

## WILLBRANDT Rubber Compensator Type 50

Type 50 is a low corrugated bellow compensator with good sound insulating characteristics for structure and liquid-borne noise. It is characterized by a very high expansion capability, particularly in the angular plane.



### Design:

Low corrugated rubber bellow with reinforcing inserts and integral sealing bead (therefore self-sealing without additional gaskets) for accommodating the swivel flanges. The flanges are provided with through holes.

### Details for DN 20 - DN 600

Bellow colour code	Bellow colour ring	Design of the bellow			Permissible operating data				Short-term C°	Surface resistance Ro [Ohm cm]				
		Core (inner)	Reinforcing material	Cover (outer)	°C	bar	°C	bar			°C	bar	°C	bar
red Sp	red-red	EPDM	Aramide	EPDM	-40	10	70	16	100	10	130	8	150	3 x 10 <sup>3</sup>
red	red	IIR	Nylon cord	EPDM	-40	10	50	16	70	12	100	10	120	7 x 10 <sup>6</sup>
yellow	yellow	NBR	Nylon cord	CR	-20	10	50	16	70	12	90	10	100	2 x 10 <sup>2</sup>
white	white	NBR	Nylon cord	CR	-20	10	50	16	70	12	90	10	100	1 x 10 <sup>9</sup>
green	green	CSM	Nylon cord	CSM	-20	10	50	16	70	12	100	10	110	3 x 10 <sup>11</sup>
orange	orange	NBR	Nylon cord	CR	-20	10	50	25	70	20	90	15	100	2 x 10 <sup>2</sup>
black EPDM		IIR	Nylon cord	EPDM	-40	10	50	10	70	8	100	6	120	7 x 10 <sup>6</sup>
black	without	CR	Nylon cord	CR	-25	10	50	16	70	12	90	10	100	8 x 10 <sup>8</sup>
yellow St	yellow-yellow	NBR	Stahl cord	CR	-20	10	60	16	70	12	90	10	100	7 x 10 <sup>8</sup>
yellow LT	yellow LT	NBR-LT	Steel cord	CR	-40	10	50	16	70	12	90	10	100	1 x 10 <sup>4</sup>
yellow HNBR	yellow-blue-yellow	HNBR	Seel cord	CR	-35	10	60	16	70	12	100	10	120	7 x 10 <sup>8</sup>
lilac	white-green-white	FPM	Steel cord	ECO	-15	10	50	16	70	12	100	10	130	-

Suitable for vacuum up to 0.8 bar abs., without supporting ring (2 m suction)  
 Suitable for vacuum up to 0 bar abs., with supporting ring (10 m suction)  
 DN 20 - DN 50 suitable for vacuum without supporting ring.  
 All compensators can be delivered with earthing straps.

Burst pressure DN 20 - 600 > 48 bar  
 Burst pressure DN 700 - 1000 > 30 bar

### Details for DN 700 - DN 1000

Bellow colour code	Bellow colour ring	Design of the bellow			Permissible operating data				Short-term C°	Surface resistance Ro [Ohm cm]				
		Core (inner)	Reinforcing material	Cover (outer)	°C	bar	°C	bar			°C	bar	°C	bar
red Sp	red-red	EPDM	Aramide	EPDM	-40	8	70	10	100	7,5	130	6	150	3 x 10 <sup>3</sup>
red	red	IIR	Nylon cord	EPDM	-40	8	50	10	70	8	100	6	120	7 x 10 <sup>6</sup>
yellow	yellow	NBR	Nylon cord	CR	-20	8	50	10	70	8	90	6	100	2 x 10 <sup>2</sup>
white	white	NBR	Nylon cord	CR	-40	8	50	10	70	8	90	6	100	1 x 10 <sup>9</sup>
green	green	CSM	Nylon cord	CSM	-20	8	50	10	70	8	100	6	110	3 x 10 <sup>11</sup>
black		IIR	Nylon cord	EPDM	-25	8	50	10	70	8	90	6	100	7 x 10 <sup>6</sup>

Suitable for vacuum up to 0.8 bar abs., without supporting ring (2 m suction)  
 Suitable for vacuum up to 0 bar abs., with supporting ring (10 m suction)  
 All compensators can be delivered with earthing straps.

Burst pressure DN 20 - 600 > 48 bar  
 Burst pressure DN 700 - 1000 > 30 bar

### Flanges: (Design A)

Swivel flanges both sides (Design A) with integral rubber profile, so that additional gaskets are not required (self-sealing). The flanges are drilled acc. to DIN PN 10 as standard. Other specifications in accordance with DIN, ASA, BS. Special flanges are also available.

### Flange material:

Standard S 235 JRG2 (RSt 37-2) zinc plated and yellow passivated. Other materials available on request. (Flanges up to DN 200 are in some cases made with forged collars for the bellow side).



### Approvals:

**Type 50 red-aramide**

with TÜV/DIN approval, DIN 4809 for heating installation, Technical Control Number 3 E 003

**Type 50 red**

with Drinking Water Approval in accordance with 1986 Federal health Bureau KTW Rubber Committee

**Type 50 white**

with quality assessment in accordance with DIN 7725 - suitable for foodstuff - Marine Approval with or without flame protective cover.

**Type 50 all**

**Application:****Type 50 red Sp**

For heating systems according to DIN 4809, with corrosion-protected aramidcord inserts for permanent use in hot water and high temperature water, cooling water and hot air. Not suitable for oil emulsive media. Resistance to weather, ageing and ozone. Temperature range -40 up to +130°C, temporarily up to 150°C, surface area electrically conductive.

**Type 50 red**

For drinking water, hot water with DVGW W270 and ACS approval as well as for sea water, cooling water with chemical additives for water treatment, low concentrated acids and lyes, salt solution. Resistance to weather, ageing and ozone. Temperature range -40 up to +100°C, temporarily up to 120°C, surface area electrically conductive. Not suitable for oil products of all kinds. Cooling water with additives of oil emulsive mixtures.

**Type 50 black, EPDM**

For drinking water with DVGW W270 approval as well as for sea water, cooling water, low concentrated acids and lyes, technical alcohols, esters and ketones. Resistance to weather, ageing and ozone. Temperature range -40 up to +90°C, temporarily up to 100°C, surface area electrically conductive, maximum pressure 10bar.

**Type 50 black CR**

For cold and hot water, swimming pool water, salt water, waste water, cooling water with oil emulsive corrosion protection material, oil mixture, oil emulsive compressed air. Resistance to weather, ageing and ozone. Temperature range -25 up to +90°C, temporarily up to 100°C, electrically insulating.

**Type 50 white**

Especially for fat-containing foodstuff, the inner rubber is in accordance with the German food law KTW. Resistance to weather, ageing and ozone. Temperature range -20 up to +90°C, temporarily up to 100°C, electrically insulating, not suitable for drinking water, inner cover light-coloured.

**Type 50 green**

Especially for chemical and aggressive chemical waste water, oil emulsive compressor air, regarding the media it is essential to pay attention to the media resistance table. Resistance to weather, ageing and ozone. Temperature range -20°C up to +100°C, temporarily up to 110°C, electrically insulating.

**Type 50 lilac**

Especially for flue gas desulfurization plant, biodiesel, good resistance to benzol, xylol, toluol and fuel with an aromatic content of more than 50% aromatic/ chlorinated carbon hydride and mineral acids. Resistance to weather, ageing and ozone. Temperature range -15°C up to +90°C, temporarily up to 130°C, electrically insulating.

**Type 50 yellow**

For oil, fuel, gas, fuel-ethanol mixture and DIN EN-fuel with up to 50% aromatic content. Natural and town gas with the exception of liquid gas. Resistance to weather, ageing and ozone. Temperature range -20°C up to +90°C, temporarily up to 100°C, electrically conductive.

**Type 50 yellow LT**

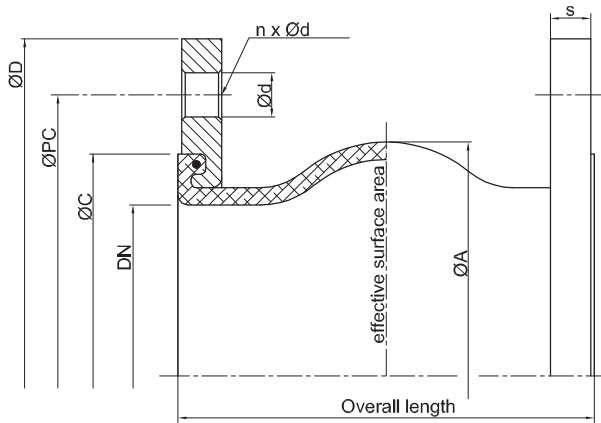
Like type 50 yellow the media and liquid gas is in accordance with DIN EN 589. For tank vehicles and filling stations. Temperature range -40 up to +90°C, temporarily up to 100°C, electrically conductive.

**Type 50 yellow St**

For oil, fuel, gas, fuel-ethanol mixture and DIN EN-fuel with up to 50% aromatic content. Natural and town gas with the exception of liquid gas. Resistance to weather, ageing and ozone. Temperature range -20°C up to +90°C, temporarily up to 100°C, flame-resistant up to 30 minutes at 800°C, electrically conductive.

**Type 50 yellow HNBR**

For oil, fuel, gas, fuel-ethanol mixture and DIN EN-fuel with up to 50% aromatic content. Natural and town gas with the exception of liquid gas. Resistance to weather, ageing and ozone. Temperature range -20°C up to +90°C, temporarily up to 100°C. Cooling water with oil emulsive corrosion protection, lube- and hydraulic oil and sea water. Temperature range -35 up to +100°C, temporarily up to 120°C, electrically conductive.



DN	Overall length mm	Bellows		Flange PN 10					ØC mm	For standard types Movement absorption				With steel cord Movement absorption			
		ØA mm	Effective surface cm <sup>2</sup>	ØD mm	ØPC mm	Ød mm	n	s mm		axial		lat. +/- mm	∠ ° +/-	axial		lat. +/- mm	∠ ° +/-
										+	-			+	-		
20	130	81	17	105	75	12	4	14	65	30	30	30	30	-	-	-	-
25	130	81	17	115	85	14	4	14	65	30	30	30	30	-	-	-	-
32	130	81	17	140	100	18	4	15	65	30	30	30	30	15	30	10	30
40	130	86	18	150	110	18	4	15	74	30	30	30	30	15	30	10	30
50	130	96	32	165	125	18	4	16	86	30	30	30	30	15	35	10	30
65	130	111	53	185	145	18	4	16	105	30	30	30	30	15	35	10	25
80	130	122	85	200	160	18	8	18	118	30	30	30	30	15	15	10	25
100	130	142	128	220	180	18	8	18	137	30	30	30	20	15	15	10	20
125	130	168	187	250	210	18	8	18	166	30	30	30	20	15	15	10	20
150	130	192	259	285	240	22	8	18	192	30	30	30	20	15	15	10	15
200	130	252	410	340	295	22	8	20	252	30	30	30	12	15	15	10	10
250	130	302	596	395	350	22	12	20	304	30	30	30	12	15	15	10	5
300	130	354	822	445	400	22	12	22	354	30	30	30	12	15	15	10	5
350	200	420	1176	505	460	22	16	24	412	30	50	30	8	-	-	-	-
400	200	480	1547	565	515	26	16	25	470	30	50	30	8	-	-	-	-
500	200	580	2279	670	620	26	20	30	570	30	50	30	8	-	-	-	-
600	200	680	3115	780	725	30	20	30	675	30	50	30	8	-	-	-	-
700	250	800	4342	895	840	30	24	35	780	30	50	30	8	-	-	-	-
800	250	880	5274	1015	950	33	24	40	887	30	50	30	6	-	-	-	-
900	300	1038	7379	1115	1050	33	28	40	985	30	50	30	5	-	-	-	-
1000	300	1138	8894	1230	1160	36	28	40	1085	30	50	30	5	-	-	-	-

Permissible % of indicated movement relative to temperature:

- up to 50°C ~ 100%
- up to 70°C ~ 75%
- up to 90°C ~ 60%

**Stiffness rate axial for type 50 (average value by full way)**

DN	Overall length mm	0 bar N/mm	2,5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	130	25	51	98	134	173
65	130	24	53	100	150	190
80	130	28	58	104	148	185
100	130	35	71	116	206	274
125	130	36	71	137	214	282
150	130	49	102	189	293	390
200	130	100	180	365	568	735
250	130	105	207	388	609	778
300	130	123	248	448	658	883
350	200	105	177	349	567	753
400	200	154	261	516	535	1090
450	250	167	320	581	903	1162
500	200	196	376	686	1060	1364
600	200	208	292	692	1123	1441
700	250	140	198	521	714	954
800	250	180	270	594	975	1258
900	300	200	380	690	1080	1395
1000	300	225	420	742	1248	1568

**Stiffness rate lateral for type 50 (average value by full way)**

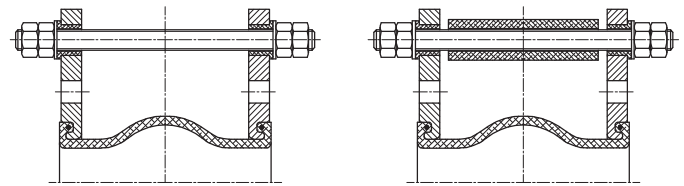
DN	Overall length mm	0 bar N/mm	2,5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	130	50	65	80	105	145
65	130	40	78	115	150	165
80	130	35	74	136	155	173
100	130	55	88	143	168	192
125	130	100	200	261	293	383
150	130	120	260	309	366	466
200	130	323	723	836	949	1219
250	130	379	806	1022	1173	1479
300	130	392	837	1068	1216	1542
350	200	305	610	762	875	1098
400	200	338	642	817	946	1199
450	250	342	639	821	971	1200
500	200	426	818	1048	1204	1495
600	200	456	834	1062	1295	1586
700	250	516	939	1191	1449	1775
800	250	558	960	1055	1557	1758
900	300	800	1480	1984	2248	2560
1000	300	960	1824	2361	2736	2976

**Attention:** Variations in stiffness rate is possible by material reinforcing or production process change with +/-25%.

### Tie bar (Standard designs B and C):

Since the rubber bellow is a soft flexible component, under pressure the compensator will always try to move in the axial direction because of its reaction force (bellow cross section area x working pressure).

It must be ensured by constructive measures on the piping (roller bearing, restraining or anchor points) or tie bars directly on the compensator that any over-extension of the bellow is avoided. See tie bar range on pages 50 and 51.



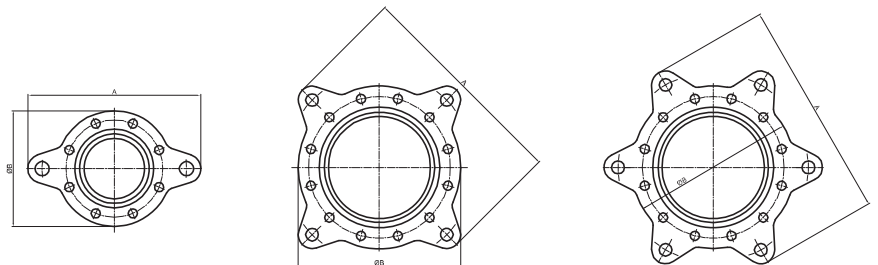
Design B

Design C

### Vacuum supporting ring in 1.4571

DN	Art-No.
350	2150315235
400	2150335240
500	2150315250
600	2150315260
700	2150315270
800	2150315280
900	2150315290
1000	2150315310

### Flange shapes for tie bars as per designs B and C



DN 25 - 200

DN 250 - 900 (1000)

DN 1000

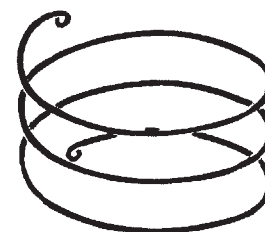
### Vacuum supporting ring:

WILLBRANDT type 50 compensators are vacuum-resistant. To prevent the compensator bellow being drawn together by suction at negative pressure, the insertion of a vacuum supporting ring is necessary for a suction value above 2 m (0.8 bar abs., 20% negative pressure).



Application example for a gimbal flange design for joint pipe angulation DN 300.

DN	Art-No.
50	2150315150
65	2150305180
80	2150305180
100	2150305210
125	2151305212
150	2150305215
200	2151305220
250	2151305225
300	2151305230



### Note:

For aggressive media, see resistance table.  
The bellow must not be painted or insulated.  
Further installation information is provided in the Annex.

### Accessories:

Tie bar/Restrains	See page 50
Deflector sleeve	See page 52
Flameproof protection cover	See page 52
Earth cover	See page 53