

Axial expansion joints

HYDRA axial expansion joints are used in steel, stainless steel and copper pipelines. They compensate for axial movements. Angular and lateral movements are conceivable. Please send us your specific enquiries.

- Enquiry form for HYDRA expansion joints --> page 53
- Enquiry form for acceptance according to Pressure Equipment Directive --> page 54

Or get in touch with us.
We will be happy to advise you.

Loading cycles/movement absorption

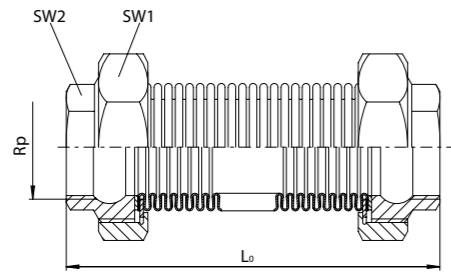
The movement absorptions specified in the tables refer to application in gas installation according to DIN 30681 for 1,000 axial loading cycles. If the expansion joints are used for

drinking water/heating systems, the value for the nominal axial movement absorption of the selected expansion joint should be divided by 1.5. It is then valid for 10,000 loading cycles, corresponding to DIN 1988, Part 2.

Example:
Type AMB, DN 32
1,000 loading cycles = ± 15 mm = 30 mm axial movement absorption,
10,000 loading cycles = ± 10 mm = 20 mm axial movement absorption

Please state the following with your order:

1. Type, nominal diameter (DN), length, axial movement absorption
2. Medium



Type AMB

HYDRA axial expansion joints with screw couplings
Internal thread, flat seal

Material/end fittings:
Bellows of stainless steel grade 1.4571 (AISI 316Ti), multi layered
flat seal screw couplings made of malleable cast iron at both ends galvanised with internal thread
DIN EN 10226-1

Operating temperature:
up to 250°C

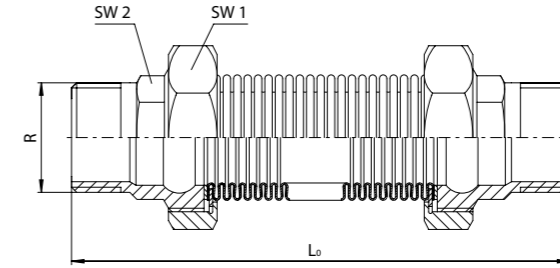
Nominal pressure:
for water -> 10 bar
for gas to DN 25-> 10 bar, > DN 32 -> 4 bar



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Internal thread	Bellows Effective cross-section	Adjusting force rate	ID Nr.	€/ Unit
DN	PN	2 δ _N mm	AMB ...	L ₀ mm	W kg	DIN EN 10226-1	A cm ²	C _δ N/mm		
15	10	±12 = 24	10.0015.024.0	125	0.3	Rp 1/2	4.03	43	459515	33.50
20	10	±14 = 28	10.0020.028.0	135	0.5	Rp 3/4	7.04	41	459527	36.50
25	10	±15 = 30	10.0025.030.0	150	0.7	Rp 1	9.51	47	459529	59.60
32	10	±15 = 30	10.0032.030.0	165	1.1	Rp 1 1/4	14.6	66	459534	72.50
40	10	±17 = 34	10.0040.034.0	190	1.4	Rp 1 1/2	18.3	51	459539	80.80
50	10	±21 = 42	10.0050.042.0	210	2	Rp 2	30.5	53	459547	112.30

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



Type AGB

HYDRA axial expansion joints with screw couplings
External thread, flat seal

Material/end fittings:
Bellows of stainless steel grade 1.4571 (AISI 316Ti), multi layered
flat seal screw couplings made of malleable cast iron at both ends galvanised with external thread
DIN EN 10226-1

Operating temperature:
up to 250°C

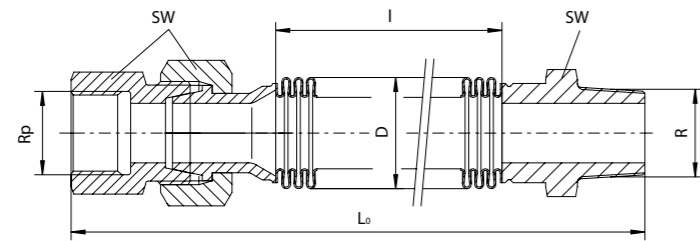
Nominal pressure:
for water -> 10 bar
for gas to DN 25-> 10 bar, > DN 32 -> 4 bar



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	External thread	Bellows Effective cross-section	Adjusting force rate	ID Nr.	€/ Unit
DN	PN	2 δ _N mm	AGB ...	L ₀ mm	W kg	DIN EN 10226-1	A cm ²	C _δ N/mm		
15	10	±12 = 24	10.0015.024.0	157	0.3	R 1/2	4.03	43	459569	56.20
20	10	±14 = 28	10.0020.028.0	173	0.5	R 3/4	7.04	41	459573	61.60
25	10	±15 = 30	10.0025.030.0	194	0.7	R 1	9.5	47	459578	66.00
32	10	±15 = 30	10.0032.030.0	215	1.2	R 1 1/4	14.6	66	459583	71.80
40	10	±17 = 34	10.0040.034.0	240	1.5	R 1 1/2	18.3	51	459584	89.00
50	10	±21 = 42	10.0050.042.0	270	2.3	R 2	30.5	53	459587	124.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



Type AMV

HYDRA axial expansion joints with screw couplings made of stainless steel

Material/end fittings:

Bellows of stainless steel grade 1.4571 (AISI 316Ti), multi layered
stainless steel conical seal screw coupling with internal thread DIN EN 10226-1 on one end, stainless steel threaded nipple with external thread DIN EN 10226-1 at the other

Operating temperature:
up to 550°C

Nominal pressure:
for water -> 16 bar
for gas -> max. 5 bar

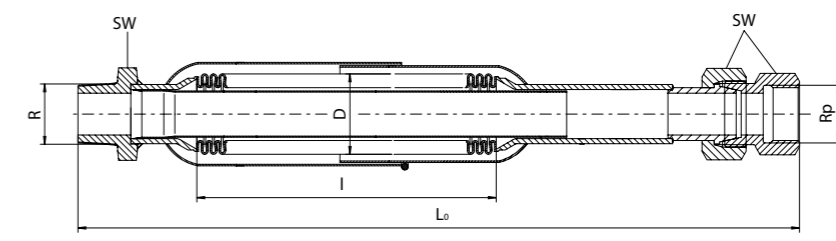
Approval:



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Screw coupling	Threaded nipple	Thread length	Bellows Effective cross section	Adjusting force rate	ID Nr.	€/ Unit
DN	PN	2 δ _N mm	AMV ...	L ₀ mm	W kg	DIN EN 10226-1	DIN EN 10226-1	I mm	A cm ²	C _δ N/mm		
15	16	±10 = 20	16.0015.020.0	164	0.31	Rp 1/2	R 1/2	13	4.4	38.0	401598	78.20
20	16	±11 = 22	16.0020.022.0	172	0.49	Rp 3/4	R 3/4	14	7.6	47.7	401599	83.70
25	16	±14 = 28	16.0025.028.0	180	0.63	Rp 1	R 1	16	10.7	58.0	401601	87.00
32	16	±14 = 28	16.0032.028.0	200	1.06	Rp 1 1/4	R 1 1/4	19	18.2	57.6	401602	121.00
40	16	±12 = 24	16.0040.024.0	206	1.30	Rp 1 1/2	R 1 1/2	19	21.3	71.4	401604	186.00
50	16	±20 = 40	16.0050.040.0	231	1.80	Rp 2	R 2	23	35.6	55.0	401605	254.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



Type AMV

HYDRA axial expansion joints with inner sleeve and external protective tube, with screw couplings made of stainless steel, pre-stressed

Material/end fittings:

Bellows from stainless steel grade 1.4571 (AISI 316Ti), multi-ply with inner sleeve and external protective tube from stainless steel grade 1.4571 (AISI 316Ti), conical seal screw coupling made from stainless steel with internal thread DIN EN 10226-1 on one end, stainless steel threaded nipple with external thread DIN EN 10226-1 at the other

Operating temperature:
up to 550°C

Nominal pressure:
for water -> 10 bar or 16 bar
for gas -> max. 5 bar

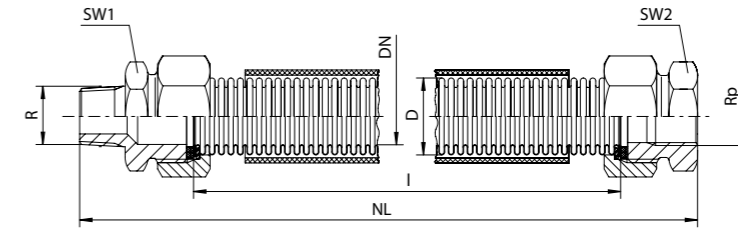
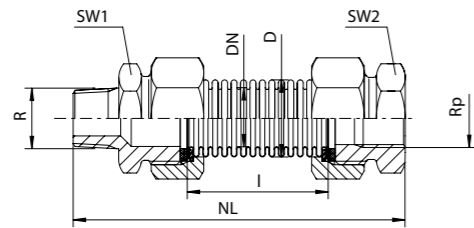
Approval:



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Srew coupling	Threaded nipple	Thread length	Bellows Effective cross section	Adjusting force rate	ID Nr.	€/ Unit
DN	PN	2 δ _N mm	AMV ...	L ₀ mm	W kg	DIN EN 10226-1	DIN EN 10226-1	I mm	A cm ²	C _δ N/mm		
15	16	±16 = 32	16.0015.032.2	296	0.57	Rp 1/2	R 1/2	13	4.4	32	401545	180.50
		±25 = 50	16.0015.050.2	369	0.71							21
20	10	±40 = 80	10.0020.080.2	437	1.20	Rp 3/4	R 3/4	14	6.0	16	401555	210.00
20	16	±18 = 36	16.0020.036.2	309	0.87	Rp 3/4	R 3/4	14	6.0	31	401553	164.70
		±25 = 50	16.0020.050.2	388	1.10							20
25	16	±20 = 40	16.0025.040.2	312	1.10	Rp 1	R 1	16	10.7	40	401549	196.80
		±32 = 64	16.0025.064.2	394	1.40							27
32	10	±40 = 80	10.0032.080.2	463	2.40	Rp 1 1/4	R 1/4	19	18.2	25	401559	298.00
32	16	±20 = 40	16.0032.040.2	343	2.00	Rp 1 1/4	R 1/4	19	18.2	43	401551	250.80
		±32 = 64	16.0032.064.2	429	2.40							30
40	16	±18 = 36	16.0040.036.2	344	2.10	Rp 1 1/2	R 1 1/2	19	21.6	50	401547	301.00
		±32 = 64	16.0040.064.2	514	3.20							42
50	10	±40 = 80	10.0050.080.2	475	3.80	Rp 2	R 2	23	35.6	29	401556	414.00
50	16	±20 = 40	16.0050.040.2	339	2.80	Rp 2	R 2	23	35.6	55	401523	390.00
		±32 = 64	16.0050.064.2	421	3.40							37

* Valid for 1,000 loading cycles

Delivery: PN 16 ex stock, short lead time for PN 10 (subject to prior sale). Special sizes on request.



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Type
AWN

Type
AWF

**HYDRA axial expansion joints
with screw couplings
Internal/external thread**

Operating temperature:
250°C

Material/end fittings:

Bellows made from stainless steel grade 1.4404 (AISI 316L), flat seal screw couplings at both ends, made of brass with external thread DIN EN 10226-1 at one end, internal thread DIN EN 10226-1 at other

Nominal pressure:
10 bar

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	External thread	Internal thread	Bellows Effective cross-section A	ID Nr.	€/ Unit
DN	PN	$2 \delta_N$ mm	AWN ...	L_0 mm	W kg	DIN EN 10226-1	DIN EN 10226-1	A cm ²		
12	10	-8	10.0012.008.0	95	0.19	R 3/8	Rp 3/8	2.81	422600	20.60
16	10	-8	10.0016.008.0	111	0.23	R 1/2	Rp 1/2	2.81	422601	18.40
20	10	-8	10.0020.008.0	119	0.46	R 3/4	Rp 3/4	4.27	422602	21.00
25	10	-8	10.0025.010.0	134	0.78	R 1	Rp 1	6.36	422603	37.80

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).

**HYDRA axial expansion joints
with external protective tube and screw couplings
Internal/external thread**

Operating temperature:
200°C

Material/end fittings:

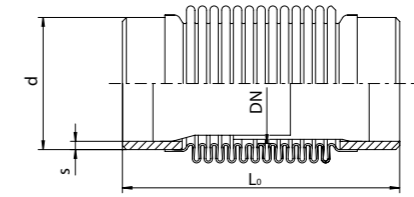
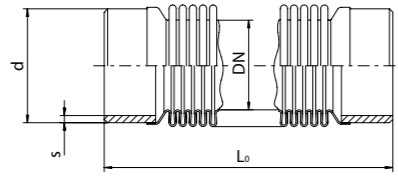
Bellows made from stainless steel grade 1.4404 (AISI 316L) with external protective tube made from EP GC 22 glass reinforced laminate, flat seal screw couplings at both ends, made of brass with external thread DIN EN 10226-1 at one end, internal thread DIN EN 10226-1 at other

Nominal pressure:
10 bar

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	External thread	Internal thread	Bellows Effective cross-section A	ID Nr.	€/ Unit
DN	PN	$2 \delta_N$ mm	AWF ...	L_0 mm	W kg	DIN EN 10226-1	DIN EN 10226-1	A cm ²		
12	10	-20	10.0012.020.3	157	0.220	R 3/8	Rp 3/8	2.81	422596	24.20
16	10	-20	10.0016.020.3	173	0.270	R 1/2	Rp 1/2	2.81	422597	21.50
20	10	-23	10.0020.023.3	206	0.508	R 3/4	Rp 3/4	4.27	422598	25.30
25	10	-26	10.0025.026.3	221	0.842	R 1	Rp 1	6.36	422599	43.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



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Type
ARN

HYDRA axial expansion joints with weld ends

Nominal pressure:
10 bzw. 16 bar

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply, weld ends made from 1.0305 (St. 35.8) at both ends

Approval:



Operating temperature:

up to 300°C

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Weld ends Size	Wall thickness	Bellows	Adjusting force axial	ID Nr.	€/ Unit
DN	PN	2δ _N mm	ARN ...	L ₀ mm	W kg	Outside diameter	s mm	Effective cross-section A cm ²	C _δ N/mm		
15	10	±10 = 20	10.0015.020.0	122	0.10	21.3	2	4.4	32	081331	43.20
20	10	±12 = 24	10.0020.024.0	122	0.14	26.9	2.3	7.5	33	078991	45.80
25	10	±12 = 24	10.0025.024.0	122	0.23	33.7	2.6	10.6	36	078911	47.20
32	10	±12 = 24	10.0032.024.0	144	0.36	42.4	2.6	18.3	47	078992	53.20
40	10	±12 = 24	10.0040.024.0	144	0.41	48.3	2.9	21.1	43	078993	63.80
50	10	±24 = 48	10.0050.048.0	174	0.66	60.3	2.9	35.4	30	078994	70.50
65	10	±20 = 40	10.0065.040.0	176	0.88	76.1	3.2	54.9	24	078995	81.00
80	10	±20 = 40	10.0080.040.0	174	1.10	88.9	3.2	72.8	47	078997	89.00
100	10	±24 = 48	10.0100.048.0	174	1.30	114.3	3.6	115.0	60	078998	110.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request.

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Type
ARN

HYDRA axial expansion joints with inner sleeve and weld ends

Nominal pressure:
10 bzw. 16 bar

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multilayered, with stainless steel inner sleeve, weld ends of 1.0305 (St. 35.8) at both ends

Approval:



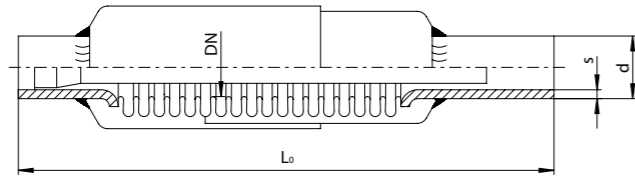
Operating temperature:

up to 300°C

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Weld ends Size	Wall thickness	Bellows	Adjusting force axial	ID Nr.	€/ Unit
DN	PN	2δ _N mm	ARN ...	L ₀ mm	W kg	Outside diameter	s mm	Effective cross-section A cm ²	C _δ N/mm		
15	16	±16 = 32	16.0015.032.1	222	0.25	21.3	2.0	4.4	32	081172	69.90
20	16	±18 = 36	16.0020.036.1	226	0.41	26.9	2.3	7.6	31	081176	72.50
25	16	±20 = 40	16.0025.040.1	220	0.52	33.7	2.6	10.7	40	081177	79.30
32	16	±20 = 40	16.0032.040.1	242	0.81	42.4	2.6	18.2	43	081173	92.80
40	16	±18 = 36	16.0040.036.1	238	0.94	48.3	2.9	21.3	50	081171	108.70
50	16	±32 = 64	16.0050.064.1	302	1.60	60.3	2.9	35.6	37	081178	132.00
65	16	±40 = 80	16.0065.080.1	352	2.80	76.1	3.2	53.0	64	081179	189.60
80	16	±32 = 64	16.0080.064.1	324	2.90	88.9	3.2	73.2	44	081180	202.50
100	16	±40 = 80	16.0100.080.1	384	4.50	114.3	3.6	117.0	57	085070	284.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request.



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Type ARF

HYDRA axial expansion joints with inner sleeve and external protective tube weld ends on both ends, pre-stressed

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply, with inner sleeve/protective tube from stainless steel and weld ends from St 35.8 on both ends

Operating temperature: up to 300°C
Nominal pressure: for water -> 10 bar or 16 bar for gas -> 10 bar or 16 bar

Approval:



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Weld ends Size		Bellows Effective cross-section A cm ²	Adjusting force rate axial C ₆ N/mm	ID Nr.	€/ Unit
						Outside diameter d mm	Wall thickness s mm				
DN	PN	2δ _N mm	ARF ...	L ₀ mm	W kg	d mm	s mm	A cm ²	C ₆ N/mm		
15	10	±16 = 32	10.0015.032.2	200	0.37	21.3	2	4.4	29	331382	107.40
		±32 = 64	10.0015.064.2	312	0.53						
15	16	±16 = 32	16.0015.032.2	222	0.42	21.3	2	4.4	32	331401	119.50
		±25 = 50	16.0015.050.2	295	0.52						
20	10	±20 = 40	10.0020.040.2	226	0.62	26.9	2.3	7.6	31	331384	115.20
		±40 = 80	10.0020.080.2	354	0.94						
20	16	±18 = 36	16.0020.036.2	226	0.62	26.9	2.3	7.6	31	331403	114.00
		±25 = 50	16.0020.050.2	305	0.81						
25	10	±18 = 36	10.0025.036.2	216	0.75	33.7	2.6	10.7	42	331387	115.20
		±32 = 64	10.0025.064.2	332	1.10						
25	16	±20 = 40	16.0025.040.2	220	0.79	33.7	2.6	10.7	40	331406	117.00
		±32 = 64	16.0025.064.2	302	1.00						
32	10	±18 = 36	10.0032.036.2	238	1.20	42.4	2.6	18.2	43	331389	123.70
		±40 = 80	10.0032.080.2	362	1.80						
32	16	±20 = 40	16.0032.040.2	242	1.20	42.4	2.6	18.2	43	331408	126.90
		±32 = 64	16.0032.064.2	328	1.70						
40	10	±18 = 36	10.0040.036.2	238	1.30	48.3	2.9	21.3	50	331391	132.10
		±32 = 64	10.0040.064.2	324	1.90						
40	16	±18 = 36	16.0040.036.2	238	1.30	48.3	2.9	21.3	53	331410	136.00
		±32 = 64	16.0040.064.2	408	2.30						

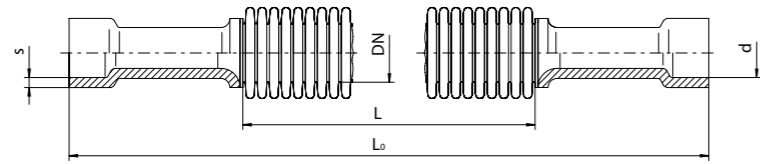
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Type ARF

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Free length	Approx. weight	Weld ends Size		Bellows Effective cross-section A cm ²	Adjusting force rate axial C ₆ N/mm	ID Nr.	€/ Unit
						Outside diameter d mm	Wall thickness s mm				
DN	PN	2δ _N mm	ARF ...	L ₀ mm	W kg	d mm	s mm	A cm ²	C ₆ N/mm		
50	10	±24 = 48	10.0050.048.2	214	1.40	60.3	2.9	35.4	55	331393	142.30
		±40 = 80	10.0050.080.2	356	2.70						
50	16	±20 = 40	16.0050.040.2	220	1.40	60.3	2.9	35.6	24	331412	169.30
		±32 = 64	16.0050.064.2	302	2.30						
65	10	±20 = 40	10.0065.040.2	216	2.30	76.1	3.2	54.9	100	331395	211.00
		±40 = 80	10.0065.080.2	420	4.50						
65	16	±20 = 40	16.0065.040.2	250	2.80	76.1	3.2	53.0	133	331414	238.00
		±40 = 80	16.0065.080.2	352	4.20						
80	10	±20 = 40	10.0080.040.2	214	2.60	88.9	3.2	72.8	47	331397	206.00
		±40 = 80	10.0080.080.2	384	5.00						
80	16	±18 = 36	16.0080.036.2	214	2.80	88.9	3.2	73.2	82	331417	232.00
		±32 = 64	16.0080.064.2	324	4.50						
100	10	±24 = 48	10.0100.048.2	214	3.30	114.3	3.6	115.0	60	331399	269.00
		±40 = 80	10.0100.080.2	356	5.80						
100	16	±22 = 44	16.0100.044.2	230	3.70	114.3	3.6	115.0	92	331419	318.00
		±40 = 80	16.0100.080.2	384	6.40						

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). PN 10 on request. Special sizes on request.



Type AMC

HYDRA axial expansion joints with pipe sleeves for brazing, pre-stretched

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply with stainless steel pipe sleeves galvanic copper-plated on both ends, for brazing

Operating temperature:
up to 200°C

Nominal pressure:
16 bar

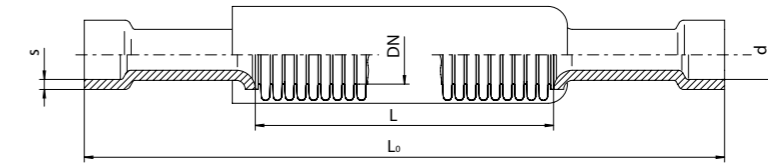
Approvals:



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Length pre-stretched	Approx. weight	Pipe sleeve Sizes		Bellows Effective cross-section A cm ²	Adjusting force rate axial C _δ N/mm	ID Nr.	€/ Unit
						Inside diameter d mm	Wall thickness s mm				
12	16	-20	16.0012.020.0	167	0,075	15	1.0	3.38	31	335316	63.20
15	16	-20	16.0015.020.0	166	0.100	18	1.0	4.42	63	335317	64.50
20	16	-22	16.0020.022.0	187	0.190	22	1.2	7.62	47	331481	81.60
25	16	-28	16.0025.028.0	210	0.265	28	1.2	10.70	58	331440	84.30
32	16	-28	16.0032.028.0	218	0.395	35	1.5	14.60	75	335323	91.40
40	16	-28	16.0040.028.0	240	0.520	42	1.5	18.30	58	335364	104.20
50	16	-30	16.0050.030.0	261	0.740	54	1.5	30.50	68	335383	128.50

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



Type AMC

HYDRA axial expansion joints with pipe sleeves for brazing and external protective tube, pre-stretched

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply with stainless steel pipe sleeves galvanic copper-plated on both ends, for brazing

Operating temperature:
up to 200°C

Nominal pressure:
16 bar

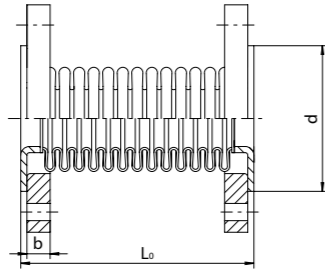
Approvals:



Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Length pre-stretched	Approx. weight	Pipe sleeve Sizes		Bellows Effective cross-section A cm ²	Adjusting force rate axial C _δ N/mm	ID Nr.	€/ Unit
						Inside diameter d mm	Wall thickness s mm				
12	16	-20	16.0012.020.3	167	0.090	15	1.0	3.38	31	336290	79.90
15	16	-20	16.0015.020.3	166	0.130	18	1.0	4.42	63	336308	83.20
20	16	-22	16.0020.022.3	187	0.265	22	1.2	7.62	47	336283	88.30
25	16	-28	16.0025.028.3	210	0.338	28	1.2	10.70	58	336279	101.00
32	16	-28	16.0032.028.3	218	0.495	35	1.5	14.60	75	336311	103.80
40	16	-28	16.0040.028.3	240	0.685	42	1.5	18.30	58	336323	125.50
50	16	-30	16.0050.030.3	261	0.970	54	1.5	30.50	68	336327	144.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request.



Type ALN

HYDRA axial expansion joints with swivel loose flanges

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply, with swivel loose flanges made of steel on both ends
Flange size as per DIN EN 1092-1

Operating temperature:
up to 300°C

Nominal pressure:
6 or 10 bar

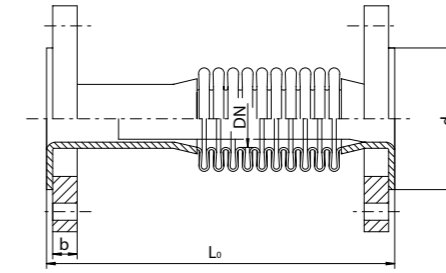
Approval:



Nominal diam.	Pressure rating	Nominal axial movement nominal* $2\delta_N$ mm	Type	Length free length L_0 mm	Approx. weight W kg	Bellows Effective cross-section A cm ²	Adjusting force rate axial C_6 N/mm	ID Nr.	€/ Unit
DN	PN		ALN						
20	6	±16 = 32	06.0020.032.0	78	1.00	7.4	15	074284	103.50
	10	±12 = 24	10.0020.024.0		1.40	7.5	35	071619	92.60
25	6	±16 = 32	06.0025.032.0	78	1.40	10.7	13	074285	102.00
	10	±12 = 24	10.0025.024.0		1.70	10.6	36	071620	93.80
32	6	±16 = 32	06.0032.032.0	84	2.00	18.1	12	074286	136.30
	10	±12 = 24	10.0032.024.0		2.20	18.3	47	071621	114.80
40	6	±16 = 32	06.0040.032.0	84	2.40	22.2	15	074287	127.40
	10	±12 = 24	10.0040.024.0		2.80	21.1	43	071622	113.70
50	6	±25 = 50	06.0050.050.0	114	2.70	35.4	30	074288	149.50
	10	±24 = 48	10.0050.048.0		4.00	35.4	30	071623	126.60
65	6	±25 = 50	06.0065.050.0	120	3.60	54.9	24	074289	170.90
	10	±20 = 40	10.0065.040.0		4.10	54.9	24	071624	156.30
80	6	±25 = 50	06.0080.050.0	118	4.70	72.8	47	074281	176.30
	10	±20 = 40	10.0080.040.0		5.10	72.8	47	071625	178.90
100	6	±25 = 50	06.0100.050.0	118	5.20	115.0	60	074282	189.00
	10	±24 = 48	10.0100.048.0		5.40	115.0	60	071626	224.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request. Flange made of stainless steel on request.



Type ALN

HYDRA axial expansion joints with inner sleeve and swivel loose flanges

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply, with inner sleeve made from stainless steel and swivel loose flanges made of steel on both ends
Flange size as per DIN EN 1092-1

Operating temperature:
up to 300°C

Nominal pressure:
6 or 16 bar

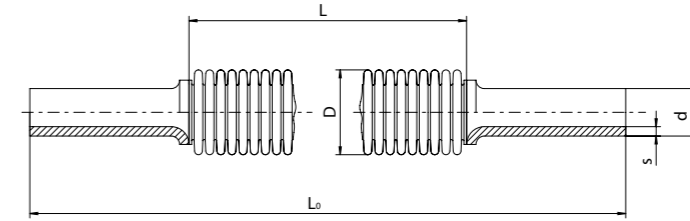
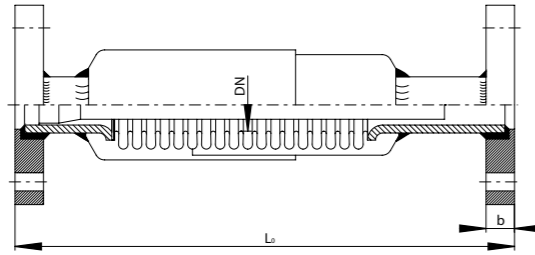
Approval:



Nominal diam.	Pressure rating	Nominal axial movement nominal* $2\delta_N$ mm	Type	Length free length L_0 mm	Approx. weight Effective cross-section W kg	Bellows axial A cm ²	Adjusting force rate C_6 N/mm	ID Nr.	€/ Unit
DN	PN		ALN						
32	6	±25 = 50	06.0032.050.1	202	2.3	18.3	28	081182	207.90
	16	±24 = 48	16.0032.048.1	263	2.8	18.3	33	081183	223.00
40	6	±32 = 64	06.0040.064.1	251	3.0	21.1	19	083446	230.00
	16	±24 = 48	16.0040.048.1	300	3.8	21.6	58	081184	254.40
50	6	±32 = 64	06.0050.064.1	229	3.1	35.4	24	081185	258.00
	16	±32 = 64	16.0050.064.1	278	4.4	35.6	37	081186	260.20
65	6	±32 = 64	06.0065.064.1	311	4.3	52.5	32	081187	316.00
	16	±40 = 80	16.0065.080.1	337	5.0	53.0	64	081188	333.00
80	6	±32 = 64	06.0080.064.1	242	5.2	72.8	35	081189	261.00
	16	±27 = 54	16.0080.054.1	262	5.9	73.2	55	081191	281.00
100	6	±40 = 80	06.0100.080.1	297	6.3	115.0	36	081192	394.00
	16	±28 = 56	16.0100.056.1	262	6.4	115.0	74	081193	351.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request. Flange made of stainless steel on request.



46

Type
AFF

HYDRA axial expansion joints with inner sleeve and external protective tube fixed flanges on both ends, pre-stressed

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti), multi-ply with inner sleeve and external protective tube made from stainless steel grade 1.4571 (AISI 316Ti) fixed steel flange on both ends
Flange size as per DIN EN 1092-1

Operating temperature:
up to 300°C

Nominal pressure:
16 bar

Approval:



Nominal diam.	Pressure rating	Nominal axial movement nominal* 2δ _N mm	Type AFF ...	Length free length L ₀ mm	Approx. weight W kg	Bellows Effective cross-section A cm ²	Adjusting force rate axial C ₀ N/mm	ID Nr.	€/ Unit
20	16	±18 = 36 ±25 = 50	16.0020.036.2	236	2.2	7.6	32	331461	157.80
			16.0020.050.2	315	2.4	7.6	20	331462	174.90
25	16	±20 = 40 ±32 = 64	16.0025.040.2	230	3.0	10.7	40	331463	167.30
			16.0025.064.2	312	3.2	10.7	27	331464	184.90
32	16	±20 = 40 ±32 = 64	16.0032.040.2	252	4.4	18.2	43	331465	188.30
			16.0032.064.2	338	4.9	18.2	30	331466	212.80
40	16	±18 = 36 ±32 = 64	16.0040.036.2	248	5.1	21.3	50	331467	194.70
			16.0040.064.2	418	6.1	21.6	42	331468	219.20
50	16	±20 = 40 ±32 = 64	16.0050.040.2	230	5.8	35.6	55	331469	229.10
			16.0050.064.2	312	6.7	35.6	37	331470	250.40
65	16	±20 = 40 ±40 = 80	16.0065.040.2	260	8.0	53.0	100	331471	298.00
			16.0065.080.2	362	9.4	53.0	64	331472	303.50
80	16	±18 = 36 ±32 = 64	16.0080.036.2	224	8.6	73.2	82	331473	306.00
			16.0080.064.2	334	10.3	73.2	44	331474	334.00
100	16	±22 = 44 ±40 = 80	16.0100.044.2	240	10.1	115.0	92	331475	395.00
			16.0100.080.2	394	12.8	117.0	58	331476	523.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale). Special sizes on request. Flange made of stainless steel on request.

47

Type
ARP

HYDRA axial expansion joints with pipe ends for pressfitting systems, pre-stretched

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti), multi-ply with pipe ends of stainless steel for pressfitting systems on both ends

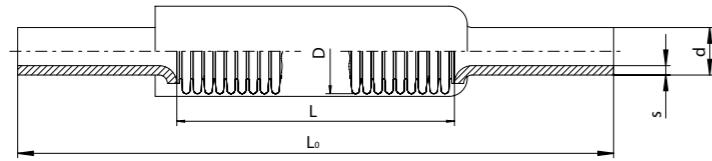
Operating temperature:
to 550°C only for expansion joint, please note max. operating temperature of pressfittings used

Nominal pressure:
16 bar

Nominal diam.	Pressure rating	Nominal axial movement absorption* 2δ _N mm	Type ARP ...	Length pre-stretched L ₀ mm	Approx. weight W kg	Pipe connection Sizes		Bellows Effective cross-section A cm ²	Adjusting force rate axial C ₀ N/mm	ID Nr.	€/ Unit
						Outside diameter d mm	Wall thickness s mm				
12	16	-20	16.0012.020.0	167	0.08	15.0	1.0	3.4	31	326160	42.40
15	16	-20	16.0015.020.0	166	0.12	18.0	1.0	2.4	63	318654	47.90
20	16	-22	16.0025.022.0	187	0.19	22.0	1.2	7.6	47	318655	54.70
25	16	-28	16.0025.028.0	210	0.26	28.0	1.2	10.7	58	318656	62.20
32	16	-28	16.0032.028.0	218	0.40	35.0	1.5	14.6	75	318657	78.00
40	16	-28	16.0040.028.0	240	0.50	42.0	1.5	18.3	58	318658	89.80
50	16	-30	16.0050.030.0	261	0.72	54.0	1.5	30.5	68	318659	107.30
65	16	-30	16.0065.030.0	275	1.40	76.1	2.0	52.5	60	318660	143.00
80	16	-30	16.0080.030.0	289	1.60	88.9	2.0	73.2	82	318661	162.00
100	16	-30	16.0100.030.0	345	2.10	108.0	2.0	115.0	92	318662	196.00

* Valid for 1,000 loading cycles

Delivery: ex stock (subject to prior sale).



Type
ARP

HYDRA axial expansion joints with external protective tube and pipe connection for pressfitting systems, pre-stretched

Material/end fittings:

Bellows made from stainless steel grade 1.4571 (AISI 316Ti) or 1.4541 (AISI 321), multi-ply, with external protective tube made from stainless steel and pipe connection stainless steel grade 1.4571 (AISI 316Ti) for pressfitting systems on both ends

Operating temperature:

to 550°C only for expansion joint, please note max. operating temperature of pressfittings used

Nominal pressure:

16 bar

Nominal diam.	Pressure rating	Nominal axial movement absorption*	Type	Length pre-stretched	Approx. weight	Pipe connection Sizes		Bellows Effective cross-section	Adjusting force rate axial	ID Nr.	€/ Unit
						Outside diameter	Wall thickness				
DN	PN	2δ _N mm	ARP ...	L ₀ mm	W kg	d mm	s mm	A cm ²	C _δ N/mm		
12	16	-20	16.0012.020.3	167	0.095	15.0	1.0	3.4	31	336346	82.60
15	16	-20	16.0015.020.3	166	0.133	18.0	1.0	4.4	63	336353	85.80
20	16	-22	16.0020.022.3	187	0.260	22.0	1.2	7.6	47	336355	88.20
25	16	-28	16.0025.028.3	210	0.336	28.0	1.2	10.7	58	336356	99.50
32	16	-28	16.0032.028.3	218	0.500	35.0	1.5	14.6	75	336360	109.80
40	16	-28	16.0040.028.3	240	0.690	42.0	1.5	18.3	58	336362	141.70
50	16	-30	16.0050.030.3	261	0.940	54.0	1.5	30.5	68	336383	180.60
65	16	-30	16.0065.030.3	275	1.105	76.1	2.0	52.5	60	336424	197.00
80	16	-30	16.0080.030.3	289	1.273	88.9	2.0	73.2	82	339891	236.00
100	16	-30	16.0100.030.3	345	1.940	108.0	2.0	115.0	92	339892	265.00

* Valid for 1,000 loading cycles



Sound
insulating

HYDRA sound insulating expansion joint, ABS/LBS series

Mechanical oscillations and vibrations occur inevitably in many types of equipment, e.g. burners, compressors, pumps, control fittings. They are, of course, transmitted via the medium being conveyed, but primarily through the connected pipes into the entire pipework system and hence into adjoining parts of the building, e.g. in the upper storeys of many residential and office buildings, where they are perceived as audible sound. A distinction is made between three different types of sound types: airborne sound, structure-borne sound and underwater sound. Effective sound insulation can only be achieved when all the sound components audible to the human ear can be reduced equally. This was the goal consistently aimed at - and realised - by the developers of the newly conceived generation of HYDRA sound insulating expansion joints of the ABS/LBS series.

The vibration energy causing the emission of sound is partly converted, by friction, into heat in the expansion joint and thus removed from the system. Our newly developed expansion joints are designed in such a way that the best possible sound reduction is achieved by way of several elements:

- Multi-ply construction: sound energy is converted into heat energy by the relative movements between the individual bellow layers and thus removed from the system.
- Outer braiding of stainless steel: here, too, the relative movements between braiding and stainless steel bellows ensure effective sound reduction.
- Tie rods set in cushions of stainless steel braiding: in the LBS expansion joint the tie rods are fixed in braided stainless steel cushions to reduce, in particular, the transmission of structure-borne sound via the tie rods.

HYDRA sound insulating expansion joints of the ABS/LBS series are primarily conceived for reducing sound: the nature of their design limits the amount of axial and lateral movement that can be accommodated.

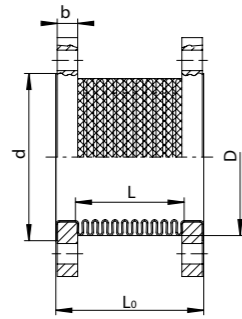
Design features

- DN 40 to DN 300
- PN 6, PN 10, PN 16 pressure ratings
- uniform length, BL = 130 mm, for all DN sizes: hence enabling convenient exchange and replacement of rubber expansion joints.
- Operating temperature -20°C to 300°C
- Bellows of stainless steel grade 1.4541, swivel lap-joint flange of steel grade 37-2
- all parts in contact with the medium made from stainless steel
- multi-ply structure of corrugations for optimum sound reduction
- two versions, with and without tie rods
- tie rods fixed in "braiding cushions" for optimum reduction of structure-borne sound transmission
- effective sound reduction through multi-ply structure of bellows and additional outer braiding
- absence of EPDM components means absolute ageing resistance

The effectiveness of the HYDRA sound insulating expansion joints has been tested and verified in studies carried out by the Fraunhofer Institute for Building Physics in Stuttgart.

Please state the following with your order:

1. Type, nominal diameter (DN), length, axial movement absorption
2. Medium



Type
ABS

HYDRA sound insulating expansion joint with swivel lap-joint flanges for absorbing vibrations and reducing sound transmission

Operating temperature:
up to 300°C

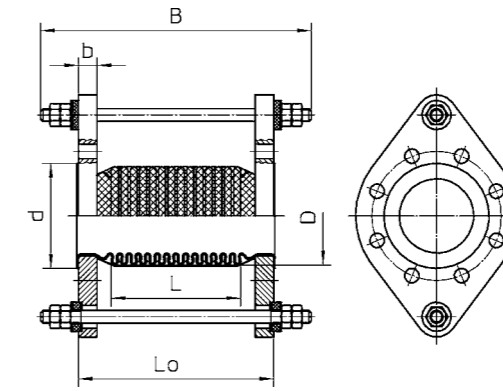
Construction/end fittings/material:
Bellows of stainless steel grade 1.4541 (AISI 321), multi-ply with stainless steel braiding and swivel steel lap-joint flange at both ends
Flange size as per DIN EN 1092-1

Nominal pressure:
6/10/16 bar

Approvals:

Nominal diam.	Pressure rating	Movement accommodation vibrations in all directions		Type	Length	Approx. weight wirt-	Bellows	Adjusting force rate		Natural frequency of bellow		ID Nr.	€/ Unit		
		axial	lateral					axial	lateral	axial	radial				
DN	PN	mm	mm	ABS ...	L ₀ mm	W kg	Effective cross-section A cm ²	axial C _δ N/mm	lateral C _λ N/mm	axial ω _a Hz	radial ω _r Hz				
40	6	3.0	1.50	06.0040.006.0	130	3.2	30.7	160	100	300	500	405575	246.00		
	16	2.0	1.00	16.0040.004.0		4.7		180	130	340	600			405596	320.00
50	6	2.5	1.20	06.0050.005.0	130	3.7	43.6	295	270	350	700	405576	293.20		
	16	2.0	1.00	16.0050.004.0		6.0		340	350	400	840			405597	354.70
65	6	2.5	1.00	06.0065.005.0	130	4.8	67.2	230	325	270	660	405578	367.10		
	16	2.0	0.80	16.0065.004.0		7.6		265	440	300	820			405598	389.80
80	6	2.0	0.70	06.0080.004.0	130	7.0	84.9	330	690	330	970	405579	396.50		
	16	2.0	0.70	16.0080.004.0		8.4		330	690	330	970			405599	417.20
100	6	2.0	0.70	06.0100.004.0	130	8.0	120.8	120	330	160	550	405580	430.70		
	16	2.0	0.50	16.0100.004.0		10.0		135	460	180	680			405600	441.20
125	6	2.0	0.50	06.0125.004.0	130	11.0	172.0	185	785	190	800	405581	463.70		
	16	2.0	0.40	16.0125.004.0		13.0		200	990	200	950			405601	471.70
150	6	2.0	0.40	06.0150.004.0	130	12.0	248.8	195	1190	180	900	405582	499.80		
	16	2.0	0.30	16.0150.004.0		17.0		215	1550	200	1100			405602	515.20
200	6	2.0	0.30	06.0200.004.0	130	17.0	408.3	275	3050	195	1330	405583	565.00		
	10	2.0	0.30	10.0200.004.0		22.0		280	3400	195	1400			405593	598.00
	16	2.0	0.20	16.0200.004.0		23.0		310	4300	220	1700			405603	630.00
250	6	2.0	0.30	06.0250.004.0	130	22.0	633.5	260	4850	165	1500	405584	721.00		
	10	2.0	0.20	10.0250.004.0		28.0		260	5430	165	1570			405594	763.00
	16	1.5	0.10	16.0250.003.0		33.0		295	7200	190	1950			405604	807.00
300	6	2.0	0.30	06.0300.004.0	130	29.0	876.2	300	7950	165	1750	405585	795.00		
	10	1.5	0.10	10.0300.003.0		32.0		300	8870	165	1840			405595	841.00
	16	1.0	0.05	16.0300.002.0		43.0		400	16900	220	3000			405605	868.00

Delivery: standard pressure ratings PN 10/16. Other sizes and types on request.



Type
LBS

HYDRA sound insulating expansion joint with tie rods and swivel lap-joint flanges for absorbing vibration and reducing sound transmission

Operating temperature:
up to 300°C

Construction/end fittings/material:
Bellows of stainless steel grade 1.4541 (AISI 321), multi-ply with stainless steel braiding and C-steel tie rods fixed insulating metal cushions, steel lap-joint flanges on both ends
Flange size as per DIN EN 1092-1

Nominal pressure:
6/10/16 bar

Approval:

Nominal diam.	Pressure rating	Movement accommodation	Type	Length	Approx. weight	Max. width	Bellows	Adjustin force rate		Natural frequency of bellow		ID Nr.	€/ Unit		
								axial	lateral	axial	radial				
DN	PN	lateral mm	LBS ...	L ₀ mm	W kg	B mm	Effective cross-section A N/mm	axial C _δ N/mm	lateral C _λ Hz	axial ω _a Hz	radial ω _r Hz				
40	6	1.50	06.0040.003.0	130	4.4	214	30.7	160	100	300	500	406134	460.80		
	16	1.00	16.0040.002.0		6.7	234		180	130	340	600			406154	516.40
50	6	1.20	06.0050.002.0	130	4.8	240	43.6	295	270	350	700	406135	511.60		
	16	1.00	16.0050.002.0		8.3	265		340	350	400	840			406155	515.90
65	6	1.00	06.0065.002.0	130	5.9	260	67.2	230	325	270	660	406136	528.20		
	16	0.80	16.0065.002.0		10.1	285		265	440	300	820			406156	545.00
80	6	0.70	06.0080.001.0	130	8.3	290	84.9	330	690	330	970	406137	534.40		
	16	0.70	16.0080.001.0		11.3	300		330	690	330	970			406157	621.00
100	6	0.70	06.0100.001.0	130	10.0	310	120.8	120	330	160	550	406138	537.50		
	16	0.50	16.0100.001.0		14.0	320		135	460	180	680			406158	639.80
125	6	0.50	06.0125.001.0	130	12.0	340	172.0	185	785	190	800	406139	550.80		
	16	0.40	16.0125.001.0		17.0	350		200	990	200	950			406159	647.70
150	6	0.40	06.0150.001.0	130	14.0	365	248.8	195	1190	180	900	406140	601.50		
	16	0.30	16.0150.001.0		22.0	413		215	1550	200	1100			406160	719.00
200	6	0.30	06.0200.001.0	130	20.0	420	408.3	275	3050	195	1330	406141	739.00		
	10	0.30	10.0200.001.0		28.0	468		280	3400	195	1400			406151	783.00
	16	0.20	16.0200.001.0		29.0	500		310	4300	220	1700			406161	968.00
250	6	0.30	06.0250.001.0	130	25.0	503	633.5	260	4850	165	1500	406142	899.00		
	10	0.20	10.0250.001.0		35.0	555		260	5430	165	1570			406152	1027.00
	16	0.10	16.0250.001.0		41.0	589		295	7200	190	1950			406162	1101.00
300	6	0.30	06.0300.001.0	130	32.0	600	876.2	300	7950	165	1750	406143	1161.00		
	10	0.10	10.0300.001.0		40.0	629		300	8870	165	1840			406153	1220.00
	16	0.05	16.0300.001.0		53.0	680		400	16900	220	3000			406163	1297.00

Delivery: standard pressure ratings PN 10/16. Other sizes and types on request.

ENQUIRY FORM FOR HOSE ASSEMBLIES

COMPANY		Enquiry No		
CONTACT	Dept.	Tel.	Fax	E-mail
PROJECT		Project-Nr./-Name		
ITEM				
QUANTITY				
TYPE DESIGNATION				
NOMINAL DIAM. DN				
NOMINAL PRESSURE PN				
NOMINAL LENGTH NL				
END FITTINGS/TYPE OR CONNECTION DIMENSIONS				
THERMAL INSULATION				
CLEANLINESS				
	<input type="checkbox"/> no special requirements			
	<input type="checkbox"/> free from oil and grease			
	<input type="checkbox"/> other (please specify)			
MEDIUM/DESIGNATION				
for acidic concentration		<input type="checkbox"/> internal	<input type="checkbox"/> external	
Additives		<input type="checkbox"/> gaseous	<input type="checkbox"/> liquid	
Condensates		<input type="checkbox"/> highly toxic	<input type="checkbox"/> toxic	
Other		<input type="checkbox"/> combustible	<input type="checkbox"/> caustic	
Flow velocity (m/s)		<input type="checkbox"/>	<input type="checkbox"/>	
PRESSURE (overpressure) in bar				<input type="checkbox"/> internal
				<input type="checkbox"/> external
Operating pressure:		<input type="checkbox"/> constant	<input type="checkbox"/> intermittent	
Design pressure (if applicable)				
Test pressure				
TEMPERATURE in °C		Operating temperature		
		Design temperature		
MOVEMENT ACCOMMODATION		<input type="checkbox"/> axial		
		<input type="checkbox"/> angular		
		<input type="checkbox"/> lateral		
LOADING CYCLES		<input type="checkbox"/> standard = 1,000		
		<input type="checkbox"/> for drinking water = 10,000		
VIBRATIONS		Amplitude (mm)		
		Frequency (Hz)		
		Direction		
		<input type="checkbox"/> axial	<input type="checkbox"/> radial	<input type="checkbox"/> all directions
MATERIAL		Bellows		
		End fittings		
DESIGN REGULATIONS				
ACCEPTANCE REGULATIONS/CERTIFICATION				
MISCELLANEOUS/REMARKS				
Date	Signature			Sheet No.

If acceptance to **Pressure Equipment Directive 97/23/EEC** is necessary, please use the form on p. 54.

ENQUIRY FORM FOR EXPANSION JOINTS

COMPANY		Enquiry No		
CONTACT	Dept.	Tel.	Fax	E-mail
PROJECT		Project-Nr./-Name		
ITEM				
QUANTITY				
TYPE DESIGNATION				
NOMINAL DIAM. DN				
NOMINAL PRESSURE PN				
NOMINAL LENGTH NL				
END FITTINGS/TYPE OR CONNECTION DIMENSIONS				
MEDIUM/DESIGNATION				
for acidic concentration		<input type="checkbox"/> internal	<input type="checkbox"/> external	
Additives		<input type="checkbox"/> gaseous	<input type="checkbox"/> liquid	
Condensates		<input type="checkbox"/> highly toxic	<input type="checkbox"/> toxic	
Other		<input type="checkbox"/> combustible	<input type="checkbox"/> caustic	
Flow velocity (m/s)		<input type="checkbox"/>	<input type="checkbox"/>	
PRESSURE (overpressure) in bar				<input type="checkbox"/> internal
				<input type="checkbox"/> external
Operating pressure:		<input type="checkbox"/> constant	<input type="checkbox"/> intermittent	
Design pressure (if applicable)				
Test pressure				
TEMPERATURE in °C		Operating temperature		
		Design temperature		
MOVEMENT ACCOMMODATION		<input type="checkbox"/> axial		
		<input type="checkbox"/> angular		
		<input type="checkbox"/> lateral		
LOADING CYCLES		<input type="checkbox"/> standard = 1,000		
		<input type="checkbox"/> for drinking water = 10,000		
VIBRATIONS		Amplitude (mm)		
		Frequency (Hz)		
		Direction		
		<input type="checkbox"/> axial	<input type="checkbox"/> radial	<input type="checkbox"/> all directions
MATERIAL		Bellows		
		End fittings		
DESIGN REGULATIONS				
ACCEPTANCE REGULATIONS/CERTIFICATION				
MISCELLANEOUS/REMARKS				
Date	Signature			Sheet No.

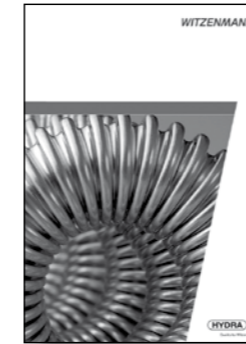
If acceptance to **Pressure Equipment Directive 97/23/EEC** is necessary, please use the form on p. 54.

ENQUIRY FORM FOR HOSE ASSEMBLIES & EXPANSION JOINTS
FOR ACCEPTANCE TO PRESSURE EQUIPMENT DIRECTIVE 97/23/EEC

ADDITIONAL INFORMATION

Documentation for our other products can be directly obtained from:
E-Mail: prospekte@witzenmann.com, Fax: +49-(0)7231-581-820

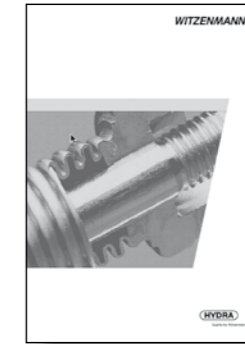
COMPANY		Enquiry No		
CONTACT	Dept.	Tel.	Fax	E-mail
PROJECT		Project-Nr./-Name		
DESCRIPTION & DESIGN DATA FOR COMPLETE SYSTEM				
COMPLETE SYSTEM	CATEGORY	MODULE		
	TYPE OF PRESSURE EQUIPMENT	<input type="checkbox"/> pressure vessel <input type="checkbox"/> pipeline <input type="checkbox"/> hot water appliance/steam generator <input type="checkbox"/> pressure-retaining appliance		
	MEDIUM	DESIGNATION		
		<input type="checkbox"/> hazardous/group 1 <input type="checkbox"/> gaseous/liquid pD > 0,5 bar	<input type="checkbox"/> other/group 2 <input type="checkbox"/> gaseous/liquid pD < 0,5 bar	
DESIGN	max. permissible pressure	PS		
	min./max. permissible temperature	TS		
	Volume	V		
OPERATING DATA	p _{min} =	p _{max} =		
	t _{min} =	t _{max} =		
DESCRIPTION OF HOSE ASSEMBLY OR EXPANSION JOINT SELECTED				
ITEM				
QUANTITY				
TYPE DESIGNATION				
NOMINAL DIAM. DN				
NOMINAL PRESSURE PN				
NOMINAL LENGTH NL mm/BAULÄNGE mm				
END FITTINGS/TYPE OR CONNECTION DIMENSIONS				
MATERIAL	Metal hose			
	Braiding			
	Bellows			
	End fittings			
METAL HOSE				
MOVEMENT	Type and magnitude			
FORM OF INSTALLATION (include sketch if possible)	<input type="checkbox"/> 180°bend		<input type="checkbox"/> 90°bend	
<input type="checkbox"/> straight				
LOADING CYCLES/YEAR				
EXPANSION JOINT				
Movement accommodation	<input type="checkbox"/> axial			
	<input type="checkbox"/> angular			
	<input type="checkbox"/> lateral			
LOADING CYCLES	<input type="checkbox"/> standard = 1,000			
	<input type="checkbox"/> for drinking water = 10,000			
VIBRATIONS	Amplitude (mm)			
	Frequency (Hz)			
	Direction	<input type="checkbox"/> axial		<input type="checkbox"/> radial
		<input type="checkbox"/> all directions		
Date	Signature			Sheet No.



The metal hose manual
No. 0301



The expansion joint manual
No. 0501



The metal bellows manual
No. 0441



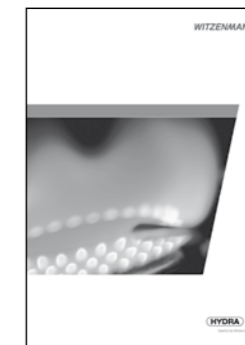
Systems for ventilation technology
No. 3322



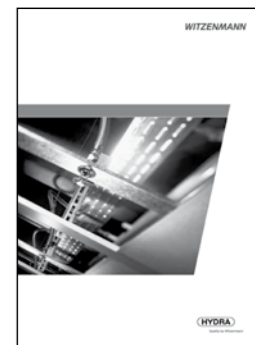
Systems for exhaust technology
No. 3320



Shower hoses
No. 8701



Flexible gas hoses
No. 3356



Fire protection
No. 3366



Product information for metal hoses
No. 0339



Product information for expansion joints
No. 0554



Product information for metal bellows
No. 0459



Product information for pipe supports
No. 0755