

WILLBRANDT Rubber Expansion Joint Type 49

■ mainly in stock

DN 32 to DN 500

Type 49 is a highly corrugated, highly elastic rubber expansion joint, whose corrugated shape achieves very low inherent resistance. It reduces structure-borne noise to a very high degree and is characterised by its large movement absorption with a short length. Due to the wide variety of rubber qualities, a suitable rubber compound is available for every application (see material descriptions on the following page).

Type 49 is primarily used in building technology, where it is used to absorb movement and vibrations and to dampen noise. It is also used in industrial applications, particularly in the field of weighing technology. Due to its very low inherent resistance, it is ideal for decoupling scales/load cells.



Bellow design	High corrugated rubber bellow with reinforcement and shaped sealing bead with core ring, self-sealing (no additional seals required). Suitable for swiveling flanges.	Approvals/Conformity	CE, drinking water conform (WRAS), shipbuilding approvals, TÜV tested in accordance with DIN 4809 (Detailed overview on page 5.)
Flange version	Both sides with swiveling flange made of galvanized steel with threaded holes, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.	Accessories	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover
Vacuum resistance	- DN 50 to DN 250 up to -200 mbar - With vacuum supporting spiral/ring, vacuum-proof		Further information on page 99 - 105.

Specifications

Bellow		Bellow design			Permissible operating data										Surface resistance Ro	
Colour code	Colour marking	Core (inner)	Reinforcement	Cover (outer)									Short-term °C	Core	Cover	
A-red		EPDM	PEEK	EPDM	-40	16	70	25	100	18	130	12	150	dissipative	dissipative	
blue		IIR	Polyamide	EPDM	-40	16	50	25	70	18	100	12	120	dissipative	dissipative	
black*	-	IIR	Polyamide	EPDM	-40	10	50	10	70	8	90	6	120	dissipative	conductive	
yellow		NBR	Polyamide	CR	-20	16	50	25	70	18	90	12	100	conductive	dissipative	
green		CSM	Polyamide	CSM	-20	16	50	25	70	18	100	12	110	insulating	insulating	

DN 400 and DN 500 max. 16 bar at 50 °C
* black max. DN 200

Bursting pressure 75 bar, 48 bar at DN 400 and DN 500
black 30 bar

Important information

The expansion joints are designed for connection to a flange in accordance with EN 1092-1, form A/B, type 11. If the flange dimensions or surface finish differ from this, additional measures must be taken, such as installing an adapter disc (see also table „Rubber bellow sealing profiles“ on page 125). For aggressive media, please have the material resistance checked by our engineers. The bellows must not be painted or insulated at media temperatures >50 °C. Please also note the planning and installation instructions.

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Application

Type 49 A-red

For heating installations according to DIN 4809. For many years of operation under constant loading with hot water and heating water at 100 °C/110 °C at 10 bar/6 bar operating pressure. Electrically dissipative surface. Not suitable for media with additives containing oil.

Type 49 blue

Drinking water conform (WRAS), for hot water, sea water, cooling water with glycol or other chemical additives for treating water, weak acids and alkalis and salt solutions, technical alcohols, esters and ketones. Electrically dissipative surface. Not suitable for oil products or cooling water with additives containing oil.

Type 49 black

Like type 49 blue, but for maximum 10 bar operating pressure.

Type 49 yellow

For oils, lubricants, fuels, gases, city and natural gas (not liquefied). Electrically conductive surface.

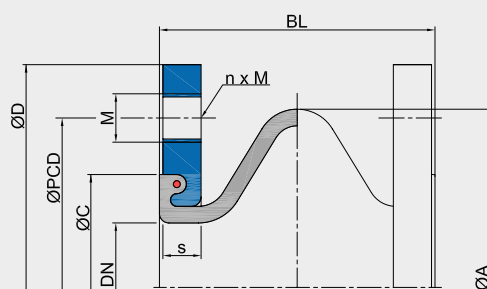
Type 49 green

For chemicals, aggressive chemical wastewater and compressor air containing oil. Electrically insulating surface.

Design A - without tie rods

Can be used for absorb movements in all directions (for combined movements, refer to the movement diagram in the technical appendix), for vibration and noise damping.

The expansion joint's reaction force must be absorbed through appropriate pipeline guidance (see planning instructions in the appendix).



Dimensions for design A

DN	Length BL	Bellow		Flange PN 10*2						Movement absorption*3				Weight
		ØA	WF*1	ØD	ØPCD	M	n	s	ØC	axial +	axial -	lateral ±	angular ±	
	mm	mm²	mm	mm			mm	mm	mm	mm	mm	mm	∠°	kg
32	100	110	1800	140	100	M16	4	16	79	20	30	30	7	3.0
40	100	110	1800	150	110	M16	4	16	79	20	30	30	7	3.6
50	100	120	3500	165	125	M16	4	16	89	20	30	30	7	4.4
65	100	135	5600	185	145	M16	8	16	104	20	30	30	7	5.0
80	100	150	8700	200	160	M16	8	18	119	20	30	30	7	6.3
100	100	170	13000	220	180	M16	8	18	142	20	30	30	7	7.0
125	100	195	19000	250	210	M16	8	18	169	20	30	30	7	8.6
150	100	260	26300	285	240	M20	8	20	195	20	30	30	7	12.4
200	100	310	41600	340	295	M20	8	20	245	20	30	30	7	16.2
250	100	360	60700	395	350	M20	12	20	295	20	30	30	7	19.7
300	100	410	83000	445	400	M20	12	20	345	20	30	30	7	23.1
350	100	460	110000	505	460	M20	16	20	396	20	30	30	7	28.4
400	110	515	138500	565	515	M24	16	25	450	20	30	30	7	39.2
500	110	615	209100	670	620	M24	20	25	550	20	30	30	7	49.9

*1 WF = effective area

*2 Other standards/dimensions possible.

*3 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).

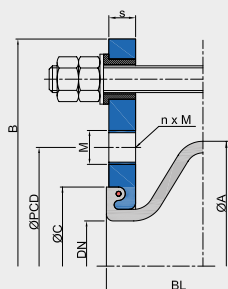
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Bracings

A selection of different bracings is available to absorb the reaction force and to protect the bellows from overstretching or excessive compression (detailed description on page 99 - 102).

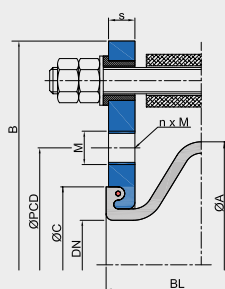
Design B*

Tie rods, mounted in rubber bushing



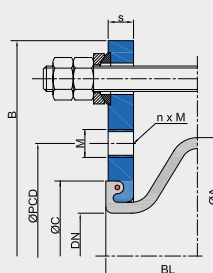
Design C*

Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



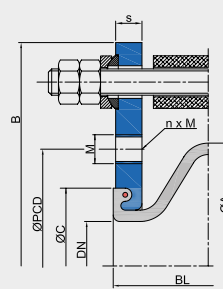
Design E

Tie rods, outside with spherical washers/conical sockets



Design S

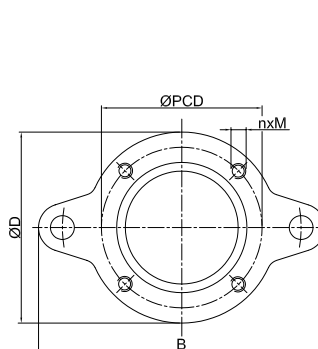
Tie rods, outside with spherical washers/conical sockets, inside with thrust limiters (plastic bushing)



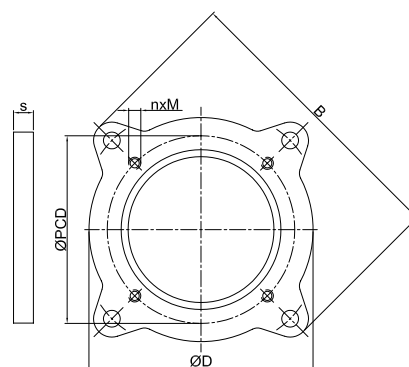
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

DN	Length BL	Flange PN 10 (example dimensions)						
		B	ØD	ØPCD	M	n	s	ØC
	mm	mm	mm	mm			mm	mm
32	100	230	140	100	M16	4	16	79
40	100	240	150	110	M16	4	16	79
50	100	255	165	125	M16	4	16	89
65	100	275	185	145	M16	8	16	104
80	100	290	200	160	M16	8	18	119
100	100	310	220	180	M16	8	18	142
125	100	340	250	210	M16	8	18	169
150	100	375	285	240	M20	8	20	195
200	100	440	340	295	M20	8	20	245
250	100	509	395	350	M20	12	20	295
300	100	559	445	400	M20	12	20	345
350	100	619	505	460	M20	16	20	396
400	110	700	565	515	M24	16	25	450
500	110	810	670	620	M24	20	25	550



DN 32 - 200



DN 250 - 500

Axial stiffness rates

DN	Length BL	Stiffness rates (average value form full way)								
		0 bar	1 bar	2.5 bar	3 bar	6 bar	10 bar	12 bar	16 bar	25 bar
	mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm
32	100	14	30	56	62	116	180	210	264	390
40	100	14	30	56	62	116	180	210	264	390
50	100	12	30	66	76	142	220	260	332	512
65	100	14	45	87	99	189	286	346	414	621
80	100	33	75	135	150	258	396	460	555	796
100	100	28	80	156	176	320	480	563	684	998
125	100	30	95	186	218	374	580	672	819	1216
150	100	35	68	144	248	320	528	626	792	1192
200	100	42	90	178	204	370	594	702	908	1385
250	100	20	112	224	256	480	768	906	1136	1680
300	100	22	108	236	277	520	854	1019	1338	2071
350	100	28	128	270	310	570	940	1136	1510	2369
400	110	44	140	296	342	646	1052	1296	1660	2587
500	110	46	172	354	416	792	1264	1524	2000	3116

Warning: Deviations (+/-25 %) in the stiffness rates may occur due to use of different materials and manufacturing processes.

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Lateral stiffness rates

DN	Length BL mm	Stiffness rates (average value form full way)								
		0 bar N/mm	1 bar N/mm	2.5 bar N/mm	3 bar N/mm	6 bar N/mm	10 bar N/mm	12 bar N/mm	16 bar N/mm	25 bar N/mm
32	100	11	17	27	30	45	63	68	79	109
40	100	11	17	27	30	45	63	68	79	109
50	100	17	35	47	54	79	107	117	138	191
65	100	21	37	61	61	96	136	150	177	250
80	100	32	56	92	94	144	204	225	266	376
100	100	38	77	112	123	180	243	266	312	430
125	100	45	88	133	150	225	315	348	415	586
150	100	48	80	116	123	188	265	292	347	489
200	100	103	155	221	238	343	473	526	633	894
250	100	126	208	179	308	442	603	659	771	1067
300	100	167	267	337	400	550	750	836	1008	1421
350	100	137	263	385	418	587	833	922	1100	1562
400	110	187	293	423	457	633	900	996	1187	1686
500	110	203	380	536	573	840	1140	1249	1466	2029

Warning: Deviations (+/-25 %) in the stiffness rates may occur due to use of different materials and manufacturing processes.

Angular stiffness torque

DN	Length BL mm	Stiffness torque (averages value from full way)								
		0 bar Nm/°	1 bar Nm/°	2.5 bar Nm/°	3 bar Nm/°	6 bar Nm/°	10 bar Nm/°	12 bar Nm/°	16 bar Nm/°	25 bar Nm/°
32	100	0.1	0.3	0.6	0.6	1.2	1.8	1.6	1.7	1.8
40	100	0.1	0.3	0.6	0.6	1.2	1.8	1.6	1.7	1.8
50	100	0.2	0.4	0.9	1.0	1.9	2.9	2.1	2.3	2.4
65	100	0.3	0.8	1.6	1.8	3.5	5.3	3.5	3.7	3.9
80	100	0.8	1.9	3.4	3.8	6.5	10.0	4.3	4.6	4.9
100	100	1.0	2.9	5.7	6.4	11.6	17.4	8.8	9.5	10.1
125	100	1.6	5.0	9.8	11.4	19.6	30.4	14.0	15.0	16.0
150	100	0.7	5.9	12.5	21.5	27.8	45.9	25.3	27.1	28.9
200	100	5.7	12.1	24.0	27.5	49.9	80.0	51.3	55.0	58.6
250	100	4.0	22.1	44.3	50.6	94.9	151.8	83.5	89.4	95.3
300	100	5.9	28.8	62.9	73.8	138.6	227.6	119.0	127.4	135.8
350	100	9.9	45.1	95.2	109.3	201.0	331.4	209.7	224.5	239.4
400	110	19.7	62.8	132.8	153.5	289.9	472.1	329.3	352.5	375.8
500	110	30.9	115.4	237.5	279.1	531.3	848.0	580.8	624.9	662.9

Warning: Deviations (+/-25 %) in the stiffness torque may occur due to use of different materials and manufacturing processes.

Frictional force

DN	Length BL mm	For design E Frictional force N/bar	For design F Frictional torque Nm/bar
32	100	10	0.2
40	100	10	0.2
50	100	19	0.4
65	100	30	0.6
80	100	46	1.0
100	100	69	1.5
125	100	101	2.1
150	100	139	3.9
200	100	220	6.2
250	100	322	11.4
300	100	440	15.6
350	100	291	20.6
400	110	395	31.2
500	110	597	78.4

Warning: Deviations (+/-25 %) in the frictional force/torque may occur due to use of different materials and manufacturing processes.

Important information

Various bolt packs (SU) are available for the standard design. Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please note our planning and installation instructions. Regarding the bracing, please refer to the information in the technical appendix (page 99 - 102)!