Belman

TYPE 49

TYPE 49
RUBBER EXPANSION JOINT



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 overall 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

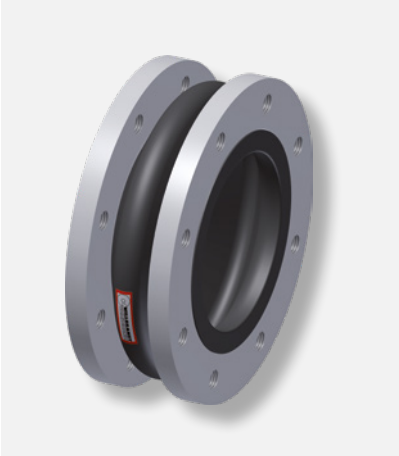
Flange version
Both sides with swiveling flange made of galvanized steel with threaded holes, drilled according to DIN PN 10 (standard).
Other materials and dimensions are possible.

Vacuum resistance
- DN 50 to DN 250 up to -200 mbar
- With vacuum supporting spiral/ring, vacuum-proof

Accessories
- Tie rods
- Vacuum supporting spiral/ring
- Guide sleeves
- Potential equalisation
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover / sun protection cover

Further information is available on request.

Approvals/conformity
CE, drinking water approval, ship-building approvals, TÜV tested in accordance with DIN 4809.
(Detailed overview is available on request).



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SPECIFICATIONS & APPLICATION

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	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
Yellow		NBR	Polyamide	CR	-20	16	50	25	70	18	90	12	100	Conductive	Conductive
Green		CSM	Polyamide	CSM	-20	16	50	25	70	18	100	12	110	Insulating	Insulating
Black EPDM*		IIR	Polyamide	EPDM	-40	10	50	10	70	8	90	6	120	Dissipative	Dissipative

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

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

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

Type 49 green
For chemicals, aggressive chemical waste water and compressor air containing oil. Electrically insulating surface.

Type 49 black EPDM
Like Type 49 blue, but for maximum 10 bar operating pressure.

Important information:
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 installation instructions, which is available on request.

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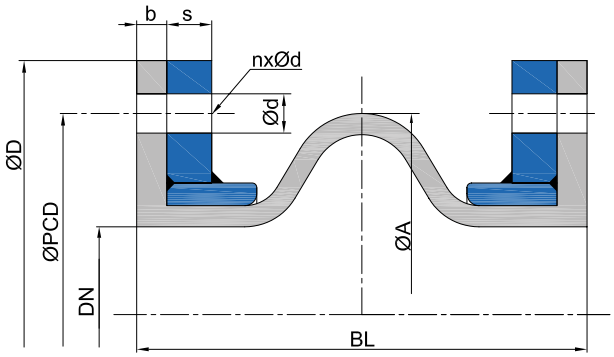
DESIGN A
WITHOUT TIE RODS



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, which is available on request), for vibration and noise damping.

The Expansion Joint's reaction force must be absorbed through appropriate pipeline guidance. (see the installation instructions, which is available on request).



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DIMENSIONS FOR **DESIGN A**

DN	LENGTH	BELLOW		FLANGE PN 10*2						MOVEMENT ABSORPTION*3				WEIGHT
										AX		LA	AN	
	BL mm	ØA mm	WF*1 mm²	ØD mm	ØPCD mm	M	n	s mm	ØC 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.

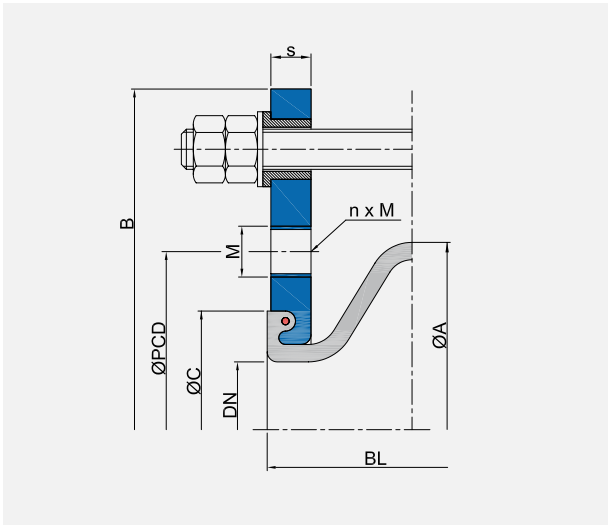
*3: Utilisation rate of movement absorption decreases at higher temperatures.

(See technical appendix, which is available on request).

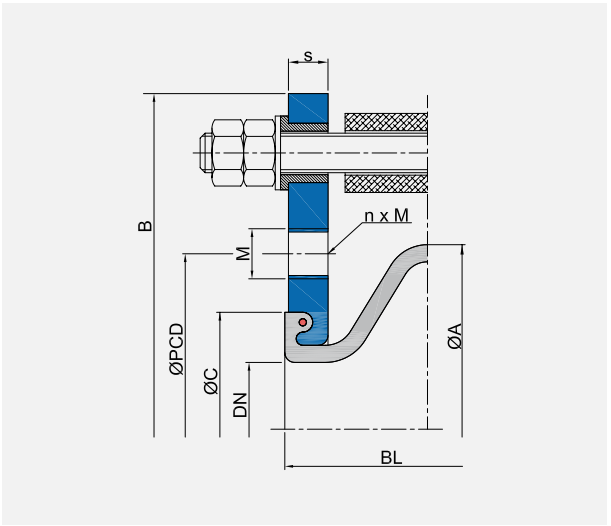
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BRACINGS
DESIGN B / C / E / S

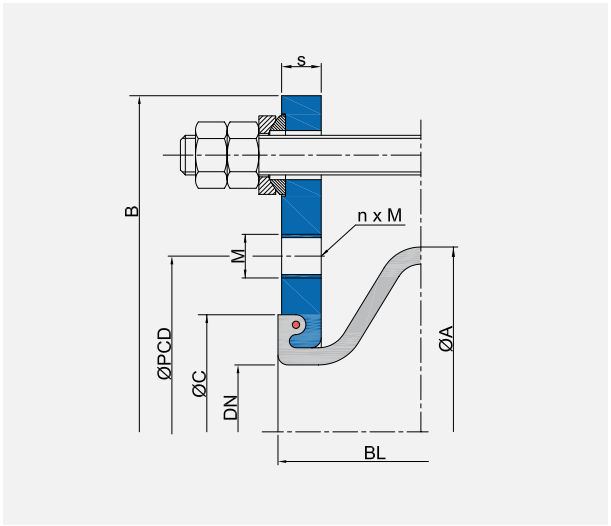
A selection of different bracings is available to absorb the reaction force and to protect the Bellows from overstretching or excessive compression (detailed description is available on request).



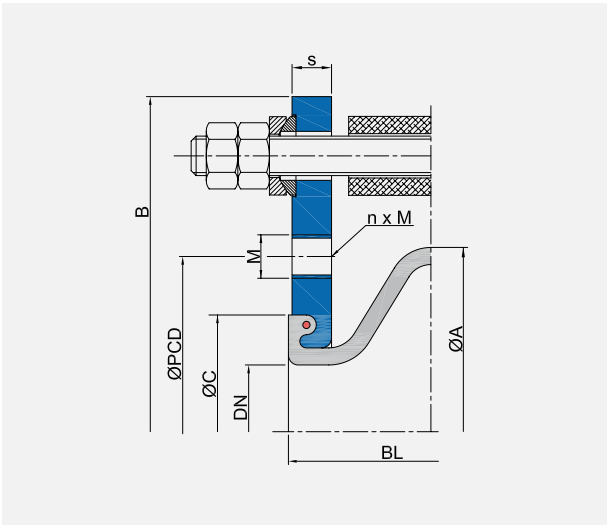
Design B*
Tie rods, mounted in rubber bushing



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



Design E
Tie rods, outside with spherical washers/conical sockets



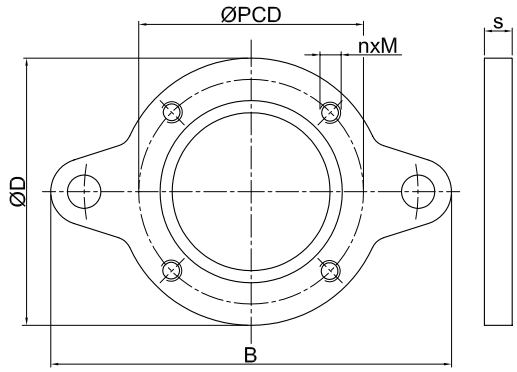
Design S
Tie rods, outside with spherical washers/conical sockets, inside with thrust limiters (plastic bushing)

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

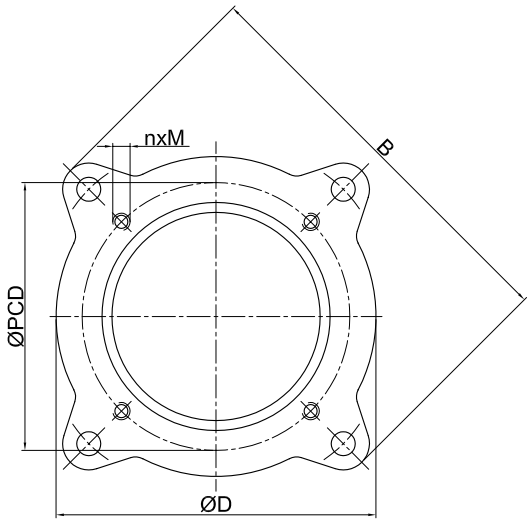
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FLANGE DIMENSIONS
FOR DESIGNS WITH TIE RODS

DN	LENGTH BL mm	FLANGE PN 10 (EXAMPLE DIMENSIONS) B mm	ØD mm	ØPCD mm	M	n	s mm	ØC 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

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TYPE 49

AXIAL STIFFNESS **RATES**

DN	LENGTH BL mm	STIFFNESS RATES (AVERAGES VALUE FROM 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**	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.

Important information:
Various bolt packs (SU) are available for the standard design.
Please note the appropriate fix point constructions and plain bearings in your piping system! For more information please note the installation instructions.

Regarding the bracing, please refer to the information in the technical appendix, which is available on request!

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LATERAL STIFFNESS **RATES**

DN	LENGTH BL mm	STIFFNESS RATES (AVERAGES VALUE FROM 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.

Important information:
Various bolt packs (SU) are available for the standard design.
Please note the appropriate fix point constructions and plain bearings in your piping system! For more information please note the installation instructions.

Regarding the bracing, please refer to the information in the technical appendix, which is available on request!

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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.

Important information:
Various bolt packs (SU) are available for the standard design.
Please note the appropriate fix point constructions and plain bearings in your piping system! For more information please note the installation instructions.

Regarding the bracing, please refer to the information in the technical appendix, which is available on request!

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FRICTIONAL **FORCE**

DN	OVERALL LENGTH BL mm	FOR DESIGN E FRICTIONAL FORCE N/bar	FOR DESIGN F FRICTIONAL FORCE 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 stiffness 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 fix point constructions and plain bearings in your piping system! For more information please note the installation instructions.

Regarding the bracing, please refer to the information in the technical appendix, which is available on request!