

FIRMA PRODUKCYJNO-HANDLOWO-USŁUGOWA

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W ofercie mamy, również inne typy !!!

Typ 46**WILLBRANDT Rubber Compensator Type 46**

Type 46, in a low corrugated high pressure design, is suitable for sanitary, heating, air-conditioning and swimming pool use, as well as for solar technology. Also for apparatus, pipeline and motor construction.

It absorbs thermal expansions and vibration, compensates for axial and lateral movements, and is resistant to chemical and mechanical stresses.

Approvals:

Type 46 red/St. and red/Sp with TÜV approval for heating systems in accordance with DIN 4809.

PED 97/23/EG

TYPE 46**Details for type 46**

Bellow colour code	Bellow design			Permissible operating data						Electrical resistance Ohm cm	Hardness shore A
	Core (inner)	Reinforcing material	Cover (outer)	bar	°C	bar	°C	bar	°C		
red/Sp	EPDM	Aramide	EPDM	16	50	10	100	6	110	7 x 10 ²	60
red/St	EPDM	Steel cord	EPDM	16	50	10	100	6	110	7 x 10 ²	60
blue	IIR	Nylon cord	EPDM	10	50	8	70	6	85	7 x 10 ²	55
yellow	NBR	Nylon cord	CR	16	50	12	70	10	90	5 x 10 ³	65
grey	CR	Nylon cord	CR			16	70			5 x 10 ¹⁰	60
red	EPDM	Nylon cord	EPDM	16	50	12	70	10	90	7 x 10 ²	65
white	NBR	Nylon cord	CR	16	50	12	70	10	80	5 x 10 ³	60
green	CSM	Nylon cord	CSM	16	50	12	70	10	90	5 x 10 ³	65

Burst pressure >50 bar, suitable for 0.5 bar abs.

Construction:

Low corrugated rubber expansion joint with reinforcing inserts and built-in sealing profile with rear mounted female thread for mating to threaded connecting pieces, with male or female threaded joints.

The compensator bellow bead is self-sealing.

No additional gaskets are required.
(Seal threaded joints in piping as usual)

Connecting pieces:

Type 46 white:

Malleable cast iron, galvanized union nut with MS or RG thread.

Other types 46:

Union nut and screw-in parts from galvanized malleable cast iron.

Special connections in stainless steel are possible.

Bracing:

Under pressure the compensator bellow develops a reaction force in the axial direction. This force has to be reduced by adequate anchor points or restraints fastened on the piping.

Important note:

Ensure torsion-free installation.

The bellow must not be insulated or painted.

For installation information, see page 59.

**TYPE 46****Application:**

Type 46 For heating systems, in acc. with DIN 4809
red aramide With corrosion-protected aramide inserts.
red-steelcord For long service life in heating and hot water at 100°C/110°C and 10 bar/6 bar pressure for 10 year service life. Not suitable for oil-related media.

Type 46 For drinking water / warm water
blue nylon For cold and hot water (up to 85°C), also with the addition of chemicals for water treatment. Industrial water, acids, lyes, alcohols, esters and ketones. Not suitable for oil-related media.

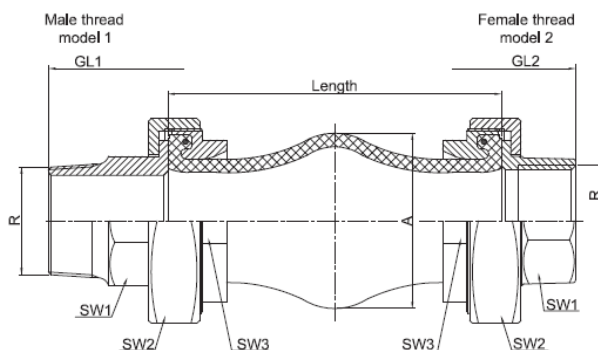
Type 46 For food processing and beverage industry
white Also suitable for oil-related and fatty foodstuff. Suitable up to +80°C.

Type 46 For warm water
red For cold and hot water (up to 90°C), also with the addition of chemicals for water treatment. Industrial water, acids, lyes, alcohols, esters and ketones. Not suitable for oil-related media.

Type 46 For chemical plants
green For heavy chemical use up to 16 bar working pressure. Permissible temperature, working pressure and life expectancy depend in individual cases on medium and concentration. Resistance table on request.

Type 46 For oil, fuel, gas
yellow Electroconductive, $R = 10^3$ up to 10^6 Ohm.
yellow-steel cord Application: town- and natural gas. Blast-furnace, fuels, lubricants, heating oil, cooling water emulsions.

Type 46 For water pipes
grey For cold and warm water, washing water, sea water, swimming pool water waste water (also oil-related, weak acid or alkaline with CR).



DN	Overall length	Bellow		R	Overall length		Width across Flats			Expansion absorption up to 70°C				Expansion absorption over 70°C				Weight	
		ØA	Effec. surface		GL ₁	GL ₂	SW ₁	SW ₂	SW ₃	axial		lat.	∠ °	axial		lat.	∠ °	Des. 2	Des. 1
		mm	cm²		thread	mm	mm	mm	mm	mm	+ mm	- mm	+/- mm	+/-	+ mm	- mm	+/- mm	+/-	kg
20	130	55	8	3/4"	228	186	36	80	48	15	30	10	30	10	15	8	30	0.70	0.60
25	130	65	12	1"	236	192	40	80	54	15	30	10	30	10	15	8	30	1.00	0.80
32	130	78	18	1 1/4"	240	190	48	80	66	15	30	10	30	10	15	8	30	1.50	1.20
40	130	90	27	1 1/2"	246	196	53	90	74	15	30	10	30	10	15	8	30	1.70	1.40
50	130	109	42	2"	254	200	66	110	90	15	30	10	30	10	15	8	30	2.60	2.20

Typ 49**WILLBRANDT Rubber Compensator Type 49****Manufactured by Continental**

Type 49 is a heavy duty rubber compensator of a highly flexible design. Its high corrugation allows an extremely short overall length with excellent noise and vibration absorbing characteristics as well as high expansion absorption in all directions at very low movement forces.

Design:

High corrugated bellow body with integral sealing profile (therefore self-sealing without additional gasket) for mating with swivel flanges. The flanges are provided with threaded holes as the bellow is supported on the flange.

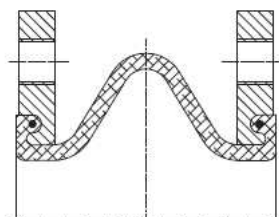
**TYPE 49****Details for type 49**

Bellow colour code	Design of the bellow			Permissible operating data						Electrical resistance [Ohm m]	Hardness shore A
	Core (inner)	Reinforcing material	Cover (outer)	bar*	°C	bar*	°C	bar	°C		
red	EPDM	Nomex	EPDM	20/25	50	16/20	70	6	110	1 x 10 ⁴	60
blue	IIR	Nylon cord	EPDM	20/25	50	16/20	70	10	90	7 x 10 ⁷	55
yellow	NBR	Nylon cord	CR	20/25	50	16/20	70	10	90	8 x 10 ³	65
white	NBR white	Nylon cord	CR	20/25	50	16/20	70	10	80	5 x 10 ³	60
green	CSM	Nylon cord	CSM	20/25	50	16/20	70	10	90	7 x 10 ¹⁰	65
**black	IIR	Nylon cord	EPDM	10	50	8	70	6	85	7 x 10 ⁷	55

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.

*) to DN80 / from DN 100

**) DN 32 - DN 200, burst pressure > 80 bar

Type A**Flange: (Design A)**

Swivel flanges on both sides with integral rubber profile, so that an additional gasket is not required (self-sealing). The flange holes are DIN PN 10 standard, with threaded holes. Other flange specifications in accordance with DIN, ASA, BS. Special flanges are also available.

The flange is produced with appropriate threaded holes; through-bolts cannot be used.

Flange material: Standard S 235 JRG2 (RSt37-2) zinc plated and yellow passivated.

Other materials available on request.

Approvals:

- Type 49 A-red **with TÜV/DIN 4809**
for heating installation, Technical Control Number **3 E001**
- Type 49 white with quality assurance as per DIN 7725
Suitable for foodstuff - RAL-C 53
- Type 49 blue with Drinking Water Approval RAL-C 52
and 1986 Federal Health Bureau KTW Rubber Committee
- Type 49 all Ship Licence with or without flame protective cover, depending on installation location.



**TYPE 49****Type 49
A-red****Application:****For heating systems, as per DIN 4809**

For continuous duty in warm and hot water heating at 100 °C/110 °C and 10bar/6bar working pressure over life. Not suitable for oil-related media.

**Type 49
blue****For drinking water / warm water**

For cold and warm water, also with the addition of chemicals for water treatment. Industrial water, acids, lyes, alcohols, esters and ketones. Not suitable for oil-related media.

**Type 49
white****For the food and beverage industry**

Also suitable for oil- and fat-containing foodstuff.

**Type 49
green****For chemical plants**

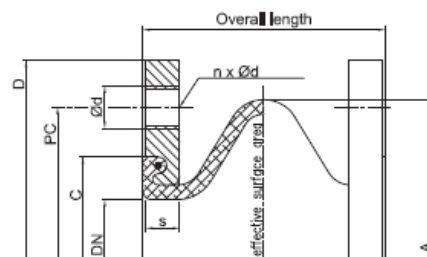
For heavy chemical use.

**Type 49
yellow****For oil, fuel, gas**

Application range: natural and town gas, blast furnace gas, fuels, lubricants, heating, cooling water emulsions.

**Type 49
black****For water pipes**

For cold and warm water, water with detergents, sea water, swimming pool water, waste water. Not suitable for oil-related media.



DN	Overall length mm	Bellows		Flange PN 10					Movement absorption				ØC mm	Weight kg
		ØA mm	Eff. surface cm²	ØD mm	ØPC mm	Ød	n	s mm	axial + mm	axial - mm	lat. +/- mm	∠ ° ±		
32	100	110	18	140	100	M16	4	16	20	30	30	7	79	3.0
40	100	110	18	150	110	M16	4	16	20	30	30	7	79	3.6
50	100	120	35	165	125	M16	4	16	20	30	30	7	89	4.4
65	100	135	56	185	145	M16	4	16	20	30	30	7	104	5.3
80	100	150	87	200	160	M16	8	18	20	30	30	7	119	6.5
100	100	170	130	220	180	M16	8	18	20	30	30	7	142	7.3
125	100	195	190	250	210	M16	8	18	20	30	30	7	169	8.9
150	100	260	263	285	240	M20	8	20	20	30	30	7	195	12.3
175	100	285	334	315	270	M20	8	20	20	30	30	7	220	16.2
200	100	310	416	340	295	M20	8	20	20	30	30	7	245	16.2
250	100	360	607	395	350	M20	12	20	20	30	30	7	295	20.3
300	100	410	830	445	400	M20	12	20	20	30	30	7	345	23.1
350	100	460	1100	505	460	M20	16	20	20	30	30	7	396	30.1
400	110	515	1385	565	515	M24	16	25	20	30	30	7	450	43.2
500	110	615	2091	670	620	M24	20	25	20	30	30	7	550	53.8

Permissible % of indicated movement relative to temperature:
 up to 50°C ~ 100%
 up to 70°C ~ 80%
 up to 90°C ~ 70%

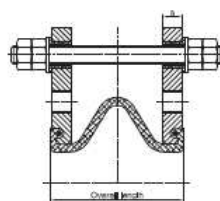
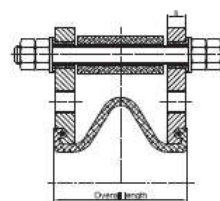
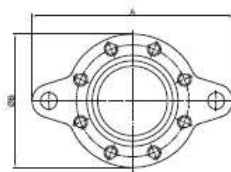
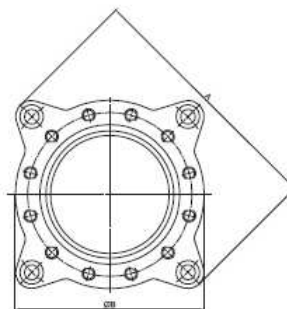
* Only valid for an assembly shortened
 by about 10 mm (90/100mm).

TYPE 49**Tie bar (Standard Designs B + C)**

Since the rubber bellow is a soft flexible component, it must be observed that under pressure the compensator will always try to move in the axial direction because of its reaction force (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 our range of tie bars on pages 49 + 50.

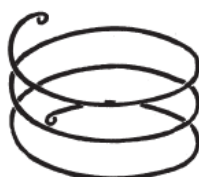
**Design B****Design C****Flange shapes for tie bars as per designs B and C at 10 bar****DN 25 - 200****DN 250 - 500**

DN	Main dimension for PN 10			
	Overall length mm	s mm	A mm	ØB mm
32	100	16	230	140
40	100	16	240	150
50	100	16	255	165
65	100	16	275	185
80	100	18	290	200
100	100	18	310	220
125	100	18	340	250
150	100	20	375	285
175	100	20	405	315
200	100	20	440	340
250	100	20	509	395
300	100	20	559	445
350	100	20	619	505
400	110	25	700	565
500	110	25	810	670

**TYPE 49****Vacuum Supporting Rings**

WILLBRANDT type 49 compensators are suitable for vacuum. To prevent the compensator bellow being drawn together by suction at negative pressure, the insertion of a vacuum supporting ring is necessary for a pressure above 2m (0.8bar abs., 20% negative pressure).

DN	Art-No.
32 / 40	2149305132
50 / 65	2149305150
80 / 100 / 125	2149305212
150	2149305215
175 / 200	2149305217
250	2149305225
300	2149305230
350	2149305235
400	2149305240
500	2149305250

**Bolt Packs SU**

Hexagon bolts according to DIN 933/8.8
 Washers DIN 125

Selected bolt packs are available for connecting type 49 compensators to piping, so that by using DIN flanges, the bolt lengths are flush with the compensator bellow.

For installation, ensure smooth, burr-free surfaces on the rubber bellow using the U-washers for length correction (place under bolt head).

Accessory bolt packs				
DN	DIN-Norms			
	PN6	PN10	PN16	
32	SU 1	SU 2	SU 2	
40	SU 1	SU 2	SU 2	
50	SU 1	SU 3	SU 3	
65	SU 1	SU 3	SU 3	
80	SU 4	SU 7	SU 7	
100	SU 4	SU 7	SU 7	
125	SU 5	SU 6	SU 6	
150	SU 6	SU 10	SU 10	
175	SU 6	SU 10	SU 10	
200	SU 8	SU 10	SU 11	
250	SU 9	SU 13	SU 17	
300	SU 11	SU 14	SU 18	
350	SU 12	SU 15	SU 19	
400	SU 15	SU 19	SU 21	
500	SU 16	SU 20	SU 22	

Contents					
Bolt pack		Quantity Bolts		Quantity U-Washers	
	kg		DIN 933/8.8		Ø
SU 1	0.35	8	M 12X30	8	13
SU 2	0.62	8	M 16X30	8	17
SU 3	0.67	8	M 16X35	8	17
SU 4	0.68	8	M 16X35	16	17
SU 5	1.4	16	M 16X35	16	17
SU 6	1.5	16	M 16X40	16	17
SU 7	1.55	16	M 16X40	32	17
SU 8	2.6	16	M 16X45	16	17
SU 9	2.4	24	M 16X45	48	17
SU 10	2.7	16	M 20X45	16	21
SU 11	4.1	24	M 20X45	24	21
SU 12	4.2	24	M 20X45	48	21
SU 13	4.3	24	M 20X50	48	21
SU 14	4.2	24	M 20X50	24	21
SU 15	5.8	32	M 20X50	64	21
SU 16	7.3	40	M 20X50	80	21
SU 17	6.7	24	M 24X50	48	25
SU 18	6.6	24	M 24X50	24	25
SU 19	9.3	32	M 24X55	64	25
SU 20	11.7	40	M 24X55	80	25
SU 21	13.5	32	M 27X60	64	28
SU 22	22.0	40	M 30X60	80	31

Typ 50**WILLBRANDT Rubber Compensator Type 50****TYPE 50****Manufactured by Continental**

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.

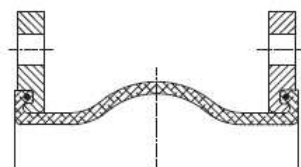
The flanges are provided with through holes.

**Details for type 50**

Bellow colour code	Bellow design			Permissible operating data						Electrical resistance [Ohm m]	Hardness shore A
	Core (inner)	Reinforcing material	Cover (outer)	bar *)	°C	bar **)	°C	bar ***)	°C		
red - aramide	EPDM	Aramide	EPDM	16	70	10	100	6	110	1 x 10 ⁴	60
red	IIR	Nylon cord	EPDM	16	50	12	80	10	90	7 x 10 ⁷	55
white	NBR	Nylon cord	CR	16	50	12	70	10	90	5 x 10 ⁸	65
green	CSM	Nylon cord	CSM	16	50	12	70	10	90	7 x 10 ¹⁰	65
yellow	NBR	Nylon cord	CR	16	50	12	70	10	90	8 x 10 ³	60
orange	NBR	Nylon S	CR	20	20	25	50	16	70	8 x 10 ³	60
yellow-steel cord	NBR	Steel cord	CR	16	50	12	70	10	100	5 x 10 ¹¹	60
black/CR	CR	Nylon cord	CR	16	50	10	70	-	-	1 x 10 ¹¹	60
black/EPDM	IIR	Nylon cord	EPDM	10	50	8	70	6	85	7 x 10 ⁷	55

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

*) DN 700 - 1000 = 10 bar
**) DN 700 - 1000 = 8 bar
***) DN 700 - 1000 = 6 bar
Burst pressure DN 20 - 600 > 48 bar
Burst pressure DN 700 - 1000 > 30 bar

Type A**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

Type 50 red

Type 50 white

Type 50 all

with TÜV/DIN approval, DIN 4809 for heating installation, Technical Control Number 3 E 003 with Drinking Water Approval in accordance with 1986 Federal health Bureau KTW Rubber Committee with quality assessment in accordance with DIN 7725 - suitable for foodstuff - Marine Approval with or without flame protective cover.



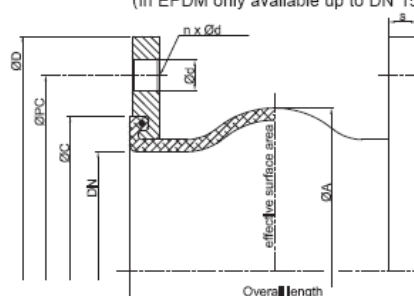
**TYPE 50****Application:****Type 50 For heating systems, as per DIN 4809.****red** With corrosion-proofed aramide inserts.**aramide** For continuous duty in hot water heating and high temperature water central heating at 100°C / 110°C and 10bar / 6bar working pressure over a 10 year working life. Not suitable for oil-related media.**Type 50 For drinking water / hot water****red nylon** For cold and hot water (up to 90°C), also with the addition of chemicals for water treatment. Industrial water, acids, lyes, alcohols, esters and ketones. Not suitable for oil-related media.**Type 50 For the food and beverage industry****white** Also suitable for oil- and fat-containing foodstuff. May be used up to +90°C.**Type 50 For chemical plants****green** For heavy chemical use up to 16 bar working pressure. Permissible temperature, working pressure and life expectancy depend in individual cases on medium and concentration. Resistance table on request.**Type 50 For oil, fuel, gas****orange** Electroconductive, $R = 8 \times 10^3 \text{ Ohm}$. Application range: Natural and town gas, blast furnace gas, liquid gas acc. to DIN 51622, fuels, lubricants, heating oil, cooling water emulsion.**Type 50 yellow yellow-steel cord****For oil, fuel, gas**Electroconductive, $R = 10^3$ to 10^5 Ohm .

Application range: natural and town gas, blast furnace gas, fuels, lubricants, heating oil, cooling water emulsions.

Type 50 black/CR black/EPDM**For water pipes**

For cold and hot water, water with detergents, sea water, swimming bath water, waste water with CR (also oil-related, weak acid or alkaline)

(In EPDM only available up to DN 150)

**For standard types****With steel cord**

DN	Overall length	Bellow		Flange PN 10					ØC	Movement absorption				Movement absorption			
		ØA	Effective surface	ØD	ØPC	Ød	n	s		axial		lat. +/-	∠°	axial		lat. +/-	∠°
		mm	cm²	mm	mm	mm	mm	mm		+ mm	- mm	mm	°	+ mm	- mm	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	35	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	907	505	460	22	16	24	412	30	50	30	8	-	-	-	-
400	200	480	1018	565	515	26	16	25	470	30	50	30	8	-	-	-	-
500	200	580	1692	670	620	26	20	30	570	30	50	30	8	-	-	-	-
600	200	680	3078	780	725	30	20	30	675	30	50	30	8	-	-	-	-
700	250	800	4019	895	840	30	24	35	780	30	50	30	8	-	-	-	-
800	250	880	5436	1015	950	33	24	40	887	30	50	30	6	-	-	-	-
900	300	1038	6706	1115	1050	33	28	40	985	30	50	30	5	-	-	-	-
1000	300	1138	8231	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)

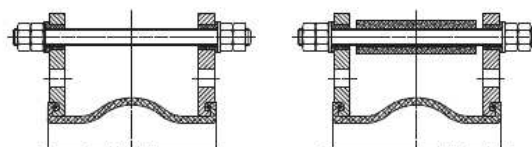
DN	Overall length mm	0 bar N/mm	2,5 bar N/mm	4 bar N/mm	6 bar N/mm	10 bar N/mm
50	130	50	65	80	105	145
65	130	40	78	115	150	165
80	130	35	74	136	155	173
100	130	55	88	143	168	192
125	130	100	200	261	293	383
150	130	120	260	309	366	466
200	130	323	723	836	949	1219
250	130	379	806	1022	1173	1479
300	130	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%.

**TYPE 50****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 49 and 50.

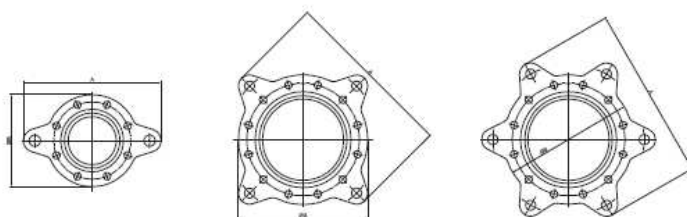


Design B

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

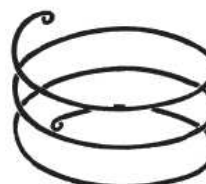
Vacuum supporting ring

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

Deflector sleeve

Flameproof protection cover

Earth cover

See page 49

See page 51

See page 51

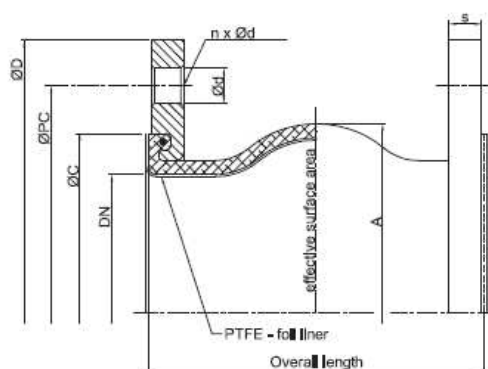
See page 52

**TYPE 50****Type 50 PTFE chemical design**

Type 50 in a special design has a PTFE foil liner for effective resistance against aggressive chemicals.

The PTFE liner is suitable for all commonly used liquids; attention should be paid to heat resistance. The compensator should only be used in higher pressure ranges (up to max. 6 bar); not safe for vacuums.

A special PTFE supporting ring is available for vacuums, but only for DN 65-300.



DN	Overall length mm	Bellow		Flange PN 10					Movement absorption axial / lateral				ØC mm
		ØA mm	Eff. surface cm²	ØD mm	ØPC mm	Ød mm	n	s mm	+ mm	- mm	+/- mm	∠° +/-	
25	130	81	17	115	85	14	4	14	15	15	15	15	65
32	130	81	17	140	100	14	4	15	15	15	15	15	65
40	130	86	18	150	110	18	4	15	15	15	15	15	74
50	130	96	32	165	125	18	4	16	15	15	15	15	86
65	130	111	53	185	145	18	4	16	15	15	15	15	105
80	130	122	85	200	160	18	8	18	15	15	15	15	118
100	130	142	128	220	180	18	8	18	15	15	15	10	137
125	130	168	187	250	210	18	8	18	15	15	15	10	166
150	130	192	259	285	240	22	8	20	15	15	15	10	192
200	130	252	410	340	295	22	8	20	15	15	15	6	252
250	130	302	596	395	350	22	12	20	15	15	15	6	304
300	130	354	822	445	400	22	12	20	15	15	15	6	354
400	200	480	1579	565	515	26	16	25	15	15	15	4	470
500	200	580	2186	670	620	26	20	30	15	15	15	4	570
600	200	680	3076	780	725	30	20	30	15	15	15	4	675
800	250	880	5436	1015	950	33	24	40	15	15	15	3	887

Typ 53



WILLBRANDT Rubber Compensator Type 53

TYPE 53

Type 53 is a low corrugated bellow compensator with good sound insulating characteristics. It is characterized by a very high expansion capability in all three planes.

Design:

Low corrugated rubber bellow with reinforcing inserts and integral sealing bead (therefore - self-sealing without additional gaskets) for accommodating the steel-backed swivel flange with solid ring support.

The flanges are provided with through holes (PN 6, PN 10, PN 16, ASA150 lbs, etc.).

All steel parts in S 235 JRG2 (RSt 37-2) are zinc plated and passivated.

Details for type 53

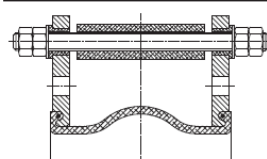
Bellow colour code	Core (inner)	Reinforcing material	Cover (outer)	Permissible operating data			Hardness shore A
				bar	°C	bar	
red/blue	IIR-D	Aramide	EPDM	25	80	16	120
yellow/blue	NBR	Aramide	CR	25	50	16	90
green/blue	CSM	Aramide	CSM	25	50	16	90

Suitable for vacuum up to 8.0 bar abs., without supporting ring.
 Suitable for vacuum up to 0 bar abs., with supporting ring.



Design A

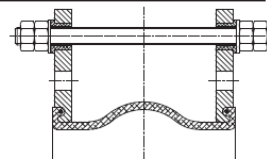
DN	Bellow		Flange PN 10					Movement absorption				ØC
	Overall length mm	ØA mm	ØD mm	ØPC mm	Ød mm	n	s mm	ax + mm	ax - mm	lat ± mm	∠ ± °	
32	130	81	140	100	18	4	15	10	20	15	20	65
40	130	86	150	110	18	4	15	10	20	15	20	74
50	130	96	165	125	18	4	15	10	20	15	20	86
65	130	110	185	145	18	4	15	10	20	15	20	105
80	130	122	200	160	18	8	15	15	20	15	20	118
100	130	142	220	180	18	8	15	15	20	15	20	137
125	130	170	250	210	18	8	18	15	20	15	20	166
150	130	196	285	240	23	8	18	15	20	15	20	192
200	130	256	340	295	23	8	20	15	20	15	15	252
250	130	306	395	350	23	12	20	15	20	15	10	304
300	130	356	445	400	23	12	22	15	20	15	10	354



Design C

Special designs

With tie-rods design B as axial stroke limitation and for absorption of the reaction forces. With tie-rods design C as axial stroke - and thrust limitation, tie-rods supported in rubber bushes.



Design B

Typ 54**WILLBRANDT Rubber Compensator Type 54 yellow****TYPE 54**

Type 54 yellow is a low corrugated bellow compensator with good sound insulating characteristics. It is characterized by a very high expansion capability in all three planes.

Design:

Low corrugated rubber bellow with reinforcing inserts and integral sealing bead (therefore - self-sealing without additional gasket) for accommodating steel-backed swivel flanges with solid ring support. The flanges SAE 3000 are provided with through holes.

All steel parts in S235JRG2 (R St 37-2) are zinc-plated and passivated.

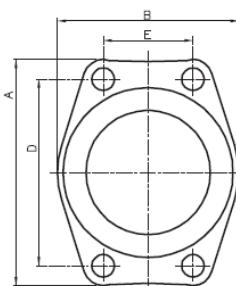
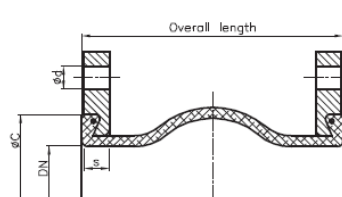
Note: The flanges are also available in other standards, e.g. DIN PN 6, 10, 16 or ASA150 lb.

**Details for type 54 yellow**

Bellow colour code	Core (inner)	Reinforcing material	Cover (outer)	Permissible operating data			Electrical resistance [Ohm cm]	Hardness shore A
				bar °C	bar °C	bar °C		
yellow	NBR	Nylon	CR	10 50		10 80	5*10 ⁶	60

Suitable for vacuum up to 8.0 bar abs., without supporting ring.
Suitable for vacuum up to 0 bar abs., with supporting ring.

DN	Bellow		Flange SAE 300							Movement absorption				ØC mm
	Overall length nmm	Ødi mm	A mm	B mm	D mm	E mm	Ød mm	n	s mm	ax + mm	ax - mm	lat ± mm	∠ ± °	
25/1"	65	24	70	55	52.4	26.2	11	4	11	10	20	10	7.5	46
32/1 1/4"	65	32	80	70	58.7	30.2	13	4	11	10	20	10	7.5	53
40/1 1/2"	100	40	90	80	70.0	35.7	13	4	13	10	20	10	10.0	64
50/2"	100	50	100	90	77.8	42.9	13	4	13	10	20	10	10.0	73
65/2 1/2"	100	65	115	105	89.0	50.8	13	4	14	10	20	10	10.0	89
80/3"	100	80	132	120	106.4	62.0	17	4	14	10	20	10	10.0	102
90/3 1/2"	100	80	146	130	120.6	70.0	17	4	14	10	20	10	10.0	102
100/4"	100	100	156	140	130.2	77.8	17	4	16	10	20	10	10.0	130
125/5"	130	121	184	165	152.4	92.0	17	4	16	10	20	10	25.0	166



Typ 55**WILLBRANDT Rubber Compensator Type 55****TYPE 55**

Type 55 is a low corrugated bellow compensator with good sound insulating characteristics (structure- and liquid-borne noise). It is characterized by a high expansion absorption capability, in particular angular expansion.

Design:

Low corrugated rubber bellow with reinforcing inserts and integral sealing beads (therefore self-sealing without additional gaskets) for accommodating swivel flanges.

The flanges are provided with through holes.

Other bellow designs similar to type 50 are available on request.

**Details for type 55**

Bellow colour code	Bellows design			Permissible operating data						Electrical resistance [Ohm m]	Hardness shore A
	Core (inner)	Reinforcing material	Cover (outer)	bar ^{*)}	°C	bar ^{**)}	°C	bar ^{***)}	°C		
red/St	EPDM	Aramide	EPDM	16	70	10	100	6	110	7 x 10 ³	60
red	IIR	Nylon cord	EPDM	16	50	12	70	10	90	7 x 10 ⁷	55
yellow	NBR	Nylon cord	CR	16	50	12	70	10	90	8 x 10 ³	60
green	CSM	Nylon cord	CSM	16	50	12	70	10	90	7 x 10 ¹⁰	65

Burst pressure > 50 bar

Suitable for vacuum up to 8.0 bar abs., without supporting ring.

Suitable for vacuum up to 0 bar abs., with supporting ring.

*) DN 450 - 1000 = 10bar

**) DN 450 - 1000 = 8bar

***) DN 450 - 1000 = 6bar

Burst pressure DN 450 - 1000 > 30 bar

Burst pressure DN 32 - 400 > 50 bar

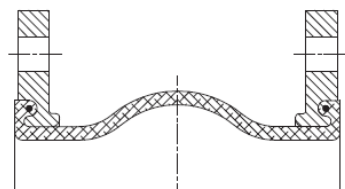
Other bellow constructions as type 50 available on request.

Flange: (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 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 are available on request (flanges up to DN 200 are partly provided with forged collars towards the bellow side.)

**Design A****Note:**

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

Vacuum supporting rings

WILLBRANDT compensators type 50 are vacuum-resistant. To prevent the compensator bellow being drawn together by suction at negative pressure, the insertion of a vacuum supporting spiral (up to DN 300) alternatively a vacuum supporting ring (from DN 350) is necessary for a suction value above 2 m (0.8 bar abs., 20% negative pressure).



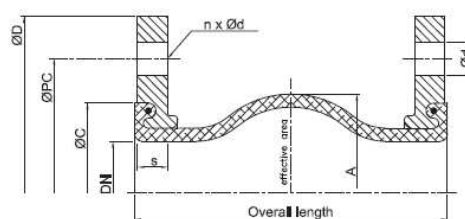
Application:

Type 55 red For heating water
For cold and hot water, also with the addition of chemicals for water treatment. Industrial water, acids, lyes, alcohols, esters and ketones.
Not suitable for oil-related media.

Type 55 yellow For oil, fuel, gas
Application range: natural and town gas, blast furnace gas, fuels, lubricants, heating oil, cooling water emulsions.

Type 55 red/Sp For heating systems, as per DIN 4809
With corrosion-protected aramide inserts. For continuous duty in hot water heating and high temperature water central heating at 100°C / 110°C and 10bar / 6bar working pressure over a 10year working life.
Not suitable for oil-related media.

Type 55 all All types with GL-Improved

TYPE 55

DN	Overall length mm	Bellows		Flange PN 10					Movement absorption				ØC mm
		ØA mm	Eff. surface cm²	ØD mm	ØPC mm	Ød mm	n	s mm	ax + mm	ax - mm	lat +/- mm	∠ ° +/-	
32	125	81	17	140	100	18	4	15	30	30	30	30	65
40	125	86	18	150	110	18	4	15	30	30	30	30	74
50	125	96	32	165	125	18	4	16	30	30	30	30	86
65	125	110	53	185	145	18	4	16	30	30	30	30	105
80	150	122	85	200	160	18	8	18	30	30	30	30	118
100	150	142	128	220	180	18	8	18	30	30	30	20	137
125	150	170	187	250	210	18	8	18	30	30	30	20	166
150	150	196	259	285	240	22	8	18	30	30	30	20	192
200	175	256	409	340	295	22	8	20	30	30	30	12	245
250	175	306	599	395	350	22	12	20	30	30	30	12	295
300	200	410	822	445	400	22	12	22	30	30	30	12	354
350	200	470	1080	505	460	22	16	24	30	40	30	8	412
400	200	480	1379	565	515	26	16	25	30	50	30	8	470
450	250	545	1801	615	565	26	20	25	20	40	30	6	512
500	250	595	2038	670	620	26	20	30	20	40	30	6	570
600	250	695	3310	780	725	30	20	30	20	40	30	6	675
700	275	800	4019	895	840	30	24	35	30	50	30	8	780
800	250	880	5436	1015	950	33	24	40	30	50	30	6	887
900	300	981	6706	1115	1050	33	28	40	30	50	30	5	985
1000	300	1086	8231	1230	1160	36	28	40	30	50	30	5	1085

Permissible % of indicated movement relative to temperature:

up to 50°C ~ 100%

up to 70°C ~ 75%

up to 90°C ~ 60%

Typ 80**WILLBRANDT PTFE Compensator Type 80**

Type 80 is a PTFE expansion bellow compensator hot-formed from extruded PTFE tubing under pressure to form continuous corrugations.

Design:

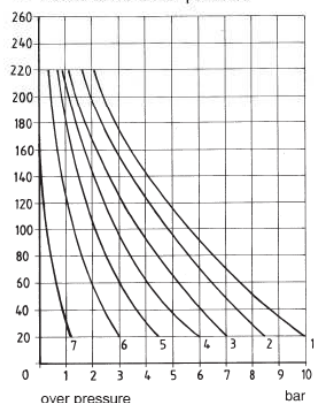
Pure PTFE bellow with external stainless steel supporting rings, PTFE profiles on both sides with steel backing-flange and integral brace.

Application:

Chemical plants, for movement and noise reduction as well as compensation of assembly inaccuracies. Recommended for use in piping of fragile materials, e.g. glass, graphite, enamel. Minimal compensating forces are necessary due to the elasticity of the material.

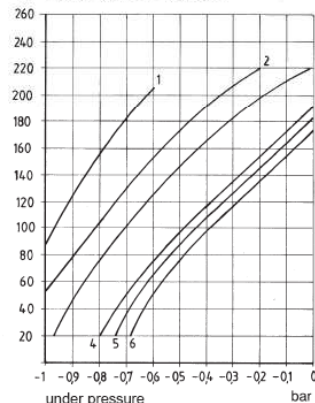
TYPE 80

°C Power curve under pressure



curve	DN
1	25 - 80
2	100 - 150
3	200 - 250
4	300 - 350
5	400 - 450
6	500 - 600
7	700 - 1200

°C Power curve in vacuum

**Important installation information:**

It is imperative that gaskets are used except in the case of PTFE/PTFE-connections, e.g. PTFE covered IT gaskets (Design 1) or PTFE covered IT gaskets with stainless steel inserts (Design 2) or their equivalent.

Flanges:

Steel edge flanges with antirust coating on both sides, drilled acc. to DIN PN 10. Other materials and hole patterns available.

Note:

Not suitable for vibrations!
 Do not insulate!
 See installation information!

Special designs:

For glass tubing.
 For total vacuum.
 For higher working pressure.
 Available on request.

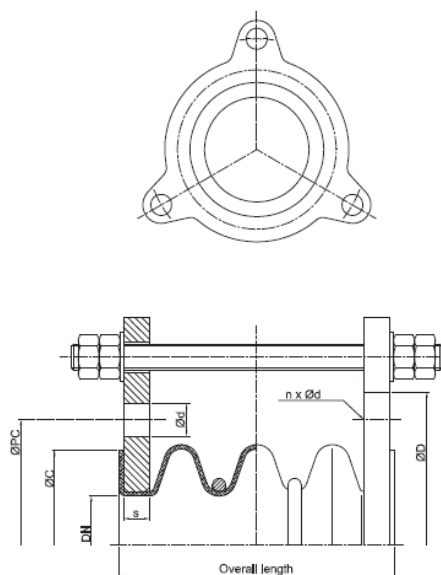
Special construction up to PN 16 possible
 in 2 - 10 corrugated design (Type 80 HD).

**Type 1****Type 2**

TYPE 80

Movement forces type 80

DN	3 Convolutions		5 Convolutions	
	ax ± N/mm	lat ± N/mm	ax ± N/mm	lat ± N/mm
20	45	20	-	-
25	45	20	40	15
32	50	25	40	20
40	50	28	40	20
50	50	45	40	35
65	40	50	35	40
80	40	60	35	45
100	50	90	35	60
125	60	110	40	80
150	100	150	80	120
200	150	180	100	150
250	150	200	100	170
300	150	200	120	170
350	200	270	160	250
400	200	270	200	230
450	250	290	200	240
500	300	350	250	300
600	300	350	250	300
700	350	410	-	-
800	380	490	-	-
900	400	530	-	-
1000	425	570	-	-
1200	460	620	-	-



DN	Effec. bellow surface cm²	Flange						ØC mm	3 Convolutions					5 Convolutions				
		ØD mm	ØPC cm²	Ød mm	n	s mm	Movement absorption				Weight kg	Movement absorption				Weight kg		
							Overall length mm		axial			lat. +/- mm	length mm	axial			lat. +/- mm	
									+	-				+	-			
20	9	105	75	14	4	12.0	53	50	10	10	8	2.5	-	-	-	-	-	
25	13	115	85	14	4	10.0	62	50	12	12	10	2.5	75	20	20	15	2.8	
32	18	140	100	18	4	12.5	72	50	12	12	12	3.0	75	20	20	18	3.5	
40	25	150	110	18	4	12.5	80	50	12	12	15	4.0	75	20	20	20	4.5	
50	39	165	125	18	4	14.5	98	75	15	15	15	6.0	100	25	25	30	6.5	
65	55	185	145	18	4	18.5	118	75	22	22	17	7.0	100	35	35	30	7.5	
80	90	200	160	18	8	18.5	122	100	25	25	17	8.0	125	40	40	30	9.0	
100	135	220	180	18	8	18.0	148	100	25	25	17	10.0	150	40	40	30	11.0	
125	190	250	210	18	8	20.5	174	125	28	28	18	12.0	175	45	45	32	13.0	
150	295	285	240	22	8	21.0	200	150	28	28	18	15.0	225	45	45	32	17.0	
200	460	340	295	22	8	23.0	256	150	28	28	20	20.0	225	45	45	32	22.0	
250	670	395	350	22	12	27.0	303	150	28	28	10	35.0	225	45	45	15	37.0	
300	940	445	400	22	12	27.0	360	150	30	30	8	48.0	225	50	50	10	50.0	
350	1080	505	460	22	16	27.0	402	150	30	30	6	57.0	225	50	50	8	59.0	
400	1400	565	515	27	16	27.5	453	150	30	30	6	70.0	225	50	50	8	72.0	
450	1800	615	565	27	20	27.0	513	150	30	30	5	78.0	225	50	50	7	80.0	
500	2100	670	620	27	20	29.0	564	150	30	30	5	86.0	225	50	50	7	89.0	
600	3100	780	725	30	20	33.0	658	175	30	30	4	125.0	250	50	50	6	130.0	
700	4415	895	840	30	24	33.0	800	170	35	35	2	128.0						
800	5700	1015	950	33	24	35.0	905	170	35	35	2	130.0						
900	7120	1115	1050	33	28	35.0	1005	170	35	35	2	133.0						
1000	8740	1230	1160	36	28	35.0	1110	170	35	35	2	146.0						
1200	12561	1455	1380	39	32	35.0	1330	170	35	35	2	175.0						

Typ 80 HD**WILLBRANDT PTFE Compensator Type 80 HD**

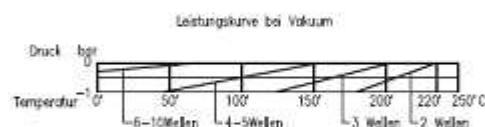
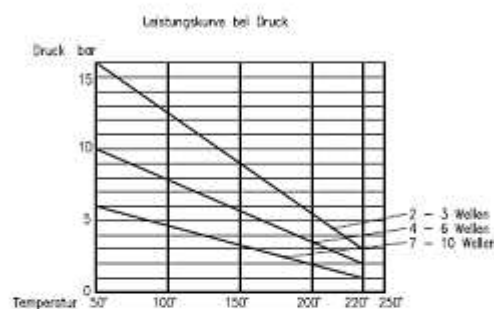
Type 80 is a PTFE expansion bellow compensator hot-formed from extruded PTFE tubing under pressure to form continuous convolutions. Available with 2 to 10 convolutions for all nominal widths.

Design:

Pure PTFE bellow with external stainless steel support rings, PTFE profiles on both sides with steel backing flange and integral restraint.

Flange:

Material GGG 40 with rust preventive coating (hole circle drilling partly with threaded holes, for narrow design), standard design PN 10.
Special holes and materials available on request.

**TYPE 80 HD****Pressure- and vacuumdiagram with temperature influence**

DN	Overall length			Movement absorption with 2 convolutions			Movement absorption with 3 convolutions			Movement absorption per further convolution*		
	2 Conv. mm	3 Conv. mm	+ je Conv. mm	ax +/- mm	lat +/- mm	ang +/- °	ax +/- mm	lat +/- mm	ang +/- °	ax +/- mm	lat +/- mm	ang +/- °
25	45	55	12	6	4	9	9	6	14	3.0	2.0	4.5
32	55	65	13	6	4	8	9	6	12	3.0	2.0	4.0
40	55	70	15	7	5	8	11	8	12	3.5	2.5	4.0
50	60	70	16	7	5	7	11	8	11	3.5	2.5	3.5
65	60	80	20	8	6	7	12	9	11	4.0	3.0	3.5
80	65	90	24	8	6	7	12	9	11	4.0	3.0	3.5
100	70	95	25	9	6	6	14	9	9	4.5	3.0	3.0
125	75	100	25	9	6	6	14	9	9	4.5	3.0	3.0
150	75	105	25	10	6	5	15	9	8	5.0	3.0	2.5
200	80	110	25	10	7	4	15	11	6	5.0	3.5	2.0
250	90	120	26	11	7	4	17	11	6	5.5	3.5	2.0
300	95	125	26	11	7	3	17	11	5	5.5	3.5	1.5
350	100	125	26	12	7	3	18	11	5	6.0	3.5	1.5
400	100	135	26	12	7	3	18	11	5	6.0	3.5	1.5
500	105	140	26	15	8	3	20	12	5	6.5	4.0	1.5
600	105	140	26	13	8	2	20	12	3	6.5	4.0	1.0

*max. 10 Convolutions