WILLBRANDT **Rubber Expansion Joint Type 51**

■ **partly in stock**

DN 32 to DN 600

Type 51 is a low corrugated rubber expansion joint. Due to its low corrugation, the lowest possible flow resistance is achieved. It is also characterised by its high pressure resistance. Type 51 is produced in four different rubber qualities, so that a suitable rubber compound is available for almost every application (see material descriptions).

Type 51 is mainly used in industrial plants, where it is used to absorb expansion and vibrations and to dampen noise.

Bellow design	Low corrugated rubber bellow with reinforcement and shaped sealing bead with core ring, self-sealing (no additional seals required). Suitable for accommodating swiveling flanges.
Flange version	Both sides with swiveling flange made of galvanized steel, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Pressure resistance	- Max. 25 bar, for the shortest length of each nominal diameter - Max. 16 bar, for all other length, but depending on nominal diameter and total length
Approvals/Conformity	CE (A2) (Detailed oveview on page 5.)
Vacuum resistance	- DN 32 to 50 vakuum-proof - DN 65 to 250 up to -200 mbar - DN 300 to 600 not vacuum-proof - with vacuum supporting spiral/ring from DN 65 to DN 600 vacuum-proof
Accessories	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - PTFE lining - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth covers / sun protection covers Further information on page 99 - 105.

Specifications

Bellow		Bellow design			Permissible operating data											
					Only for shortest length							For all other length				
Colour code	Colour marking	Core (inner)	Rein-forcement	Cover (outer)	°C	bar	°C	bar	°C	bar	Short-term °C	°C	bar	°C	bar	°C	bar
red-blue	■■	IIR-D	Aramid	EPDM	80	25	120	16	130	10	140						
green-blue	■■	CSM	Aramid	CR	50	25	90	16	120	10	130						
lilac	■	FPM	Aramid	ECO	50	25	120	16	150	4	160						
yellow-blue	■■	NBR	Aramid	CR	50	25	90	16	120	10	130						

Operating data depend on the nominal diameter and the total length.

Bursting pressure: 75 bar at 25 bar working pressure / 48 bar at 16 bar working pressure

Application

Type 51 red-blue
For hot water, sea water, cooling water with glycol or other chemical additives for treating water, saline solutions, weak acids and weak alkali solutions. Not suitable for oil products or cooling water with additives containing oil, hot air or steam.

Type 51 lilac
For flue gas desulphurisation systems and bio-diesel. Good resistance to benzene, xylene, toluene, fuels with an aromatic content of more than 50 %, aromatic/chlorinated hydrocarbons and mineral acids. Not suitable for water or steam.

Type 51 green-blue
For chemicals, aggressive chemical waste water and compressor air containing oil.

Type 51 yellow-blue
For oils, lubricants, fuels, gases, city and natural gas (not liquefied).

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 117).
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 instructions.

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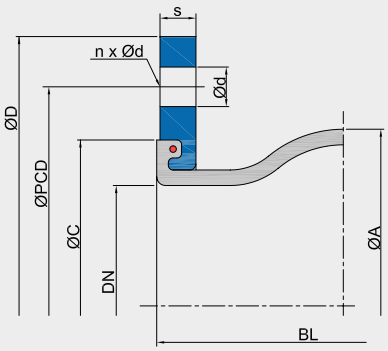
Design A - without tie rods

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.




axial -


axial +


lateral ±


angular ±

Dimensions for design A

DN	Length BL		Bellow		Flange PN 10*2						Movement absorption*3				Weight*4
	max. 25 bar	max. 16 bar	ØA	WF*1	ØD	ØPCD	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	kg
32	**130**	**150 / 160**	81	2700	140	100	18	4	15	79	10	20	15	20	3.2
40	**130**	**150 / 160**	86	2700	150	110	18	4	15	79	10	20	15	20	3.6
50	**130**	**150 / 160**	96	3200	165	125	18	4	15	88	10	20	15	20	3.8
65	**130**	**150 / 160**	110	5300	185	145	18	8	15	104	10	20	15	20	5.4
80	**130**	**150 / 160**	122	8500	200	160	18	8	15	119	15	20	15	20	7.0
100	**130**	**150 / 160 / 175**	142	12800	220	180	18	8	15	142	15	20	15	20	8.0
125	**130**	**150 / 160 / 175**	170	18700	250	210	18	8	18	169	15	20	15	20	9.7
150	**130**	**150 / 160 / 175**	196	25900	285	240	23	8	18	195	15	20	15	20	13.0
200	**130**	**150 / 175 / 200 / 250**	256	40900	340	295	23	8	20	244	15	20	15	15	16.6
250	**130**	**150 / 175 / 200 / 250**	306	59900	395	350	23	12	20	295	15	20	15	10	21.9
300	**130**	**150 / 165 / 175 / 200**	356	82200	445	400	23	12	22	351	15	20	15	10	25.2
350	**200**	**-**	442	117600	505	460	22	16	24	400	15	20	15	10	39.2
400	**200**	**250 / 300**	495	154700	565	515	26	16	25	450	20	25	20	8	38.8
450	**250**	**-**	545	227900	615	565	26	20	25	512	20	25	20	6	54.0
500	**250**	**-**	595	227900	670	620	26	20	30	563	20	25	20	6	57.3
600	**250**	**-**	695	311500	780	725	30	20	30	675	20	25	20	6	77.1

*1 WF = effective area
*2 Other standards/dimensions possible.
*3 Utilisation rate of movement absorption decreases at higher temperatures.
*4 For the shortest length.

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please refer to our planning instructions. Regarding the bracing, please refer to the technical appendix (page 99 - 102).

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Bracings

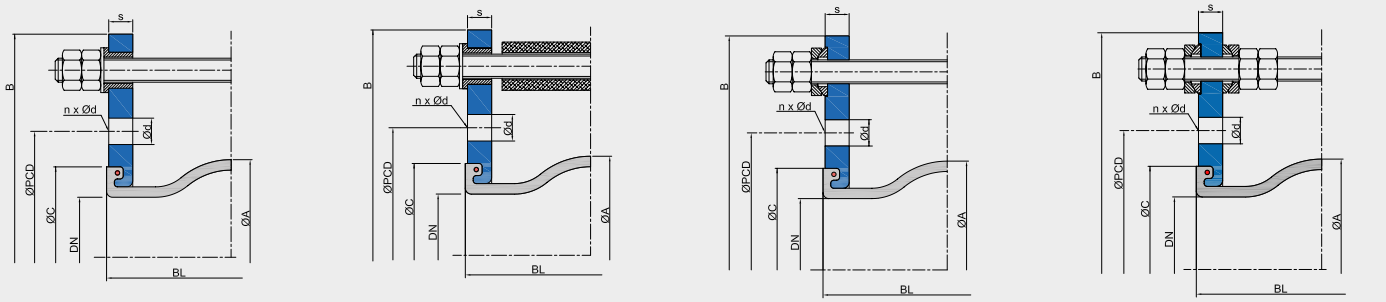
A selection of different bracings is available to absorb the reaction force and to protect the bellows from overstretching or excessive compression.

Design B*
Tie rods, mounted in rubber bushing

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

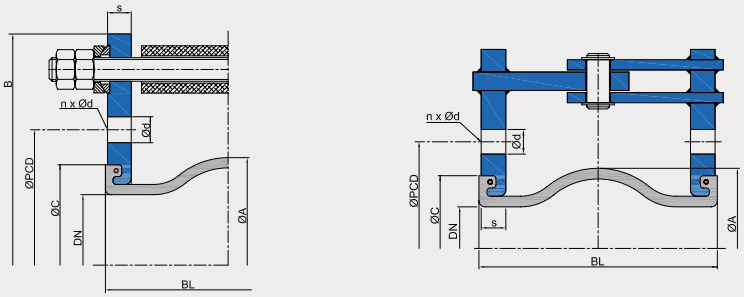
Design E
Tie rods, outside with spherical washers/conical sockets

Design M
Tie rods, inside and outside with spherical washers/conical sockets



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

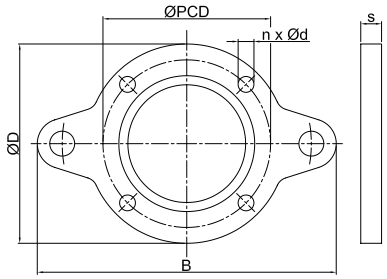
Design F
Hinge



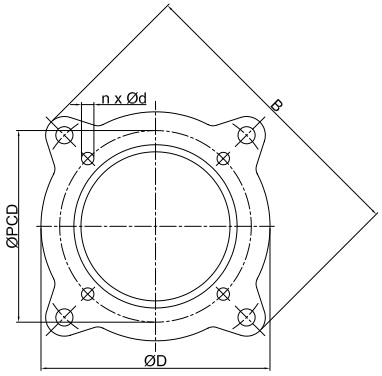
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

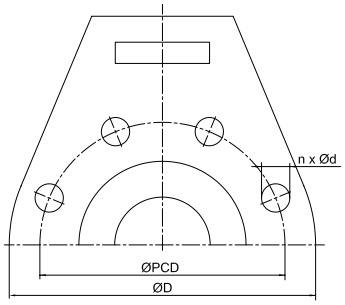
DN	Flange PN 10 (example dimensions)						
	B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm		mm	mm
32	230	140	100	18	4	15	79
40	240	150	110	18	4	15	79
50	255	165	125	18	4	16	88
65	275	185	145	18	8	16	104
80	290	200	160	18	8	18	119
100	310	220	180	18	8	18	142
125	340	250	210	18	8	18	169
150	375	285	240	23	8	18	195
200	440	340	295	23	8	20	244
250	509	395	350	23	12	20	295
300	559	445	400	23	12	22	351
350	619	505	460	22	16	24	400
400	700	565	515	26	16	25	450
450	760	615	565	26	20	30	512
500	810	670	620	26	20	30	563
600	930	780	725	30	20	30	675



DN 32 - 200



DN 250 - 600



DN 50 - 600 (Design F)

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Axial stiffness rates

DN	Length	Stiffness rates (averages value from full way)						
	BL mm	0 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm	16 bar N/mm	25 bar N/mm
32	**130**	54	130	245	368	466	605	788
40	**130**	56	126	237	356	451	584	760
50	**130**	47	97	187	256	330	430	558
65	**130**	61	134	252	379	480	624	811
80	**130**	82	170	305	434	543	706	918
100	**130**	95	191	315	559	743	966	1256
125	**130**	111	216	419	655	863	1122	1459
150	**130**	127	268	496	770	1024	1332	1731
200	**130**	148	267	541	842	1089	1416	1841
250	**130**	160	315	591	927	1185	1540	2002
300	**130**	182	367	663	974	1307	1699	2208
350	**200**	189	318	627	1018	1352	1757	2285
400	**200**	200	339	671	696	1417	1842	2395
450	**250**	217	416	755	1174	1511	1964	2553
500	**250**	255	489	892	1378	1773	2305	2997
600	**250**	270	380	900	1460	1873	2435	3166

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 (averages value from full way)						
	BL mm	0 bar N/mm	2.5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm	16 bar N/mm	25 bar N/mm
32	**130**	85	166	240	315	346	360	470
40	**130**	81	159	232	305	335	348	455
50	**130**	65	85	104	137	189	245	319
65	**130**	52	101	150	195	215	279	363
80	**130**	46	96	177	202	225	292	380
100	**130**	72	114	186	218	250	324	422
125	**130**	130	260	339	381	498	647	841
150	**130**	156	338	402	476	606	788	1024
200	**130**	420	940	1087	1234	1585	2060	2678
250	**130**	492	1048	1329	1525	1923	2500	3249
300	**130**	510	1088	1388	1581	2005	2606	3388
350	**200**	397	793	991	1138	1427	1856	2412
400	**200**	439	835	1062	1230	1559	2026	2634
450	**250**	445	831	1067	1262	1560	2028	2636
500	**250**	554	1063	1362	1565	1944	2527	3285
600	**250**	593	1084	1381	1684	2062	2680	3484

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

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please refer to our planning instructions. Regarding the bracing, please refer to the technical appendix (page 99 - 102).

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Angular stiffness torque

DN	Length BL mm	Stiffness torque (averages value from full way) 0 bar Nm/°	2.5 bar Nm/°	4 bar Nm/°	6 bar Nm/°	10 bar Nm/°	16 bar Nm/°	25 bar Nm/°
32	**130**	0.9	0.8	1.8	2.7	2.6	3.7	5.7
40	**130**	1	0.9	1.9	2.8	3.8	4	5.9
50	**130**	1	1	2	3	4	5	6
65	**130**	1	2	4	6	7	9	12
80	**130**	2	4	6	9	11	15	19
100	**130**	3	6	10	17	23	30	38
125	**130**	5	10	19	30	39	51	66
150	**130**	8	17	31	48	63	83	107
200	**130**	16	29	59	92	119	154	201
250	**130**	26	51	96	151	193	251	327
300	**130**	42	84	152	224	300	390	507
350	**200**	60	101	200	325	432	561	729
400	**200**	85	143	283	294	599	778	1012
450	**250**	114	218	396	615	791	1029	1337
500	**250**	162	311	567	877	1128	1467	1907
600	**250**	242	339	804	1305	1674	2176	2829

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 and M Frictional force N/bar	For design F Frictional torque Nm/bar
32	**130**	7	0.3
40	**130**	7	0.3
50	**130**	12	0.3
65	**130**	20	0.5
80	**130**	35	1.0
100	**130**	51	1.4
125	**130**	75	2.1
150	**130**	118	4.4
200	**130**	167	6.2
250	**130**	243	11.2
300	**130**	335	15.4
350	**200**	120	17.0
400	**200**	160	22.9
450	**250**	226	40.5
500	**250**	266	63.5
600	**250**	634	138.5

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

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please refer to our planning instructions. Regarding the bracing, please refer to the technical appendix.