

D110A

NB 20 – NB 1200



- ▶ **Type D110A**
without vacuum support ring
- ▶ **Type D111A**
with internal vacuum support ring
- ▶ **Type D112A**
with embedded vacuum support ring

Type key ▶ page 20

D1 1 0 A

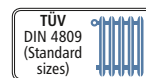
- └─ Tie rod variant
- └─ Support ring variant
- └─ Number of arches
- └─ Type

Universal expansion joint with one arch

- Design:** Hydrodynamic, single-arch rubber bellows with self sealing rubber bulges and swivel backing flanges with support collar
Optionally with vacuum support ring
- Nominal diameters:** NB 20 to NB 1200, intermediate sizes possible
- Installation length:** Standard $L_E = 130$ to 350 mm (▶ page 115–117)
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 axial, lateral and angular movements
(▶ page 115–117)
- Stiffness rate:** Axial and lateral stiffness rates (▶ page 279)

Application:

Cooling water systems,
desalination plants,
drinking water supply,
plant construction, 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: For severe chemical attacks. Take the restriction of the listed movement into account (▶ page 115–117)			

Flanges

Design:	Single-part, swivel, round backing flanges with support collar, clearance holes and groove to accommodate the rubber bulges		
Flange norms:	DIN, ANSI, AWWA, BS, JIS, special measurements (▶ page 280)		
Materials:	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		
Coating:	Primed, hot-dip galvanised, special paint		

Optional accessories

Protective hood:	UV protection cover
	Ground protective cover
	Fire protection cover
	(▶ page 50)
Flow liners:	Cylindrical flow liner
	Conical flow liner
	Telescoping flow liner
	(▶ page 49)

Support rings

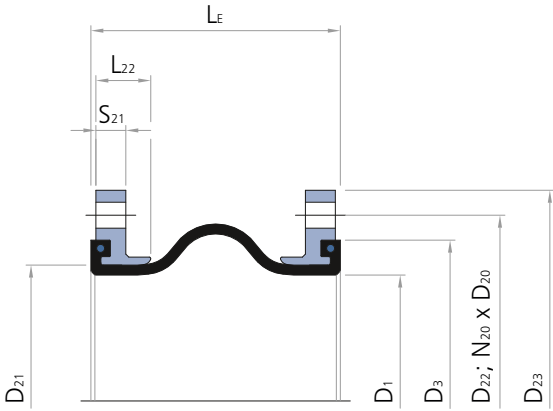
TYPE		Vacuum support ring	Pressure	Movement
D110A		Without	Depending on the nominal diameter up to 25 bar, for vacuum up to 0.8 bar absolute	▶ page 115
D111A		Vacuum support ring spirals (1.4310) up to NB 300, vacuum support ring starting at NB 350 Medium contact, inside the arch apex	Depending on the nominal diameter up to 25 bar, for vacuum up to 0.05 bar absolute	▶ page 116
D112A		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 117

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	



Planning help D1110A





Installation length (L _E) at design pressure															
	up to 10 bar L _E = 130 mm					up to 10 bar L _E = 150 mm					up to 10 bar L _E = 175 mm				
	higher pressures on request														
NB	Movement				A cm ²	Movement				A cm ²	Movement				A cm ²
															
	mm	mm	± mm	± °		mm	mm	± mm	± °		mm	mm	± mm	± °	
20	30	30	30	30.0	17										
25	30	30	30	30.0	17										
32	30	30	30	30.0	17										
40	30	30	30	35.0	18										
50	30	30	30	30.0	32										
65	30	30	30	30.0	53										
80	30	30	30	30.0	85	30	30	30	30.0	85					
100	30	30	30	20.0	128	30	30	30	20.0	128					
125	30	30	30	20.0	187	30	30	30	20.0	187					
150	30	30	30	20.0	259	30	30	30	20.0	259					
200	30	30	30	12.0	410						30	30	30	12.0	409
250	30	30	30	12.0	596						30	30	30	12.0	599
300	30	30	30	12.0	822						31	10	17	3.8	903
350											31	10	17	3.3	1,134
400											31	10	17	2.9	1,521
450											31	10	17	2.5	1,878
500											31	10	17	2.3	2,290
600											31	10	16	1.9	3,187
700											31	10	16	1.6	4,312
800											31	10	16	1.4	5,555
900											31	10	16	1.3	6,910
1000											31	10	16	1.1	8,462
1100											31	10	15	1.0	10,171
1200											31	10	15	1.0	12,037

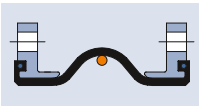
Installation length (L _E) at design pressure															
	up to 10 bar L _E = 200 mm					up to 10 bar L _E = 250 mm					up to 10 bar L _E = 275 mm				
	higher pressures on request														
NB	Movement				A cm ²	Movement				A cm ²	Movement				A cm ²
															
	mm	mm	± mm	± °		mm	mm	± mm	± °		mm	mm	± mm	± °	
200	40	20	26	11.3	564	44	20	29	11.3	573	44	20	29	11.3	573
250	40	20	26	9.1	799	44	20	28	9.1	809	44	20	28	9.1	809
300	30	30	30	12.0	822	44	20	27	7.6	1,081	44	20	27	7.6	1,081
350	50	30	30	8.0	907	44	20	27	6.5	1,333	44	20	27	6.5	1,333
400	50	30	30	8.0	1,018	44	20	27	5.7	1,750	44	20	27	5.7	1,750
450	40	20	25	5.1	2,116	40	20	30	6.0	1,801	44	20	26	5.1	2,132
500	50	30	30	8.0	1,692	44	20	26	4.6	2,570	44	20	26	4.6	2,570
600	50	30	30	8.0	3,078	44	20	26	3.8	3,515	44	20	26	3.8	3,515
700	40	20	24	3.3	4,669	50	30	30	8.0	4,019	50	30	30	8.0	4,019
800	40	20	23	2.9	5,958	50	30	30	8.0	5,436	44	20	25	2.9	5,986
900	40	20	23	2.5	7,359	44	20	25	2.5	7,390	44	20	25	2.5	7,390
1000	40	20	23	2.3	8,958	44	20	25	2.3	8,992	44	20	25	2.3	8,992
1100	40	20	23	2.1	10,715	44	20	24	2.1	10,751	44	20	24	2.1	10,751
1200	40	20	22	1.9	12,628	44	20	24	1.9	12,668	44	20	24	1.9	12,668

Installation length (L _E) at design pressure										
	up to 10 bar L _E = 300 mm					up to 10 bar L _E = 350 mm				
	higher pressures on request									
NB	Movement				A	Movement				A
										
	mm	mm	± mm	± °	cm ²	mm	mm	± mm	± °	cm ²
200	53	31	37	17.2	707	69	43	49	23.3	897
250	53	31	36	19.0	968	69	43	48	19.0	1,188
300	53	31	36	16.0	1,263	69	43	48	16.0	1,514
350	53	31	35	13.8	1,534	69	43	47	13.8	1,810
400	53	31	35	12.1	1,979	69	43	46	12.1	2,290
450	53	31	34	10.8	2,384	69	43	46	10.8	2,725
500	53	31	34	9.8	2,846	69	43	45	9.8	3,217
600	53	31	33	8.2	3,837	69	43	45	8.2	4,266
700	53	31	33	7.0	5,064	69	43	44	7.0	5,555
800	53	31	33	6.1	6,404	69	43	43	6.1	6,955
900	50	30	30	5.0	6,706	69	43	43	5.5	8,462
1000	50	30	30	5.0	8,231	69	43	43	4.9	10,171
1100	53	31	32	4.5	11,310	69	43	42	4.5	12,037
1200	53	31	31	4.1	13,273	69	43	42	4.1	14,061

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 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 29).
For larger movements see type D120A and D123A.

Individual fabrication possible

**D111A**

▶ with internal vacuum support ring

Installation length (L _E) at design pressure															
	up to 10 bar L _E = 130 mm					up to 10 bar L _E = 150 mm					up to 10 bar L _E = 175 mm				
	higher pressures on request														
NB	Movement				A	Movement				A	Movement				A
															
20	30	10	20	30.0	17										
25	30	10	20	30.0	17										
32	30	10	20	30.0	17										
40	30	10	20	35.0	18										
50	30	10	20	30.0	32										
65	30	10	20	30.0	53										
80	30	10	20	30.0	85	30	10	20	30.0	85					
100	30	10	20	20.0	128	30	10	20	20.0	128					
125	30	10	20	20.0	187	30	10	20	20.0	187					
150	30	10	20	20.0	259	30	10	20	20.0	259					
200	30	10	20	12.0	410						30	10	20	12.0	409
250	30	10	20	12.0	596						30	10	20	12.0	599
300	30	10	20	12.0	822						31	3	11	1.1	903
350											31	3	11	1.0	1,134
400											31	3	11	0.9	1,521
450											31	3	11	0.8	1,878
500											31	3	11	0.7	2,290
600											31	3	11	0.6	3,187
700											31	3	11	0.5	4,312
800											31	3	10	0.4	5,555
900											31	3	10	0.4	6,910
1000											31	3	10	0.3	8,462
1100											31	3	10	0.3	10,171
1200											31	3	10	0.3	12,037

Installation length (L _E) at design pressure															
	up to 10 bar L _E = 200 mm					up to 10 bar L _E = 250 mm					up to 10 bar L _E = 275 mm				
	higher pressures on request														
NB	Movement				A	Movement				A	Movement				A
															
	mm	mm	±mm	±°	cm ²	mm	mm	±mm	±°	cm ²	mm	mm	±mm	±°	cm ²
200	40	7	17	4.0	564	44	7	19	4.0	573	44	7	19	4.0	573
250	40	7	17	3.2	799	44	7	18	3.2	809	44	7	18	3.2	809
300	30	10	20	12.0	822	44	7	18	2.7	1,081	44	7	18	2.7	1,081
350	50	10	20	8.0	907	44	7	18	2.3	1,333	44	7	18	2.3	1,333
400	50	10	20	8.0	1,018	44	7	18	2.0	1,750	44	7	18	2.0	1,750
450	40	7	16	1.8	2,116	40	10	20	2.5	1,801	44	7	17	1.8	2,132
500	50	10	20	8.0	1,692	44	7	17	1.6	2,570	44	7	17	1.6	2,570
600	50	10	20	8.0	3,078	44	7	17	1.3	3,515	44	7	17	1.3	3,515
700	40	7	16	1.1	4,669	50	10	20	8.0	4,019	50	10	20	8.0	4,019
800	40	7	15	1.0	5,958	50	10	20	8.0	5,436	44	7	17	1.0	5,986
900	40	7	15	0.9	7,359	44	7	16	0.9	7,390	44	7	16	0.9	7,390
1000	40	7	15	0.8	8,958	44	7	16	0.8	8,992	44	7	16	0.8	8,992
1100	40	7	15	0.7	10,715	44	7	16	0.7	10,751	44	7	16	0.7	10,751
1200	40	7	15	0.7	12,628	44	7	16	0.7	12,668	44	7	16	0.7	12,668

Installation length (L _E) at design pressure															
up to 10 bar L _E = 300 mm						up to 10 bar L _E = 350 mm					higher pressures on request				
NB	Movement				A cm ²	Movement				A cm ²	Movement				A cm ²
	mm	mm	±mm	±°		mm	mm	±mm	±°		mm	mm	±mm	±°	
200	53	10	24	5.7	707	69	14	33	8.0	897					
250	53	10	24	6.4	968	69	14	32	6.4	1,188					
300	53	10	24	5.3	1,263	69	14	31	5.3	1,514					
350	53	10	23	4.6	1,534	69	14	31	4.6	1,810					
400	53	10	23	4.0	1,979	69	14	31	4.0	2,290					
450	53	10	23	3.6	2,384	69	14	30	3.6	2,725					
500	53	10	22	3.2	2,846	69	14	30	3.2	3,217					
600	53	10	22	2.7	3,837	69	14	29	2.7	4,266					
700	53	10	22	2.3	5,064	69	14	29	2.3	5,555					
800	53	10	22	2.0	6,404	69	14	29	2.0	6,955					
900	50	10	20	5.0	6,706	69	14	28	1.8	8,462					
1000	50	10	20	5.0	8,231	69	14	28	1.6	10,171					
1100	53	10	21	1.5	11,310	69	14	28	1.5	12,037					
1200	53	10	21	1.3	13,273	69	14	28	1.3	14,061					

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 %.

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

For larger movements see type D121A or D124A.

Individual fabrication possible



Installation length (L _E) at design pressure															
	up to 10 bar L _E = 130 mm					up to 10 bar L _E = 150 mm					up to 10 bar L _E = 175 mm				
	higher pressures on request														
NB	Movement				A	Movement				A	Movement				A
															
	mm	mm	± mm	± °	cm ²	mm	mm	± mm	± °	cm ²	mm	mm	± mm	± °	cm ²
20															
25															
32															
40															
50															
65															
80															
100															
125															
150															
200															
250											30	10	20	12.0	409
300											30	10	20	12.0	599
350											31	3	11	1.1	903
400											31	3	11	1.0	1,134
450											31	3	11	0.9	1,521
500											31	3	11	0.8	1,878
600											31	3	11	0.7	2,290
700											31	3	11	0.6	3,187
800											31	3	11	0.5	4,312
900											31	3	10	0.4	5,555
1000											31	3	10	0.4	6,910
1100											31	3	10	0.3	8,462
1200											31	3	10	0.3	10,171
											31	3	10	0.3	12,037

Installation length (L _E) at design pressure															
	up to 10 bar L _E = 200 mm					up to 10 bar L _E = 250 mm					up to 10 bar L _E = 275 mm				
	higher pressures on request														
NB	Movement				A	Movement				A	Movement				A
															
	mm	mm	±mm	±°	cm ²	mm	mm	±mm	±°	cm ²	mm	mm	±mm	±°	cm ²
200	40	7	17	4.0	564	44	7	19	4.0	573	44	7	19	4.0	573
250	40	7	17	3.2	799	44	7	18	3.2	809	44	7	18	3.2	809
300	30	10	20	12.0	822	44	7	18	2.7	1,081	44	7	18	2.7	1,081
350	50	10	20	8.0	907	44	7	18	2.3	1,333	44	7	18	2.3	1,333
400	50	10	20	8.0	1,018	44	7	18	2.0	1,750	44	7	18	2.0	1,750
450	40	7	16	1.8	2,116	40	10	20	2.5	1,801	44	7	17	1.8	2,132
500	50	10	20	8.0	1,692	44	7	17	1.6	2,570	44	7	17	1.6	2,570
600	50	10	20	8.0	3,078	44	7	17	1.3	3,515	44	7	17	1.3	3,515
700	40	7	16	1.1	4,669	50	30	30	8.0	4,019	50	10	20	8.0	4,019
800	40	7	15	1.0	5,958	50	30	30	8.0	5,436	44	7	17	1.0	5,986
900	40	7	15	0.9	7,359	44	7	16	0.9	7,390	44	7	16	0.9	7,390
1000	40	7	15	0.8	8,958	44	7	16	0.8	8,992	44	7	16	0.8	8,992
1100	40	7	15	0.7	10,715	44	7	16	0.7	10,751	44	7	16	0.7	10,751
1200	40	7	15	0.7	12,628	44	7	16	0.7	12,668	44	7	16	0.7	12,668

Installation length (L _E) at design pressure										
up to 10 bar L _E = 300 mm						up to 10 bar L _E = 350 mm				
higher pressures on request										
NB	Movement				A	Movement				A
										
	mm	mm	± mm	± °	cm ²	mm	mm	± mm	± °	cm ²
200	53	10	24	5.7	707	69	14	33	8.0	897
250	53	10	24	6.4	968	69	14	32	6.4	1,188
300	53	10	24	5.3	1,263	69	14	31	5.3	1,514
350	53	10	23	4.6	1,534	69	14	31	4.6	1,810
400	53	10	23	4.0	1,979	69	14	31	4.0	2,290
450	53	10	23	3.6	2,384	69	14	30	3.6	2,725
500	53	10	22	3.2	2,846	69	14	30	3.2	3,217
600	53	10	22	2.7	3,837	69	14	29	2.7	4,266
700	53	10	22	2.3	5,064	69	14	29	2.3	5,555
800	53	10	22	2.0	6,404	69	14	29	2.0	6,955
900	50	10	20	5.0	6,706	69	14	28	1.8	8,462
1000	50	10	20	5.0	8,231	69	14	28	1.6	10,171
1100	53	10	21	1.5	11,310	69	14	28	1.5	12,037
1200	53	10	21	1.3	13,273	69	14	28	1.3	14,061

Recommended sizes
Additional possible sizes

Reduction of movement for expansion joints with PTFE lining:
axial compression: -0 %; axial extension: -66 %; lateral displacement: -0 %; angular movement: -0 %.
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 29).
For larger movements see type D122A or D125A.

Individual fabrication possible