






















## 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

PTFE-lining: Firmly embedded against chemical attacks on the interior at the rubber bellows, available starting at  $\varnothing$  300 mm. Take the restriction of the listed movement into account (> page 283–285)

## Backing flanges

**Design:** Single-part, oval backing flanges with support collar, clearance holes, consisting of a pair of hinge plates connected with pins (type F)

**Flange norms:** DIN, EN, ANSI, AWWA, BS, JIS, special measurements (> page 298)

**Materials:** Carbon steel, stainless steel

**Coating:** Primed, hot-dip galvanised, special paint

## Accessories

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

**Flow liners:** Cylindrical flow liner  
Conical flow liner  
Telescoping flow liner (> page 57)

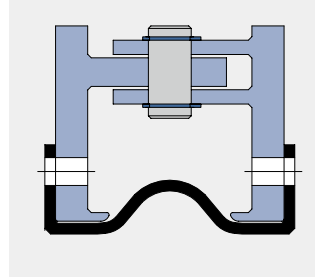
**Filled arch:**



## 282 Angular expansion joints with full faced rubber flange

### Hinge

- Design:** Dimensions according to design pressure (test pressure)
- Materials:** Carbon steel, stainless steel
- Coating:** Galvanised or hot-dip galvanised



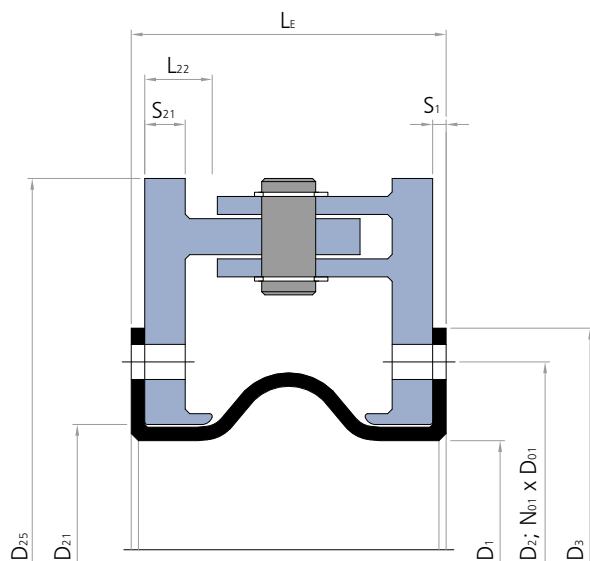
#### Type U110F

Hinge for angular movements on one plane with plates and pins to absorb the reaction forces from pressure and vacuum. Rotation axis in the center of the installation gap

### Support rings

TYPE	Support rings	Vacuum ring	Pressure	Movement
U110F		None	Depending on the diameter up to 25 bar, vacuum stability on request	> page 283
U111F		Medium contact, inside the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 284
U112F		No medium contact, embedded in the arch	Depending on the diameter up to 25 bar, for vacuum up to 0.05 bar absolute	> page 285
<b>Materials</b>				
Stainless steel		Carbon steel, rubberised	Carbon steel, embedded	

Cross section U110F





# U110F

> without vacuum ring



## Installation length (L<sub>E</sub>) depending on design pressure

Ø mm	up to 10 bar L <sub>E</sub> = 150 mm		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> = 300 mm		up to 10 bar L <sub>E</sub> = 350 mm		up to 10 bar L <sub>E</sub> = 400 mm	
	pressures on request											
	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>
100	22.3	177	31.0	254	32.6	260	40	353	48.2	491	52.6	616
125	18.2	241	25.6	330	27.1	337	33.9	441	41.9	594	46.3	731
150	15.3	314	21.8	415	23.1	423	29.2	539	36.7	707	41.1	855
175	13.2	415	18.9	531	20.1	539	25.6	670	32.6	855	36.8	1,018
200	11.6	491	16.7	616	17.7	625	22.8	765	29.2	962	33.2	1,134
250	9.3	707	13.5	855	14.4	866	18.6	1,029	24.1	1,257	27.7	1,452
300	7.8	973	11.3	1,146	12	1,158	15.6	1,346	20.5	1,605	23.6	1,825
350	6.7	1,288	9.7	1,486	10.4	1,500	13.5	1,713	17.7	2,003	20.5	2,248
400	5.9	1,605	8.5	1,825	9.1	1,840	11.9	2,075	15.6	2,393	18.1	2,660
450	5.2	1,987	7.6	2,231	8.1	2,248	10.6	2,507	14	2,856	16.2	3,147
500	4.7	2,402	6.8	2,669	7.3	2,688	9.5	2,971	12.6	3,349	14.7	3,664
550	4.3	2,827	6.2	3,117	6.6	3,137	8.7	3,442	11.5	3,848	13.4	4,185
600	3.9	3,349	5.7	3,664	6.1	3,685	8	4,015	10.6	4,453	12.3	4,815
650	3.6	3,848	5.3	4,185	5.6	4,208	7.4	4,560	9.8	5,027	11.4	5,411
700	3.4	4,465	4.9	4,827	5.2	4,852	6.8	5,230	9.1	5,728	10.6	6,138
750	3.1	5,027	4.6	5,411	4.9	5,437	6.4	5,836	8.5	6,362	9.9	6,793
800	2.9	5,741	4.3	6,151	4.6	6,179	6	6,604	8	7,163	9.3	7,620
850	2.8	6,362	4.0	6,793	4.3	6,822	5.6	7,268	7.5	7,854	8.8	8,332
900	2.6	7,163	3.8	7,620	4.1	7,651	5.3	8,123	7.1	8,742	8.3	9,246
950	2.5	7,854	3.6	8,332	3.9	8,365	5.1	8,858	6.7	9,503	7.9	10,029
1000	2.3	8,742	3.4	9,246	3.7	9,280	4.8	9,799	6.4	10,477	7.5	11,029
1050	2.2	9,503	3.3	10,029	3.5	10,064	4.6	10,605	6.1	11,310	7.1	11,882
1100	2.1	10,496	3.1	11,047	3.3	11,085	4.4	11,652	5.8	12,390	6.8	12,989
1150	2.0	11,310	3.0	11,882	3.2	11,921	4.2	12,509	5.6	13,273	6.5	13,893
1200	2.0	12,370	2.9	12,969	3.1	13,009	4	13,623	5.3	14,420	6.2	15,066
1250	1.9	13,273	2.7	13,893	2.9	13,935	3.8	14,569	5.1	15,394	6	16,061
1300	1.8	14,420	2.6	15,066	2.8	15,109	3.7	15,770	4.9	16,627	5.8	17,320
1350	1.7	15,394	2.5	16,061	2.7	16,106	3.6	16,787	4.7	17,671	5.5	18,385
1400	1.7	16,627	2.5	17,320	2.6	17,366	3.4	18,074	4.6	18,991	5.3	19,731
1450	1.6	17,671	2.4	18,385	2.5	18,433	3.3	19,162	4.4	20,106	5.2	20,867
1500	1.6	18,991	2.3	19,731	2.4	19,781	3.2	20,536	4.3	21,512	5	22,299
1600	1.5	21,512	2.1	22,299	2.3	22,352	3	23,154	4	24,190	4.7	25,025
1650	1.4	22,698	2.1	23,506	2.2	23,561	2.9	24,384	3.9	25,447	4.5	26,302
1700	1.4	24,190	2.0	25,025	2.2	25,081	2.8	25,930	3.8	27,026	4.4	27,907
1800	1.3	27,055	1.9	27,937	2	27,996	2.7	28,893	3.6	30,049	4.2	30,978
1900	1.2	30,018	1.8	30,946	1.9	31,009	2.5	31,952	3.4	33,168	3.9	34,143
1950	1.2	31,416	1.8	32,365	1.9	32,429	2.5	33,394	3.3	34,636	3.8	35,633
2000	1.2	33,168	1.7	34,143	1.8	34,209	2.4	35,199	3.2	36,474	3.7	37,497
2100	1.1	36,474	1.6	37,497	1.7	37,565	2.3	38,603	3.1	39,938	3.6	41,007
2200	1.1	39,938	1.6	41,007	1.7	41,079	2.2	42,164	2.9	43,558	3.4	44,675
2250	1.0	41,548	1.5	42,638	1.6	42,712	2.1	43,818	2.8	45,239	3.3	46,377
2300	1.0	43,558	1.5	44,675	1.6	44,750	2.1	45,882	2.8	47,336	3.3	48,500
2400	1.0	47,336	1.4	48,500	1.5	48,578	2	49,757	2.7	51,271	3.1	52,482
2500	0.9	51,271	1.4	52,482	1.5	52,563	1.9	53,789	2.6	55,363	3	56,621
2550	0.9	53,093	1.3	54,325	1.4	54,408	1.9	55,655	2.5	57,256	2.9	58,535
2600	0.9	55,363	1.3	56,621	1.4	56,706	1.9	57,979	2.5	59,612	2.9	60,917
2700	0.9	59,612	1.3	60,917	1.4	61,005	1.8	62,325	2.4	64,018	2.8	65,370
2800	0.8	64,018	1.2	65,370	1.3	65,461	1.7	66,829	2.3	68,581	2.7	69,981
2850	0.8	66,052	1.2	67,426	1.3	67,518	1.7	68,906	2.3	70,686	2.6	72,107
2900	0.8	68,581	1.2	69,981	1.3	70,075	1.7	71,489	2.2	73,301	2.6	74,748
3000	0.8	73,301	1.1	74,748	1.2	74,845	1.6	76,307	2.1	78,179	2.5	79,673
3100	0.8	78,179	1.1	79,673	1.2	79,773	1.6	81,282	2.1	83,213	2.4	84,754
3150	0.7	80,425	1.1	81,940	1.2	82,041	1.5	83,571	2	85,530	2.4	87,092
3200	0.7	83,213	1.1	84,754	1.1	84,857	1.5	86,413	2	88,405	2.3	89,993
3300	0.7	88,405	1.0	89,993	1.1	90,099	1.5	91,702	1.9	93,753	2.3	95,388
3400	0.7	93,753	1.0	95,388	1.1	95,498	1.4	97,148	1.9	99,259	2.2	100,941
3450	0.7	96,211	1.0	97,868	1.1	97,979	1.4	99,650	1.9	101,788	2.2	103,491
3600	0.7	104,922	1.0	106,651	1	106,767	1.3	108,511	1.8	110,741	2.1	112,518
3800	0.6	116,718	0.9	118,542	1	118,664	1.3	120,503	1.7	122,852	2	124,723
4000	0.6	129,143	0.9	131,061	0.9	131,190	1.2	133,123	1.6	135,591	1.9	137,556

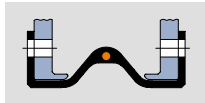
Recommended sizes  
Further possible sizes

Reduction of movement for expansion joints with PTFE lining: angular movement: -66 %.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available





# U112F

> with embedded vacuum ring



## Installation length (L<sub>E</sub>) depending on design pressure

∅ mm	up to 10 bar L <sub>E</sub> = 150 mm		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> = 300 mm		up to 10 bar L <sub>E</sub> = 350 mm		up to 10 bar L <sub>E</sub> = 400 mm	
	pressures on request		pressures on request		pressures on request		pressures on request		pressures on request		pressures on request	
	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>	Movement ±°	A cm <sup>2</sup>
100	12.4	150	17.7	222	19.3	232	23.7	320	30.5	423	33.8	539
125	10.0	209	14.4	293	15.6	305	19.4	405	25.3	519	28.2	647
150	8.3	278	12.0	373	13.1	387	16.3	499	21.5	625	24.1	765
175	7.2	373	10.4	483	11.3	499	14.1	625	18.6	765	20.9	919
200	6.3	445	9.1	564	9.9	581	12.4	716	16.4	866	18.5	1,029
250	5.0	651	7.3	794	8	814	10	973	13.3	1,146	15	1,333
300	4.2	908	6.1	1,075	6.7	1,099	8.3	1,282	11.1	1,479	12.6	1,691
350	3.6	1,213	5.2	1,405	5.7	1,432	7.2	1,640	9.6	1,863	10.8	2,099
400	3.1	1,521	4.6	1,735	5	1,765	6.3	1,995	8.4	2,240	9.5	2,498
450	2.8	1,893	4.1	2,132	4.4	2,165	5.6	2,419	7.5	2,688	8.5	2,971
500	2.5	2,299	3.7	2,561	4	2,597	5	2,875	6.7	3,167	7.6	3,473
550	2.3	2,715	3.3	3,000	3.6	3,039	4.6	3,339	6.1	3,653	6.9	3,982
600	2.1	3,227	3.1	3,536	3.3	3,578	4.2	3,904	5.6	4,243	6.4	4,596
650	1.9	3,718	2.8	4,049	3.1	4,094	3.9	4,441	5.2	4,803	5.9	5,178
700	1.8	4,324	2.6	4,681	2.9	4,729	3.6	5,102	4.8	5,489	5.5	5,890
750	1.7	4,877	2.4	5,255	2.7	5,307	3.4	5,701	4.5	6,110	5.1	6,533
800	1.6	5,581	2.3	5,986	2.5	6,041	3.1	6,461	4.2	6,896	4.8	7,344
850	1.5	6,193	2.2	6,619	2.4	6,677	3	7,118	4	7,574	4.5	8,044
900	1.4	6,984	2.0	7,436	2.2	7,497	2.8	7,964	3.8	8,446	4.3	8,942
950	1.3	7,667	1.9	8,139	2.1	8,203	2.7	8,692	3.6	9,195	4	9,712
1000	1.3	8,544	1.8	9,043	2	9,110	2.5	9,625	3.4	10,153	3.8	10,696
1050	1.2	9,297	1.7	9,817	1.9	9,887	2.4	10,423	3.2	10,973	3.7	11,537
1100	1.1	10,279	1.7	10,825	1.8	10,899	2.3	11,461	3.1	12,037	3.5	12,628
1150	1.1	11,085	1.6	11,652	1.7	11,728	2.2	12,311	2.9	12,908	3.3	13,519
1200	1.1	12,135	1.5	12,728	1.7	12,808	2.1	13,417	2.8	14,040	3.2	14,677
1250	1.0	13,029	1.5	13,643	1.6	13,726	2	14,356	2.7	15,001	3.1	15,659
1300	1.0	14,166	1.4	14,806	1.5	14,892	1.9	15,548	2.6	16,218	3	16,902
1350	0.9	15,131	1.4	15,792	1.5	15,881	1.9	16,559	2.5	17,250	2.8	17,955
1400	0.9	16,354	1.3	17,041	1.4	17,134	1.8	17,837	2.4	18,554	2.7	19,285
1450	0.9	17,390	1.3	18,098	1.4	18,194	1.7	18,918	2.3	19,656	2.6	20,409
1500	0.8	18,699	1.2	19,433	1.3	19,532	1.7	20,283	2.3	21,047	2.6	21,825
1600	0.8	21,201	1.1	21,983	1.3	22,088	1.6	22,885	2.1	23,697	2.4	24,522
1650	0.8	22,379	1.1	23,181	1.2	23,289	1.5	24,108	2	24,941	2.3	25,787
1700	0.7	23,861	1.1	24,689	1.2	24,801	1.5	25,645	2	26,504	2.3	27,377
1800	0.7	26,706	1.0	27,582	1.1	27,700	1.4	28,592	1.9	29,498	2.1	30,419
1900	0.7	29,651	1.0	30,573	1.1	30,698	1.3	31,636	1.8	32,589	2	33,556
1950	0.6	31,040	0.9	31,984	1	32,111	1.3	33,071	1.7	34,045	2	35,033
2000	0.6	32,781	0.9	33,751	1	33,882	1.3	34,867	1.7	35,867	1.9	36,881
2100	0.6	36,069	0.9	37,086	1	37,223	1.2	38,256	1.6	39,303	1.8	40,364
2200	0.6	39,514	0.8	40,578	0.9	40,721	1.1	41,801	1.5	42,895	1.7	44,003
2250	0.6	41,115	0.8	42,200	0.9	42,346	1.1	43,447	1.5	44,563	1.7	45,692
2300	0.5	43,116	0.8	44,227	0.9	44,376	1.1	45,503	1.5	46,645	1.7	47,800
2400	0.5	46,875	0.8	48,033	0.8	48,188	1.1	49,363	1.4	50,551	1.6	51,754
2500	0.5	50,791	0.7	51,996	0.8	52,158	1	53,379	1.4	54,615	1.5	55,864
2550	0.5	52,604	0.7	53,831	0.8	53,995	1	55,238	1.3	56,495	1.5	57,766
2600	0.5	54,864	0.7	56,116	0.8	56,284	1	57,553	1.3	58,836	1.5	60,132
2700	0.5	59,094	0.7	60,393	0.7	60,568	0.9	61,883	1.3	63,213	1.4	64,557
2800	0.5	63,481	0.7	64,828	0.7	65,008	0.9	66,371	1.2	67,748	1.4	69,139
2850	0.4	65,506	0.6	66,874	0.7	67,058	0.9	68,442	1.2	69,840	1.3	71,252
2900	0.4	68,025	0.6	69,419	0.7	69,606	0.9	71,016	1.2	72,440	1.3	73,878
3000	0.4	72,727	0.6	74,168	0.7	74,361	0.8	75,818	1.1	77,289	1.3	78,775
3100	0.4	77,585	0.6	79,073	0.6	79,273	0.8	80,777	1.1	82,295	1.2	83,828
3150	0.4	79,823	0.6	81,332	0.6	81,534	0.8	83,060	1.1	84,599	1.2	86,153
3200	0.4	82,601	0.6	84,136	0.6	84,342	0.8	85,893	1.1	87,459	1.2	89,038
3300	0.4	87,773	0.6	89,356	0.6	89,568	0.8	91,166	1	92,779	1.2	94,406
3400	0.4	93,103	0.5	94,733	0.6	94,951	0.7	96,597	1	98,256	1.1	99,930
3450	0.4	95,553	0.5	97,203	0.6	97,425	0.7	99,091	1	100,772	1.1	102,467
3600	0.4	104,234	0.5	105,958	0.6	106,188	0.7	107,928	0.9	109,682	1.1	111,450
3800	0.3	115,993	0.5	117,811	0.5	118,054	0.7	119,888	0.9	121,736	1	123,599
4000	0.3	128,380	0.5	130,292	0.5	130,548	0.6	132,477	0.8	134,419	1	136,376

Recommended sizes  
Further possible sizes

Reduction of movement for expansion joints  
with PTFE lining: angular movement: -0 %.

The movement capability of the expansion joints given in the tables is determined for flange dimensions according to DIN PN10. In case of deviating flange dimensions, please contact us.

Customised products available