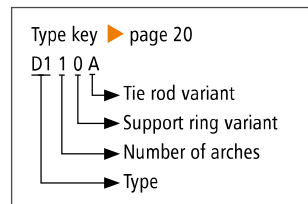


## D110A

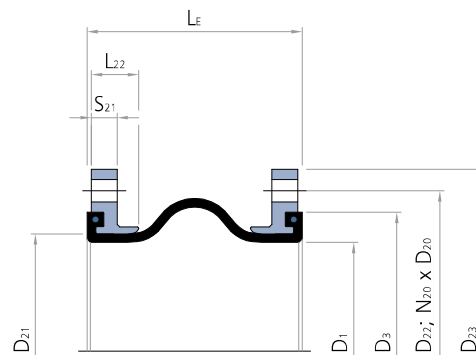
NB 20 – NB 1200



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



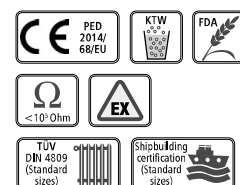
### Planning help D110A



## 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 109–111)  
Other installation lengths on request
- Pressure:** Depending on the nominal diameter up to 25 bar  
Vacuum stability on request with vacuum support ring up to 0.05 bar absolute  
Design in accordance with Pressure Equipment Directive PED 2014/68/EU
- Movement:** For axial, lateral and angular movements (▶ page 109–111)
- Stiffness rate:** Axial and lateral stiffness rates (▶ page 254)

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






Assembly instruction download  
[www.ditec-adam.de/en/downloads.html](http://www.ditec-adam.de/en/downloads.html)

## Standard rubber bellows

Rubber	Fabric		Max.	Application
EPDM / EPDM	PEEK		130 °C	Heating systems, cooling, hot air
IIR / EPDM	Nylon		100 °C	Drinking water, seawater, weak acids and alkalis, dilute weather resistant
NBR / CR	Nylon		90 °C	Oils, fuels, gases
NBRweiß / CR	Nylon		90 °C	Fat containing food, weather resistant
CSM / CSM	Nylon		100 °C	Chemicals, aggressive chemical wastewater, weather resistant
NBR / CR	Nylon		90 °C	Oils, fuels, gases, LPG, blast furnace gas, lubricants
CR / CR	Nylon		90 °C	Cold- and hot water, seawater, wastewater with oleaginous corrosion protection
NBR / CR	Stahl		90 °C	Oils, fuels, gases, fuel ethanol blends
NBR-LT / CR	Nylon		90 °C	Oils, fuels, gases, LPG, for tanker and filling stations
HNBR / CR	Stahl		100 °C	Oils, fuels, gases, LPG, high Temperature
FPM / ECO	Nylon		100 °C	Flue gas desulphurisation, biodiesel, benzene, xylene
IIR-D / EPDM	PEEK		130 °C	Steam, water
NBR / CR	PEEK		120 °C	Mineral oil, hydraulic oil
CSM / CR	PEEK		120 °C	Acids, alkalis

 UNIVERSAL  
swivel flange

## Non-standard rubber bellows

Rubber	Fabric	Marking	Max.	Application
EPDM	Nylon		100 °C	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Kevlar		100 °C	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Kevlar		120 °C	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMtw	Nylon		100 °C	Drinking water
EPDMtw	Kevlar		100 °C	Drinking water
EPDMaf	Nylon		100 °C	Abrasive materials, water-sand extraction
EPDMaf	Kevlar		100 °C	Abrasive materials, water-sand extraction
EPDMbeige	Nylon		100 °C	Foodstuffs
EPDMbeige	Kevlar		100 °C	Foodstuffs
IIR	Nylon		100 °C	Hot water, acids, bases, gases
IIR	Kevlar		100 °C	Hot water, acids, bases, gases
CSM	Nylon		100 °C	Strong acids, bases, chemicals
CSM	Kevlar		100 °C	Strong acids, bases, chemicals
NBR	Nylon		100 °C	Oils, petrol, solvents, compressed air
NBR	Kevlar		100 °C	Oils, petrol, solvents, compressed air
NBRbeige	Nylon		100 °C	Oil, fatty foods
NBRbeige	Kevlar		100 °C	Oil, fatty foods
CR	Nylon		90 °C	Cooling water, slightly oily water, seawater
CR	Kevlar		90 °C	Cooling water, slightly oily water, seawater
FPM	Kevlar		180 °C	Corrosive chemicals, petroleum distillates
FPMbeige	Kevlar		180 °C	Oil, fatty foods
NR	Nylon		70 °C	Abrasive materials
Silicon	Kevlar or glass		200 °C	Air, saltwater atmosphere, foodstuffs, medical technology

D110A

## Flanges

**Design:** Single-part, swivel, round backing flanges with support collar, clearance holes and groove to accommodate the rubber bulges

**Flange norms:** DIN, EN, ANSI, AWWA, BS, JIS, special measurements (▶ page 256)

**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  
Splash protective cover (▶ page 44)

**Flow liners:** Cylindrical flow liner  
Conical flow liner  
Telescoping flow liner (▶ page 43)

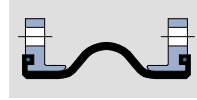
## Support rings

TYPE		Vacuum support ring	Pressure	Movement
D110A		Without	Depending on the nominal diameter up to 25 bar, vacuum stability on request	▶ page 109
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 110
D112A		No medium contact, embedded into the arch apex of the rubber bellows	Depending on the nominal diameter up to 16 bar, for vacuum up to 0.05 bar absolute	▶ page 111

### Materials

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

Carbon steel: 1.0570 (S355J2G3) rubber coated



Installation length (L <sub>E</sub> ) at design pressure															
NB	up to 10 bar L <sub>E</sub> = 130 mm					up to 10 bar L <sub>E</sub> = 150 mm					up to 10 bar L <sub>E</sub> = 175 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	±°	
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 <sub>E</sub> ) at design pressure															
NB	up to 10 bar L <sub>E</sub> = 200 mm					up to 10 bar L <sub>E</sub> = 250 mm					up to 10 bar L <sub>E</sub> = 275 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	±°	
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

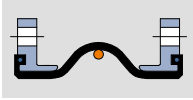
Installation length (L <sub>E</sub> ) at design pressure										
NB	up to 10 bar L <sub>E</sub> = 300 mm					up to 10 bar L <sub>E</sub> = 350 mm				
	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>
	mm	mm	±mm	±°		mm	mm	±mm	±°	
200	53	31	37	17.2	707	69	43	49	23.3	897
250	53	31	36	19.0	968	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

Standard sizes  
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 22).  
For larger movements see type D120A and D123A.

Individual fabrication possible

D110A



**D111A**  
▶ with internal vacuum support ring

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

Installation length (L <sub>E</sub> ) at design pressure															
NB	up to 10 bar L <sub>E</sub> = 200 mm					up to 10 bar L <sub>E</sub> = 250 mm					up to 10 bar L <sub>E</sub> = 275 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	±°	
200	40	7	26	11.3	564	44	7	29	11.3	573	44	7	29	11.3	573
250	40	7	26	9.1	799	44	7	28	9.1	809	44	7	28	9.1	809
300	30	10	30	12	822	44	7	27	7.6	1,081	44	7	27	7.6	1,081
350	50	10	30	8	907	44	7	27	6.5	1,333	44	7	27	6.5	1,333
400	50	10	30	8	1,018	44	7	27	5.7	1,750	44	7	27	5.7	1,750
450	40	7	25	5.1	2,116	40	10	30	6	1,801	44	7	26	5.1	2,132
500	50	10	30	8	1,692	44	7	26	4.6	2,570	44	7	26	4.6	2,570
600	50	10	30	8	3,078	44	7	26	3.8	3,515	44	7	26	3.8	3,515
700	40	7	24	3.3	4,669	50	10	30	8	4,019	50	10	30	8	4,019
800	40	7	23	2.9	5,958	50	10	30	8	5,436	44	7	25	2.9	5,986
900	40	7	23	2.5	7,359	44	7	25	2.5	7,390	44	7	25	2.5	7,390
1000	40	7	23	2.3	8,958	44	7	25	2.3	8,992	44	7	25	2.3	8,992
1100	40	7	23	2.1	10,715	44	7	24	2.1	10,751	44	7	24	2.1	10,751
1200	40	7	22	1.9	12,628	44	7	24	1.9	12,668	44	7	24	1.9	12,668

Installation length (L <sub>E</sub> ) at design pressure										
NB	up to 10 bar L <sub>E</sub> = 300 mm					up to 10 bar L <sub>E</sub> = 350 mm				
	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>
	mm	mm	±mm	±°		mm	mm	±mm	±°	
200	53	10	37	17.2	707	69	14	49	23.3	897
250	53	10	36	13.9	968	69	14	48	19	1,188
300	53	10	36	11.7	1,263	69	14	48	16	1,514
350	53	10	35	10	1,534	69	14	47	13.8	1,810
400	53	10	35	8.8	1,979	69	14	46	12.1	2,290
450	53	10	34	7.8	2,384	69	14	46	10.8	2,725
500	53	10	34	7.1	2,846	69	14	45	9.8	3,217
600	53	10	33	5.9	3,837	69	14	45	8.2	4,266
700	53	10	33	5.1	5,064	69	14	44	7	5,555
800	53	10	33	4.4	6,404	69	14	43	6.1	6,955
900	50	10	30	5	6,706	69	14	43	5.5	8,462
1000	50	10	30	5	8,231	69	14	43	4.9	10,171
1100	53	10	32	3.2	11,310	69	14	42	4.5	12,037
1200	53	10	31	3	13,273	69	14	42	4.1	14,061

Standard sizes  
Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (▶ page 22).  
For larger movements see type D121A or D124A.

**Individual fabrication possible**



Installation length (L <sub>E</sub> ) at design pressure															
up to 10 bar L <sub>E</sub> = 130 mm					up to 10 bar L <sub>E</sub> = 150 mm					up to 10 bar L <sub>E</sub> = 175 mm					
higher pressures on request															
NB	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	± °	
20															
25															
32															
40															
50															
65															
80															
100															
125															
150															
200										20	2	17	4	401	
250										20	2	16	3.2	603	
300										20	2	16	2.7	840	
350										20	2	16	2.3	1,064	
400										20	2	16	2	1,439	
450										20	2	16	1.8	1,787	
500										20	2	15	1.6	2,190	
600										20	2	15	1.3	3,068	
700										20	2	15	1.1	4,174	
800										20	2	15	1	5,398	
900										20	2	15	0.9	6,735	
1000										20	2	15	0.8	8,268	
1100										20	2	14	0.7	9,958	
1200										20	2	14	0.7	11,805	

Installation length (L <sub>E</sub> ) at design pressure															
up to 10 bar L <sub>E</sub> = 200 mm					up to 10 bar L <sub>E</sub> = 250 mm					up to 10 bar L <sub>E</sub> = 275 mm					
higher pressures on request															
NB	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	± °	
200	26	6	25	10.2	515	29	6	28	10.2	531	29	6	28	10.2	531
250	26	6	25	8.2	740	29	6	27	8.2	760	29	6	27	8.2	760
300	26	6	24	6.8	1,001	29	6	27	6.8	1,024	29	6	27	6.8	1,024
350	26	6	24	5.9	1,244	29	6	26	5.9	1,269	29	6	26	5.9	1,269
400	26	6	24	5.1	1,647	29	6	26	5.1	1,676	29	6	26	5.1	1,676
450	26	6	23	4.6	2,019	29	6	26	4.6	2,051	29	6	26	4.6	2,051
500	26	6	23	4.1	2,445	29	6	25	4.1	2,481	29	6	25	4.1	2,481
600	26	6	23	3.4	3,370	29	6	25	3.4	3,411	29	6	25	3.4	3,411
700	26	6	23	2.9	4,525	29	6	25	2.9	4,572	29	6	25	2.9	4,572
800	26	6	22	2.6	5,795	29	6	24	2.6	5,849	29	6	24	2.6	5,849
900	26	6	22	2.3	7,178	29	6	24	2.3	7,238	29	6	24	2.3	7,238
1000	26	6	22	2.1	8,758	29	6	24	2.1	8,825	29	6	24	2.1	8,825
1100	26	6	22	1.9	10,496	29	6	24	1.9	10,568	29	6	24	1.9	10,568
1200	26	6	21	1.7	12,390	29	6	23	1.7	12,469	29	6	23	1.7	12,469

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					
higher pressures on request										
NB	Movement				A cm <sup>2</sup>	Movement				A cm <sup>2</sup>
	mm	mm	± mm	± °		mm	mm	± mm	± °	
200	35	9	36	16.2	661	46	13	48	21.3	804
250	35	9	35	13.1	913	46	13	47	17.3	1,081
300	35	9	35	10.9	1,201	46	13	46	14.6	1,392
350	35	9	34	9.4	1,466	46	13	45	12.6	1,676
400	35	9	34	8.3	1,901	46	13	45	11	2,140
450	35	9	33	7.3	2,299	46	13	44	9.8	2,561
500	35	9	33	6.6	2,753	46	13	44	8.9	3,039
600	35	9	33	5.5	3,728	46	13	43	7.4	4,060
700	35	9	32	4.7	4,939	46	13	43	6.4	5,320
800	35	9	32	4.1	6,263	46	13	42	5.6	6,691
900	35	9	31	3.7	7,698	46	13	42	5	8,171
1000	35	9	31	3.3	9,331	46	13	41	4.5	9,852
1100	35	9	31	3	11,122	46	13	41	4.1	11,690
1200	35	9	31	2.8	13,070	46	13	41	3.7	13,685

Standard sizes  
 Non-standard sizes

In the event of axial extension and simultaneous lateral displacement the above movements are reduced (► page 22).  
 For larger movements see type D122A or D125A.

Individual fabrication possible