	N x d	B	E	Number	ZL	Di	Da	Ca	AB		
mm	bar	mm	mm	mm	mm	mm	mm		mm	mm	mm	N/mm	cm ²	kg	
40	6	150	130	100	4 x 14	16	193	2	200	46,0	61,5	144	16,62	4,00	HES000140
50	6	150	140	110	4 x 14	16	203	2	200	53,5	70,5	138	22,48	4,41	HES000141
65	6	150	160	130	4 x 14	16	223	2	200	67,0	84,9	163	35,26	5,35	HES000116
80	6	150	190	150	4 x 18	18	253	2	200	78,5	100,5	111	48,40	7,80	HES000117
100	6	150	210	170	4 x 18	18	242	3	200	103,5	126,5	145	84,13	9,14	HES000118
125	6	150	240	200	8 x 18	20	272	3	200	128,5	153,5	179	129,69	11,67	HES000119
150	6	150	265	225	8 x 18	20	307	3	220	152,0	180,5	164	181,46	14,54	HES000120
200	6	150	320	280	8 x 18	22	373	3	250	203,0	233,0	286	323,65	22,55	HES000142

2.3 Hatec Vibration Absorber Versa PN 16

For heating installations, compensation of assembly inaccuracies, damping vibrations

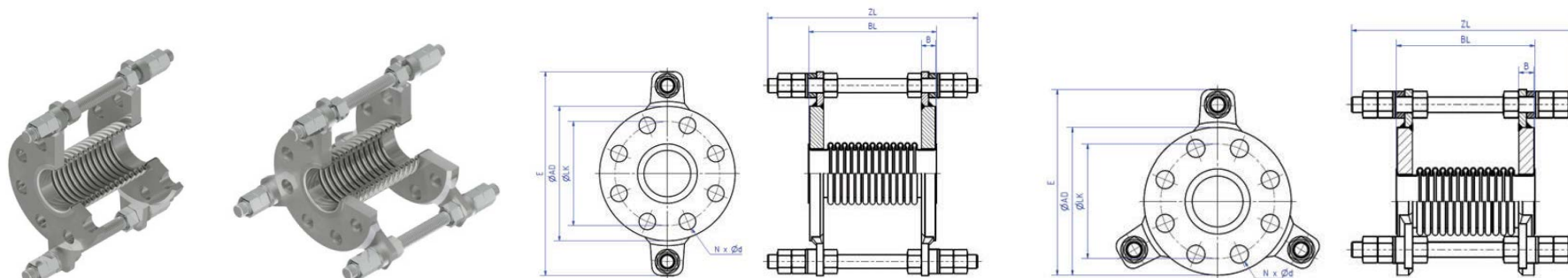
Bellows made of 1.4404

Collar made of 1.4404

Flange galvanized steel

Tie Rods made of carbon steel, with rubber buffers

Max. Operating temperature 0 ° C to + 80 ° C, max. Operating pressure 16 bar at 80 ° C, higher temperatures on request



DN	PN	Length	Flanges					Tie Rods		Bellows		Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		BL	AD	LK	N x d	B	E	No.	ZL	Di	Da	Ca	AB		
mm	bar	mm	mm	mm	mm	mm	mm		mm	mm	mm	N/mm	cm ²	kg	
40	16	110	150	110	4 x 18	18	213	2	160	46,0	61,5	216	16,62	5,50	HES000143
50	16	110	165	125	4 x 18	20	228	2	160	53,5	70,5	218	22,48	6,99	HES000121
65	16	110	185	145	4 x 18	20	217	3	160	67,0	84,9	272	35,26	8,43	HES000122
80	16	110	200	160	8 x 18	20	242	3	190	78,5	100,5	231	48,40	10,85	HES000123
100	16	150	220	180	8 x 18	22	304	4	220	103,5	126,7	291	84,13	14,06	HES000124
125	16	150	250	210	8 x 18	22	356	4	250	128,5	153,8	453	129,69	18,28	HES000125
150	16	150	285	240	8 x 22	24	406	4	280	152,0	180,5	437	181,46	24,47	HES000126
200	16	150	340	295	12 x 22	26	461	4	280	203,0	233,2	415	323,65	33,29	HES000127
250	16	150	405	355	12 x 26	26	559	4	360	250	285,5	655	490,87	54,48	HES000263
300	16	150	460	410	12 x 26	28	614	6	360	300,5	336,5	1666	709,22	73,89	HES000264

2.4 Hatec Axial Expansion Joint AE

For heating installations

All parts made of stainless steel 1.4571 / 1.4541 and 1.4301

Multi-ply bellows

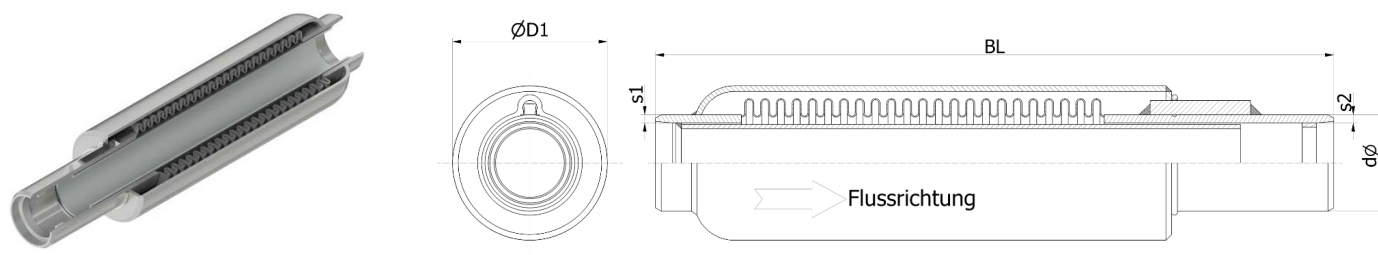
Both sides welding ends

With inner sleeve and outer protective tube

Prestressed design

Max. Operating temperature -30 ° to + 480 ° C

Max. Operating pressure 16 bar g to DN 32, 10 bar up to DN 50 (from + 120 ° C note pressure reduction)



DN	PN	Movement	Length	Welding end			Outer protective tube	Bellows		Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	D	S1	S2	D1	Di	Da	Ca	AB		
mm	bar	mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
15	16	0/-45	250	21.3	2.65	2.85	38.0	20	30,9	12,5	5,0	0,4	HES000170
20	16	0/-45	250	26.9	3.45	3.1	48.3	25,4	39,2	11,9	8,1	0,5	HES000111
25	16	0/-45	250	33.7	4.35	2.85	54.0	32,1	46,4	30,9	11,8	0,6	HES000112
32	16	0/-45	250	42.4	3.2	3.35	63.5	41,1	59,1	52,6	19,3	0,9	HES000113
40	10	0/-45	260	48.3	3.2	3.2	63.5	41,1	59,1	52,6	19,3	0,9	HES000114
50	10	0/-45	260	60.3	3	3	76.1	50,5	70,3	54,1	28,1	1,6	HES000115

2.5 Hatec Axial Expansion Joint AG

For heating and sanitary installations

All parts made of stainless steel 1.4571 / 1.4541 and 1.4301

Multi-ply bellows

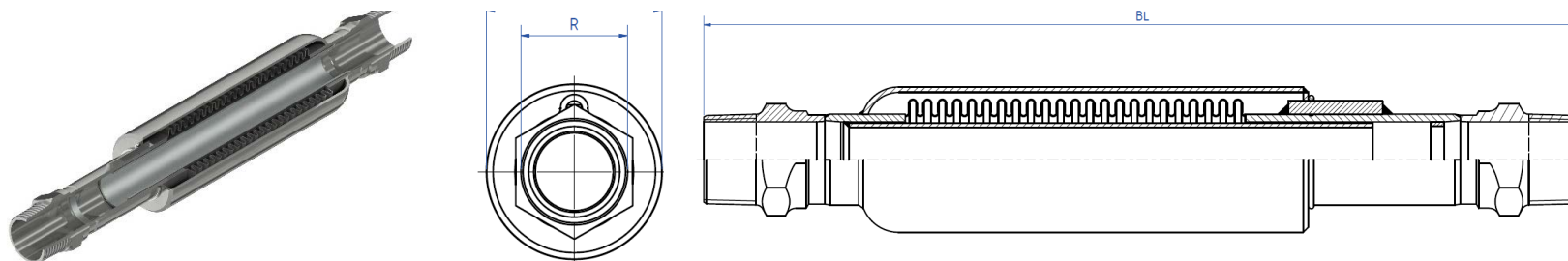
Both sides tapered male thread to EN 10226

With inner sleeve and outer protective tube

Prestressed design

Max. Operating temperature -30 ° to + 480 ° C

Max. Operating pressure 10 bar (note from + 120 ° C Pressure reduction)



DN	PN	Movement	Length	Threaded connection EN 10226-1	Outer protective tube	Bellows		Axial spring rate	Bellows- cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	R	D1	Di	Da	Ca	AB		
mm	bar	mm	mm	Zoll	mm	mm	mm	N/mm	cm ²	kg	
15	10	0/-45	300	½"	38.0	20	30,9	12,5	5,0	0,5	HES000165
20	10	0/-45	304	¾"	48.3	25,4	39,2	11,9	8,1	0,6	HES000166
25	10	0/-45	306	1"	54.0	32,1	46,4	30,9	11,8	0,7	HES000110
32	10	0/-45	310	1 ¼"	63.5	41,1	59,1	52,6	19,3	1,1	HES000167
40	10	0/-45	328	1 ½"	63.5	41,1	59,1	52,6	19,3	1,2	HES000168
50	10	0/-45	334	2"	76.1	50,5	70,3	54,1	28,1	1,8	HES000169

2.6 Hatec Axial Expansion Joint ALS - H / PN16

For heating installations

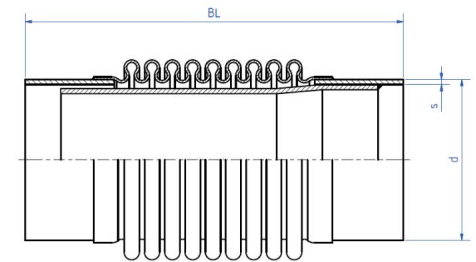
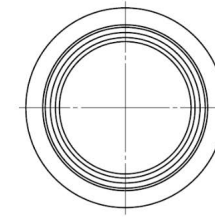
Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends carbon steel

Inner sleeve made of stainless steel 1.4301

Max. Operating temperature 120 ° C

Max. Operating pressure 16 bar



DN	PN	Movement	Length	Welding end		Bellows		Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	D	S*	Di	Da	Ca	AB		
mm	bar	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
40	16	25	270	48.3	2.6	41,1	59,1	53,1	19,8	1,1	HES000146
50	16	25	269	60.3	2.9	50,5	70,3	62,5	28,7	1,6	HES000100
65	16	25	269	76.1	2.9	65,6	87,9	69,7	46,3	1.9	HES000101
80	16	25	266	88.9	3.2	79,5	104,3	48,9	66,3	2,3	HES000102
100	16	25	265	114.3	3.6	99,6	127,2	43,8	101,0	2	HES000103
125	16	25	322	139.7	4	124,3	155,2	76,2	153,4	4,3	HES000147

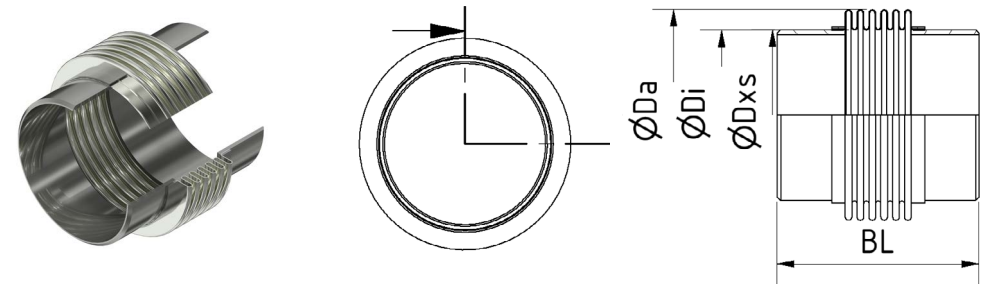
3.1 Hatec Axial Expansion Joint ANS / PN 2,5

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends of carbon steel

Available on request with protective tube and / or inner sleeve

Design in complete stainless steel available



DN	PN	Movement	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring rate	Bel-lows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	+/-lateral	BL	D	S*	Di	Da	C ax	C lat	AB	G	
mm	barü	mm	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
200	2,5	50	10	310	219,1	6,3	218	263	35,8	138	454,3	7,3	Hatec-ANS-0200-0025-100-0310-00
250	2,5	50	9	320	273	5	273	318	44	226	685,8	7,7	Hatec-ANS-0250-0025-100-0320-00
300	2,5	50	8	360	323,9	6	324	370	48,4	343	945,7	12,4	Hatec-ANS-0300-0025-100-0360-00
350	2,5	50	6	345	355,6	6	356	407	48	496	1143,1	13,3	Hatec-ANS-0350-0025-100-0345-00
400	2,5	50	5	325	406,4	6	407	469	40,5	744	1506,1	15,1	Hatec-ANS-0400-0025-100-0325-00
500	2,5	50	4,5	330	508	6	509	575	48,1	1256	2307,2	18,6	Hatec-ANS-0500-0025-100-0330-00
600	2,5	50	5	375	610	6	611	683	136	2784	3285,7	27,3	Hatec-ANS-0600-0025-100-0375-00
700	2,5	50	4	370	711	8	712	790	158,1	4652	4430,8	37,1	Hatec-ANS-0700-0025-100-0370-00
800	2,5	50	3	380	813	8	814	892	178	5995	5716	42,6	Hatec-ANS-0800-0025-100-0380-00
900	2,5	50	3	380	914	8	915	993	198,9	8382	7149,5	48	Hatec-ANS-0900-0025-100-0380-00
1000	2,5	56	3,5	400	1016	8	1016	1099	185,9	8644	8781,5	56	Hatec-ANS-1000-0025-112-0400-00
1200	2,5	56	3	430	1220	8	1221	1300	245,2	12000	12480,9	67,1	Hatec-ANS-1200-0025-112-0430-00

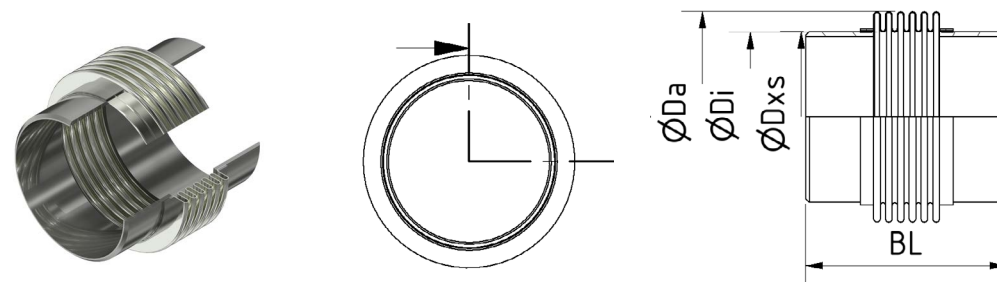
3.2 Hatec Axial Expansion Joint ANS / PN 6

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends of carbon steel

Available on request with protective tube and / or inner sleeve

Design in complete stainless steel possible



DN	PN	Movement	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	+/-lateral	BL	D	S*	Di	Da	C ax	C lat	AB	G	
mm	barü	mm	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
15	6	12	8	180	21,3	2,6	15	23	14	0,9	3	0,13	Hatec-ANS-0015-0060-024-0180-00
20	6	12,5	8	188	26,9	2,6	18	28	19	1,7	4	0,18	Hatec-ANS-0020-0060-025-0188-00
25	6	12,5	8	166	33,7	2,6	24	36	19	5,5	7	0,25	Hatec-ANS-0025-0060-025-0166-00
32	6	15	8	178	42,4	2,6	31	44	17	5	11	0,43	Hatec-ANS-0032-0060-030-0178-00
40	6	18	8	189	48,3	2,6	37	51	22	6,1	15	0,64	Hatec-ANS-0040-0060-036-0189-00
50	6	20	8	227	60,3	2,9	50	66	28	11,6	26	0,95	Hatec-ANS-0050-0060-040-0227-00
65	6	25	8	266	76,1	2,9	62	81	29	14,6	40	1,27	Hatec-ANS-0065-0060-050-0266-00
80	6	25	8	247	88,9	3,2	75	96	42	30,3	57	1,21	Hatec-ANS-0080-0060-050-0247-00
100	6	25	7	240	114,3	3,6	101	126	63	69,8	100	1,65	Hatec-ANS-0100-0060-050-0240-00
125	6	25	6	246	139,7	4	124	153	92	149	150	2,4	Hatec-ANS-0125-0060-050-0246-00
150	6	25	6	333	168,3	4,5	148	176	170	177	199	3,95	Hatec-ANS-0150-0060-050-0333-00

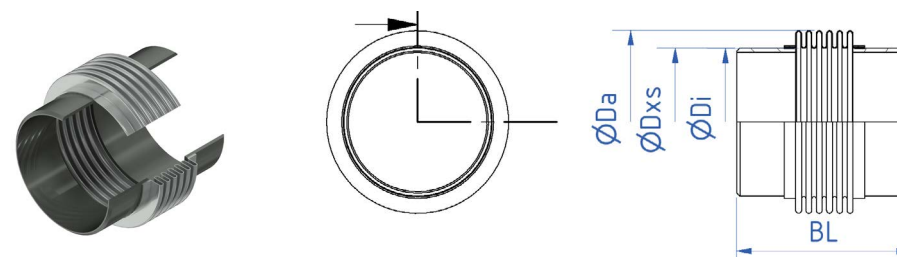
3.3 Hatec Axial Expansion Joint ANS / PN 16

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends of carbon steel

Available on request with protective tube and / or inner sleeve

Design in complete stainless steel is available



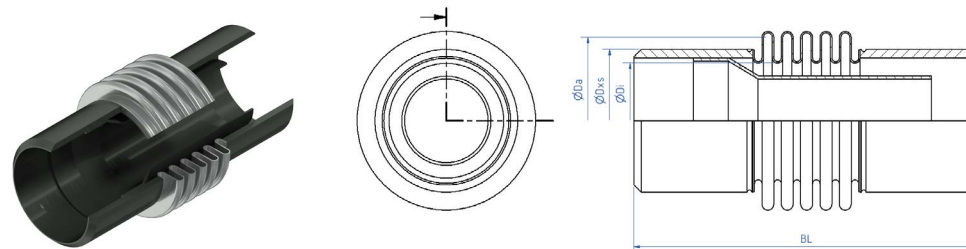
DN	PN	Movement	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	+/-lateral	BL	D	S*	Di	Da	C ax	C lat	AB		
mm	barü	mm	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
15	16	10	6	148	21,3	2,6	16	26	29	8,6	3	0,13	Hatec-ANS-0015-0160-020-0148-00
20	16	11	6	151	26,9	2,6	20	30	28	11,1	5	0,18	Hatec-ANS-0020-0160-022-0151-00
25	16	13	6	152	33,7	2,6	25	39	24	14,4	8	0,25	Hatec-ANS-0025-0160-026-0152-00
32	16	13	8	186	42,4	2,6	32	46	36	15,4	12	0,43	Hatec-ANS-0032-0160-026-0186-00
40	16	18	8	202	48,3	2,6	41	59	76	28,3	19	0,64	Hatec-ANS-0040-0160-036-0202-00
50	16	23	8	224	60,3	2,9	50	70	70	36,9	28	0,95	Hatec-ANS-0050-0160-046-0224-00
65	16	24	8	236	76,1	2,9	65	88	66	45,3	46	1,27	Hatec-ANS-0065-0160-048-0236-00
80	16	20	7	230	88,9	3,2	79	104	136	137	82	1,4	Hatec-ANS-0080-0160-040-0205-00
100	16	20	6	225	114,3	3,6	100	127	156	299	132	2,3	Hatec-ANS-0100-0160-040-0205-00
125	16	25	4	210	139,7	4	124	155	106	744	202	3,3	Hatec-ANS-0125-0160-050-0210-00
150	16	25	5	265	168,3	4,5	169	208	128	632	275,6	5	Hatec-ANS-0150-0160-050-0265-00
200	16	25	5	250	219,1	6,3	219	257	173	866	445	6,5	Hatec-ANS-0200-0160-050-0250-00
250	16	35	5	313	273	6,3	273	320	181	1307	691	12,6	Hatec-ANS-0250-0160-070-0295-00
300	16	35	4	335	323,9	7,1	324	371	211	2087	948	17,4	Hatec-ANS-0300-0160-070-0335-00
350	16	40	5	350	355,6	8	356	405	203	1973	1137	21	Hatec-ANS-0350-0160-080-0350-00
400	16	45	5	350	406,4	8	407	462	264	3315	1483	26,4	Hatec-ANS-0400-0160-090-0350-00
450	16	50	5	365	457	8	458	515	259	3364	1860	30,4	Hatec-ANS-0450-0160-100-0365-00
500	16	50	5	380	508	8	509	566	293	3923	2268	34,1	Hatec-ANS-0500-0160-100-0380-00
600	16	50	4	360	610	10	611	675	370	8924	3247	49,7	Hatec-ANS-0600-0160-100-0360-00

3.4 Hatec Axial Expansion Joint ALS / PN 16

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends carbon steel

Inner sleeve made of stainless steel 1.4301



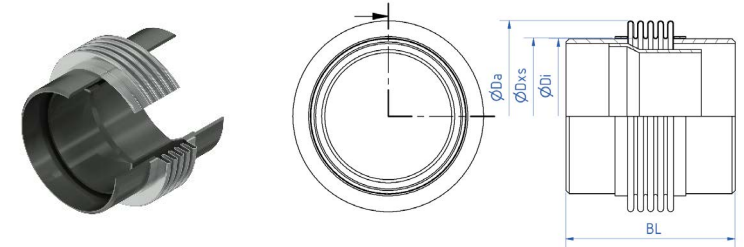
DN	PN	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	D	S*	Di	Da	Ca	Clat	AB		
mm	bar	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
15	16	12,5	173	21,3	2,6	16	26	15,3	2,9	3,4	0,3	Hatec-ALS EU-0015-0160-025-0173-00
15	16	25	262	21,3	2,6	16	26	7,8	0,4	3,4	0,4	Hatec-ALS EU-0015-0160-050-0262-00
15	16	37,5	365	21,3	2,6	16	26	5,2	0,1	3,4	0,5	Hatec-ALS EU-0015-0160-075-0365-00
15	16	50	454	21,3	2,6	16	26	3,9	0	3,4	0,6	Hatec-ALS EU-0015-0160-100-0454-00
20	16	12,5	156	26,9	2,6	20	32	14,7	8,5	5,2	0,3	Hatec-ALS EU-0020-0160-025-0156-00
20	16	25	229	26,9	2,6	20	32	7,6	1,1	5,2	0,4	Hatec-ALS EU-0020-0160-050-0229-00
20	16	37,5	315	26,9	2,6	20	32	5	0,3	5,2	0,5	Hatec-ALS EU-0020-0160-075-0315-00
20	16	50	388	26,9	2,6	20	32	3,8	0,1	5,2	0,6	Hatec-ALS EU-0020-0160-100-0388-00
25	16	12,5	156	33,7	2,6	25	39	23,6	20,9	8	0,6	Hatec-ALS EU-0025-0160-025-0156-00
25	16	25	232	33,7	2,6	25	39	11,8	2,5	8	0,7	Hatec-ALS EU-0025-0160-050-0232-00
25	16	37,5	318	33,7	2,6	25	39	7,9	0,7	8	0,8	Hatec-ALS EU-0025-0160-075-0318-00
25	16	50	394	33,7	2,6	25	39	5,9	0,3	8	0,9	Hatec-ALS EU-0025-0160-100-0394-00
32	16	12,5	157	42,4	2,6	32	46	27,2	34,6	12	0,6	Hatec-ALS EU-0032-0160-025-0157-00
32	16	25	234	42,4	2,6	32	46	13,6	4,2	12	0,8	Hatec-ALS EU-0032-0160-050-0234-00
32	16	37,5	321	42,4	2,6	32	46	9,1	1,2	12	1	Hatec-ALS EU-0032-0160-075-0321-00
32	16	50	398	42,4	2,6	32	46	6,8	0,5	12	1,1	Hatec-ALS EU-0032-0160-100-0398-00
40	16	12,5	161	48,3	2,6	41	59	51,2	87,2	19,2	0,7	Hatec-ALS EU-0040-0160-025-0161-00
40	16	25	245	48,3	2,6	41	59	25,6	9,9	19,2	1	Hatec-ALS EU-0040-0160-050-0245-00
40	16	37,5	336	48,3	2,6	41	59	17,1	2,9	19,2	1,2	Hatec-ALS EU-0040-0160-075-0336-00
40	16	50	420	48,3	2,6	41	59	12,8	1,2	19,2	1,4	Hatec-ALS EU-0040-0160-100-0420-00

3.4 Hatec Axial Expansion Joint ALS / PN 16

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel 1.4301



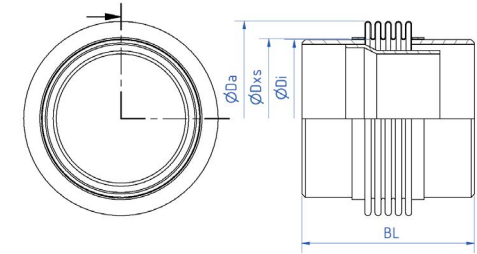
DN	PN	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring constant	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	D	S*	Di	Da	Ca	Clat	AB		
mm	bar	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
50	16	12,5	184	60,3	2,9	50	70	57	128,4	28,3	1	Hatec-ALS EU-0050-0160-025-0184-00
50	16	25	248	60,3	2,9	50	70	29,9	19,7	28,3	1,3	Hatec-ALS EU-0050-0160-050-0248-00
50	16	37,5	342	60,3	2,9	50	70	19,6	5,3	28,3	1,8	Hatec-ALS EU-0050-0160-075-0342-00
50	16	50	416	60,3	2,9	50	70	14,9	2,4	28,3	2	Hatec-ALS EU-0050-0160-100-0416-00
65	16	12,5	176	76,1	2,9	65	88	56	295	45	1,4	Hatec-ALS EU-0065-0160-025-0176-00
65	16	25	235	76,1	2,9	65	88	29,6	42,8	45	1,6	Hatec-ALS EU-0065-0160-050-0235-00
65	16	37,5	321	76,1	2,9	65	88	19,4	11,5	45	2,2	Hatec-ALS EU-0065-0160-075-0321-00
65	16	50	390	76,1	2,9	65	88	14,8	5,2	45	2,5	Hatec-ALS EU-0065-0160-100-0390-00
80	16	12,5	175	88,9	3,2	79	104	98,2	784,9	66	1,8	Hatec-ALS EU-0080-0160-025-0175-00
80	16	25	240	88,9	3,2	79	104	48,9	91,4	66	2,2	Hatec-ALS EU-0080-0160-050-0240-00
80	16	37,5	325	88,9	3,2	79	104	32,6	26,8	66	2,9	Hatec-ALS EU-0080-0160-075-0325-00
80	16	50	400	88,9	3,2	79	104	24,4	11,1	66	3,6	Hatec-ALS EU-0080-0160-100-0400-00
100	16	12,5	178	114,3	3,6	100	127	99,2	1058,7	101	1,9	Hatec-ALS EU-0100-0160-025-0178-00
100	16	25	238	114,3	3,6	100	127	52,9	162,8	101	2,4	Hatec-ALS EU-0100-0160-050-0238-00
100	16	37,5	326	114,3	3,6	100	127	34,4	42,8	101	3,2	Hatec-ALS EU-0100-0160-075-0326-00
100	16	50	396	114,3	3,6	100	127	26,4	19,2	101	3,9	Hatec-ALS EU-0100-0160-100-0396-00
125	16	12,5	173	139,7	4	124	155	177	3815,6	154	2,8	Hatec-ALS EU-0125-0160-025-0173-00
125	16	25	236	139,7	4	124	155	88,1	431,2	154	3,6	Hatec-ALS EU-0125-0160-050-0236-00
125	16	37,5	319	139,7	4	124	155	58,6	123,7	154	4,6	Hatec-ALS EU-0125-0160-075-0319-00
125	16	50	392	139,7	4	124	155	44	51,6	154	5,6	Hatec-ALS EU-0125-0160-100-0392-00

3.4 Hatec Axial Expansion Joint ALS / PN 16

Multi-ply bellows of stainless steel 1.4541 or 1.4571

Both welding ends of carbon steel

Inner sleeve made of stainless steel 1.4301



DN	PN	Movement	Length	Welding end		Bellows		Axial spring rate	Lateral spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
		+/-axial	BL	D	S*	Di	Da	Ca	Clat	AB		
mm	bar	mm	mm	mm	mm	mm	mm	N/mm	N/mm	cm ²	kg	
150	16	12,5	213	168,3	4,5	150	208	184,7	5760,2	219	4,2	Hatec-ALS EU-0150-0160-025-0213-00
150	16	25	267	168,3	4,5	150	208	91,9	641,3	219	5	Hatec-ALS EU-0150-0160-050-0267-00
150	16	37,5	340	168,3	4,5	150	208	61,1	182,2	219	6,2	Hatec-ALS EU-0150-0160-075-0340-00
150	16	50	414	168,3	4,5	150	208	45,8	74,8	219	7,2	Hatec-ALS EU-0150-0160-100-0414-00
200	16	12,5	219	219,1	6,3	196	231	316	7622	358	6,9	Hatec-ALS EU-0200-0160-025-0219-00
200	16	25	268	219,1	6,3	196	231	158	953	358	7,7	Hatec-ALS EU-0200-0160-050-0268-00
200	16	37,5	347	219,1	6,3	196	231	105	282	358	9,4	Hatec-ALS EU-0200-0160-075-0347-01
200	16	50	416	219,1	6,3	196	231	83	142	358	11,2	Hatec-ALS EU-0200-0160-100-0416-02
250	16	12,5	267	273	6,3	250	286	361	10809	564	10,4	Hatec-ALS EU-0250-0160-025-0267-00
250	16	25	334	273	6,3	250	286	201	1942	564	12,5	Hatec-ALS EU-0250-0160-050-0334-00
250	16	37,5	401	273	6,3	250	286	129	507	564	14,1	Hatec-ALS EU-0250-0160-075-0401-00
250	16	50	488	273	6,3	250	286	100	243	564	16,9	Hatec-ALS EU-0250-0160-100-0488-00
300	16	12,5	283	323,9	7,1	300	336	416	14309	795	14	Hatec-ALS EU-0300-0160-025-0283-00
300	16	25	353	323,9	7,1	300	336	231	2560	795	16,4	Hatec-ALS EU-0300-0160-050-0353-00
300	16	37,5	436	323,9	7,1	300	336	148	670	795	19	Hatec-ALS EU-0300-0160-075-0434-00
300	16	50	526	323,9	7,1	300	336	115	320	795	22,4	Hatec-ALS EU-0300-0160-100-0526-00

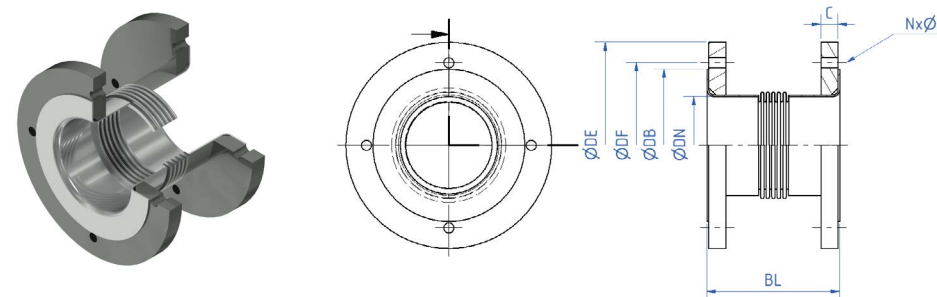
3.5 Hatec Axial Expansion Joint ANL / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides collar of 1.4541

Both sides loose flanges drilled acc.to PN in carbon steel

Stainless steel flanges or galvanized on request



DN	Movement	Length	Flanges		Bellows		Spring Constants	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	PN	DB	Di	Da	Ca	AB		
mm	mm	mm	bar	mm	mm	mm	N/mm	cm ²	kg	
15	10	60	Flansch PN 16	45	16	26	29	3	1,3	Hatec-ANL-0015-0160-020-0060-00
20	11	65		58	20	30	28	5	1,59	Hatec-ANL-0020-0160-022-0065-00
25	13	70		68	25	39	24	8	2,08	Hatec-ANL-0025-0160-026-0070-00
32	13	110		78	32	46	36	12	3,61	Hatec-ANL-0023-0160-026-0110-00
40	18	130		88	41	59	76	19	4,6	Hatec-ANL-0040-0160-036-0130-00
50	23	145		102	50	70	70	28	5,82	Hatec-ANL-0050-0160-046-0145-00
65	24	155		122	65	88	66	46	7,12	Hatec-ANL-0065-0160-048-0155-00
80	20	135		138	79	104	73	66	8,02	Hatec-ANL-0080-0160-040-0135-00
100	20	135		158	100	127	77	100	10,01	Hatec-ANL-0100-0160-040-0135-00
125	25	140		188	124	155	121	153	12,58	Hatec-ANL-0125-0160-050-0140-00
150	25	155		212	150	184	118	218	15,94	Hatec-ANL-0150-0160-050-0155-00
200	25	175		268	194	231	148	355	25,7	Hatec-ANL-0200-0160-050-0175-00
250	20	175		320	250	285	248	562	36,3	Hatec-ANL-0250-0160-040-0175-00
300	25	200		370	300	336	232	795	47,4	Hatec-ANL-0300-0160-050-0200-00

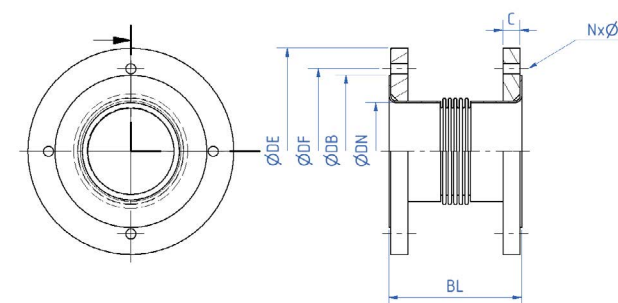
3.6 Hatec Axial Expansion Joint ANL 130 / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides collar of 1.4541

Both sides loose flanges drilled acc to PN in carbon steel

Stainless steel flanges or galvanized on request



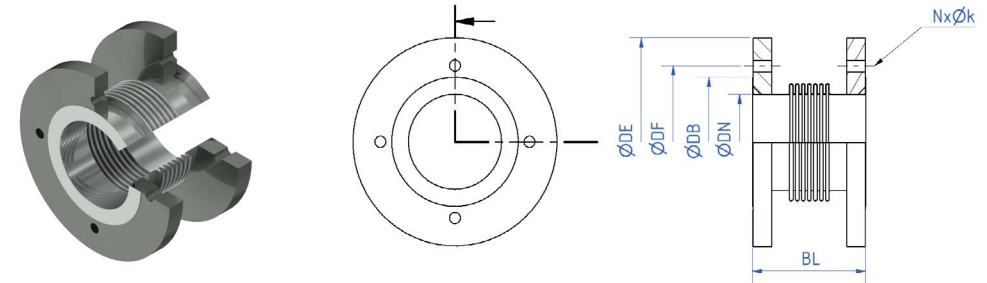
DN	Movement	Length	Flanges		Bellows		Spring Constants	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	PN	DB	Di	Da	Ca	AB		
mm	mm	mm	bar	mm	mm	mm	N/mm	cm ²	kg	
40	17	130	Flansch PN 16	88	41	59	67	19	4,6	Hatec-ANL-0040-0160-034-0130-00
50	19	130		102	50	70	72	28	5,75	Hatec-ANL-0050-0160-038-0130-00
65	17	130		122	65	88	74	46	6,95	Hatec-ANL-0065-0160-034-0130-00
80	18	130		138	79	104	63	66	7,99	Hatec-ANL-0080-0160-036-0130-00
100	18	130		158	100	127	68	100	10,06	Hatec-ANL-0100-0160-036-0130-00
125	20	130		188	124	155	62	153	12,45	Hatec-ANL-0125-0160-040-0130-00
150	18	130		212	150	184	69	218	15,68	Hatec-ANL-0150-0160-036-0130-00
200	13	130		268	195	231	236	356	25	Hatec-ANL-0200-0160-026-0130-00
250	12	130		320	250	285	396	562	35,5	Hatec-ANL-0250-0160-024-0130-00
300	12	130		370	300	336	435	794	46	Hatec-ANL-0300-0160-024-0130-00

3.7 Hatec Axial Expansion Joint ANB 130 / PN 16

Bellows with both sides collar of stainless steel 1.4541

Both sides loose flanges drilled acc. to PN in carbon steel, galvanized

Stainless steel flanges on request



DN	Movement	Length	Flanges	Rand	Bellows		Spring Constants	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	DB	Di	Da	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
80	13	130	Flange PN 16	121	90	116,8	125	82,9	8,2	Hatec-ANB-0080-0160-026-0130-00
100	13	130		143	113	1445,4	207	129,3	9,5	Hatec-ANB-0100-0160-026-0130-00
125	15	130		174	139	175,4	169	191,9	12	Hatec-ANB-0125-0160-030-0130-00
150	13	130		203	162	199	236	253,3	13	Hatec-ANB-01500160-026-0130-00
200	18	130		259	209	254	239	416,3	22	Hatec-ANB-0200-0160-036-0130-00
250	14	130		316	262	307	385	629,7	26	Hatec-ANB-0250-0160-028-0130-00
300	16	130		367	313	362	465	885,4	36	Hatec-ANB-0300-0160-032-0130-00
350	8	130		406	352	414,8	1583	1142,3	67	Hatec-ANB-0350-0160-016-0130-00

3.8 Hatec Axial Expansion Joint DX1S / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

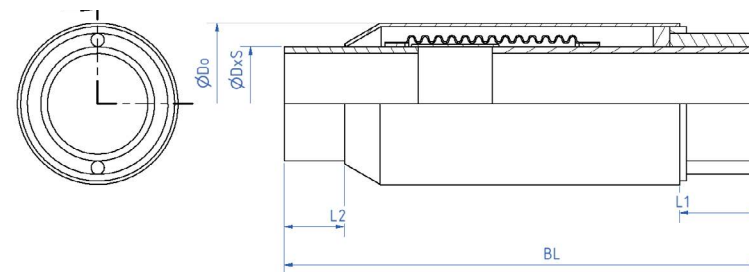
Outer protective tube made of carbon steel

Prestressed

With lifting and torsion protection

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protective tube	Axial spring constant	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
25	+0/-100	610	33,7	2,6	108	40	76,1	29,2	19,3	5,9	Hatec-DX1S-025-16-100-0610-00
32	+0/-100	610	42,4	2,6	113	60	88,9	30,5	28,1	7,2	Hatec-DX1S-032-16-100-0610-00
40	+0/-100	610	48,3	5	113	60	88,9	30,5	28,1	8,6	Hatec-DX1S-040-16-100-0610-00
50	+0/-100	610	60,3	2,9	133	60	101,6	33,1	45,6	9	Hatec-DX1S-050-16-100-0610-00
65	+0/-100	610	76,1	2,9	106	55	127	53,2	46,5	11,7	Hatec-DX1S-065-16-100-0610-00
80	+0/-100	610	88,9	3,2	113	40	139,7	57,6	94,7	12,7	Hatec-DX1S-080-16-100-0610-00
	+0/-150	790			157	39		39,3		16,1	Hatec-DX1S-080-16-150-0790-00
100	+0/-125	700	114,3	3,6	137,5	64,5	168,3	42,4	149,6	20,6	Hatec-DX1S-100-16-125-0700-00
	+0/-155	810			178,5	68,5		35,8		23	Hatec-DX1S-100-16-155-0810-00
108	+0/-125	700	108	3,6	137,5	64,5	168,3	42,4	149,6	20,5	Hatec-DX1S-108-16-125-0700-00
	+0/-155	810			178,5	68,5		35,8		22,9	Hatec-DX1S-108-16-155-0810-00
125	+0/-125	700	139,7	4	137,5	49,5	197,3	46,6	212	25,6	Hatec-DX1S-125-16-125-0700-00
	+0/-160	815			172	63		39,2		28,7	Hatec-DX1S-125-16-160-0815-00
133	+0/-125	700	133	4	137,5	49,5	197,3	46,6	212	25,5	Hatec-DX1S-133-16-125-0700-00
	+0/-160	815			172	63		39,2		28,6	Hatec-DX1S-133-16-160-0815-00

3.8 Hatec Axial Expansion Joint DX1S / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

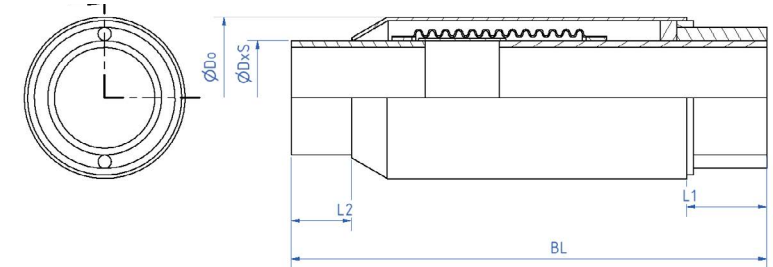
Outer protective tube made of carbon steel

Prestressed

With lifting and torsion protection

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protective tube	Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
150	+0/-125	700	168,3	4,5	154,5	49,5	229,8	79,5	307	35,3	Hatec-DX1S-150-16-125-0700-00
	+0/-165	820			180,5	49,5		61,5		41,1	Hatec-DX1S-150-16-165-0820-00
159	+0/-125	700	159	4,5	134,5	49,5	229,8	79,5	307	36,4	Hatec-DX1S-159-16-125-0700-00
	+0/-165	820			174,5	40,5		61,5		41,9	Hatec-DX1S-159-16-165-0820-00
200	+0/-125	725	219,1	6,3	150,5	79,5	296,7	81,4	519,6	55	Hatec-DX1S-200-16-125-0725-00
	+0/-170	880			198	80		60		65,1	Hatec-DX1S-200-16-170-0880-00
250	+0/-125	725	273	6,3	150,5	66,5	355,6	84,3	754,8	73,9	Hatec-DX1S-250-16-125-0725-00
	+0/-170	880			226	57		65,5		85,9	Hatec-DX1S-250-16-170-0680-00
300	+0/-125	760	323,9	7,1	180,5	69,5	420	131,2	1096,2	98,2	Hatec-DX1S-300-16-125-0760-00
	+0/-190	975			265	70		93,1		120,1	Hatec-DX1S-300-16-190-0975-00
350	+0/-125	785	355,8	8	246,5	66,5	438	191,9	1195,8	105,9	Hatec-DX1S-350-16-125-0785-00
	+0/-190	975			243	117		124,2		131,8	Hatec-DX1S-350-16-190-0975-00
400	+0/-125	785	406,4	8	195,5	115,5	508	207,9	1582,7	129,7	Hatec-DX1S-400-16-125-0785-00
	+0/-200	985			238	116		132,1		162,1	Hatec-DX1S-400-16-200-0985-00

3.8 Hatec Axial Expansion Joint DX1S / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

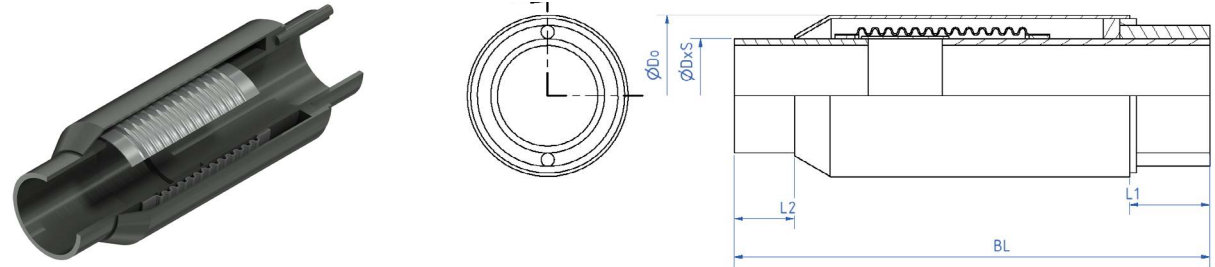
Outer protective tube made of carbon steel

Prestressed design

With lifting and Torsions protection

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protec- tive tube	Axial spring rate	Bellows- cross section- al area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
426	+0/-125	785	426	8	191,5	115,5	522,8	188,8	1737,2	135,2	Hatec-DX1S-426-16-125-0785-00
	+0/-200	985			246	116		132,6		165,8	Hatec-DX1S-426-16-200-0985-00
450	+0/-125	785	457	8	195,5	115,5	550	271,2	1966,6	144,2	Hatec-DX1S-450-16-125-0785-00
	+0/-200	985			243	116		174,4		180,1	Hatec-DX1S-450-16-200-0985-00
500	+0/-125	785	508	8	195,5	115,5	610	231,9	2397,5	158,7	Hatec-DX1S-500-16-125-0785-00
	+0/-200	985			245	116		142,7		197,2	Hatec-DX1S-500-16-200-0985-00
530	+0/-125	785	530	8	225,5	79,5	636	250,9	2718,2	171,4	Hatec-DX1S-530-16-125-0785-00
	+0/-200	985			216	116		154,4		216,3	Hatec-DX1S-530-16-200-0985-00
600	+0/-125	785	610	10	195,5	115,5	711	223,7	3399,5	215,2	Hatec-DX1S-600-16-125-0785-00
	+0/-200	985			245	116		154,8		264,9	Hatec-DX1S-600-16-200-0985-00

3.9 Hatec Axial Expansion Joint DX1S / PN 25

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

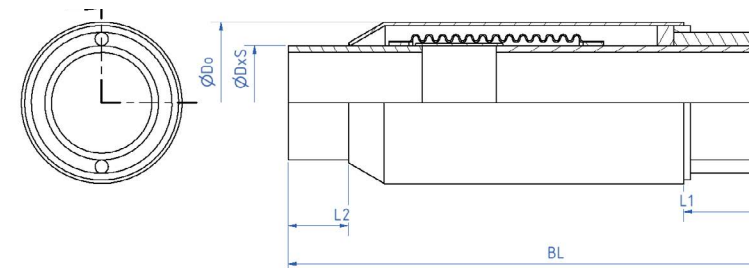
Outer protective tube made of carbon steel

Prestressed design

With lifting and torsion assurance

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protective tube	Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
25	+0/-90	610	33,7	2,6	141	40	76,1	32,9	19,3	5,5	Hatec-DX1S-025-25-090-0610-00
32	+0/-90	610	33,7	2,6	142	60	76,1	34	19,3	6,9	Hatec-DX1S-032-25-090-0610-00
40	+0/-90	610	48,3	5	142	60	88,9	34	28,7	8,2	Hatec-DX1S-040-25-090-0610-00
40	+0/-110	700	48,3	5	176	60	88,9	27,7	28,7	9,4	Hatec-DX1S-040-25-110-0700-00
50	+0/-90	610	60,3	2,9	147	70	102	36,6	45,6	9	Hatec-DX1S-050-25-090-0610-00
50	+0/-110	700	60,3	2,9	190	70	102	30,5	45,6	9,9	Hatec-DX1S-050-25-110-0700-00
65	+0/-90	620	76,1	3,2	97	40	127	59,1	81,4	12,6	Hatec-DX1S-065-25-090-0620-00
65	+0/-110	800	76,1	3,2	163	70	127	46,1	81,4	14,9	Hatec-DX1S-065-25-110-0800-00
80	+0/-90	610	88,9	3,2	116	55	139,7	51,4	94,7	13,3	Hatec-DX1S-080-25-090-0610-00
80	+0/-110	800	88,9	3,2	220	75	139,7	41,5	94,7	15,8	Hatec-DX1S-080-25-110-0800-00
100	+0/-90	700	114,3	3,6	144	108	168,3	72	151,1	20,5	Hatec-DX1S-100-25-090-0700-00
100	+0/-120	800	114,3	3,6	162	108	168,3	54,4	151,1	23,6	Hatec-DX1S-100-25-120-0800-00
108	+0/-90	700	108	3,6	144	108	168,3	72	151,1	20,5	Hatec-DX1S-108-25-090-0700-00
108	+0/-120	800	108	3,6	162	108	168,3	54,4	151,1	23,5	Hatec-DX1S-108-25-120-0800-00
125	+0/-90	700	139,7	4	116	108	197,3	91,3	211,8	27,8	Hatec-DX1S-125-25-090-0700-00
125	+0/-120	800	139,7	4	141	88	197,3	68	211,8	32,2	Hatec-DX1S-125-25-120-0800-00

3.9 Hatec Axial Expansion Joint DX1S / PN 25

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

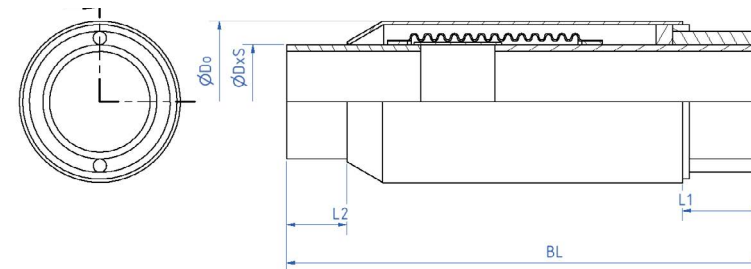
Outer protective tube made of carbon steel

Prestressed design

With lifting and Torsions protection

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protective tube	Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
133	+0/-90	700	133	4	116	108	197,3	91,3	211,8	25,8	Hatec-DX1S-133-25-090-0700-00
133	+0/-120	800	133	4	141	88	197,3	68	211,8	29,7	Hatec-DX1S-133-25-120-0800-00
150	+0/-90	700	168,3	4,5	140	88	229,8	114,4	304	34	Hatec-DX1S-150-25-090-0700-00
150	+0/-120	800	168,3	4,5	158	68	229,8	85,8	304	39,5	Hatec-DX1S-150-25-120-0800-00
159	+0/-90	700	159	4,5	120	88	229,8	114,4	304	35	Hatec-DX1S-159-25-090-0700-00
159	+0/-120	800	159	4,5	138	68	229,8	85,8	304	40,4	Hatec-DX1S-159-25-120-0800-00
200	+0/-90	760	219,1	6,3	188	100	296,7	162,8	513,1	55,9	Hatec-DX1S-200-25-090-0760-00
200	+0/-120	860	219,1	6,3	219	100	296,7	132,3	513,1	62,5	Hatec-DX1S-200-25-120-0860-00
250	+0/-90	760	273	6,3	214	107	355,6	236,9	750,2	74,9	Hatec-DX1S-250-25-090-0760-00
250	+0/-125	860	273	6,3	240,5	106,5	355,6	173,7	750,2	84,5	Hatec-DX1S-250-25-125-0860-00
300	+0/-90	760	323,9	8	213	120	420	302,2	1100,9	99,9	Hatec-DX1S-300-25-090-0760-00
300	+0/-140	860	323,9	8	211	90	420	186	1100,9	118,3	Hatec-DX1S-300-25-140-0860-00
350	+0/-90	850	355,6	8	329	117	438	320,2	1198,3	105,7	Hatec-DX1S-350-25-090-0850-00
350	+0/-140	950	355,6	8	314	117	438	197,1	1198,3	124	Hatec-DX1S-350-25-140-0950-00
400	+0/-90	850	406,4	8	330	116	508	425,9	1569,3	129,1	Hatec-DX1S-400-25-090-0850-00
400	+0/-140	950	406,4	8	327	116	508	271	1569,3	150	Hatec-DX1S-400-25-140-0950-00

3.9 Hatec Axial Expansion Joint DX1S / PN 25



Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

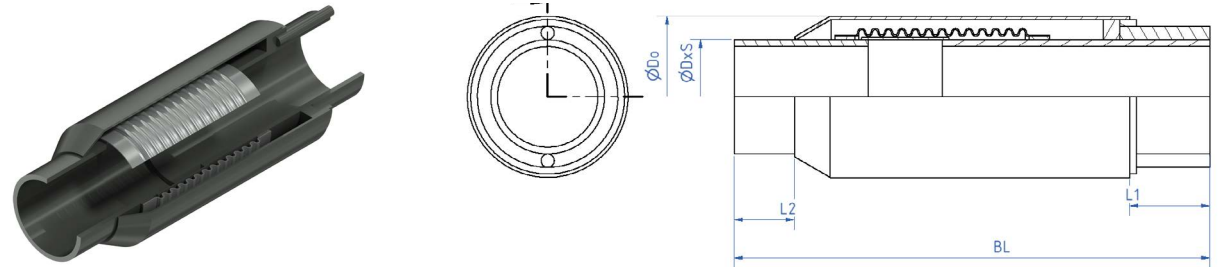
Outer protective tube made of carbon steel

Prestressed design

With lifting and Torsion protection

Available on request with fixed flanges PN 25 / ANSI 300 lbs

Warning: pretensioner must be removed before commissioning!



DN	Movement	Length	Welding end				Outer Protective tube	Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	L1	L2	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
426	+0/-90	850	426	8	330	116	519,2	382,2	1743,1	134,1	Hatec-DX1S-426-25-090-0850-00
426	+0/-140	950	426	8	305	116	519,2	243,2	1743,1	157,9	Hatec-DX1S-426-25-140-0950-00
450	+0/-90	875	457	10	353	116	550	486,5	1972,9	164,8	Hatec-DX1S-450-25-090-0875-00
450	+0/-140	950	457	10	322	116	550	334,9	1972,9	185,9	Hatec-DX1S-450-25-140-0950-00
500	+0/-90	875	508	10	340	116	610	442	2407,9	189,7	Hatec-DX1S-500-25-090-0875-00
500	+0/-140	950	508	10	303	116	610	309,4	2407,9	214	Hatec-DX1S-500-25-140-0950-00
530	+0/-90	875	530	8	391	80	636	250,9	2713,6	181,6	Hatec-DX1S-530-25-090-0875-00
530	+0/-140	950	530	8	325	116	636	154,4	2713,6	205,9	Hatec-DX1S-530-25-140-0950-00
600	+0/-90	875	610	11	351	116	711	437,9	3411,9	241,2	Hatec-DX1S-600-25-090-0875-00
600	+0/-140	950	610	11	319	116	711	306,5	3411,9	271,9	Hatec-DX1S-600-25-140-0950-00

3.10 Hatec Axial Expansion Joint RXA / PN 16

Multi-ply bellows of stainless steel 1.4541

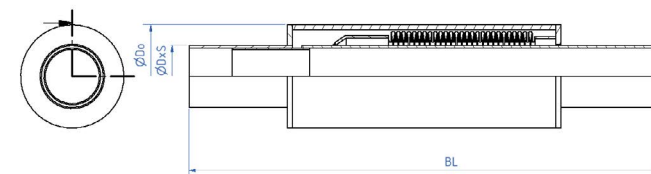
Externally pressurized

Both sides welding ends of carbon steel

Inner sleeve made of stainless steel

Outer protective tube made of carbon steel

Available on request with fixed flanges PN 16 / ANSI 150 LB (type RXAF)



DN	Movement	Length	Welding end		Outer protective tube	Axial spring rate	Bellows-cross sectional area	Weight	Hatec-Article-Number
	+/-axial	BL	D	S*	Do	Ca	AB		
mm	mm	mm	mm	mm	mm	N/mm	cm ²	kg	
15	+10/-70	525	21,3	2,6	60,3	7	8	2,6	Hatec-RXA-0015-0160-080-0525-00
20	+10/-70	525	26,9	2,6	76,1	8,3	11,9	4	Hatec-RXA-0020-0160-080-0525-00
25	+10/-70	525	33,7	2,6	88,9	15	19	4,8	Hatec-RXA-0025-0160-080-0525-00
32	+10/-70	525	42,4	2,6	101,6	15,8	27,7	6	Hatec-RXA-0032-0160-080-0525-00
40	+10/-70	525	48,3	2,6	114,3	17,2	45	7,3	Hatec-RXA-0040-0160-080-0525-00
50	+10/-70	525	60,3	2,9	114,3	17,2	45	7,5	Hatec-RXA-0050-0160-080-0525-00
65	+10/-70	525	76,1	2,9	127	28,4	66	10	Hatec-RXA-0065-0160-080-0525-00
80	+10/-70	525	88,9	3,2	152	31,3	100,6	12,5	Hatec-RXA-0080-0160-080-0525-00
100	+10/-70	525	114,3	3,6	177,8	48,3	152,7	15	Hatec-RXA-0100-0160-080-0525-00
125	+10/-70	525	139,7	3,6	219,1	52,7	217,7	25,3	Hatec-RXA-0125-0160-080-0525-00
150	+10/-70	525	168,3	4,5	273	78	287,3	29	Hatec-RXA-0150-0160-080-0525-00
200	+10/-70	525	219,1	6,3	324	77,1	472,5	45	Hatec-RXA-0200-0160-080-0525-00
250	+10/-70	525	273	6	406	139	710,4	60	Hatec-RXA-0250-0160-080-0525-00
300	+10/-70	525	324	6	406	151	968,9	70	Hatec-RXA-0300-0160-080-0525-00

4.1 Hatec Angular Expansion Joint WHS / PN 10 / PN 16



Multi-ply bellows of stainless steel 1.4541

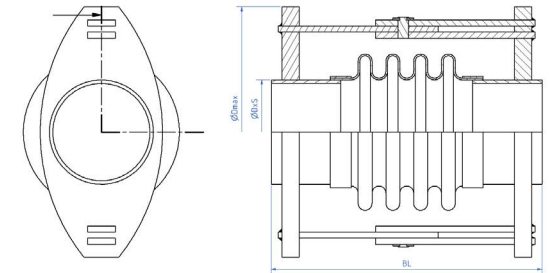
Both sides welding ends carbon steel

Outer gimbal restraints of carbon steel estrain with bolts

Suitable for angular movement around one axis

Available on request with inner sleeve and / or fixed flanges

PN 10 or PN 16 / ANSI 150 lbs



DN	PN	Angle	Length	Welding end		Width	Weight				Hatec-Article-Number
		°	BL	D	S	Dmax		C alfa	Cr	Cp	
mm	mm	mm	mm	mm	mm	mm	kg	Nm/deg	Nm/bar	Nm/bar/deg	
200	10	15	468	219,1	6,3	400	39,8	28,6	6,7	1,92	Hatec-WHS-0200-0100-030-0468-00
250	10	13	439	273	6,3	450	58,8	41,7	10,3	2,38	Hatec-WHS-0250-0100-026-0439-00
300	10	13	464	323,9	10	520	75,9	74,3	17,8	3,98	Hatec-WHS-0300-0100-026-0464-00
40	16	20	262	48,3	3,2	150	3	0,7	0,1	0,04	Hatec-WHS-0040-0160-040-0262-00
50	16	20	278	60,3	2,9	160	4,2	0,8	0,3	0,06	Hatec-WHS-0050-0160-040-0278-00
65	16	18	288	76,1	2,9	190	5,4	1,4	0,4	0,09	Hatec-WHS-0065-0160-036-0288-00
80	16	18	316	88,9	3,2	210	8,4	3,4	0,7	0,28	Hatec-WHS-0080-0160-036-0316-00
100	16	15	337	114,3	3,6	270	14	7,9	1,5	0,44	Hatec-WHS-0100-0160-030-0337-00
125	16	18	362	139,7	4	310	23	11,5	2,9	0,69	Hatec-WHS-0125-0160-036-0362-00
150	16	17	372	168,3	4	370	36,2	21,7	4,2	1,07	Hatec-WHS-0150-0160-034-0372-00
200	16	13	452	219,1	6,3	400	44,2	32,2	6,7	1,72	Hatec-WHS-0200-0160-026-0452-00
250	16	13	446	273	6,3	470	70,1	56	15,5	2,53	Hatec-WHS-0250-0160-026-0446-00
300	16	11	446	323,9	10	520	81,4	84,9	21,4	3,49	Hatec-WHS-0300-0160-022-0446-00

4.2 Hatec Angular Expansion Joint WHS / PN 25

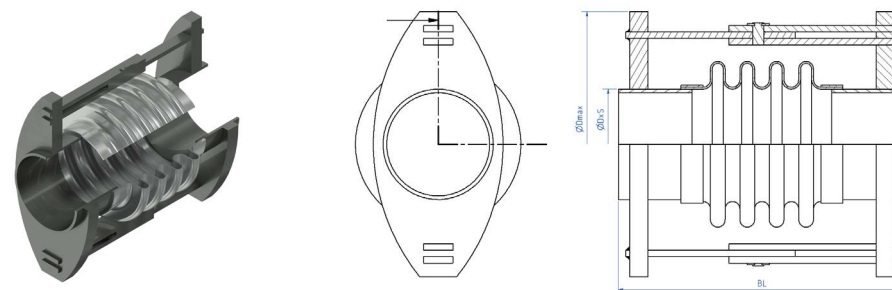
Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Outer gimbal restraints of carbon steel estrain with bolts

Suitable for angular movement around one axis

Available on request with inner sleeve and / or fixed flanges PN 25 / ANSI 300 lbs



DN	PN	Angle	Length	Welding end		Width	Weight				Hatec-Article-Number
		+/-	BL	D	S	Dmax		C alfa	Cr	Cp	
mm	mm	°	mm	mm	mm	mm	kg	Nm/deg	Nm/bar	Nm/bar/deg	
40	25	20	262	48,3	3,2	150	3	0,7	0,1	0,04	Hatec-WHS-0040-0250-040-0262-00
50	25	16	280	60,3	2,9	160	4,6	1	0,3	0,05	Hatec-WHS-0050-0250-032-0280-00
65	25	14	282	76,1	2,9	190	5,8	1,6	0,4	0,08	Hatec-WHS-0065-0250-028-0282-00
80	25	17	333	88,9	3,2	210	10,2	5,5	0,7	0,32	Hatec-WHS-0080-0250-034-0333-00
100	25	15	337	114,3	3,6	270	16	7,9	1,5	0,44	Hatec-WHS-0100-0250-030-0337-00
125	25	14	335	139,7	4	310	25,4	14,8	2,9	0,54	Hatec-WHS-0125-0250-028-0335-00
150	25	14	355	168,3	4	370	40,4	24,8	4,2	0,93	Hatec-WHS-0150-0250-028-0355-00
200	25	10	467	219,1	6,3	410	51,3	55,1	8,5	1,95	Hatec-WHS-0200-0250-020-0467-00
250	25	12	455	273	6,3	500	94,9	80,8	15,5	2,7	Hatec-WHS-0250-0250-024-0455-00
300	25	10	454	323,9	10	520	96,9	106,6	21,5	3,72	Hatec-WHS-0300-0250-020-0454-00

4.3 Hatec Kardan Expansion Joint WRS / PN 10 / PN 16

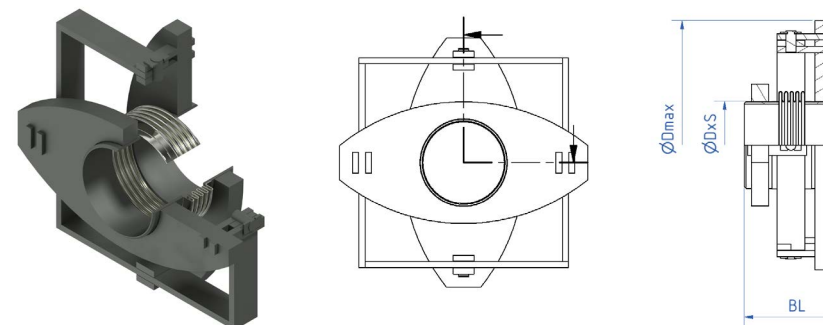
Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Outer cardanic restraints made of carbon steel

Suitable for angular movement around two axes

Available on request with inner sleeve and / or fixed flanges PN 10 or PN 16 / ANSI 150 lbs



DN	PN	Angle	Length	Welding end		Width	Weight				Hatec-Article-Number
		+/-	BL	D	S	Dmax		C alfa	Cr	Cp	
mm	mm	°	mm	mm	mm	mm	kg	Nm/deg	Nm/bar	Nm/bar/deg	
200	10	15	468	219,1	6,3	400	51,3	28,6	6,7	1,92	Hatec-WRS-0200-0100-030-0468-00
250	10	13	439	273	6,3	450	73,8	41,7	10,3	2,38	Hatec-WRS-0250-0100-026-0439-00
300	10	13	464	323,9	10	520	95,5	74,3	17,8	3,98	Hatec-WRS-0300-0100-026-0464-00
40	16	20	262	48,3	3,2	150	3,6	0,7	0,1	0,04	Hatec-WRS-0040-0160-040-0262-00
50	16	20	278	60,3	2,9	160	5,1	0,8	0,3	0,06	Hatec-WRS-0050-0160-040-0278-00
65	16	18	288	76,1	2,9	190	6,8	1,4	0,4	0,09	Hatec-WRS-0065-0160-036-0288-00
80	16	18	316	88,9	3,2	210	10,5	3,4	0,7	0,28	Hatec-WRS-0080-0160-036-0316-00
100	16	15	337	114,3	3,6	270	17,3	7,9	1,5	0,44	Hatec-WRS-0100-0160-030-0337-00
125	16	18	362	139,7	4	310	29,7	11,5	2,9	0,69	Hatec-WRS-0125-0160-036-0362-00
150	16	17	372	168,3	4	370	43,7	21,7	4,2	1,07	Hatec-WRS-0150-0160-034-0372-00
200	16	13	452	219,1	6,3	400	55,7	32,2	6,7	1,72	Hatec-WRS-0200-0160-026-0452-00
250	16	13	446	273	6,3	470	90,1	56	15,5	2,53	Hatec-WRS-0250-0160-026-0446-00
300	16	11	446	323,9	10	520	115,4	84,9	21,4	3,49	Hatec-WRS-0300-0160-022-0446-00

4.4 Hatec Kardan Expansion Joint WRS / PN 25

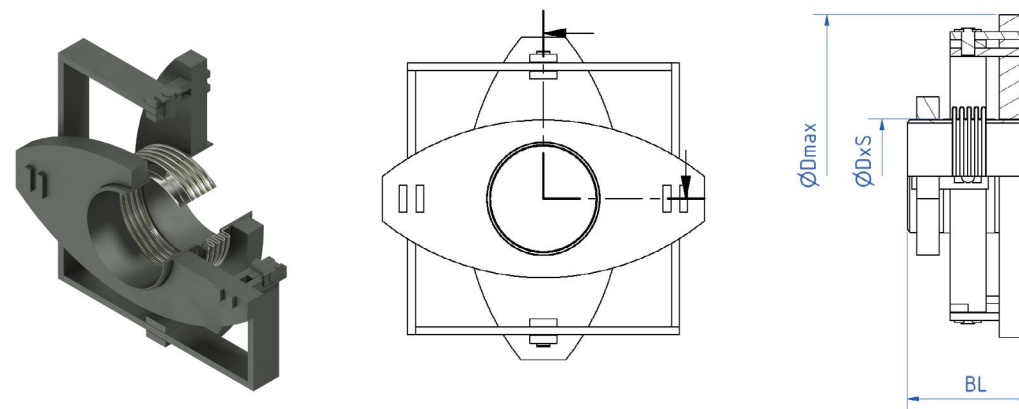
Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Outer cardanic restraints made of carbon steel

Suitable for angular movement around two axes

Available on request with inner sleeve and / or fixed flanges PN 25 / ANSI 300 lbs



DN	PN	Angle	Length	Welding end		Width	Weight				Hatec-Article-Number
		+/-	BL	D	S	Dmax		C alfa	Cr	Cp	
mm	mm	°	mm	mm	mm	mm	kg	Nm/deg	Nm/bar	Nm/bar/deg	
40	25	20	262	48,3	3,2	150	3,6	0,7	0,1	0,04	Hatec-WRS-0040-0250-040-0262-00
50	25	16	280	60,3	2,9	160	5,5	1	0,3	0,05	Hatec-WRS-0050-0250-032-0280-00
65	25	14	282	76,1	2,9	190	7,2	1,6	0,4	0,08	Hatec-WRS-0065-0250-028-0282-00
80	25	17	333	88,9	3,2	210	12,3	5,5	0,7	0,32	Hatec-WRS-0080-0250-034-0333-00
100	25	15	337	114,3	3,6	270	19,2	7,9	1,5	0,44	Hatec-WRS-0100-0250-030-0337-00
125	25	14	335	139,7	4	310	32,2	14,8	2,9	0,54	Hatec-WRS-0125-0250-028-0335-00
150	25	14	355	168,3	4	370	49,1	24,8	4,2	0,93	Hatec-WRS-0150-0250-028-0355-00
200	25	10	467	219,1	6,3	410	66	55,1	8,5	1,95	Hatec-WRS-0200-0250-020-0467-00
250	25	12	455	273	6,3	500	124,7	80,8	15,5	2,7	Hatec-WRS-0250-0250-024-0455-00
300	25	10	454	323,9	10	520	136,8	106,6	21,5	3,72	Hatec-WRS-0300-0250-020-0454-00

5.1 Hatec Lateral Expansion Joint LZS / PN 10

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

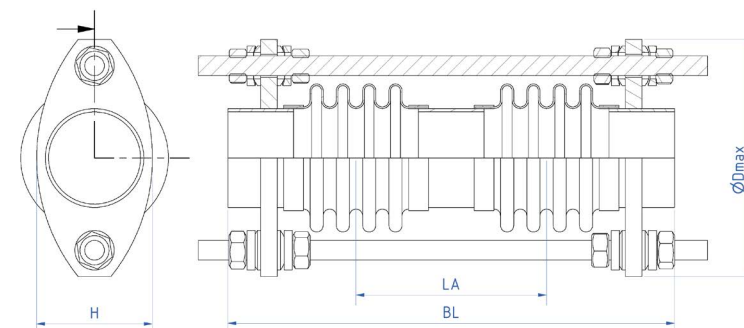
Welded intermediate pipe of carbon steel

Outer balljoint restrains of carbon steel

With 2 tie rods

With or without inner sleeve made of stainless steel

Suitable for lateral movements in circular planes



DN	PN	Lateral	Length	Welding end		Width	Weight			Adjusting Rates		Bellows center distance	Hatec-Article-Number
		+/-	BL	D	S	Dmax		H	Clat	Cp	Cr	L1	
mm	mm	mm	mm	mm	mm	mm	kg	mm	N/mm	N/bar/mm	N/bar	mm	
200	10	20	505	219,1	6,3	400	40,8	320	115,9	1,8	131,2	143	Hatec-LZS-0200-0100-040-0505-R1
200	10	50	700	219,1	6,3	400	54	320	23,3	0,6	86,3	338	Hatec-LZS-0200-0100-100-0700-00
250	10	20	540	273	7,1	430	46,5	370	129,4	1,9	138,9	189	Hatec-LZS-0250-0100-040-0540-00
250	10	50	780	273	7,1	430	64,1	370	27,9	0,6	89,9	429	Hatec-LZS-0250-0100-100-0780-00
300	10	20	563	323,9	10	500	73,1	430	245,6	2,9	195,4	179	Hatec-LZS-0300-0100-040-0563-00
300	10	50	795	323,9	10	500	93,4	430	53	1,0	127,8	411	Hatec-LZS-0300-0100-100-0795-00

5.2 Hatec Lateral Expansion Joint LZS / PN 16

Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

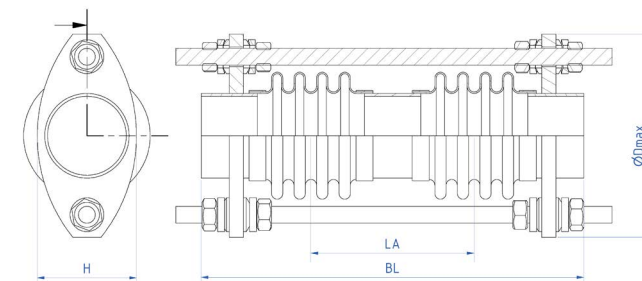
Welded intermediate pipe of carbon steel

Outer ball joint restrains of carbon steel

With 2 tie rods

With or without inner sleeve made of stainless steel

Suitable for lateral movement in circular planes



DN	PN	Lateral	Length	Welding end		Width	Weight	Height				Bel-lows-center distance	Hatec-Article-Number
		+/-	BL	D	S	Dmax		H	Clat	Cp	Cr	L1	
mm	mm	mm	mm	mm	mm	mm	kg	mm	N/mm	N/bar/mm	N/bar	mm	
40	16	24	360	48,3	3,2	130	3,3	110	5,9	0,06	2,9	150	Hatec-LZS-0040-0160-048-0360-00
40	16	100	750	48,3	3,2	130	6,1	110	0,5	0,01	1,3	540	Hatec-LZS-0040-0160-200-0750-00
50	16	25	400	60,3	2,9	160	4,8	120	5,9	0,09	4,7	541	Hatec-LZS-0050-0160-050-0400-00
50	16	100	780	60,3	2,9	160	8,3	120	0,5	0,02	2,1	160	Hatec-LZS-0050-0160-200-0780-00
65	16	25	420	76,1	2,9	180	6,4	140	8	0,12	7,1	180	Hatec-LZS-0065-0160-050-0420-00
65	16	80	760	76,1	2,9	180	10,2	140	1	0,03	3,5	520	Hatec-LZS-0065-0160-160-0760-00
80	16	25	480	88,9	4	210	8,9	150	17,8	0,20	10,5	196	Hatec-LZS-0080-0160-050-0480-00
80	16	80	850	88,9	4	210	14,4	150	2,3	0,05	5,4	566	Hatec-LZS-0080-0160-160-0850-00
100	16	25	510	114,3	4	260	15,6	200	18,9	0,27	16,2	220	Hatec-LZS-0100-0160-050-0510-00
100	16	80	920	114,3	4	260	22,8	200	2,4	0,06	8,0	630	Hatec-LZS-0100-0160-160-0920-00
125	16	25	515	139,7	4,5	310	23,8	230	36	0,46	34,7	206	Hatec-LZS-0125-0160-050-0515-00
125	16	80	980	139,7	4,5	310	35,6	230	3,6	0,09	16,2	671	Hatec-LZS-0125-0160-160-0980-00

5.2 Hatec Lateral Expansion Joint LZS / PN 16

Multi-ply bellows of Edelstahl 1.4541

Both sides welding ends of carbon steel

Welded intermediate pipe of carbon steel

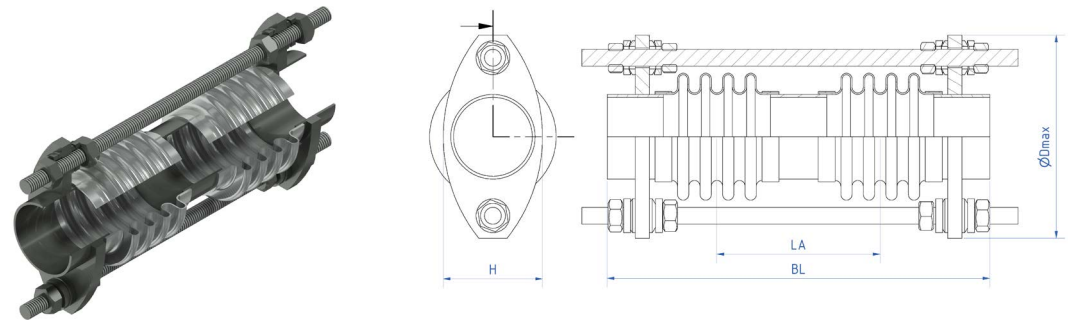
Outer stress of carbon steel

With 2 tie rods

With or without inner guide pipes made of stainless steel

Suitable for lateral movements in circular planes

Available on request with fixed flanges PN 16 / ANSI 150 lbs



DN	PN	Lateral	Length	Welding end		Width	Weight	Height				Bellows-center distance	Hatec-Article-Number
		+/-	BL	D	S	Dmax		H	Clat	Cp	Cr	L1	
mm	mm	mm	mm	mm	mm	mm	kg	mm	N/mm	N/bar/mm	N/bar	mm	
150	16	25	555	168,3	4,5	320	28,1	240	58,8	0,67	56,6	205	Hatec-LZS-0150-0160-050-0555-00
150	16	70	870	168,3	4,5	320	40,9	240	9,7	0,18	32,7	520	Hatec-LZS-0150-0160-140-0870-00
200	16	20	530	219,1	6,3	400	49,7	320	216,4	1,6	122,8	162	Hatec-LZS-0200-0160-040-0530-00
200	16	50	740	219,1	6,3	400	66,1	320	45,6	0,5	80,8	372	Hatec-LZS-0200-0160-100-0740-00
250	16	20	566	273	7,1	460	66,5	370	300,8	2,3	161,9	174	Hatec-LZS-0250-0160-040-0566-00
250	16	50	800	273	7,1	460	89,6	370	62,2	0,7	107,0	408	Hatec-LZS-0250-0160-100-0800-00
300	16	20	575	323,9	10	500	85,2	430	329,3	2,9	220,9	185	Hatec-LZS-0300-0160-040-0575-00
300	16	50	810	323,9	10	500	109,7	430	72,3	1,0	146,8	420	Hatec-LZS-0300-0160-100-0810-00

5.3 Hatec Lateral Expansion Joint LZS / PN 25



Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Welded intermediate pipe of carbon steel

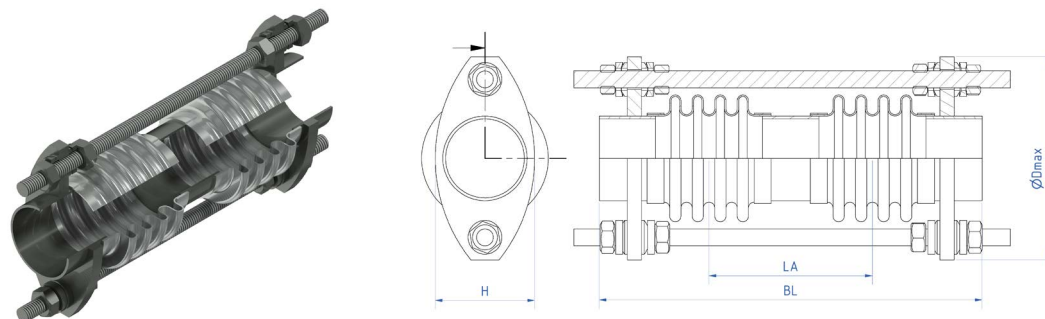
Outer stress of carbon steel

With 2 tie rods

With or without inner sleeve made of stainless steel

Suitable for lateral movements in circular planes

Available on request with fixed flanges PN 16 / ANSI 150 lbs



DN	PN	Lateral	Length	Welding end		Width	Weight	Height	Adjusting Rates			Bellows-center distance	Hatec-Article-Number
		+/-	BL	D	S	Dmax		H	Clat	Cp	Cr	L1	
mm	mm	mm	mm	mm	mm	mm	kg	mm	N/mm	N/bar/mm	N/bar	mm	
40	25	25	388	48,3	3,2	130	3,8	110	4,9	0,05	2,7	184	Hatec-LZS-0040-0250-050-0388-00
40	25	90	820	48,3	3,2	130	6,9	110	0,4	0,01	1,1	616	Hatec-LZS-0040-0250-180-0820-00
50	25	25	450	60,3	2,9	160	5,6	120	4,7	0,05	4,0	218	Hatec-LZS-0050-0250-050-0450-00
50	25	90	880	60,3	2,9	160	9,6	120	0,5	0,01	1,8	648	Hatec-LZS-0050-0250-180-0880-00
65	25	25	480	76,1	2,9	180	8,5	140	6,4	0,07	5,9	252	Hatec-LZS-0065-0250-050-0480-00
65	25	80	1000	76,1	2,9	180	13,6	140	0,7	0,01	2,6	772	Hatec-LZS-0065-0250-160-1000-00
80	25	25	504	88,9	4	210	10,5	150	26,5	0,18	10,1	217	Hatec-LZS-0080-0250-050-0504-00
80	25	80	900	88,9	4	210	16,9	150	3,5	0,04	5,1	613	Hatec-LZS-0080-0250-160-0900-00
100	25	25	520	114,3	4	260	19,4	200	29,1	0,27	22,0	229	Hatec-LZS-0100-0250-050-0520-00
100	25	80	945	114,3	4	260	27,9	200	3,7	0,06	11,1	654	Hatec-LZS-0100-0250-160-0945-00
125	25	25	520	139,7	4,5	310	30	230	54,9	0,48	41,6	206	Hatec-LZS-0125-0250-050-0520-00
125	25	80	930	139,7	4,5	310	40,1	230	6,5	0,10	17,2	616	Hatec-LZS-0125-0250-160-0930-00

5.3 Hatec Lateral Expansion Joint LZS / PN 25



Multi-ply bellows of stainless steel 1.4541

Both sides welding ends of carbon steel

Welded intermediate pipe of carbon steel

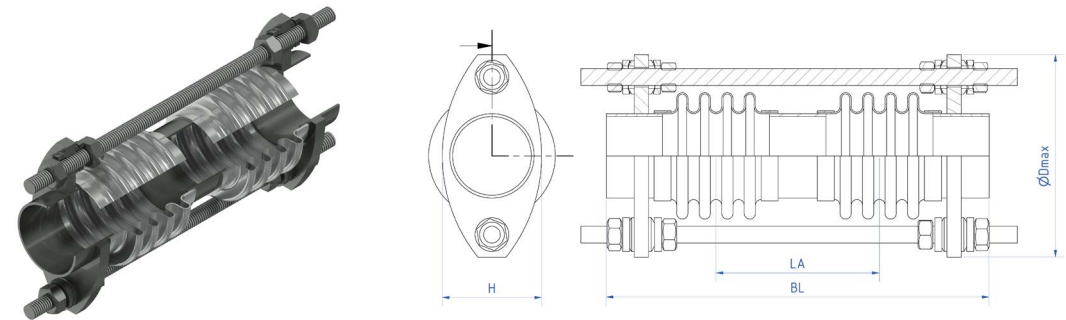
Outer stress of carbon steel

With 2 tie rods

With or without inner guide pipes made of stainless steel

Suitable for lateral movements in circular planes

Available on request with fixed flanges PN 16 / ANSI 150 lbs



DN	PN	Lateral	Length	Welding end		Width	Weight			Adjusting Rates		Bellows-center distance	Hatec-Article-Number
		+/-	BL	D	S	Dmax		H	Clat	Cp	Cr	L1	
mm	mm	mm	mm	mm	mm	mm	kg	mm	N/mm	N/bar/mm	N/bar	mm	
150	25	25	580	168,3	4,5	330	39,2	260	98,3	0,63	63,7	224	Hatec-LZS-0150-0250-050-0580-00
150	25	70	900	168,3	4,5	330	56,7	260	17,6	0,18	37,9	544	Hatec-LZS-0150-0250-140-0900-00
200	25	20	545	219,1	6,3	400	57	320	248,9	1,5	117,5	172	Hatec-LZS-0200-0250-040-0545-00
200	25	50	760	219,1	6,3	400	75,5	320	54,1	0,5	78	387	Hatec-LZS-0200-0250-100-0760-00
250	25	20	595	273	7,1	480	88,3	370	373	2,0	189,8	197	Hatec-LZS-0250-0250-040-0595-00
250	25	50	840	273	7,1	480	118,1	370	82,3	0,7	128,6	442	Hatec-LZS-0250-0250-100-0840-00
300	25	20	630	323,9	10	550	122,4	430	416,6	2,5	256,2	213	Hatec-LZS-0300-0250-040-0630-00
300	25	50	900	323,9	10	550	149,5	430	89,4	0,8	169,7	483	Hatec-LZS-0300-0250-100-0900-00

6.1 Operating Instructions / Installation Instructions

General Safety instructions

Installation, commissioning and maintenance work must be carried out by qualified and authorized persons. Compensators are basically maintenance free. However, we recommend sporadic inspections of the pipe system and the compensator during the period of use. These inspections have to check the purpose if rust is present or loose parts, etc.

Important: Prior to assembly and maintenance, the system must be depressurized, cooled down and emptied.

Transport, packaging and storage

The packet is to give be checked for completeness. Any shipping damage to the carrier and the manufacturer must be notified within 8 days of receipt. In an intermediate storage is recommended to use the original packaging. The compensator must not be damaged mechanically or by moisture, water, soil, sand, chemicals or similar.

The joints must not be lifted at the bellows.

Ambient conditions during storage and transport:

Ambient temperature -4°C to $+70^{\circ}\text{C}$, relative humidity up to 95%.

General Information and Warranty

A warranty claim requires professional installation and commissioning are essential according o installation and operating instructions. The necessary installation, commissioning and maintenance work must be carried out by qualified and authorized persons. The permissible working pressure is based on a temperature of 20°C . At higher temperatures, the nominal pressure has to be adjusted in consideration of the reduction factors. The pressure values have at least one triple safety to burst. The test pressure corresponds to the Standard Expansion Joints 1.43 times the value of the specified in the technical documentation nominal or operating pressure at 20°C .

For expansion joints in accordance with PED 2014/68/EU is the test pressure of this declaration, or test certificate apparent. The permissible test pressure must not be exceeded in any examination.

The suitability of the material used to the medium must be checked by the operator.

The operator is responsible for compliance with the allowable load cycles, if necessary are exchanges or recurring inspections provide

Application

a) Axial Expansion Joints



Axial Expansion Joints are suitable for absorbing axial strains in straight piping sections.

For example, they are used for:

- Compensating thermal expansions in straight pipes
- Reduce stresses, forces and moments of connection points
- In flues on boilers and engines for thermal expansions and vibrations
- As dismantling pieces of pumps, valves and plate heat exchangers
- For gas-tight wall penetrations of pipelines in reactors, shipbuilding
- In tank and apparatus for receiving differential expansions occurring.

Condition for the application of axial expansion joints without stress is the presence of suitable anchors and axial guide bearings. The technical data are decisive for use.

b) Angular Expansion Joints



Angular- and gimbal are suitable by angular movements of the steel bellows to absorb expansions, the (side) occur in a plane perpendicular or at county level for Compensator longitudinal axis. The technical data are decisive for use. , Angular- and gimbal are suitable for compensating long pipeline routes in pipelines as well as short-limbed boiler and engine house lines for planar and spatial piping systems.

At least two and no more than three angular expansion joints, or 2 gimbal, possibly in conjunction with a hinged expansion joint form a statically defined articulated system. 3 gimbal in a system are not allowed. The time required for the respective movement capacity of the joint system arrangement of Expansion Joints done as specified by Hatec engineering, or corresponding structural calculations.

c) Lateral Expansion Joints



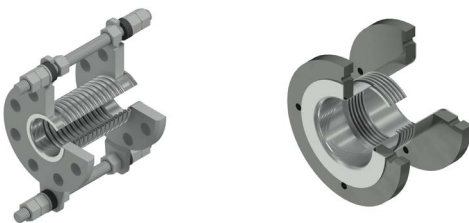
The operation of the Lateral based as that of the angular expansion joints on angular movements of the steel bellows. They are also suitable for installation in tight spaces. The movement capacity is dependent on the length or the distance between bellows centres: The larger the distance between bellows centres, the greater the absorbing lateral movement.

Through a greater distance between bellows centres allows the adjusting of the compensator reduce.

The Lateral is a self-expansion unit, which is a complete two-hinge system.

When used in combination with a wide angular compensator as joint system required for the respective movement capacity of the joint system arrangement of Expansion Joint as specified by Hatec engineering, or corresponding structural calculations carried out.

d) Vibration Absorber



Vibration dampers are used:

- for vibration damping and structure-borne noise of pumps and compressors
- for supporting very small axial and lateral expansions
- Reduce stress, forces and moments of connection points

Condition for the application of vibration with and without stress, the presence of appropriate pipe-guides, or fixed points in accordance with DIN EN 14917, Appendix C, section 3.2 (can be sent on request).

The technical data are decisive for use.

Assembly

- Fixed points and pipe guides must be firmly installed prior to filling and pressure testing the system.
- Simple pipe supports are not sufficient as guides. Use it correctly dimensioned fixed points and guide bearings
- The compensator must not be loaded by twisting (torsion). This applies especially to joints with socket attachment.
- There must be no inaccuracies in the installation situation be provided by the compensator is an additional burden.
- The steel bellows is from damage and contamination (for example. As welding chips, plaster or mortar splatter) to protect.
- Steam pipes must be installed so that no water shocks may occur. This can be achieved by adequate drainage, insulation and prevent water pockets and by the line.
- Expansion joints with inner sleeves, the flow direction is observed.
- In the immediate vicinity of reducers, superheated steam coolers and shut valves the installation of expansion joints should be avoided, when high-frequency vibrations are expected due to turbulence, or there must be special measures (for example. As thick-walled conduit tubes, pinhole, calming sections) are provided.
- Are in the medium frequency vibrations or turbulence or high flow velocities expected expansion joints are to be used with inner sleeve.
- In steam pipes, we generally recommend the use of expansion joints with inner sleeves
- There are the permissible limits of the flow rates in accordance with DIN EN 14917, Kap.6.4.3.2 (can be sent on request)
- Biasing and transport devices are marked and must be removed prior to testing and commissioning.

Fixed points and guide bearings

- Each to be compensated pipe length should be limited by fixed points.
- Only one expansion joint or a joint system should always be installed between two fixed points.
- When installing axial expansion joints Directional deviations of the pipes must get major benchmarks. These have to take the pressure reaction- and adjusting forces of the expansion joints, and the frictional forces of the guide bearings (forces information by Hatec Engineering, or equivalent static interpretations)
- Between control points are necessary if long pipe runs the install an axial no longer sufficient to accommodate pipe expansion occurring and several axial expansion joints must be provided.
- In vacuum operation the fixed points must be able to absorb tensile and compressive forces.
- In vacuum operation the fixed points must be able to absorb tensile and compressive forces.
- When using axial expansion of the distance between the compensator and the first guide bearing must not exceed 4 times the pipe diameter, further distances in accordance with DIN EN 14917, Appendix C, Section 3.2 (can be sent on request).

Initial Tension

Axial compensators, and angular- and lateral can be installed with bias, the introduction of bias in joint systems expediently carried out on the finished system.

When bias the respective installation temperature of the pipeline is taken into account, this is especially true for overhead lines. The magnitude of the bias voltage can by Hatec Engineering, or equivalent static calculations are given.

Before Commissioning

The following should be controlled.

- the lines were laid on a slope to avoid water pockets is sufficient drainage.
- Fixed points and pipe guides are firmly mounted prior to filling and pressure testing the system.
- not burdened by the compensator is by turning (torsion).
- joints with inner sleeves, the flow direction is observed.
- the steel bellows is free of dirt, welding chips, plaster or mortar splatter or other contamination.
- all screws are tightened.
- the general duties of care to prevent corrosion damage are observed, for example, Preparation of water, avoid galvanic corrosion in copper and galvanized pipes.

If prior to commissioning additional tests and inspections may be required for this purpose, the operator is responsible.

Unauthorized modes

The specified limit values must not be exceeded. During pressure testing and operation, the permissible testing, or operating pressure of the expansion joint must not be exceeded. If the pipeline will clean by blowing steam should be avoided due to the risk of water hammer and unacceptable vibration stimulating the bellows. The Steam pipelines must be such that the condensate drain off in time. Pressure surges as a result of faulty operation, water hammers, etc. are not permitted.

6.2 Enquiry Form for Steel Expansion Joints

Project	
TAG-Nr.	
DN	
PN	
Material - Bellow - Connection	
End fittings way of mounting (Suspended, U-bolt pipe hanger, carriage guidance, etc.)	
Medium	
Operating / design pressure	
Operating / design pressure	
Flow Rate	
Viscosity	
Type of Expansion Joint (without/ with Tension) - Axial - Angular - Kardan - Lateral - Universal - Special	
Movement Absorption (x,y,z-direction, or Axis) - Axial - Angel - Lateral	
Number required in each case (Full) load change	
- Connection (both sides) - Weld (Dn x s) - Flange - (Lot or fixed flange, hole pattern according to DIN, EN, ASME, etc.) - Special	
(Max.) Length / outer diameter (installation space)	
Exterior additional loads, for example, out Weight, wind, snow, etc.	
Allowable loads of connection points/ Fixed points, bearings (isometric required)	
Classification according to PED 2014/68/EU (Fluidgr., p _n), if necessary	
Certificate, commissioning, testing, Approvals , etc., if necessary	
Other/ Remarks	



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