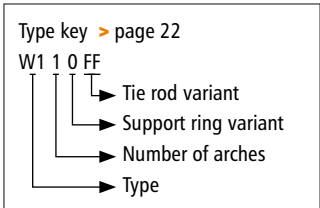


**W100FF W110FF**  $\varnothing$  200 - 4,000 mm  
 $\varnothing$  up to 4,000 x 4,000 mm  
 $\varnothing$  up to 6,000 x 3,000 mm



- > **Type W100FF**  
without arch,  
without vacuum ring
- > **Type W110FF**  
with arch,  
without vacuum ring
- > **Type W111FF**  
with arch,  
with vacuum ring




## Penetration seal without arch or with one arch

**Design:** Cylindrical, single or multiple arch penetration seals with excellent all-directional movement capability, available in flanged or slip-on designs, constructed with a high-grade leak-proof tube, multiple layers of high-strength cord, a seamless cover, and with single- or multi-part backing flanges or fixing clamps. Arch styles optional with vacuum ring. Available customised round or rectangular styles, also offset designs for pipe misalignment and split wrap designs available for field installation around existing penetrating pipe applications.

**Dimensions:**  $\varnothing$  200 to 4,000 mm  
 $\varnothing$  up to 4,000 x 4,000 mm or 6,000 x 3,000 mm  
 Custom diameters/rectangular cross-sections possible

**Length:** Standard  $L_E = 150$  to  $250$  mm (> page 308–310)  
 Custom length on request

**Pressure:** Up to 2.5 bar depending on diameter and length  
 Vacuum or external pressure not allowed without vacuum ring




















**Movement:** For axial, lateral and angular movements  
 (> page 308–310)

**Application:**  
**Power plants, plant construction, armature shafts, turbine houses e.g. for building / ground settlements for pipe or vessel penetrations, noise absorption, vibration, pipe misalignment, thermal movements, seismic displacements or as ground water seals**



Request assembly instructions at:  
[www.ditec-adam.de/en/contact](http://www.ditec-adam.de/en/contact)

## Bellows elastomers and reinforcements

Elastomer	Fabric	Marking	°C	Application
EPDM	Polyamid		-40   +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDM	Aramid		-40   +100	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMht	Aramid		-40   +120	Cooling water, hot water, seawater, acids, dilute chlorine compounds
EPDMwras	Polyamid		-40   +100	Drinking water, foodstuffs
EPDMwras	Aramid		-40   +100	Drinking water, foodstuffs
EPDMbeige	Polyamid		-40   +100	Foodstuffs
EPDMbeige	Aramid		-40   +100	Foodstuffs
IIR	Polyamid		-20   +100	Hot water, acids, bases, gases
IIR	Aramid		-20   +100	Hot water, acids, bases, gases
CSM	Polyamid		-20   +100	Strong acids, bases, chemicals
CSM	Aramid		-20   +100	Strong acids, bases, chemicals
NBR	Polyamid		-30   +100	Oils, petrol, solvents, compressed air
NBR	Aramid		-30   +100	Oils, petrol, solvents, compressed air
NBRbeige	Polyamid		-30   +100	Oil, fatty foods
NBRbeige	Aramid		-30   +100	Oil, fatty foods
CR	Polyamid		-20   +90	Cooling water, slightly oily water, seawater
CR	Aramid		-20   +90	Cooling water, slightly oily water, seawater
FPM	Aramid		-20   +180	Corrosive chemicals, petroleum distillates
FPMbeige	Aramid		-20   +180	Oil, fatty foods
NR	Polyamid		-20   +70	Abrasive materials
Silicon	Aramid Glass		-60   +200	Air, saltwater atmosphere, foodstuffs, medical technology

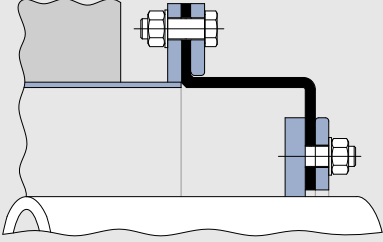
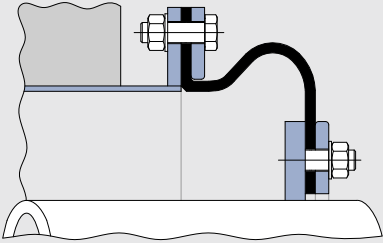
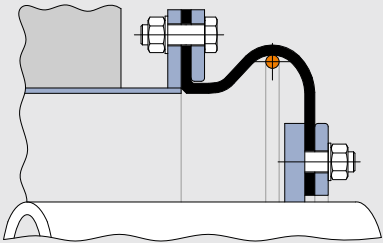
## Backing flanges

<b>Design:</b>	Single- or multi-part round backing flanges with clearance holes Optional support collar for high internal pressure
<b>Flange norms:</b>	DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)
<b>Materials:</b>	Carbon steel, stainless steel
<b>Coating:</b>	Primed, hot-dip galvanised, special paint

## Clamps

<b>Design:</b>	Depending on pressure and diameter, endless clamp belt or hinge bolt clamps At higher pressures, 2 parallel clamps per side
<b>Width:</b>	Endless clamp belt: $\frac{3}{4}$ " Hinge bolt clamp: depending on Ø: 18 – 30 mm
<b>Materials:</b>	Endless clamp belt with screw lugs (tongs): 1.7300 Hinge bolt clamp, belt and housing: 1.4016 (Screw steel galvanised)

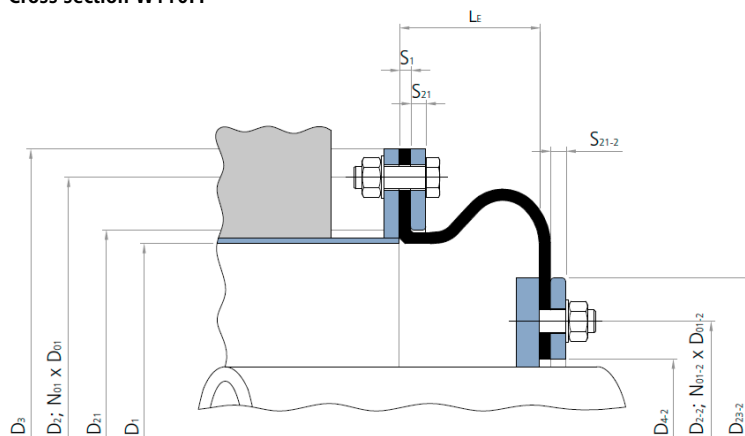
### Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
W100FF		None	Depending on the diameter up to 2.5 bar, vacuum stability on request	> page 308
W110FF		None	Depending on the diameter up to 2.5 bar, vacuum stability on request	> page 309
W111FF		Inside the arch	Depending on diameter up to 2.5 bar, tested for external pressure up to 2.0 bar	> page 310
<b>Materials</b>				
Stainless steel		Carbon steel, rubberised	Carbon steel, embedded	

### Accessories

- Protective covers:** Ground protective shield  
 Protective shield or cover  
 Fire protective shield (> page 58)

Cross section W110FF

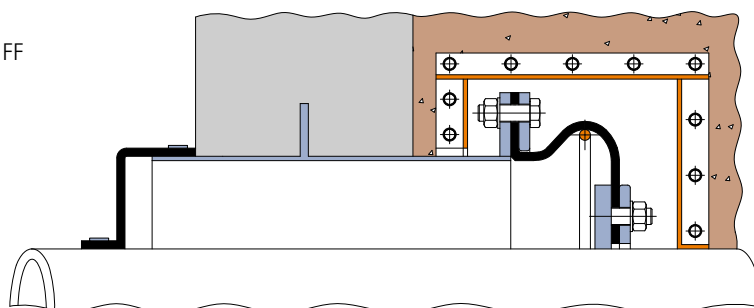


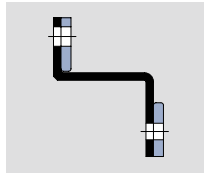
**Installation variants**

TYPE		Wall pipe fixing	Medium pipe fixing	Pressure	Dimensions
W110SS		Sleeve	Sleeve	Low	Medium pipe up to $\varnothing$ 1,000 mm
W110FS		Flange	Sleeve	Low	Medium pipe up to $\varnothing$ 1,000 mm
W110SF		Sleeve	Flange	Low	Wall pipe up to $\varnothing$ 1,000 mm
W110FF		Flange	Flange	up to 2.5 bar with vacuum ring, tested for external pressure, up to 20 m water column	Wall pipe / duct up to $\varnothing$ 4,000 mm, $\varnothing$ 4,000 x 4,000 mm or $\varnothing$ 6,000 x 3,000 mm
U110A > page 70		Flange	Flange	high pressure	Wall pipe / duct up to $\varnothing$ 4,000 mm, $\varnothing$ 4,000 x 4,000 mm or $\varnothing$ 6,000 x 3,000 mm

**Installation example**

- wall penetration seal type W111FF
- wall pipe
- ground protective shield
- test expansion joint





## W100FF

> without arch, without vacuum ring

Installation length ( $L_E$ ) at design pressure																
		up to 2.5 bar $L_E = 150$ mm					up to 2.5 bar $L_E = 200$ mm					up to 2.5 bar $L_E = 250$ mm				
		Movement				A	Movement				A	Movement				A
Wall pipe $\varnothing$ mm	Medium pipe $\varnothing$ mm					cm <sup>2</sup>					cm <sup>2</sup>					cm <sup>2</sup>
		mm	mm	± mm	± °		mm	mm	± mm	± °		mm	mm	± mm	± °	
200	80	8	5	9	2.9	314	10	6	12	3.4	314	13	8	14	4.6	314
250	100	8	5	8	2.3	491	10	6	11	2.7	491	13	8	14	3.7	491
300	125	8	5	8	1.9	716	10	6	11	2.3	716	13	8	13	3.1	716
	150	8	5	8	1.9	716	10	6	11	2.3	716	13	8	13	3.1	716
400	175	8	5	8	1.4	1,269	10	6	10	1.7	1,269	13	8	13	2.3	1,269
	200	8	5	8	1.4	1,269	10	6	10	1.7	1,269	13	8	13	2.3	1,269
500	250	8	5	7	1.1	1,987	10	6	10	1.4	1,987	13	8	12	1.8	1,987
	300	8	5	7	1.1	1,987	10	6	10	1.4	1,987	13	8	12	1.8	1,987
600	350	8	5	7	1.0	2,856	10	6	9	1.1	2,856	13	8	12	1.5	2,856
	400	8	5	7	1.0	2,856	10	6	9	1.1	2,856	13	8	12	1.5	2,856
700	450	8	5	7	0.8	3,893	10	6	9	1.0	3,893	13	8	11	1.3	3,893
	500	8	5	7	0.8	3,893	10	6	9	1.0	3,893	13	8	11	1.3	3,893
800	550	8	5	7	0.7	5,090	10	6	9	0.9	5,090	13	8	11	1.1	5,090
	600	8	5	7	0.7	5,090	10	6	9	0.9	5,090	13	8	11	1.1	5,090
900	650	8	5	6	0.6	6,433	10	6	9	0.8	6,433	13	8	11	1	6,433
	700	8	5	6	0.6	6,433	10	6	9	0.8	6,433	13	8	11	1	6,433
1000	750	8	5	6	0.6	7,933	10	6	8	0.7	7,933	13	8	10	0.9	7,933
	800	8	5	6	0.6	7,933	10	6	8	0.7	7,933	13	8	10	0.9	7,933
1100	850	8	5	6	0.5	9,590	10	6	8	0.6	9,590	13	8	10	0.8	9,590
	900	8	5	6	0.5	9,590	10	6	8	0.6	9,590	13	8	10	0.8	9,590
1200	950	8	5	6	0.5	11,404	10	6	8	0.6	11,404	13	8	10	0.8	11,404
	1000	8	5	6	0.5	11,404	10	6	8	0.6	11,404	13	8	10	0.8	11,404
1400	1050	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1100	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1150	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
	1200	8	5	6	0.4	15,504	10	6	8	0.5	15,504	13	8	10	0.7	15,504
1600	1250	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1300	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1350	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
	1400	8	5	6	0.4	20,232	10	6	8	0.4	20,232	13	8	10	0.6	20,232
1800	1450	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
	1500	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
	1600	8	5	6	0.3	25,588	10	6	7	0.4	25,588	13	8	9	0.5	25,588
2000	1650	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
	1700	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
	1800	8	5	5	0.3	31,573	10	6	7	0.3	31,573	13	8	9	0.5	31,573
2200	1900	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
	1950	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
	2000	8	5	5	0.3	38,186	10	6	7	0.3	38,186	13	8	9	0.4	38,186
2400	2100	8	5	5	0.2	45,428	10	6	7	0.3	45,428	13	8	9	0.4	45,428
	2200	8	5	5	0.2	45,428	10	6	7	0.3	45,428	13	8	9	0.4	45,428
2600	2250	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
	2300	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
	2400	8	5	5	0.2	53,297	10	6	7	0.3	53,297	13	8	9	0.4	53,297
2800	2500	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
	2550	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
	2600	8	5	5	0.2	61,795	10	6	7	0.2	61,795	13	8	9	0.3	61,795
3000	2700	8	5	5	0.2	70,922	10	6	7	0.2	70,922	13	8	8	0.3	70,922
	2800	8	5	5	0.2	70,922	10	6	7	0.2	70,922	13	8	8	0.3	70,922
3200	2850	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
	2900	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
	3000	8	5	5	0.2	80,676	10	6	7	0.2	80,676	13	8	8	0.3	80,676
3400	3100	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
	3150	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
	3200	8	5	5	0.2	91,059	10	6	7	0.2	91,059	13	8	8	0.3	91,059
3600	3300	8	5	5	0.2	102,071	10	6	6	0.2	102,071	13	8	8	0.3	102,071
	3400	8	5	5	0.2	102,071	10	6	6	0.2	102,071	13	8	8	0.3	102,071
3800	3450	8	5	5	0.2	113,710	10	6	6	0.2	113,710	13	8	8	0.2	113,710
	3600	8	5	5	0.2	113,710	10	6	6	0.2	113,710	13	8	8	0.2	113,710
4000	3800	8	5	5	0.1	125,978	10	6	6	0.2	125,978	13	8	8	0.2	125,978

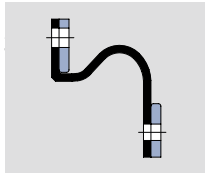
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).

Other installation lengths and combinations on request.

For larger movements see type W110FF.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN2,5. In case of deviating flange dimensions, please contact us.

**Customised products available**



# W110FF

> with arch, without vacuum ring



Installation length (L <sub>E</sub> ) at design pressure																
		up to 2.5 bar L <sub>E</sub> = 150 mm					up to 2.5 bar L <sub>E</sub> = 200 mm					up to 2.5 bar L <sub>E</sub> = 250 mm				
		higher pressures on request														
Wall pipe ∅ mm	Medium pipe ∅ 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	80	34	17	26	9.6	616	45	26	37	14.6	765	59	37	49	20.3	962
250	100	34	17	26	7.7	855	45	26	36	11.7	1,029	59	37	48	16.5	1,257
300	125	34	17	26	6.5	1,146	45	26	36	9.8	1,346	59	37	48	13.9	1,605
	150	34	17	26	6.5	1,146	45	26	36	9.8	1,346	59	37	48	13.9	1,605
400	175	34	17	25	4.9	1,825	45	26	35	7.4	2,075	59	37	46	10.5	2,393
	200	34	17	25	4.9	1,825	45	26	35	7.4	2,075	59	37	46	10.5	2,393
500	250	34	17	24	3.9	2,669	45	26	34	5.9	2,971	59	37	45	8.4	3,349
	300	34	17	24	3.9	2,669	45	26	34	5.9	2,971	59	37	45	8.4	3,349
600	350	34	17	24	3.2	3,664	45	26	33	5.0	4,015	59	37	45	7	4,453
	400	34	17	24	3.2	3,664	45	26	33	5.0	4,015	59	37	45	7	4,453
700	450	34	17	24	2.8	4,827	45	26	33	4.2	5,230	59	37	44	6	5,728
	500	34	17	24	2.8	4,827	45	26	33	4.2	5,230	59	37	44	6	5,728
800	550	34	17	23	2.4	6,151	45	26	33	3.7	6,604	59	37	43	5.3	7,163
	600	34	17	23	2.4	6,151	45	26	33	3.7	6,604	59	37	43	5.3	7,163
900	650	34	17	23	2.2	7,620	45	26	32	3.3	8,123	59	37	43	4.7	8,742
	700	34	17	23	2.2	7,620	45	26	32	3.3	8,123	59	37	43	4.7	8,742
1000	750	34	17	23	1.9	9,246	45	26	32	3.0	9,799	59	37	43	4.2	10,477
	800	34	17	23	1.9	9,246	45	26	32	3.0	9,799	59	37	43	4.2	10,477
1100	850	34	17	23	1.8	11,029	45	26	32	2.7	11,632	59	37	42	3.8	12,370
	900	34	17	23	1.8	11,029	45	26	32	2.7	11,632	59	37	42	3.8	12,370
1200	950	34	17	22	1.6	12,969	45	26	31	2.5	13,623	59	37	42	3.5	14,420
	1000	34	17	22	1.6	12,969	45	26	31	2.5	13,623	59	37	42	3.5	14,420
1400	1050	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1100	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1150	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
	1200	34	17	22	1.4	17,320	45	26	31	2.1	18,074	59	37	41	3	18,991
1600	1250	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1300	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1350	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
	1400	34	17	22	1.2	22,299	45	26	31	1.9	23,154	59	37	41	2.6	24,190
1800	1450	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
	1500	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
	1600	34	17	22	1.1	27,907	45	26	30	1.7	28,863	59	37	40	2.4	30,018
2000	1650	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
	1700	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
	1800	34	17	21	1.0	34,143	45	26	30	1.5	35,199	59	37	40	2.1	36,474
2200	1900	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
	1950	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
	2000	34	17	21	0.9	41,007	45	26	30	1.4	42,164	59	37	40	1.9	43,558
2400	2100	34	17	21	0.8	48,500	45	26	29	1.2	49,757	59	37	39	1.8	51,271
	2200	34	17	21	0.8	48,500	45	26	29	1.2	49,757	59	37	39	1.8	51,271
2600	2250	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
	2300	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
	2400	34	17	21	0.7	56,621	45	26	29	1.1	57,979	59	37	39	1.6	59,612
2800	2500	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
	2550	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
	2600	34	17	21	0.7	65,370	45	26	29	1.1	66,829	59	37	39	1.5	68,581
3000	2700	34	17	21	0.6	74,748	45	26	29	1.0	76,307	59	37	39	1.4	78,179
	2800	34	17	21	0.6	74,748	45	26	29	1.0	76,307	59	37	39	1.4	78,179
3200	2850	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
	2900	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
	3000	34	17	21	0.6	84,754	45	26	29	0.9	86,413	59	37	38	1.3	88,405
3400	3100	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
	3150	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
	3200	34	17	20	0.6	95,388	45	26	29	0.9	97,148	59	37	38	1.2	99,259
3600	3300	34	17	20	0.5	106,651	45	26	28	0.8	108,511	59	37	38	1.2	110,741
	3400	34	17	20	0.5	106,651	45	26	28	0.8	108,511	59	37	38	1.2	110,741
3800	3450	34	17	20	0.5	118,542	45	26	28	0.8	120,503	59	37	38	1.1	122,852
	3600	34	17	20	0.5	118,542	45	26	28	0.8	120,503	59	37	38	1.1	122,852
4000	3800	34	17	20	0.5	131,061	45	26	28	0.7	133,123	59	37	38	1.1	135,591

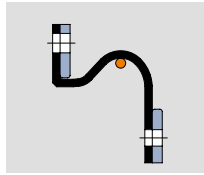
In the event of axial extension and simultaneous lateral displacement the above movements are reduced (> page 29).

Other installation lengths and combinations on request.

Larger movements on request.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN2,5. In case of deviating flange dimensions, please contact us.

**Customised products available**



# W111FF

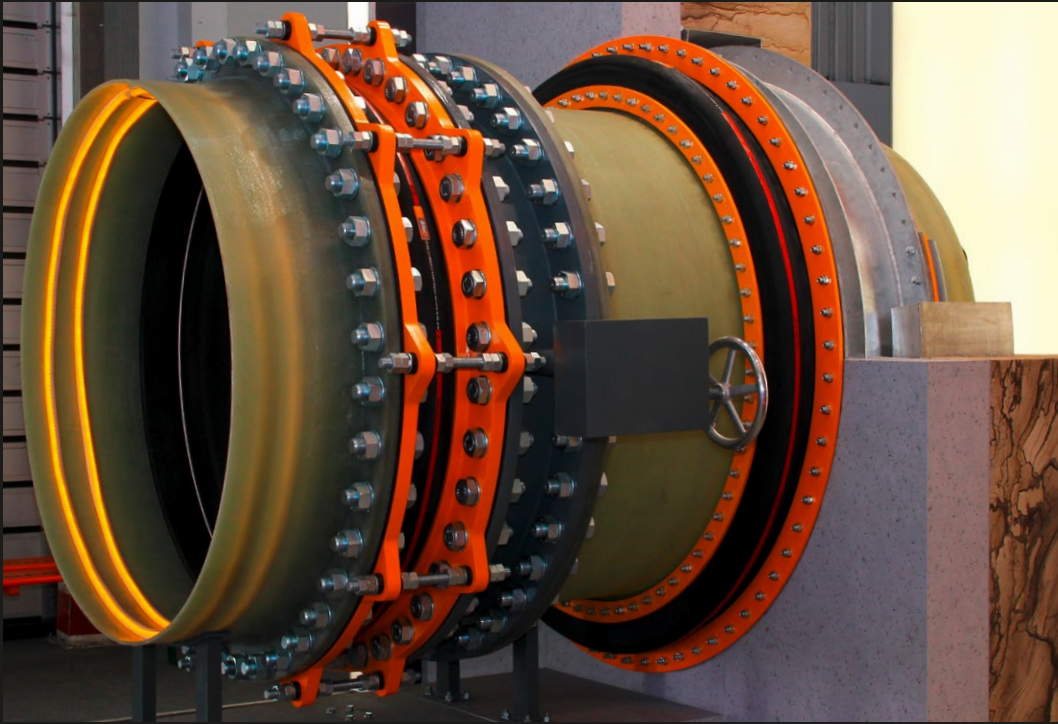
> with arch, with vacuum ring

Installation length (L <sub>E</sub> ) at design pressure																
		up to 2.5 bar L <sub>E</sub> = 150 mm					up to 2.5 bar L <sub>E</sub> = 200 mm					up to 2.5 bar L <sub>E</sub> = 250 mm				
		Movement				A	Movement				A	Movement				A
Wall pipe ∅ mm	Medium pipe ∅ mm	mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>	mm	mm	± mm	± °	cm <sup>2</sup>
200	80	34	6	26	3.4	616	45	9	37	5.1	765	59	12	49	6.8	962
250	100	34	6	26	2.7	855	45	9	36	4.1	1,029	59	12	48	5.5	1,257
300	125	34	6	26	2.3	1,146	45	9	36	3.4	1,346	59	12	48	4.6	1,605
	150	34	6	26	2.3	1,146	45	9	36	3.4	1,346	59	12	48	4.6	1,605
400	175	34	6	25	1.7	1,825	45	9	35	2.6	2,075	59	12	46	3.4	2,393
	200	34	6	25	1.7	1,825	45	9	35	2.6	2,075	59	12	46	3.4	2,393
500	250	34	6	24	1.4	2,669	45	9	34	2.1	2,971	59	12	45	2.7	3,349
	300	34	6	24	1.4	2,669	45	9	34	2.1	2,971	59	12	45	2.7	3,349
600	350	34	6	24	1.1	3,664	45	9	33	1.7	4,015	59	12	45	2.3	4,453
	400	34	6	24	1.1	3,664	45	9	33	1.7	4,015	59	12	45	2.3	4,453
700	450	34	6	24	1.0	4,827	45	9	33	1.5	5,230	59	12	44	2	5,728
	500	34	6	24	1.0	4,827	45	9	33	1.5	5,230	59	12	44	2	5,728
800	550	34	6	23	0.9	6,151	45	9	33	1.3	6,604	59	12	43	1.7	7,163
	600	34	6	23	0.9	6,151	45	9	33	1.3	6,604	59	12	43	1.7	7,163
900	650	34	6	23	0.8	7,620	45	9	32	1.1	8,123	59	12	43	1.5	8,742
	700	34	6	23	0.8	7,620	45	9	32	1.1	8,123	59	12	43	1.5	8,742
1000	750	34	6	23	0.7	9,246	45	9	32	1.0	9,799	59	12	43	1.4	10,477
	800	34	6	23	0.7	9,246	45	9	32	1.0	9,799	59	12	43	1.4	10,477
1100	850	34	6	23	0.6	11,029	45	9	32	0.9	11,632	59	12	42	1.2	12,370
	900	34	6	23	0.6	11,029	45	9	32	0.9	11,632	59	12	42	1.2	12,370
1200	950	34	6	22	0.6	12,969	45	9	31	0.9	13,623	59	12	42	1.1	14,420
	1000	34	6	22	0.6	12,969	45	9	31	0.9	13,623	59	12	42	1.1	14,420
1400	1050	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1100	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1150	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
	1200	34	6	22	0.5	17,320	45	9	31	0.7	18,074	59	12	41	1	18,991
1600	1250	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1300	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1350	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
	1400	34	6	22	0.4	22,299	45	9	31	0.6	23,154	59	12	41	0.9	24,190
1800	1450	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
	1500	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
	1600	34	6	22	0.4	27,907	45	9	30	0.6	28,863	59	12	40	0.8	30,018
2000	1650	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
	1700	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
	1800	34	6	21	0.3	34,143	45	9	30	0.5	35,199	59	12	40	0.7	36,474
2200	1900	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
	1950	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
	2000	34	6	21	0.3	41,007	45	9	30	0.5	42,164	59	12	40	0.6	43,558
2400	2100	34	6	21	0.3	48,500	45	9	29	0.4	49,757	59	12	39	0.6	51,271
	2200	34	6	21	0.3	48,500	45	9	29	0.4	49,757	59	12	39	0.6	51,271
2600	2250	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
	2300	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
	2400	34	6	21	0.3	56,621	45	9	29	0.4	57,979	59	12	39	0.5	59,612
2800	2500	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
	2550	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
	2600	34	6	21	0.2	65,370	45	9	29	0.4	66,829	59	12	39	0.5	68,581
3000	2700	34	6	21	0.2	74,748	45	9	29	0.3	76,307	59	12	39	0.5	78,179
	2800	34	6	21	0.2	74,748	45	9	29	0.3	76,307	59	12	39	0.5	78,179
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**Customised products available**



Exhibition model of size  $\varnothing$  1,600 mm  
tied dismantling expansion joint in front of a butterfly valve  
wall penetration seal for underground pipe



$\varnothing$  2,600 mm double arch ground water penetration seal  
made from radiation resistant silicone rubber installed outside of a building  
design pressure 20 m WC, lateral displacement 60 mm from building settlement