WILLBRANDT **Rubber Expansion Joint Type 49**

DN 32 - DN 500

Type 49 is a high-corrugated, highly elastic rubber expansion joint. Its high corrugation means that it has very low inherent resistance. It reduces up to 98 % of structure-borne noise. It is also characterised by very high movement absorption for a short installation length and variety of rubber qualities, which means that a suitable rubber compound is available for every application (see material descriptions).

Type 49 is primarily used in building technology, where it is used to absorb expansion, vibration and to insulate sound. It is also used in industrial applications, particularly in the field of weighing technology. Its very low inherent resistance makes it very suitable 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.	**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.
Vacuum resistance	Can be used up to -200 mbar without additional accories, full vacuum possible with vacuum supporting spiral/ring.	**Approvals/Conformity**	Similar to DIN 4809 / TÜV approved, drinking water and shipbuilding approval, FDA and EG 1935/2004 conform

Specifications for DN 32 - DN 500

Bellow		Bellow design			Permissible operating data									Surface resistance Ro	
Colour code	Colour marking	Core (inner)	Rein-forcement	Cover (outer)	°C	bar	°C	bar	°C	bar	°C	bar	Short-term °C	Core Ohm x cm	Cover Ohm x cm
A-red		EPDM	PEEK	EPDM	-40	16	70	25	100	18	130	12	150	4×10^3	4×10^3
blue		IIR	Polyamide	EPDM	-40	16	50	25	70	18	100	12	120	7×10^6	1×10^3
yellow		NBR	Polyamide	CR	-20	16	50	25	70	18	90	12	100	2×10^2	1×10^3
white		NBR	Polyamide	CR	-20	16	50	25	70	18	90	12	100	7×10^9	1×10^3
green		CSM	Polyamide	CSM	-20	16	50	25	70	18	100	12	110	7×10^9	7×10^9
black EPDM*		IIR	Polyamide	EPDM	-40	10	50	10	70	8	90	6	120	7×10^6	1×10^3

*black EPDM max. DN 200

Bursting pressure: 75 bar
black EPDM 30 bar

Important information

For aggressive media, please see the resistance table (can be requested separately).
The bellows should not be painted or insulated. Please refer to the installation instructions.
++++ We will be happy to send you further information on the individual types and designs. ++++

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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 conductive surface. Not suitable for media with additives containing oil.

Type 49 blue
For drinking water, hot water, sea water, cooling water with chemical additives for treating water, saline solutions, weak acids and weak alkaline solutions. Not suitable for oil products or cooling water with additives containing oil. Electrially dissipative inner surface and electrically conductive outer surface.

Type 49 yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied). Electrically conductive surface.

Type 49 white
For foodstuffs containing oil and fat (rubber in food-grade). Electrically insulating inner surface, electrically conductive outer surface. Not suitable for drinking water.

Type 49 green
For chemicals, aggressive chemical wastewater and compressor air containing oil. Electrically insulating sufrace.

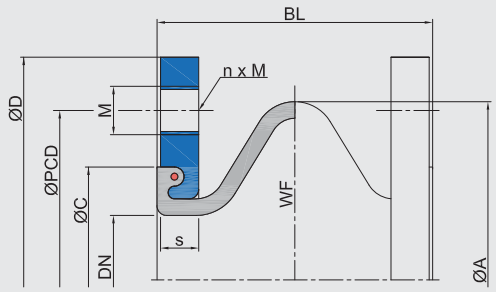
Type 49 black EPDM
For hot and cold water, sea water, cooling water, weak acids and alkali solutions, technical alcohols, esters and ketones. Electrically dissipative inner surface, conductive outer surface.
Max. pressure 10 bar.

Note!
Detailed material descriptions on pages 5 - 7.

Design A - without tie rods

Can be used for movement absorption in any direction (for combined movements, see the movement diagram in the technical appendix), noise and vibration insulation.

The expansion joint's reaction force must be absorbed via suitable piping.



Dimensions for Design A

DN	Length	Bellow		Flange PN 10*2						Movement absorption				Weight
	BL	ØA	WF*1	ØD	ØPCD	M	n	s	ØC	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm²	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	5.3
80	**100**	150	8700	200	160	M16	8	18	119	20	30	30	7	6.5
100	**100**	170	13000	220	180	M16	8	18	142	20	30	30	7	7.3
125	**100**	195	19000	250	210	M16	8	18	169	20	30	30	7	8.9
150	**100**	260	26300	285	240	M20	8	20	195	20	30	30	7	12.3
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	20.3
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	30.1
400	**110**	515	138500	565	515	M24	16	25	450	20	30	30	7	43.2
500	**110**	615	209100	670	620	M24	20	25	550	20	30	30	7	53.8

*1 WF = effective area
*2 Other standards/dimensions possible.

Permissible degree of utilisation for movement areas:
- up to 50 °C: Utilisation ~ 100 %
- up to 70 °C: Utilisation ~ 75 %
- up to 90 °C: Utilisation ~ 60 %

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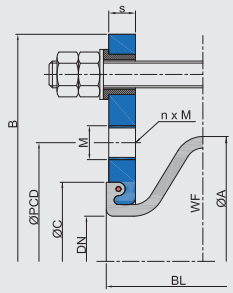
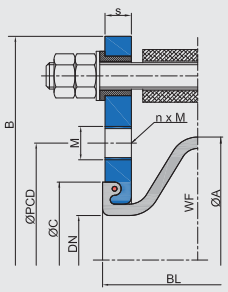
Length limiters

There is a selection of various length limiters / tie rods to absorb the reaction force and to protect the bellow from overstretching or collapsing:

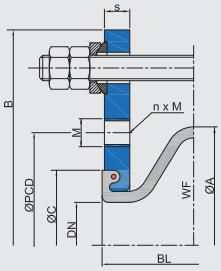
Design B*
with tie rods



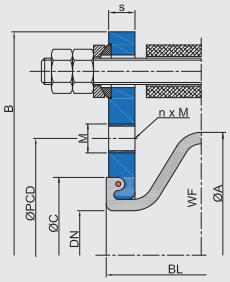
Design C*
with tie rods/thrust limiters



Design E
with tie rods and spherical washers/conical sockets



Design S
with tie rods/thrust limiters and spherical washers/conical sockets



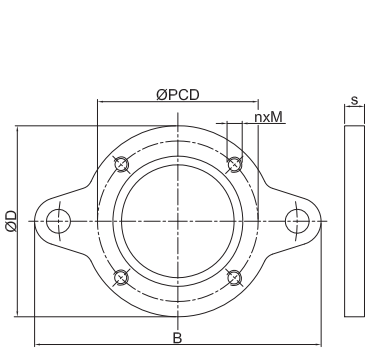
*Note: In Designs B and C the lateral movement absorption is reduced by around 50 %.

Accessories

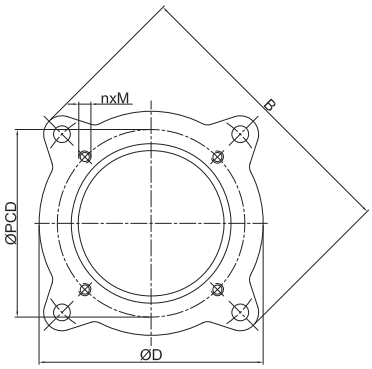
- Vacuum supporting spirals / rings
- Guide sleeves
- Potential equalisation
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover hoods

Flange dimensions for designs with tie rods

DN	Length	Flange PN 10 (example dimensions)						
	BL	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

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 refer to our installation instructions.
For information on the tie rods, please see the technical appendix (p. 89 - 92)!
++++ We will be happy to send you further information on the individual types and designs. ++++

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Axial stiffness rates

DN	Length	Stiffness rates (average value form full way)								
	BL mm	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**	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.

Lateral stiffness rates

DN	Length	Stiffness rates (average value form full way)								
	BL mm	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	Stiffness torque (averages value from full way)								
	0 bar mm	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.