

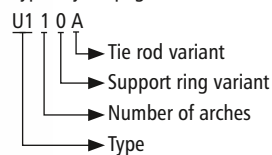
## U110A

NB 100 – NB 4000



- ▶ **Type U110A**  
without vacuum support ring
- ▶ **Type U111A**  
with internal vacuum support ring
- ▶ **Type U112A**  
with embedded vacuum support ring

Type key ▶ page 20



## Universal expansion joint with one arch

- Design:** Highly elastic, hydrodynamic, single-arch rubber bellows with full faced rubber flanges and backing flanges with support collar  
Optionally with vacuum support ring
- Nominal diameters:** NB 100 to NB 4000, intermediate sizes possible
- Installation length:** Standard  $L_e = 150$  to  $400$  mm (▶ page 62–67)  
Other installation lengths on request
- Pressure:** Depending on the nominal diameter up to 25 bar  
Vacuum-proof up to 0.8 bar absolute, with vacuum support ring up to 0.05 bar absolute  
Design in accordance with Pressure Equipment Directive PED 97/23/EC
- Movement:** For large axial, lateral and angular movements (▶ page 62–67)
- Stiffness rate:** Axial and lateral stiffness rates (▶ page 62–67)

### Application:

Cooling water systems, desalination plants, drinking water supply, plant constructions e. g. in pipelines, on pumps, as dismantling joints, on condensers and vessels



## Rubber bellows

Rubber grades			Carrier
up to 100 °C:	EPDM	Cooling water, hot water, seawater, acids, dilute chlorine compounds	Nylon fabric Polyester fabric Kevlar fabric Glass fibre fabric Steel mesh
	EPDM, drinking water approved	Drinking water	
	EPDM, white, food grade	Foodstuffs	
	EPDM, abrasion-resistant	Abrasive materials, Water-sand extraction	
	EPDM, insulating	Electrical systems construction	
	IIR	Hot water, acids, bases, gases	
	CSM	Strong acids, bases, chemicals	
	NBR	Oils, petrol, solvents, compressed air	
	NBR, bright, food grade	Oil, fatty foods	
up to 80 °C:	CR	Cooling water, slightly oily water, seawater	
up to 70 °C:	NR	Abrasive materials	
up to 150 °C:	HNBR	Oils, petrol, solvents, compressed air	
up to 180 °C:	FPM	Corrosive chemicals, petroleum distillates	
up to 200 °C:	Silicon (Q)	Air, saltwater atmosphere	
	Silicon (Q), white, food grade	Foodstuffs, medical technology	
PTFE lining:	Permanently embedded against chemical attacks on the interior at the rubber bellows, available starting at NB 300. Take the restriction of the listed movement into account (▶ page 62–67)		




## Flanges

<b>Design:</b>	Single-part or multi-part, round backing flanges with support collar and clearance holes
<b>Flange norms:</b>	DIN, ANSI, AWWA, BS, JIS, special measurements (▶ page 280)
<b>Materials:</b>	Carbon steel: 1.0038 (S235JRG2) 1.0570 (S355J2G3) Stainless steel: 1.4301 (X5CrNi18-10) 1.4571 (X6CrNiMoTi17-12-2) Aluminium: AlMg3 Other materials on request
<b>Coating:</b>	Primed, hot-dip galvanised, special paint

## Optional accessories

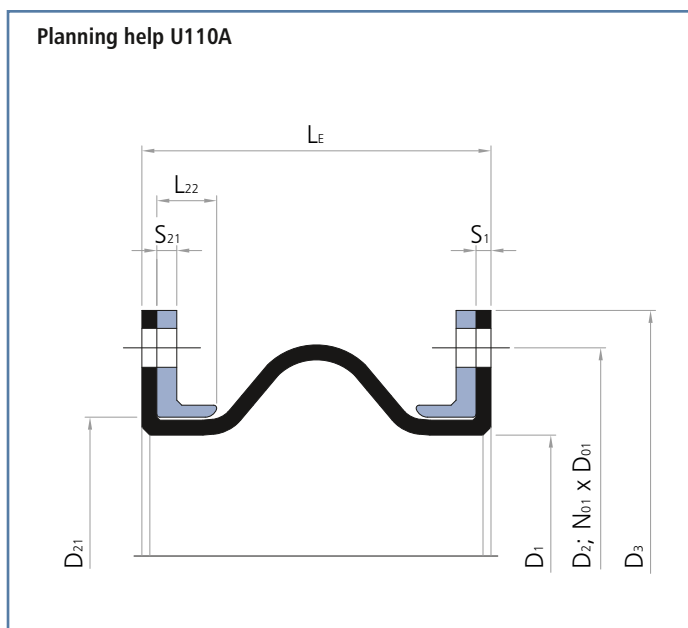
<b>Protective covers:</b>	UV protection cover Ground protective cover Fire protection cover (▶ page 50)
<b>Flow liners:</b>	Cylindrical flow liner Conical flow liner Telescoping flow liner (▶ page 49)

## Support rings

TYPE		Vacuum support ring	Pressure	Movement
U110A		Without	Depending on the nominal diameter up to 25 bar, for vacuum up to 0.8 bar absolute	▶ page 62
U111A		Medium contact, inside the arch apex	Depending on the nominal diameter up to 25 bar, for vacuum up to 0.05 bar absolute	▶ page 64
U112A		No medium contact, embedded into the arch apex of the rubber bellows	Depending on the nominal diameter up to 25 bar, for vacuum up to 0.05 bar absolute	▶ page 66

### Materials

Stainless steel:	1.4301 (X5CrNi18-10) 1.4539 (X1NiCrMoCu25-20-5) 1.4571 (X6CrNiMoTi17-12-2)	Other materials on request
Carbon steel:	1.0570 (S355J2G3) rubber coated	





Lateral expansion joint type U110R  
on the pump discharge side  
Universal expansion joint type U110A  
on the pump suction side of a lye pipe  
in a paper mill  
NB 125, 5 bar



# U110A

▶ without vacuum support ring



## Installation length ( $L_E$ ) at design pressure

NB	up to 10 bar $L_E = 150$ mm					up to 10 bar $L_E = 200$ mm					up to 10 bar $L_E = 250$ mm				
	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>
	mm	mm	±mm	±°		mm	mm	±mm	±°		mm	mm	±mm	±°	
100	31	10	19	11.3	177	40	20	28	21.8	254	44	20	30	21.8	260
125	31	10	19	9.1	241	40	20	28	17.7	330	44	20	30	17.7	337
150	31	10	18	7.6	314	40	20	27	14.9	415	44	20	29	14.9	423
175	31	10	18	6.5	415	40	20	27	12.9	531	44	20	29	12.9	539
200	31	10	18	5.7	491	40	20	26	11.3	616	44	20	29	11.3	625
250	31	10	18	4.6	707	40	20	26	9.1	855	44	20	28	9.1	866
300	31	10	17	3.8	973	40	20	26	7.6	1,146	44	20	27	7.6	1,158
350	31	10	17	3.3	1,288	40	20	25	6.5	1,486	44	20	27	6.5	1,500
400	31	10	17	2.9	1,605	40	20	25	5.7	1,825	44	20	27	5.7	1,840
450	31	10	17	2.5	1,987	40	20	25	5.1	2,231	44	20	26	5.1	2,248
500	31	10	17	2.3	2,402	40	20	24	4.6	2,669	44	20	26	4.6	2,688
550	31	10	16	2.1	2,827	40	20	24	4.2	3,117	44	20	26	4.2	3,137
600	31	10	16	1.9	3,349	40	20	24	3.8	3,664	44	20	26	3.8	3,685
650	31	10	16	1.8	3,848	40	20	24	3.5	4,185	44	20	26	3.5	4,208
700	31	10	16	1.6	4,465	40	20	24	3.3	4,827	44	20	25	3.3	4,852
750	31	10	16	1.5	5,027	40	20	23	3.1	5,411	44	20	25	3.1	5,437
800	31	10	16	1.4	5,741	40	20	23	2.9	6,151	44	20	25	2.9	6,179
850	31	10	16	1.3	6,362	40	20	23	2.7	6,793	44	20	25	2.7	6,822
900	31	10	16	1.3	7,163	40	20	23	2.5	7,620	44	20	25	2.5	7,651
950	31	10	16	1.2	7,854	40	20	23	2.4	8,332	44	20	25	2.4	8,365
1000	31	10	16	1.1	8,742	40	20	23	2.3	9,246	44	20	25	2.3	9,280
1050	31	10	15	1.1	9,503	40	20	23	2.2	10,029	44	20	25	2.2	10,064
1100	31	10	15	1.0	10,496	40	20	23	2.1	11,047	44	20	24	2.1	11,085
1150	31	10	15	1.0	11,310	40	20	23	2.0	11,882	44	20	24	2.0	11,921
1200	31	10	15	1.0	12,370	40	20	22	1.9	12,969	44	20	24	1.9	13,009
1250	31	10	15	0.9	13,273	40	20	22	1.8	13,893	44	20	24	1.8	13,935
1300	31	10	15	0.9	14,420	40	20	22	1.8	15,066	44	20	24	1.8	15,109
1350	31	10	15	0.8	15,394	40	20	22	1.7	16,061	44	20	24	1.7	16,106
1400	31	10	15	0.8	16,627	40	20	22	1.6	17,320	44	20	24	1.6	17,366
1450	31	10	15	0.8	17,671	40	20	22	1.6	18,385	44	20	24	1.6	18,433
1500	31	10	15	0.8	18,991	40	20	22	1.5	19,731	44	20	24	1.5	19,781
1600	31	10	15	0.7	21,512	40	20	22	1.4	22,299	44	20	24	1.4	22,352
1650	31	10	15	0.7	22,698	40	20	22	1.4	23,506	44	20	24	1.4	23,561
1700	31	10	15	0.7	24,190	40	20	22	1.3	25,025	44	20	23	1.3	25,081
1800	31	10	15	0.6	27,055	40	20	22	1.3	27,937	44	20	23	1.3	27,996
1900	31	10	15	0.6	30,018	40	20	22	1.2	30,946	44	20	23	1.2	31,009
1950	31	10	15	0.6	31,416	40	20	22	1.2	32,365	44	20	23	1.2	32,429
2000	31	10	15	0.6	33,168	40	20	21	1.1	34,143	44	20	23	1.1	34,209
2100	31	10	15	0.5	36,474	40	20	21	1.1	37,497	44	20	23	1.1	37,565
2200	31	10	14	0.5	39,938	40	20	21	1.0	41,007	44	20	23	1.0	41,079
2250	31	10	14	0.5	41,548	40	20	21	1.0	42,638	44	20	23	1.0	42,712
2300	31	10	14	0.5	43,558	40	20	21	1.0	44,675	44	20	23	1.0	44,750
2400	31	10	14	0.5	47,336	40	20	21	1.0	48,500	44	20	23	1.0	48,578
2500	31	10	14	0.5	51,271	40	20	21	0.9	52,482	44	20	23	0.9	52,563
2550	31	10	14	0.4	53,093	40	20	21	0.9	54,325	44	20	23	0.9	54,408
2600	31	10	14	0.4	55,363	40	20	21	0.9	56,621	44	20	23	0.9	56,706
2700	31	10	14	0.4	59,612	40	20	21	0.8	60,917	44	20	23	0.8	61,005
2800	31	10	14	0.4	64,018	40	20	21	0.8	65,370	44	20	22	0.8	65,461
2850	31	10	14	0.4	66,052	40	20	21	0.8	67,426	44	20	22	0.8	67,518
2900	31	10	14	0.4	68,581	40	20	21	0.8	69,981	44	20	22	0.8	70,075
3000	31	10	14	0.4	73,301	40	20	21	0.8	74,748	44	20	22	0.8	74,845
3100	31	10	14	0.4	78,179	40	20	21	0.7	79,673	44	20	22	0.7	79,773
3150	31	10	14	0.4	80,425	40	20	21	0.7	81,940	44	20	22	0.7	82,041
3200	31	10	14	0.4	83,213	40	20	21	0.7	84,754	44	20	22	0.7	84,857
3300	31	10	14	0.3	88,405	40	20	21	0.7	89,993	44	20	22	0.7	90,099
3400	31	10	14	0.3	93,753	40	20	20	0.7	95,388	44	20	22	0.7	95,498
3450	31	10	14	0.3	96,211	40	20	20	0.7	97,868	44	20	22	0.7	97,979
3600	31	10	14	0.3	104,922	40	20	20	0.6	106,651	44	20	22	0.6	106,767
3800	31	10	14	0.3	116,718	40	20	20	0.6	118,542	44	20	22	0.6	118,664
4000	31	10	14	0.3	129,143	40	20	20	0.6	131,061	44	20	22	0.6	131,190

Recommended sizes

Additional possible sizes

Reduction of movement for expansion joints with PTFE lining:

axial compression: -33 %; axial extension: -66 %; lateral displacement: -50 %; angular movement: -66 %.

When the axial compression and extension is changed to the mean value, it is possible to increase the angular movement (for values see type U110F).

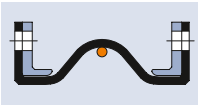
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 29).

For larger movements see type U120A or U123A.


**Installation length (L<sub>E</sub>) at design pressure**

up to 10 bar L <sub>E</sub> = 300 mm					up to 10 bar L <sub>E</sub> = 350 mm					up to 10 bar L <sub>E</sub> = 400 mm					NB
higher pressures on request															
Movement				A	Movement				A	Movement				A	
mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>	
53	31	39	31.8	353	69	43	53	40.7	491	78	53	62	46.7	616	100
53	31	39	26.4	441	69	43	51	34.5	594	78	53	60	40.3	731	125
53	31	38	22.5	539	69	43	51	29.8	707	78	53	59	35.2	855	150
53	31	37	19.5	670	69	43	50	26.2	855	78	53	58	31.2	1,018	175
53	31	37	17.2	765	69	43	49	23.3	962	78	53	58	27.9	1,134	200
53	31	36	13.9	1,029	69	43	48	19.0	1,257	78	53	57	23.0	1,452	250
53	31	36	11.7	1,346	69	43	48	16.0	1,605	78	53	56	19.5	1,825	300
53	31	35	10.0	1,713	69	43	47	13.8	2,003	78	53	55	16.8	2,248	350
53	31	35	8.8	2,075	69	43	46	12.1	2,393	78	53	54	14.8	2,660	400
53	31	34	7.8	2,507	69	43	46	10.8	2,856	78	53	54	13.3	3,147	450
53	31	34	7.1	2,971	69	43	45	9.8	3,349	78	53	53	12.0	3,664	500
53	31	34	6.4	3,442	69	43	45	8.9	3,848	78	53	53	10.9	4,185	550
53	31	33	5.9	4,015	69	43	45	8.2	4,453	78	53	52	10.0	4,815	600
53	31	33	5.4	4,560	69	43	44	7.5	5,027	78	53	52	9.3	5,411	650
53	31	33	5.1	5,230	69	43	44	7.0	5,728	78	53	52	8.6	6,138	700
53	31	33	4.7	5,836	69	43	44	6.5	6,362	78	53	51	8.0	6,793	750
53	31	33	4.4	6,604	69	43	43	6.1	7,163	78	53	51	7.5	7,620	800
53	31	32	4.2	7,268	69	43	43	5.8	7,854	78	53	51	7.1	8,332	850
53	31	32	3.9	8,123	69	43	43	5.5	8,742	78	53	50	6.7	9,246	900
53	31	32	3.7	8,858	69	43	43	5.2	9,503	78	53	50	6.4	10,029	950
53	31	32	3.5	9,799	69	43	43	4.9	10,477	78	53	50	6.1	11,029	1000
53	31	32	3.4	10,605	69	43	42	4.7	11,310	78	53	50	5.8	11,882	1050
53	31	32	3.2	11,652	69	43	42	4.5	12,390	78	53	49	5.5	12,989	1100
53	31	32	3.1	12,509	69	43	42	4.3	13,273	78	53	49	5.3	13,893	1150
53	31	31	3.0	13,623	69	43	42	4.1	14,420	78	53	49	5.0	15,066	1200
53	31	31	2.8	14,569	69	43	42	3.9	15,394	78	53	49	4.8	16,061	1250
53	31	31	2.7	15,770	69	43	42	3.8	16,627	78	53	49	4.7	17,320	1300
53	31	31	2.6	16,787	69	43	41	3.6	17,671	78	53	49	4.5	18,385	1350
53	31	31	2.5	18,074	69	43	41	3.5	18,991	78	53	48	4.3	19,731	1400
53	31	31	2.4	19,162	69	43	41	3.4	20,106	78	53	48	4.2	20,867	1450
53	31	31	2.4	20,536	69	43	41	3.3	21,512	78	53	48	4.0	22,299	1500
53	31	31	2.2	23,154	69	43	41	3.1	24,190	78	53	48	3.8	25,025	1600
53	31	31	2.2	24,384	69	43	41	3.0	25,447	78	53	48	3.7	26,302	1650
53	31	30	2.1	25,930	69	43	41	2.9	27,026	78	53	48	3.6	27,907	1700
53	31	30	2.0	28,893	69	43	40	2.7	30,049	78	53	47	3.4	30,978	1800
53	31	30	1.9	31,952	69	43	40	2.6	33,168	78	53	47	3.2	34,143	1900
53	31	30	1.8	33,394	69	43	40	2.5	34,636	78	53	47	3.1	35,633	1950
53	31	30	1.8	35,199	69	43	40	2.5	36,474	78	53	47	3.0	37,497	2000
53	31	30	1.7	38,603	69	43	40	2.3	39,938	78	53	47	2.9	41,007	2100
53	31	30	1.6	42,164	69	43	40	2.2	43,558	78	53	46	2.8	44,675	2200
53	31	30	1.6	43,818	69	43	40	2.2	45,239	78	53	46	2.7	46,377	2250
53	31	30	1.5	45,882	69	43	40	2.1	47,336	78	53	46	2.6	48,500	2300
53	31	29	1.5	49,757	69	43	39	2.1	51,271	78	53	46	2.5	52,482	2400
53	31	29	1.4	53,789	69	43	39	2.0	55,363	78	53	46	2.4	56,621	2500
53	31	29	1.4	55,655	69	43	39	1.9	57,256	78	53	46	2.4	58,535	2550
53	31	29	1.4	57,979	69	43	39	1.9	59,612	78	53	46	2.3	60,917	2600
53	31	29	1.3	62,325	69	43	39	1.8	64,018	78	53	46	2.2	65,370	2700
53	31	29	1.3	66,829	69	43	39	1.8	68,581	78	53	45	2.2	69,981	2800
53	31	29	1.2	68,906	69	43	39	1.7	70,686	78	53	45	2.1	72,107	2850
53	31	29	1.2	71,489	69	43	39	1.7	73,301	78	53	45	2.1	74,748	2900
53	31	29	1.2	76,307	69	43	39	1.6	78,179	78	53	45	2.0	79,673	3000
53	31	29	1.1	81,282	69	43	38	1.6	83,213	78	53	45	2.0	84,754	3100
53	31	29	1.1	83,571	69	43	38	1.6	85,530	78	53	45	1.9	87,092	3150
53	31	29	1.1	86,413	69	43	38	1.5	88,405	78	53	45	1.9	89,993	3200
53	31	29	1.1	91,702	69	43	38	1.5	93,753	78	53	45	1.8	95,388	3300
53	31	29	1.0	97,148	69	43	38	1.4	99,259	78	53	45	1.8	100,941	3400
53	31	29	1.0	99,650	69	43	38	1.4	101,788	78	53	45	1.8	103,491	3450
53	31	28	1.0	108,511	69	43	38	1.4	110,741	78	53	44	1.7	112,518	3600
53	31	28	0.9	120,503	69	43	38	1.3	122,852	78	53	44	1.6	124,723	3800
53	31	28	0.9	133,123	69	43	38	1.2	135,591	78	53	44	1.5	137,556	4000

Individual fabrication possible



# U111A

▶ with internal vacuum support ring



## Installation length ( $L_E$ ) at design pressure

NB	up to 10 bar $L_E = 150$ mm					up to 10 bar $L_E = 200$ mm					up to 10 bar $L_E = 250$ mm				
	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>
	mm	mm	±mm	±°		mm	mm	±mm	±°		mm	mm	±mm	±°	
100	31	3	13	3.4	177	40	7	19	8.0	254	44	7	20	8.0	260
125	31	3	12	2.7	241	40	7	18	6.4	330	44	7	20	6.4	337
150	31	3	12	2.3	314	40	7	18	5.3	415	44	7	19	5.3	423
175	31	3	12	2.0	415	40	7	18	4.6	531	44	7	19	4.6	539
200	31	3	12	1.7	491	40	7	17	4.0	616	44	7	19	4.0	625
250	31	3	12	1.4	707	40	7	17	3.2	855	44	7	18	3.2	866
300	31	3	11	1.1	973	40	7	17	2.7	1,146	44	7	18	2.7	1,158
350	31	3	11	1.0	1,288	40	7	17	2.3	1,486	44	7	18	2.3	1,500
400	31	3	11	0.9	1,605	40	7	16	2.0	1,825	44	7	18	2.0	1,840
450	31	3	11	0.8	1,987	40	7	16	1.8	2,231	44	7	17	1.8	2,248
500	31	3	11	0.7	2,402	40	7	16	1.6	2,669	44	7	17	1.6	2,688
550	31	3	11	0.6	2,827	40	7	16	1.5	3,117	44	7	17	1.5	3,137
600	31	3	11	0.6	3,349	40	7	16	1.3	3,664	44	7	17	1.3	3,685
650	31	3	11	0.5	3,848	40	7	16	1.2	4,185	44	7	17	1.2	4,208
700	31	3	11	0.5	4,465	40	7	16	1.1	4,827	44	7	17	1.1	4,852
750	31	3	11	0.5	5,027	40	7	15	1.1	5,411	44	7	17	1.1	5,437
800	31	3	10	0.4	5,741	40	7	15	1.0	6,151	44	7	17	1.0	6,179
850	31	3	10	0.4	6,362	40	7	15	0.9	6,793	44	7	16	0.9	6,822
900	31	3	10	0.4	7,163	40	7	15	0.9	7,620	44	7	16	0.9	7,651
950	31	3	10	0.4	7,854	40	7	15	0.8	8,332	44	7	16	0.8	8,365
1000	31	3	10	0.3	8,742	40	7	15	0.8	9,246	44	7	16	0.8	9,280
1050	31	3	10	0.3	9,503	40	7	15	0.8	10,029	44	7	16	0.8	10,064
1100	31	3	10	0.3	10,496	40	7	15	0.7	11,047	44	7	16	0.7	11,085
1150	31	3	10	0.3	11,310	40	7	15	0.7	11,882	44	7	16	0.7	11,921
1200	31	3	10	0.3	12,370	40	7	15	0.7	12,969	44	7	16	0.7	13,009
1250	31	3	10	0.3	13,273	40	7	15	0.6	13,893	44	7	16	0.6	13,935
1300	31	3	10	0.3	14,420	40	7	15	0.6	15,066	44	7	16	0.6	15,109
1350	31	3	10	0.3	15,394	40	7	15	0.6	16,061	44	7	16	0.6	16,106
1400	31	3	10	0.2	16,627	40	7	15	0.6	17,320	44	7	16	0.6	17,366
1450	31	3	10	0.2	17,671	40	7	15	0.6	18,385	44	7	16	0.6	18,433
1500	31	3	10	0.2	18,991	40	7	15	0.5	19,731	44	7	16	0.5	19,781
1600	31	3	10	0.2	21,512	40	7	14	0.5	22,299	44	7	16	0.5	22,352
1650	31	3	10	0.2	22,698	40	7	14	0.5	23,506	44	7	16	0.5	23,561
1700	31	3	10	0.2	24,190	40	7	14	0.5	25,025	44	7	15	0.5	25,081
1800	31	3	10	0.2	27,055	40	7	14	0.4	27,937	44	7	15	0.4	27,996
1900	31	3	10	0.2	30,018	40	7	14	0.4	30,946	44	7	15	0.4	31,009
1950	31	3	10	0.2	31,416	40	7	14	0.4	32,365	44	7	15	0.4	32,429
2000	31	3	10	0.2	33,168	40	7	14	0.4	34,143	44	7	15	0.4	34,209
2100	31	3	10	0.2	36,474	40	7	14	0.4	37,497	44	7	15	0.4	37,565
2200	31	3	10	0.2	39,938	40	7	14	0.4	41,007	44	7	15	0.4	41,079
2250	31	3	10	0.2	41,548	40	7	14	0.4	42,638	44	7	15	0.4	42,712
2300	31	3	10	0.1	43,558	40	7	14	0.3	44,675	44	7	15	0.3	44,750
2400	31	3	9	0.1	47,336	40	7	14	0.3	48,500	44	7	15	0.3	48,578
2500	31	3	9	0.1	51,271	40	7	14	0.3	52,482	44	7	15	0.3	52,563
2550	31	3	9	0.1	53,093	40	7	14	0.3	54,325	44	7	15	0.3	54,408
2600	31	3	9	0.1	55,363	40	7	14	0.3	56,621	44	7	15	0.3	56,706
2700	31	3	9	0.1	59,612	40	7	14	0.3	60,917	44	7	15	0.3	61,005
2800	31	3	9	0.1	64,018	40	7	14	0.3	65,370	44	7	15	0.3	65,461
2850	31	3	9	0.1	66,052	40	7	14	0.3	67,426	44	7	15	0.3	67,518
2900	31	3	9	0.1	68,581	40	7	14	0.3	69,981	44	7	15	0.3	70,075
3000	31	3	9	0.1	73,301	40	7	14	0.3	74,748	44	7	15	0.3	74,845
3100	31	3	9	0.1	78,179	40	7	14	0.3	79,673	44	7	15	0.3	79,773
3150	31	3	9	0.1	80,425	40	7	14	0.3	81,940	44	7	15	0.3	82,041
3200	31	3	9	0.1	83,213	40	7	14	0.3	84,754	44	7	15	0.3	84,857
3300	31	3	9	0.1	88,405	40	7	14	0.2	89,993	44	7	15	0.2	90,099
3400	31	3	9	0.1	93,753	40	7	14	0.2	95,388	44	7	15	0.2	95,498
3450	31	3	9	0.1	96,211	40	7	13	0.2	97,868	44	7	15	0.2	97,979
3600	31	3	9	0.1	104,922	40	7	13	0.2	106,651	44	7	14	0.2	106,767
3800	31	3	9	0.1	116,718	40	7	13	0.2	118,542	44	7	14	0.2	118,664
4000	31	3	9	0.1	129,143	40	7	13	0.2	131,061	44	7	14	0.2	131,190

Recommended sizes

Additional possible sizes

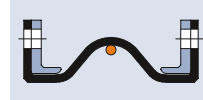
Reduction of movement for expansion joints with PTFE lining:

axial compression: -33 %; axial extension: -0 %; lateral displacement: -25 %; angular movement: -0 %.

When axial compression and extension are changed to the mean value, it is possible to increase the angular movement (for values see type U111F).

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 29).

For larger movements see type U121A or U124A.


**Installation length (L<sub>E</sub>) at design pressure**

up to 10 bar L <sub>E</sub> = 300 mm					up to 10 bar L <sub>E</sub> = 350 mm					up to 10 bar L <sub>E</sub> = 400 mm					NB
higher pressures on request															
Movement				A	Movement				A	Movement				A	
mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>	
53	10	26	11.3	353	69	14	35	15.6	491	78	17	41	18.8	616	100
53	10	25	9.1	441	69	14	34	12.6	594	78	17	40	15.2	731	125
53	10	25	7.6	539	69	14	33	10.6	707	78	17	39	12.8	855	150
53	10	25	6.5	670	69	14	33	9.1	855	78	17	39	11.0	1,018	175
53	10	24	5.7	765	69	14	33	8.0	962	78	17	38	9.6	1,134	200
53	10	24	4.6	1,029	69	14	32	6.4	1,257	78	17	37	7.7	1,452	250
53	10	24	3.8	1,346	69	14	31	5.3	1,605	78	17	37	6.5	1,825	300
53	10	23	3.3	1,713	69	14	31	4.6	2,003	78	17	36	5.5	2,248	350
53	10	23	2.9	2,075	69	14	31	4.0	2,393	78	17	36	4.9	2,660	400
53	10	23	2.5	2,507	69	14	30	3.6	2,856	78	17	35	4.3	3,147	450
53	10	22	2.3	2,971	69	14	30	3.2	3,349	78	17	35	3.9	3,664	500
53	10	22	2.1	3,442	69	14	30	2.9	3,848	78	17	35	3.5	4,185	550
53	10	22	1.9	4,015	69	14	29	2.7	4,453	78	17	35	3.2	4,815	600
53	10	22	1.8	4,560	69	14	29	2.5	5,027	78	17	34	3.0	5,411	650
53	10	22	1.6	5,230	69	14	29	2.3	5,728	78	17	34	2.8	6,138	700
53	10	22	1.5	5,836	69	14	29	2.1	6,362	78	17	34	2.6	6,793	750
53	10	22	1.4	6,604	69	14	29	2.0	7,163	78	17	34	2.4	7,620	800
53	10	21	1.3	7,268	69	14	29	1.9	7,854	78	17	33	2.3	8,332	850
53	10	21	1.3	8,123	69	14	28	1.8	8,742	78	17	33	2.2	9,246	900
53	10	21	1.2	8,858	69	14	28	1.7	9,503	78	17	33	2.0	10,029	950
53	10	21	1.1	9,799	69	14	28	1.6	10,477	78	17	33	1.9	11,029	1000
53	10	21	1.1	10,605	69	14	28	1.5	11,310	78	17	33	1.9	11,882	1050
53	10	21	1.0	11,652	69	14	28	1.5	12,390	78	17	33	1.8	12,989	1100
53	10	21	1.0	12,509	69	14	28	1.4	13,273	78	17	33	1.7	13,893	1150
53	10	21	1.0	13,623	69	14	28	1.3	14,420	78	17	32	1.6	15,066	1200
53	10	21	0.9	14,569	69	14	28	1.3	15,394	78	17	32	1.6	16,061	1250
53	10	21	0.9	15,770	69	14	27	1.2	16,627	78	17	32	1.5	17,320	1300
53	10	21	0.8	16,787	69	14	27	1.2	17,671	78	17	32	1.4	18,385	1350
53	10	20	0.8	18,074	69	14	27	1.1	18,991	78	17	32	1.4	19,731	1400
53	10	20	0.8	19,162	69	14	27	1.1	20,106	78	17	32	1.3	20,867	1450
53	10	20	0.8	20,536	69	14	27	1.1	21,512	78	17	32	1.3	22,299	1500
53	10	20	0.7	23,154	69	14	27	1.0	24,190	78	17	32	1.2	25,025	1600
53	10	20	0.7	24,384	69	14	27	1.0	25,447	78	17	31	1.2	26,302	1650
53	10	20	0.7	25,930	69	14	27	0.9	27,026	78	17	31	1.1	27,907	1700
53	10	20	0.6	28,893	69	14	27	0.9	30,049	78	17	31	1.1	30,978	1800
53	10	20	0.6	31,952	69	14	27	0.8	33,168	78	17	31	1.0	34,143	1900
53	10	20	0.6	33,394	69	14	26	0.8	34,636	78	17	31	1.0	35,633	1950
53	10	20	0.6	35,199	69	14	26	0.8	36,474	78	17	31	1.0	37,497	2000
53	10	20	0.5	38,603	69	14	26	0.8	39,938	78	17	31	0.9	41,007	2100
53	10	20	0.5	42,164	69	14	26	0.7	43,558	78	17	31	0.9	44,675	2200
53	10	20	0.5	43,818	69	14	26	0.7	45,239	78	17	31	0.9	46,377	2250
53	10	20	0.5	45,882	69	14	26	0.7	47,336	78	17	31	0.8	48,500	2300
53	10	19	0.5	49,757	69	14	26	0.7	51,271	78	17	30	0.8	52,482	2400
53	10	19	0.5	53,789	69	14	26	0.6	55,363	78	17	30	0.8	56,621	2500
53	10	19	0.4	55,655	69	14	26	0.6	57,256	78	17	30	0.8	58,535	2550
53	10	19	0.4	57,979	69	14	26	0.6	59,612	78	17	30	0.7	60,917	2600
53	10	19	0.4	62,325	69	14	26	0.6	64,018	78	17	30	0.7	65,370	2700
53	10	19	0.4	66,829	69	14	26	0.6	68,581	78	17	30	0.7	69,981	2800
53	10	19	0.4	68,906	69	14	26	0.6	70,686	78	17	30	0.7	72,107	2850
53	10	19	0.4	71,489	69	14	26	0.6	73,301	78	17	30	0.7	74,748	2900
53	10	19	0.4	76,307	69	14	25	0.5	78,179	78	17	30	0.6	79,673	3000
53	10	19	0.4	81,282	69	14	25	0.5	83,213	78	17	30	0.6	84,754	3100
53	10	19	0.4	83,571	69	14	25	0.5	85,530	78	17	30	0.6	87,092	3150
53	10	19	0.4	86,413	69	14	25	0.5	88,405	78	17	30	0.6	89,993	3200
53	10	19	0.3	91,702	69	14	25	0.5	93,753	78	17	30	0.6	95,388	3300
53	10	19	0.3	97,148	69	14	25	0.5	99,259	78	17	29	0.6	100,941	3400
53	10	19	0.3	99,650	69	14	25	0.5	101,788	78	17	29	0.6	103,491	3450
53	10	19	0.3	108,511	69	14	25	0.4	110,741	78	17	29	0.5	112,518	3600
53	10	19	0.3	120,503	69	14	25	0.4	122,852	78	17	29	0.5	124,723	3800
53	10	19	0.3	133,123	69	14	25	0.4	135,591	78	17	29	0.5	137,556	4000

Individual fabrication possible





## U112A

▶ with embedded vacuum support ring

Installation length ( $L_E$ ) at design pressure															
NB	up to 10 bar $L_E = 150$ mm					up to 10 bar $L_E = 200$ mm					up to 10 bar $L_E = 250$ mm				
	Movement				A	Movement				A	Movement				A
	mm	mm	±mm	±°	cm <sup>2</sup>	mm	mm	±mm	±°	cm <sup>2</sup>	mm	mm	±mm	±°	cm <sup>2</sup>
100	20	3	10	3.4	177	26	7	14	8.0	254	29	7	15	8.0	260
125	20	3	9	2.7	241	26	7	14	6.4	330	29	7	15	6.4	337
150	20	3	9	2.3	314	26	7	14	5.3	415	29	7	15	5.3	423
175	20	3	9	2.0	415	26	7	13	4.6	531	29	7	14	4.6	539
200	20	3	9	1.7	491	26	7	13	4.0	616	29	7	14	4.0	625
250	20	3	9	1.4	707	26	7	13	3.2	855	29	7	14	3.2	866
300	20	3	9	1.1	973	26	7	13	2.7	1,146	29	7	14	2.7	1,158
350	20	3	9	1.0	1,288	26	7	13	2.3	1,486	29	7	14	2.3	1,500
400	20	3	8	0.9	1,605	26	7	12	2.0	1,825	29	7	13	2.0	1,840
450	20	3	8	0.8	1,987	26	7	12	1.8	2,231	29	7	13	1.8	2,248
500	20	3	8	0.7	2,402	26	7	12	1.6	2,669	29	7	13	1.6	2,688
550	20	3	8	0.6	2,827	26	7	12	1.5	3,117	29	7	13	1.5	3,137
600	20	3	8	0.6	3,349	26	7	12	1.3	3,664	29	7	13	1.3	3,685
650	20	3	8	0.5	3,848	26	7	12	1.2	4,185	29	7	13	1.2	4,208
700	20	3	8	0.5	4,465	26	7	12	1.1	4,827	29	7	13	1.1	4,852
750	20	3	8	0.5	5,027	26	7	12	1.1	5,411	29	7	13	1.1	5,437
800	20	3	8	0.4	5,741	26	7	12	1.0	6,151	29	7	13	1.0	6,179
850	20	3	8	0.4	6,362	26	7	12	0.9	6,793	29	7	12	0.9	6,822
900	20	3	8	0.4	7,163	26	7	12	0.9	7,620	29	7	12	0.9	7,651
950	20	3	8	0.4	7,854	26	7	11	0.8	8,332	29	7	12	0.8	8,365
1000	20	3	8	0.3	8,742	26	7	11	0.8	9,246	29	7	12	0.8	9,280
1050	20	3	8	0.3	9,503	26	7	11	0.8	10,029	29	7	12	0.8	10,064
1100	20	3	8	0.3	10,496	26	7	11	0.7	11,047	29	7	12	0.7	11,085
1150	20	3	8	0.3	11,310	26	7	11	0.7	11,882	29	7	12	0.7	11,921
1200	20	3	8	0.3	12,370	26	7	11	0.7	12,969	29	7	12	0.7	13,009
1250	20	3	8	0.3	13,273	26	7	11	0.6	13,893	29	7	12	0.6	13,935
1300	20	3	8	0.3	14,420	26	7	11	0.6	15,066	29	7	12	0.6	15,109
1350	20	3	8	0.3	15,394	26	7	11	0.6	16,061	29	7	12	0.6	16,106
1400	20	3	8	0.2	16,627	26	7	11	0.6	17,320	29	7	12	0.6	17,366
1450	20	3	8	0.2	17,671	26	7	11	0.6	18,385	29	7	12	0.6	18,433
1500	20	3	7	0.2	18,991	26	7	11	0.5	19,731	29	7	12	0.5	19,781
1600	20	3	7	0.2	21,512	26	7	11	0.5	22,299	29	7	12	0.5	22,352
1650	20	3	7	0.2	22,698	26	7	11	0.5	23,506	29	7	12	0.5	23,561
1700	20	3	7	0.2	24,190	26	7	11	0.5	25,025	29	7	12	0.5	25,081
1800	20	3	7	0.2	27,055	26	7	11	0.4	27,937	29	7	12	0.4	27,996
1900	20	3	7	0.2	30,018	26	7	11	0.4	30,946	29	7	12	0.4	31,009
1950	20	3	7	0.2	31,416	26	7	11	0.4	32,365	29	7	12	0.4	32,429
2000	20	3	7	0.2	33,168	26	7	11	0.4	34,143	29	7	12	0.4	34,209
2100	20	3	7	0.2	36,474	26	7	11	0.4	37,497	29	7	12	0.4	37,565
2200	20	3	7	0.2	39,938	26	7	11	0.4	41,007	29	7	11	0.4	41,079
2250	20	3	7	0.2	41,548	26	7	11	0.4	42,638	29	7	11	0.4	42,712
2300	20	3	7	0.1	43,558	26	7	11	0.3	44,675	29	7	11	0.3	44,750
2400	20	3	7	0.1	47,336	26	7	11	0.3	48,500	29	7	11	0.3	48,578
2500	20	3	7	0.1	51,271	26	7	11	0.3	52,482	29	7	11	0.3	52,563
2550	20	3	7	0.1	53,093	26	7	11	0.3	54,325	29	7	11	0.3	54,408
2600	20	3	7	0.1	55,363	26	7	10	0.3	56,621	29	7	11	0.3	56,706
2700	20	3	7	0.1	59,612	26	7	10	0.3	60,917	29	7	11	0.3	61,005
2800	20	3	7	0.1	64,018	26	7	10	0.3	65,370	29	7	11	0.3	65,461
2850	20	3	7	0.1	66,052	26	7	10	0.3	67,426	29	7	11	0.3	67,518
2900	20	3	7	0.1	68,581	26	7	10	0.3	69,981	29	7	11	0.3	70,075
3000	20	3	7	0.1	73,301	26	7	10	0.3	74,748	29	7	11	0.3	74,845
3100	20	3	7	0.1	78,179	26	7	10	0.3	79,673	29	7	11	0.3	79,773
3150	20	3	7	0.1	80,425	26	7	10	0.3	81,940	29	7	11	0.3	82,041
3200	20	3	7	0.1	83,213	26	7	10	0.3	84,754	29	7	11	0.3	84,857
3300	20	3	7	0.1	88,405	26	7	10	0.2	89,993	29	7	11	0.2	90,099
3400	20	3	7	0.1	93,753	26	7	10	0.2	95,388	29	7	11	0.2	95,498
3450	20	3	7	0.1	96,211	26	7	10	0.2	97,868	29	7	11	0.2	97,979
3600	20	3	7	0.1	104,922	26	7	10	0.2	106,651	29	7	11	0.2	106,767
3800	20	3	7	0.1	116,718	26	7	10	0.2	118,542	29	7	11	0.2	118,664
4000	20	3	7	0.1	129,143	26	7	10	0.2	131,061	29	7	11	0.2	131,190

Recommended sizes  
Additional possible sizes

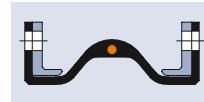
Reduction of movement for expansion joints with PTFE lining:

axial compression: -0 %; axial extension: -0 %; lateral displacement: -0 %; angular movement: -0 %.

When the axial compression and extension is changed to the mean value, it is possible to increase the angular movement (for values see type U112F).

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 29).

For larger movements see type U122A or U125A.



Installation length (L <sub>E</sub> ) at design pressure																
up to 10 bar L <sub>E</sub> = 300 mm					up to 10 bar L <sub>E</sub> = 350 mm					up to 10 bar L <sub>E</sub> = 400 mm					NB	
higher pressures on request																
Movement				A	Movement				A	Movement				A		
mm	mm	±mm	±°	cm <sup>2</sup>	mm	mm	±mm	±°	cm <sup>2</sup>	mm	mm	±mm	±°	cm <sup>2</sup>		
35	10	20	11.3	353	46	14	26	15.6	491	51	17	31	18.8	616	100	
35	10	19	9.1	441	46	14	26	12.6	594	51	17	30	15.2	731	125	
35	10	19	7.6	539	46	14	25	10.6	707	51	17	30	12.8	855	150	
35	10	19	6.5	670	46	14	25	9.1	855	51	17	29	11.0	1,018	175	
35	10	18	5.7	765	46	14	25	8.0	962	51	17	29	9.6	1,134	200	
35	10	18	4.6	1,029	46	14	24	6.4	1,257	51	17	28	7.7	1,452	250	
35	10	18	3.8	1,346	46	14	24	5.3	1,605	51	17	28	6.5	1,825	300	
35	10	18	3.3	1,713	46	14	23	4.6	2,003	51	17	27	5.5	2,248	350	
35	10	17	2.9	2,075	46	14	23	4.0	2,393	51	17	27	4.9	2,660	400	
35	10	17	2.5	2,507	46	14	23	3.6	2,856	51	17	27	4.3	3,147	450	
35	10	17	2.3	2,971	46	14	23	3.2	3,349	51	17	27	3.9	3,664	500	
35	10	17	2.1	3,442	46	14	22	2.9	3,848	51	17	26	3.5	4,185	550	
35	10	17	1.9	4,015	46	14	22	2.7	4,453	51	17	26	3.2	4,815	600	
35	10	17	1.8	4,560	46	14	22	2.5	5,027	51	17	26	3.0	5,411	650	
35	10	16	1.6	5,230	46	14	22	2.3	5,728	51	17	26	2.8	6,138	700	
35	10	16	1.5	5,836	46	14	22	2.1	6,362	51	17	26	2.6	6,793	750	
35	10	16	1.4	6,604	46	14	22	2.0	7,163	51	17	25	2.4	7,620	800	
35	10	16	1.3	7,268	46	14	22	1.9	7,854	51	17	25	2.3	8,332	850	
35	10	16	1.3	8,123	46	14	22	1.8	8,742	51	17	25	2.2	9,246	900	
35	10	16	1.2	8,858	46	14	21	1.7	9,503	51	17	25	2.0	10,029	950	
35	10	16	1.1	9,799	46	14	21	1.6	10,477	51	17	25	1.9	11,029	1000	
35	10	16	1.1	10,605	46	14	21	1.5	11,310	51	17	25	1.9	11,882	1050	
35	10	16	1.0	11,652	46	14	21	1.5	12,390	51	17	25	1.8	12,989	1100	
35	10	16	1.0	12,509	46	14	21	1.4	13,273	51	17	25	1.7	13,893	1150	
35	10	16	1.0	13,623	46	14	21	1.3	14,420	51	17	25	1.6	15,066	1200	
35	10	16	0.9	14,569	46	14	21	1.3	15,394	51	17	24	1.6	16,061	1250	
35	10	16	0.9	15,770	46	14	21	1.2	16,627	51	17	24	1.5	17,320	1300	
35	10	16	0.8	16,787	46	14	21	1.2	17,671	51	17	24	1.4	18,385	1350	
35	10	15	0.8	18,074	46	14	21	1.1	18,991	51	17	24	1.4	19,731	1400	
35	10	15	0.8	19,162	46	14	21	1.1	20,106	51	17	24	1.3	20,867	1450	
35	10	15	0.8	20,536	46	14	21	1.1	21,512	51	17	24	1.3	22,299	1500	
35	10	15	0.7	23,154	46	14	20	1.0	24,190	51	17	24	1.2	25,025	1600	
35	10	15	0.7	24,384	46	14	20	1.0	25,447	51	17	24	1.2	26,302	1650	
35	10	15	0.7	25,930	46	14	20	0.9	27,026	51	17	24	1.1	27,907	1700	
35	10	15	0.6	28,893	46	14	20	0.9	30,049	51	17	24	1.1	30,978	1800	
35	10	15	0.6	31,952	46	14	20	0.8	33,168	51	17	24	1.0	34,143	1900	
35	10	15	0.6	33,394	46	14	20	0.8	34,636	51	17	23	1.0	35,633	1950	
35	10	15	0.6	35,199	46	14	20	0.8	36,474	51	17	23	1.0	37,497	2000	
35	10	15	0.5	38,603	46	14	20	0.8	39,938	51	17	23	0.9	41,007	2100	
35	10	15	0.5	42,164	46	14	20	0.7	43,558	51	17	23	0.9	44,675	2200	
35	10	15	0.5	43,818	46	14	20	0.7	45,239	51	17	23	0.9	46,377	2250	
35	10	15	0.5	45,882	46	14	20	0.7	47,336	51	17	23	0.8	48,500	2300	
35	10	15	0.5	49,757	46	14	20	0.7	51,271	51	17	23	0.8	52,482	2400	
35	10	15	0.5	53,789	46	14	20	0.6	55,363	51	17	23	0.8	56,621	2500	
35	10	15	0.4	55,655	46	14	20	0.6	57,256	51	17	23	0.8	58,535	2550	
35	10	15	0.4	57,979	46	14	20	0.6	59,612	51	17	23	0.7	60,917	2600	
35	10	15	0.4	62,325	46	14	19	0.6	64,018	51	17	23	0.7	65,370	2700	
35	10	15	0.4	66,829	46	14	19	0.6	68,581	51	17	23	0.7	69,981	2800	
35	10	15	0.4	68,906	46	14	19	0.6	70,686	51	17	23	0.7	72,107	2850	
35	10	14	0.4	71,489	46	14	19	0.6	73,301	51	17	23	0.7	74,748	2900	
35	10	14	0.4	76,307	46	14	19	0.5	78,179	51	17	23	0.6	79,673	3000	
35	10	14	0.4	81,282	46	14	19	0.5	83,213	51	17	23	0.6	84,754	3100	
35	10	14	0.4	83,571	46	14	19	0.5	85,530	51	17	22	0.6	87,092	3150	
35	10	14	0.4	86,413	46	14	19	0.5	88,405	51	17	22	0.6	89,993	3200	
35	10	14	0.3	91,702	46	14	19	0.5	93,753	51	17	22	0.6	95,388	3300	
35	10	14	0.3	97,148	46	14	19	0.5	99,259	51	17	22	0.6	100,941	3400	
35	10	14	0.3	99,650	46	14	19	0.5	101,788	51	17	22	0.6	103,491	3450	
35	10	14	0.3	108,511	46	14	19	0.4	110,741	51	17	22	0.5	112,518	3600	
35	10	14	0.3	120,503	46	14	19	0.4	122,852	51	17	22	0.5	124,723	3800	
35	10	14	0.3	133,123	46	14	19	0.4	135,591	51	17	22	0.5	137,556	4000	

Individual fabrication possible