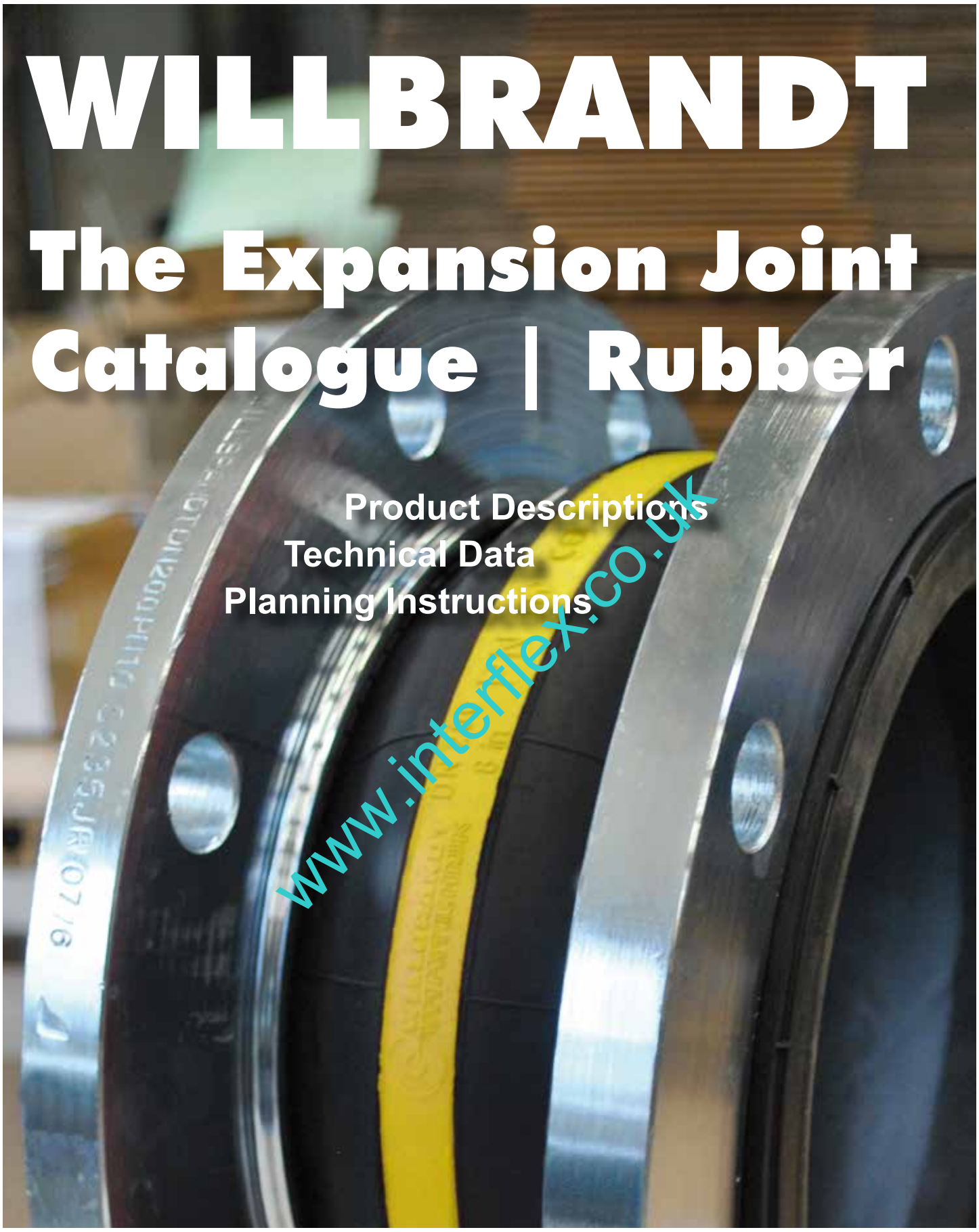
WILLBRANDT

The Expansion Joint Catalogue | Rubber

Product Descriptions
Technical Data
Planning Instructions



WILLBRANDT GUMMITECHNIK

WILLBRANDT **Expansion Joints**

If a medium flows through a pipe, it is often exposed to thermal expansion, vibrations, axial pressure forces, yielding suspensions and building settlements. These factors trigger movements in the pipeline that make the installation of flexible elements necessary. These flexible elements can absorb the resulting movements and prevent damage to the pipeline and the connected units:

- thermal expansion
- mechanical vibrations
- acoustic oscillations
- tensions

They are also used:

- for sound insulation
- as dismantling joints on pipeline armatures
- to assimilate assembly tolerances
- to seal pipeline wall penetrations

If it is not possible to design a pipeline that can compensate movements, an expansion joint is an optimal solution and as such acts as a flexible connection in a pipeline.

Typical applications are heating systems, water pipes, pipes in power stations and the chemical industry. Available are various qualities that are suitable for specific media (e.g. drinking water, oil, food).

Our qualified engineers design a suitable expansion joint according to your technical data. A wide range of different types are carried in stock.

Special types can be manufactured at short notice.

We offer expansion joints for various applications. Nominal sizes from DN 20 to DN 5000 are available.

In addition to a comprehensive standard range of products, additional expansion joints can be manufactured according to customers' specifications, with and without tie rods.

It is also possible to provide expansion joints with special accessories in order to fully exploit the advantages of the expansion joints for almost all applications.

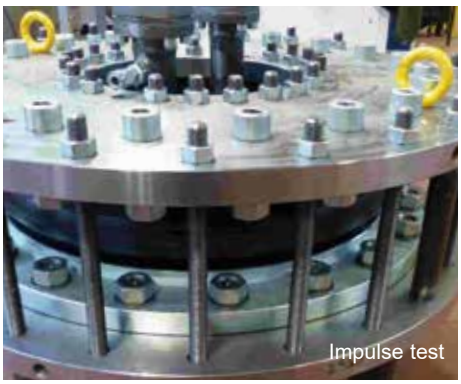
WILLBRANDT **Quality assurance**

WILLBRANDT KG produces and sells technical elastomer products as well as complementary products and sees itself as a reliable partner to its customers in the area of both procurement and sales. Long term and, in some cases, decades of close business relationships with customers and suppliers are the basis for our continued success. When it comes to quality, customers, employees, profit, costs and innovation, it is no coincidence that quality comes first.

Our commitment to quality, in the widest sense of the word, as we understand it, is the basis for everything we do and it is only successful as an integral part of our responsibilities and activities.

All our activities are focused around a zero-defect strategy with preventative measures to minimise the probability of defects occurring. WILLBRANDT KG has been certified to DIN EN ISO 9001 since 27 September 1997.


Endurance test


Impulse test


Flame resistance test

WILLBRANDT **Approvals**

Many of the WILLBRANDT expansion joints are subjected to a series of tests and inspections for quality assurance and to obtain the following approvals (see extract opposite).

- Burst pressure test
- Flame resistance test according to DIN EN ISO 15540
- Endurance test (endurance vibration test)
- Impulse test according to DIN EN ISO 6803

WILLBRANDT **Approvals**

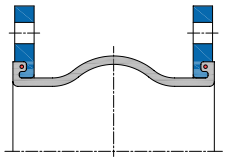
Type	Shipbuilding									Plant construction			Drinking water / Food			
	DNV	LR	BV	RINA	CCS	KR	ABS	RMRS	MED/MER	TÜV-SÜD DIN 4809	TÜV-SÜD CE Kat. A2	TÜV-SÜD CE Kat. B+C2	FDA	ELL ex W270	ACS	WRAS
39	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
40	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
42	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	-
46	ST HNBR SP CR EPDM	ST HNBR SP	✓	✓	ST HNBR SP	✓	✓	✓	ST HNBR SP CR EPDM	SP	✓	✓	-	-	-	-
48	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
49	A- EPDM	-	-	A-	-	-	-	-	A- EPDM	A-	✓	✓	-			-
49 S	-	-	-	-	-	-	-	-	-	-	✓	-		-	-	-
50	ST HNBR SP CR EPDM	ST HNBR SP	✓	✓	ST HNBR SP	✓	✓	✓	ST HNBR SP CR EPDM	SP	✓	-	-			-
51	-	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-
52	-	-	-	-	-	-	-	-	-	-	✓	-		-	-	-
54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
55	ST SP	ST SP	✓	✓	ST SP	✓	✓	ST SP	ST SP	SP	✓	✓	-			-
55 SO	ST SP	ST SP	✓	✓	ST SP	✓	✓	ST SP	ST SP	SP	✓	✓	-			-
56	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
57	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
58	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
59	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
60	-	-	-	-	-	-	-	-	-	✓	-	-	-	-	-	-
61	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
63	-	-	-	-	-	-	-	-	-	-	✓	✓		-	-	
64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80 HD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FSH	✓	-	-	✓	-	-	-	-	✓	-	-	-	-	-	-	-

✓ Approvals are available for all types.

WILLBRANDT **Expansion Joints - Overview**

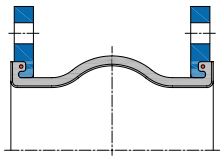
Type 39 ■ DN range 50 - 1000
Overall length (mm) variable

Applications
Industrial plants, repairs/replacements
Page 8 onwards



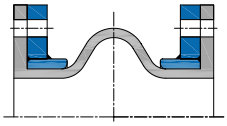
Type 39 PTFE ■ DN range 50 - 500
Overall length (mm) variabel

Applications
Chemical plants
Page 12



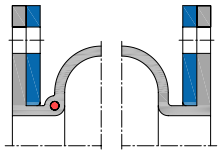
Type 40 ■ DN range 40 - 5000
Overall length (mm) variabel

Applications
Power stations, large-scale plants, treatment plants, pipelines
Page 13 onwards



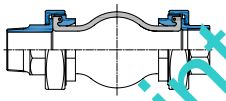
Type 42 ■ DN range 50 - 3000
Overall length (mm) 150 - 500

Applications
Paper industry, power stations, repairs/replacements
up to 100 bar
Page 20 onwards



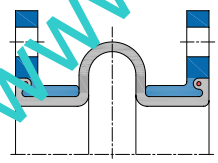
Type 46 ■ DN range 20 - 50
Overall length (mm) 130

Applications
Building technology, engine technology
Page 25 onwards



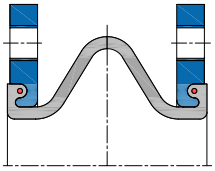
Type 48 ■ DN range 50 - 200
Overall length (mm) 150 - 160

Applications
Steelworks, plant engineering
Page 27 onwards



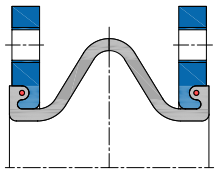
Type 49 ■ DN range 32 - 500
Overall length (mm) 100 - 110

Applications
Building technology, shipbuilding, plant engineering, weighing technology, gas plants
Page 29 onwards



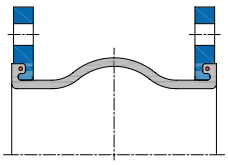
Type 49 S ■ DN range 40 - 500
Overall length (mm) 100 - 110

Applications
Food technology, chemical plants
Page 33 onwards



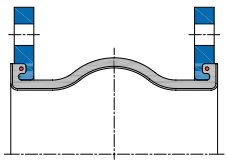
Type 50 ■ DN range 20 - 1000
Overall length (mm) 130 - 300

Applications
Plant engineering, building technology, gas plants, power stations
Page 37 onwards



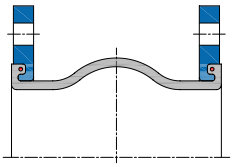
Type 50 PTFE ■ DN range 25 - 700
Overall length (mm) 130 - 200

Applications
Chemical plants
Page 43



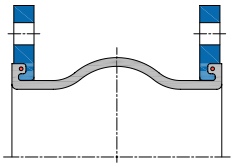
Type 51 ■ DN range 32 - 600
Overall length (mm) 130 - 300

Applications
Chemical plants, plant engineering, pressure pipes (25 bar)
Page 44 onwards



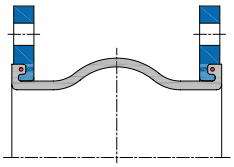
Type 52 ■ DN range 32 - 600
Overall length (mm) 130 - 300

Applications
Chemical plants, water plants, plant engineering, treatment plants
Page 49 onwards



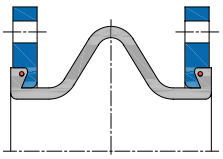
Type 52 PTFE ■ DN range 32 - 600
Overall length (mm) 150 - 300

Applications
Chemical plants
Page 55



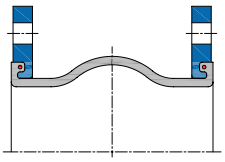
Type 54 ■ DN range 25 - 100
Overall length (mm) 65 - 100

Applications
Hydraulic systems (SAE flanges)
Page 56 onwards



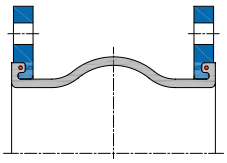
Type 55 ■ DN range 20 - 1000
Overall length (mm) 125 - 300

Applications
Shipbuilding, building technology, water plants, plant engineering, treatment plants
Page 58 onwards



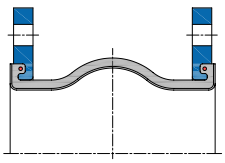
Type 55 SO ■ DN range 20 - 300
Overall length (mm) 160 - 200

Applications
Shipbuilding, building technology, water plants, treatment plants
Page 64 onwards



Type 55 PTFE ■ DN range 25 - 700
Overall length (mm) 125 - 250

Applications
Chemical plants
Page 66



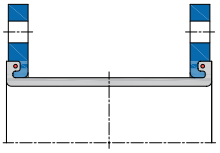
Information on warehousing

- ■ mainly in stock
- ■ partly in stock
- ■ not in stock

WILLBRANDT **Expansion Joints - Overview**

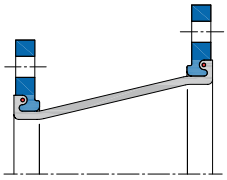
Type 56 ■ DN range 50 - 1000
Overall length (mm) 150 - 1000

Applications
Paper industry, conveyor technology, media containing solids
Page 67 onwards



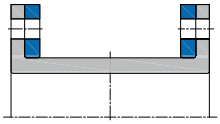
Type 57 ■ DN range 50 - 300
Overall length (mm) 250 - 400

Applications
Paper industry, conveyor technology, media containing solids
Page 70 onwards



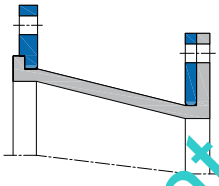
Typ 58 ■ DN range 50 - 3000
Overall length (mm) 200 - 1000

Applications
Paper industry, conveyor technology, media containing solids
Page 73 onwards



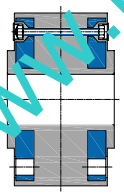
Type 59 ■ DN range 350 - 1500
Overall length (mm) variable

Applications
Paper industry, conveyor technology, media containing solids
Page 76 onwards



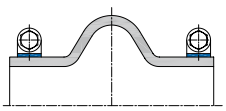
Type 60 ■ DN range 20 - 200
Overall length (mm) 70 - 90

Applications
Building technology, industrial plants
Page 80



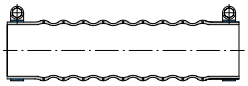
Type 61 ■ DN range 50 - 1500
Overall length (mm) 250/variable

Applications
Industrial plants, waste water technology, engine technology
Page 81 onwards



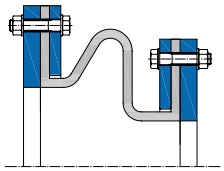
Type 62 ■ DN range 50 - 600
Overall length (mm) variable

Applications
Drainage systems for bridges, halls, buildings
Page 84



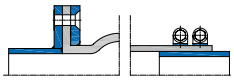
Type 63 ■ DN range all
Overall length (mm) variable

Applications
Plant engineering, production based on customer drawings
Page 85 onwards



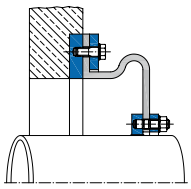
Type 64 ■ DN range all
Overall length (mm) max. 500 mm

Applications
Duct sealing, building technology, power station construction, low pressure range: max. 0.5 bar
Page 88 onwards



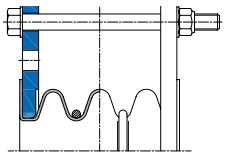
Type 65 ■ DN range 80 - 5000
Overall length (mm) variable

Applications
Wall sealing, ground water sealing
Page 90 onwards



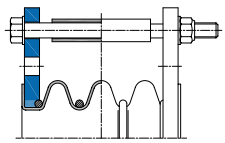
Type 81 ■ DN range 20 - 500
Overall length (mm) 40 - 320

Applications
Chemical plants
Page 92 onwards



Type 81 HD ■ DN range 20 - 1500
Overall length (mm) 40 - 280

Applications
Chemical plants
Page 95 onwards



Information on warehousing

- ■ mainly in stock
- ■ partly in stock
- ■ not in stock

We will be happy to send you further information about

- Stainless steel expansion joints
- Stainless steel corrugated hoses
- Fabric expansion joints

You can find all PDF files at: **www.willbrandt.com/Catalogue**.

WILLBRANDT **Rubber Expansion Joint Type 39**

■ not in stock

DN 50 - DN 1000

The Type 39 is a handmade, low corrugated rubber expansion joint. Its low corrugated shape minimises flow resistance. It is characterised by its flexibility in length and the wide variety of rubber qualities, so that a suitable rubber compound is available for every application (see material descriptions on the following page).

Type 39 is mainly used in plant construction and in water and wastewater technology. Here it is used especially for repairs when the gap does not correspond to a standard installation length, which means that expensive conversion work on the pipe system can be avoided. It absorbs movements and vibrations and has a noise-damping effect.

Bellow design	Low 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, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Pressure resistance	Design according to customer requirements, max. 10 bar operating pressure (for higher pressures up to max. 16 bar the feasibility must be checked)
Vacuum resistance	With appropriate design vacuum-proof.
Approvals/conformity	CE (A2), FDA and EG 1935/2004 conform (detailed overview on page 5)
Accessories	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - PTFE lining (see type 39 PTFE on page 12) - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow*		Bellow design*			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	100										
yellow	■	NBR	Polyamide	NBR	90										
green	■	CSM	Polyamide	CSM	100										
grey	■	CR	Polyamide	CR	90										
red-white	■□	EPDM light	Polyamide	EPDM	100										
yellow-white	■□	NBR light	Polyamide	NBR	90										
lilac	■	FPM	Aramid	FPM	200										
-		Silicone	Aramid	Silicone	200										

Expansion joints will designed according to your operating parameters.

* Other rubber compounds/reinforcements on request.

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 planning instructions and the tolerances according to the FSA manual (page 117) in the technical appendix!

WILLBRANDT **Rubber Expansion Joint Type 39**

Application

Type 39 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, saline solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 39 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil.
Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 39 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 39 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 39 red-white (EPDM light)
Like type 39 red, but with light-coloured internal rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 39 yellow-white (NBR light)
Like type 39 yellow, but with light-coloured internal rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 39 lilac (FPM/aramid)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. Temperatures of up to +180 °C.

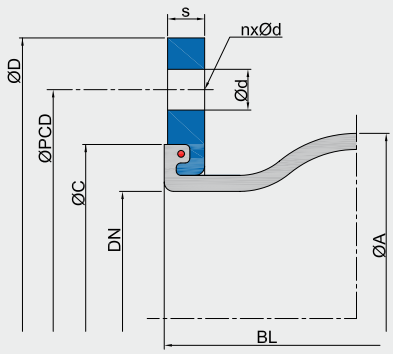
Type 39 silicone (silicone/aramid)
Suitable for hot air, acetic acid. Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good resistance to radiation. No resistance for steam above 120 °C.
No resistance to fuels.

WILLBRANDT **Rubber Expansion Joint Type 39**

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.

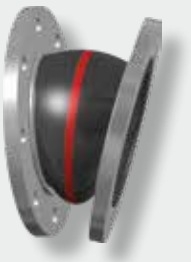
The expansion joint's reaction force must be absorbed through appropriate pipeline guidance (see planning instructions in the appendix).




axial -


axial +


lateral ±


angular ±

Dimensions - design A (Example values - may vary depending on specification)

DN	Overall length	Bellow		Flange PN 10[3]						Movement absorption[4]				Weight[6]
	BL[1]	ØA	WF[2]	ØD	ØPCD	Ød	n	s	ØC	axial +	axial -	lateral[5] ±	angular ±	
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	kg
50	**150 - 500**	96	3200	165	125.0	18.0	4	16	86	10	20	15	35	4.1
65	**150 - 500**	110	5300	185	145.0	18.0	8	16	106	10	20	15	30	5.7
80	**150 - 500**	122	8500	200	160.0	18.0	8	18	118	15	20	15	30	7.2
100	**150 - 500**	142	12800	220	180.0	18.0	8	18	138	15	20	15	25	8.3
125	**150 - 500**	170	18700	250	210.0	18.0	8	18	166	15	20	15	25	10.0
150	**150 - 500**	196	25900	285	240.0	23.0	8	20	192	15	20	15	20	13.4
200	**150 - 500**	256	40900	340	295.0	23.0	8	20	252	15	20	15	15	16.7
250	**150 - 500**	306	59900	395	350.0	23.0	12	20	304	15	20	15	10	21.9
300	**150 - 500**	352	82200	445	400.0	23.0	12	20	354	15	20	15	10	25.0
350	**150 - 500**	442	108000	505	460.0	22.0	16	20	412	15	20	15	10	38.8
400	**150 - 500**	495	137900	565	515.0	26.0	16	25	470	20	25	20	8	38.5
450	**150 - 500**	545	180100	615	565.0	26.0	20	25	512	20	25	20	8	47.7
500	**150 - 500**	595	203800	670	620.0	26.0	20	30	570	20	25	20	6	57.2
600	**150 - 500**	695	328600	780	725.0	30.0	20	30	675	20	25	20	6	75.9
700	**150 - 500**	832	418300	895	840.0	30.0	24	35	780	20	25	20	5	128.6
***7750**	**150 - 500**	882	475100	927	914.4	34.4	28	35	830	20	25	20	4	154.0
800	**150 - 500**	932	540700	1015	950.0	33.0	24	40	887	20	25	20	4	163.7
900	**150 - 500**	1032	670600	1115	1050.0	33.0	28	40	985	20	25	20	4	198.7
1000	**150 - 500**	1134	823100	1230	1160.0	36.0	28	40	1085	20	25	20	4	236.0

*1 Overall length range 150 mm to 500 mm. For larger overall lengths the feasibility must be checked. For smaller lengths, please also refer to our types 49, 50 and 55.
*2 The effective area (WF) and the outer diameter of the corrugation (ØA) may vary depending on the design
*3 Other standards/dimensions possible.
*4 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).
*5 The lateral movement absorption increases with higher overall length.
*6 For 200 mm overall length.
*7 Dimensions according to ANSI B16.47 serie A class 150 lbs.

Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

Important information

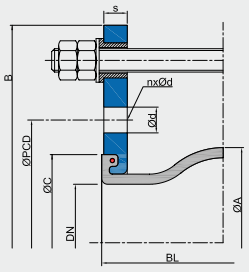
Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! For more information please refer to our planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 39**

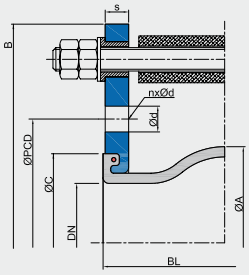
Bracings

A selection of different bracings are available to absorb the reaction force and to protect the bellows from overstretching or excessive compression (detailed description on page 99 - 102):

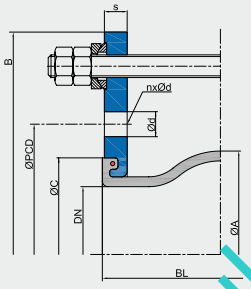
Design B*
Tie rods, mounted in rubber bushing



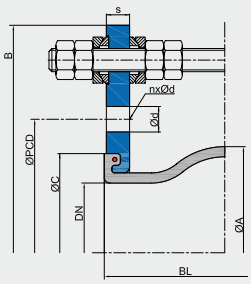
Design C*
Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



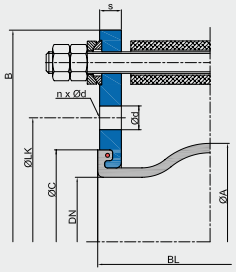
Design E
Tie rods, outside with spherical washers/conical sockets



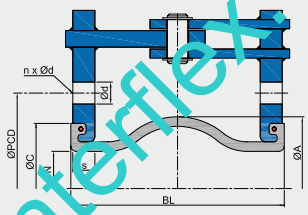
Design M
Tie rods, inside and outside with spherical washers/conical sockets



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



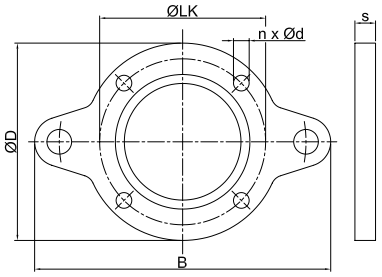
Design F
Hinge



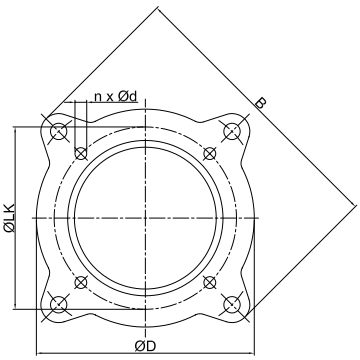
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

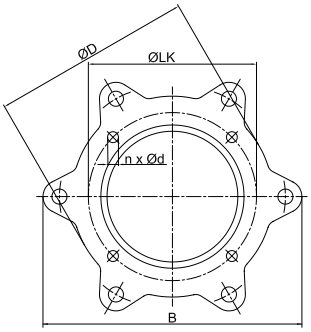
DN	Length	Flange PN 10 (example dimensions)						
	BL	B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm	mm		mm	mm
50	150 - 500	255	165	125	18	4	16	86
65	150 - 500	275	185	145	18	8	16	106
80	150 - 500	290	200	160	18	8	18	118
100	150 - 500	310	220	180	18	8	18	138
125	150 - 500	340	250	210	18	8	18	166
150	150 - 500	375	285	240	23	8	20	192
200	150 - 500	440	340	295	23	8	20	252
250	150 - 500	509	395	350	23	12	20	304
300	150 - 500	559	445	400	23	12	20	354
350	150 - 500	619	505	460	22	16	20	412
400	150 - 500	700	565	515	26	16	25	470
450	150 - 500	760	615	565	26	20	25	512
500	150 - 500	810	670	620	26	20	30	570
600	150 - 500	930	780	725	30	20	30	675
700	150 - 500	1045	895	840	30	24	35	780
800	150 - 500	1175	1015	950	33	24	40	887
900	150 - 500	1285	1115	1050	33	28	40	985
1000	150 - 500	1400	1230	1160	36	28	40	1085



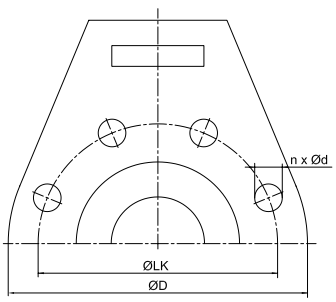
DN 50 - 150



DN 250 - 900



DN 1000



DN 50 - 1000 (Design F)

Important information

For information on the tie rods, please refer to the technical appendix (page 99 - 102)!

WILLBRANDT **Chemical Expansion Joint Type 39 PTFE**

■ not in stock

DN 50 to DN 500

Type 39 PTFE is a low corrugated rubber expansion joint lined with PTFE. Its low corrugation minimises flow resistance. The PTFE lining gives the expansion joint good anti-adhesive properties and is chemically resistant.

The PTFE lining can be used with any Type 39 rubber compound. However, it is important to ensure that the selected rubber compound achieves the highest possible resistance to the medium, as this is the only way to achieve an optimum service life.

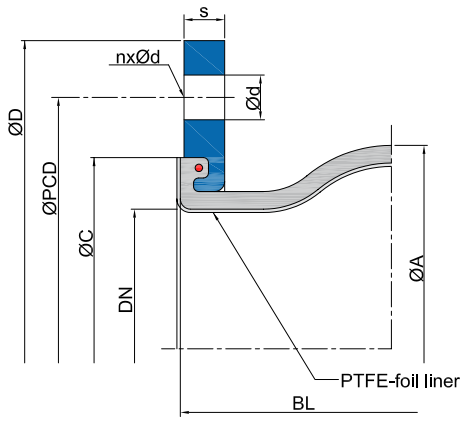
Dimensions - design A

DN*1	Length	Bellow		Flange PN 10*4						Movement absorption			
	BL*2	ØA	WF*3	ØD	ØPCD	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ±
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°
50	**150 - 500**	96	3200	165	125.0	18.0	4	16	80	15	15	15	15.0
65	**150 - 500**	110	5300	185	145.0	18.0	8	16	106	15	15	15	15.0
80	**150 - 500**	122	8500	200	160.0	18.0	8	18	118	15	15	15	15.0
100	**200 - 500**	142	12800	220	180.0	18.0	8	18	138	15	15	15	10.0
125	**150 - 500**	170	18700	250	210.0	18.0	8	18	166	15	15	15	10.0
150	**150 - 500**	196	25900	285	240.0	23.0	8	20	192	15	15	15	10.0
200	**150 - 500**	256	40900	340	295.0	23.0	8	20	252	15	15	15	6.0
250	**150 - 500**	306	59900	395	350.0	23.0	12	20	304	15	15	15	6.0
300	**150 - 500**	352	82200	445	400.0	23.0	12	20	354	15	15	15	6.0
350	**150 - 500**	442	108000	505	460.0	22.0	16	20	412	15	15	15	4.0
400	**150 - 500**	495	137900	565	515.0	26.0	16	25	470	15	15	15	4.0
450	**150 - 500**	545	180100	615	565.0	26.0	20	25	512	15	15	15	4.0
500	**150 - 500**	595	203800	670	620.0	26.0	20	30	570	15	15	15	4.0

*1 Larger nomimal diameters possible after technical inspection.
*2 Overall length range 150 mm to 500 mm. For larger overall lengths the feasibility must be checked. For smaller overall lengths, please also refer to our types 50 PTFE and 55 PTFE.
*3 The effective area (WF) and the outer diameter of the corrugation (ØA) may vary depending on the design.
*4 Other standards/dimensions possible.

Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

Pressure resistance	Max. 6 bar operating pressure with polyamide cord reinforcement, max. 9 bar operating pressure with aramid or steel cord reinforcement.
Conformity	CE (A2), FDA and EG 1935/2004
Vacuum resistance	Only limited suitability for vacuum operation. A PTFE vacuum supporting ring, which allows full vacuum for small nominal diameters, can be used upt to DN 300. The PTFE supporting ring can only be used up to 50 °C. DN 350 expansion joints are not suitable for vacuum operation.



Important information

Please also note the planning instructions and the tolerances according to the FSA manual (page 117) in the technical appendix!

WILLBRANDT **Rubber Expansion Joint Type 40**

■ not in stock

DN 40 to DN 5000

Type 40 is a highly elastic rubber expansion joint with a corrugation that achieves very low inherent resistance. It is characterised by the ability to absorb very large movements in all directions. The corrugation shape, the number of corrugations, the overall length and the material thickness can be matched to your requirements. Furthermore, a wide variety of rubber qualities are available so that a suitable rubber compound can be selected for every application (see material descriptions on the following page).

Type 40 is mainly used in large industrial plants and power stations, where it absorbs movements in the pipework, compensates for structural displacements and settlements and dampens vibrations.

Bellow design	Corrugated rubber bellow with reinforcement and shaped solid rubber flanges, self-sealing (no additional seals required). Suitable for backing flanges with support shoulder.	**Movement absorption**	Very large axial, lateral and angular movement absorption possible. Different corrugation geometries and bellow designs (single and multi-corrugated) available.
Flange version	Both sides with backing flange made of hot-dip steel galvanized, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.	**Approvals/conformity**	CE, drinking water conform, FDA and EG 1935/2004 conform (detailed overview on page 5)
Pressure resistance	Design according to customer specification, max. 100 bar operating pressure	**Accessories**	- Tie rods - Vacuum supporting rings - Guide sleeves - PTFE lining - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.
Vacuum resistance	Only vacuum-proof with vacuum support ring. Vulcanised support rings possible.		

Specifications

Bellow		Bellow design			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	100										
blue	■	EPDM TW	Polyamide	EPDM	100										
white-red	□■	EPDM beige	Polyamide	EPDM	100										
green	■	CSM	Polyamide	CSM	100										
yellow	■	NBR	Polyamide	NBR	100										
white	□	NBR beige	Polyamide	NBR	100										
grey	□	CR	Polyamide	CR	90										
red-blue-red	■■■	EPDM	Aramid	EPDM	100										
blue-blue-blue	■■■	EPDM TW	Aramid	EPDM	100	Expansion joints will designed according to your operating parameters.									
white-blue-red	□■■	EPDM beige	Aramid	EPDM	100										
orange-blue-orange	■■■	EPDM HT	Aramid	EPDM HT	125										
green-blue-green	■■■	CSM	Aramid	CSM	100										
yellow-blue-yellow	■■■	NBR	Aramid	NBR	100										
white-blue-white	□■□	NBR beige	Aramid	NBR	100										
grey-blue-grey	□■□	CR	Aramid	CR	90										
lilac-blue-lilac	■■■	FPM	Aramid	FPM	180										
-	-	Silicone	Aramid	Silicone	180										
-	-	Silicone	Glass fabric	Silicone	200										

WILLBRANDT **Rubber Expansion Joint Type 40**

Application

Type 40 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, saline solutions, weak acids and weak alkaline solutions. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 40 blue (EPDM TW)
Like type 40 red, but approved for drinking water.

Type 40 white-red (EPDM beige)
Like type 40 red, but with light-coloured internal rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 40 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 40 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 40 white (NBR beige)
Like type 40 yellow, but with light-coloured internal rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 40 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 40 red-blue-red (EPDM/aramid)
Like type 40 red, but with aramid fabric.

Type 40 blue-blue-blue AF (EPDM TW/aramid)
Like type 40 blue, but with aramid fabric.

Type 40 white-blue-red (EPDM beige/aramid)
Like type 40 white-red, but with aramid fabric.

Type 40 orange-blue-orange (EPDM HT/aramid)
Like type 40 red, but with aramid fabric for temperatures up to +125 °C.

Type 40 green-blue-green (CSM/aramid)
Like type 40 green, but with aramid fabric.

Type 40 yellow-blue-yellow (NBR/aramid)
Like type 40 yellow, but with aramid fabric.

Type 40 white-blue-white (NBR beige/aramid)
Like type 40 white-grey, but with aramid fabric.

Type 40 grey-blue-grey (CR/aramid)
Like Type 40 grey, but with aramid fabric.

Type 40 lilac-blue-lilac (FPM/aramid)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. Temperatures of up to +180 °C.

Type 40 silicone (silicone/glass fabric or aramid)
Suitable for hot air, acetic acid. Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuels.

Important information

For aggressive media, please have the material resistance checked by our engineer. The bellows must not be painted or insulated at media temperatures >50 °C. Please also note the planning instructions and the tolerances according to the FSA manual (page 117) in the technical appendix!

WILLBRANDT **Rubber Expansion Joint Type 40**

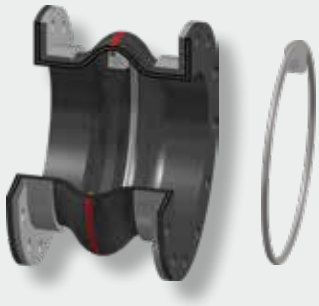
Vacuum resistance

Type 40 is a rubber expansion joint that is only vacuum-resistant to a small degree, so a suitable vacuum supporting ring should be used on underpressure.

Standard material: 1.4571

An alternative design with a vulcanised vacuum supporting ring is also available. Please note that greater stiffness rates must be taken into account and that the axial and lateral movement will be reduced.

Further information on vacuum supporting spirals/rings can be found on page 103 of the technical appendix.



Expansion joint with supporting ring

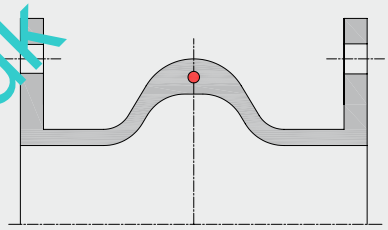
Supporting ring versions

Supporting ring with baffle

DN 150 - DN 350

Supporting ring with lock/double lock

DN 200 - DN 450 / DN 500 - DN 5000



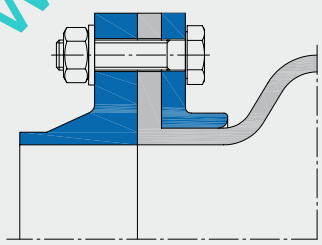
Vulcanised supporting ring (example)

Please take the limited movement into account.

Flange versions

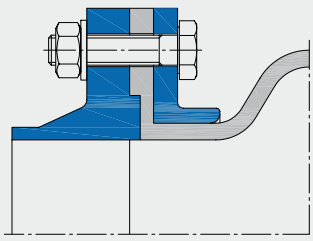
Type 40 is produced with solid rubber flanges. To ensure a tight connection to the pipeline/assembly, the counter flange should be flat without a raised face. If this is not possible, the expansion joint flange can be produced with a negative recess (see version 2) for example to accommodate the raised face of the counter flange and ensure a flat connection.

Alternatively, spacer rings can be used.



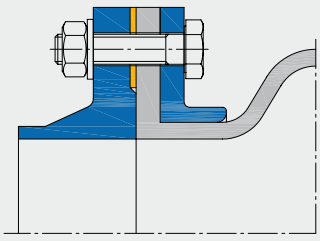
Version 1

Standard version



Version 2

With recess compensation



Version 3

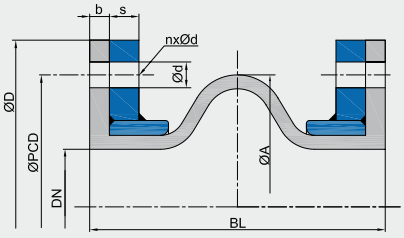
With recess spacer ring

WILLBRANDT **Rubber Expansion Joint Type 40**

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.

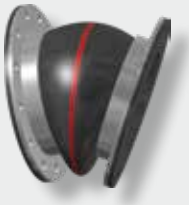
The expansion joint's reaction force must be absorbed through appropriate pipeline guidance (see planning instructions in the appendix).




axial -


axial +


lateral ±


angular ±

Dimensions for design A (Example values - may vary depending on specification)

DN*1	Length	Bellow			Flange PN 10*4					Movement absorption*5				Weight
	BL*2	ØA	b	WF*3	ØD	ØPCD	Ød	n	s	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	∠°	kg
200	**250**	280	10	53066	340	295	22	8	20	20	40	26	11.3	19.0
250	**250**	330	10	75439	395	350	22	12	20	20	40	26	9.1	22.5
300	**250**	384	10	104009	445	400	22	12	20	20	40	28	7.6	25.0
350	**250**	432	10	133249	505	460	22	16	20	20	44	27	6.5	31.5
400	**250**	484	10	169007	565	515	26	16	20	20	44	27	5.7	39.5
450	**250**	532	10	197823	615	565	26	20	28	20	44	27	5.1	51.0
500	**250**	585	10	241800	670	620	26	20	28	20	44	27	4.6	57.5
600	**250**	685	10	336785	780	725	30	20	28	20	44	27	3.8	72.5
700	**250**	786	10	448656	895	840	30	24	28	20	44	26	3.3	88.5
800	**300**	917	13	617614	1015	950	33	24	28	31	53	34	4.4	115.0
900	**300**	1017	13	764723	1115	1050	33	28	28	31	53	33	3.9	128.0
1000	**300**	1117	13	927532	1230	1160	36	28	28	31	53	33	3.5	146.0
1100	**300**	1217	13	1106041	1345	1270	36	32	28	31	53	33	3.2	168.0
1200	**300**	1317	13	1300250	1455	1380	39	32	28	41	43	32	3.9	196.0
1300	**300**	1417	13	1519151	1565	1485	42	32	28	31	53	32	2.7	219.0
1400	**300**	1517	13	1735768	1675	1590	42	36	28	31	53	31	2.5	241.0
1500	**300**	1617	13	1977077	1795	1705	48	36	28	31	53	31	2.4	261.0
1600	**300**	1717	13	2234086	1915	1820	48	40	28	31	53	31	2.2	291.0
1700	**300**	1817	13	2478817	2015	1920	48	44	33	31	53	30	2.1	380.0
1800	**300**	1917	13	2765656	2115	2020	48	44	33	31	53	30	2.0	401.0
1900	**300**	2017	13	3068195	2220	2125	48	48	33	31	53	29	1.9	428.0
2000	**300**	2117	13	3386434	2325	2230	48	48	33	31	53	29	1.8	455.0
2100	**350**	2255	15	3851387	2440	2335	56	48	33	43	69	38	2.3	505.0
2200	**350**	2355	15	4206992	2550	2440	56	52	33	43	69	37	2.2	539.0
2400	**350**	2555	15	4965302	2760	2650	56	56	33	43	69	36	2.1	600.0
2500	**350**	2655	15	5368007	2860	2750	56	56	33	43	69	36	2.0	624.0
2600	**350**	2755	15	5786412	2960	2850	56	60	33	43	69	35	1.9	646.0
2800	**350**	2955	15	6670322	3180	3070	56	64	33	43	69	34	1.8	726.0
3000	**350**	3155	15	7617032	3405	3290	62	68	33	43	69	33	1.6	807.0

*1 Smaller and larger nominal diameters possible after technical inspection.
*2 Overall length range 150 mm to 500 mm. For larger overall lengths the feasibility must be checked. For smaller overall lengths, please also refer to our types 49, 50 and 55.
*3 The effective area (WF), the rubber flange thickness (b) and the outer diameter of the corrugation (ØA) may vary depending on the design.
*4 Other standards/dimensions possible.
*5 Movement absorption can be increased by changing the corrugation and overall length.

- Maximum size DN 5000.
- Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see technical appendix on page 117)!
For more information please refer to our planning instructions in the technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 40**

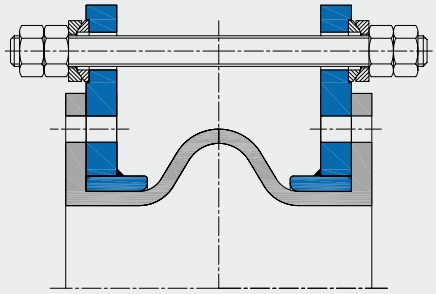
Other designs

Design E - with tie rods

For absorbing the expansion joint's reaction force in the direction of expansion while also absorbing great lateral movement.

The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement. Can be used for vibration insulation and absorbing lateral movement.

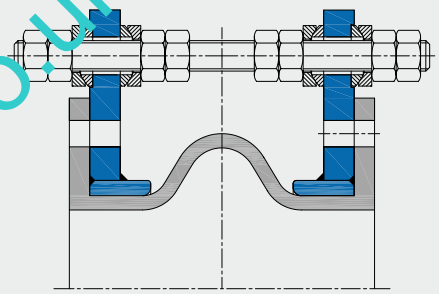
Note: The number of tie rods is calculated corresponding to the available design data.



Design M - with tie rods/thrust limiters

For absorbing the expansion joint's reaction force in the direction of expansion while also absorbing high lateral movement and preventing the bellow from strong compression. The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement. Can be used for vibration insulation and absorbing lateral movement.

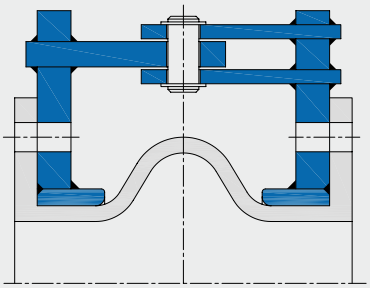
Note: The number of tie rods is calculated corresponding to the available design data.



Design F - with hinge

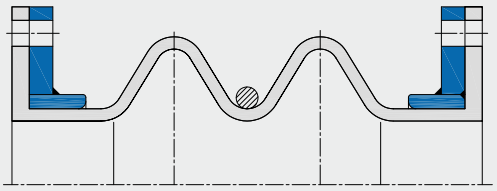
For absorbing angular movement in a single plane while simultaneously guiding the pipework. The hinge absorb the reaction forces so that the fixed point only needs to absorb the adjusting movement.

Usually two hinge expansion joints are fitted with an intermediate pipe to achieve a high level of lateral movement (see the example in the technical appendix).



Multi-corrugated bellow designs

Different corrugation geometries and bellow forms (single and multi-corrugated) are available, in order to absorb high axial, lateral and angular movement.



Example - double corrugation, Design A - without tie rods

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! Information on this can be found in our planning instructions (page 107 - 117)! Regarding the bracing, please refer to the information in the technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 42**

■ not in stock

DN 50 to DN 3000

Type 42 is a hand-made, corrugated rubber expansion joint whose corrugated shape enables a very low inherent resistance. It is characterised by its flexibility in length and the wide variety of rubber qualities, so that a suitable rubber compound is available for every application (see material descriptions on the following page).

Type 42 is mainly used in plant construction and in water and wastewater technology. Here it is used especially for repairs when the gap does not correspond to a standard installation length, which means that expensive conversion work on the pipe system can be avoided. It absorbs movements and vibrations and has a noise-damping effect.

Bellow design	Corrugated rubber bellows with reinforcement, vulcanised supporting ringes at the corrugation foot and solid rubber flanges, self-sealing (no additional seals required). Suitable for backing flanges or vulcanised steel flanges.
Flange version	Both sides with backing or vulcanised flange made of hot-dip galvanized steel, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Pressure resistance	Design according to customer specification, max. 25 bar operating pressure
Vacuum resistance	Vacuum-proof due to vulcanised supporting rings at the corrugation foot.
Approvals/conformity	CE, drinking water conform, FDA and EG 1935/2004 conform (detailed overview on page 5)
Accessories	- Tie rods - Vacuum supporting rings - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design				Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforcement	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	100										
blue	■	EPDM TW	Polyamide	EPDM	100										
white-red	□ ■	EPDM beige	Polyamide	EPDM	100										
green	■	CSM	Polyamide	CSM	100										
yellow	■	NBR	Polyamide	NBR	100										
white	□	NBR beige	Polyamide	NBR	100										
grey	■	CR	Polyamide	CR	90										
red-blue-red	■ ■ ■	EPDM	Aramid	EPDM	100										
blue-blue-blue	■ ■ ■	EPDM TW	Aramid	EPDM	100	Expansion joints will designed according to your operating parameters.									
white-blue-red	□ ■ ■	EPDM beige	Aramid	EPDM	100										
orange-blue-orange	■ ■ ■	EPDM HT	Aramid	EPDM HT	125										
green-blue-green	■ ■ ■	CSM	Aramid	CSM	100										
yellow-blue-yellow	■ ■ ■	NBR	Aramid	NBR	100										
white-blue-white	□ ■ □	NBR beige	Aramid	NBR	100										
grey-blue-grey	■ ■ ■	CR	Aramid	CR	90										
lilac-blue-lilac	■ ■ ■	FPM	Aramid	FPM	180										
-	-	Silicone	Aramid	Silicone	180										
-	-	Silicone	Glass fabric	Silicone	200										

WILLBRANDT **Rubber Expansion Joint Type 42**

Application

Type 42 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 42 blue (EPDM TW)
Like type 42 red, but approved for drinking water.

Type 42 white-red (EPDM beige)
Like type 42 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 42 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 42 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 42 white (NBR beige)
Like type 42 yellow, but with light-coloured internal rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 42 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 42 red-blue-red (EPDM/aramid)
Like type 42 red, but with aramid fabric.

Type 42 blue-blue-blue (EPDM TW/aramid)
Like type 42 blue, but with aramid fabric.

Type 42 white-blue-red (EPDM beige/aramid)
Like type 42 white-red, but with aramid fabric.

Type 42 orange-blue-orange (EPDM HT/aramid)
Like type 42 red, but with aramid fabric and for temperatures up to +125 °C.

Type 42 green-blue-green (CSM/aramid)
Like type 42 green, but with aramid fabric.

Type 42 yellow-blue-yellow (NBR/aramid)
Like type 42 yellow, but with aramid fabric.

Type 42 white-blue-white (NBR beige/aramid)
Like type 42 white-grey, but with aramid fabric.

Type 42 grey-blue-grey (CR/aramid)
Like type 42 grey, but with aramid fabric.

Type 42 lilac-blue-lilac (FPM/aramid)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. Temperatures of up to +180 °C.

Type 42 silicone (silicone/glass fabric or aramid)
Suitable for hot air, acetic acid. Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C.
No resistance to fuels.

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 observe the planning instructions and the tolerances according to the FSA manual (page 117) in the technical appendix!**

WILLBRANDT **Rubber Expansion Joint Type 42**

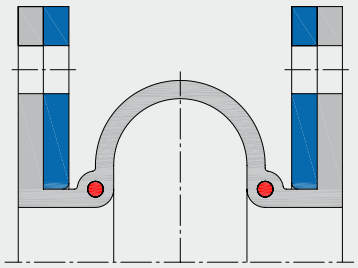
Versions

Type 42 is produced with solid rubber flanges. To ensure a tight connection to the pipe/assembly, the counter flange should be flat and have no raised face. If this is not possible, the expansion joint flange can be produced with a negative recess (see versions 2 and 4) in order to accommodate the raised face of the counter flange and ensure a flat connection.

Alternatively, spacer rings can be used.

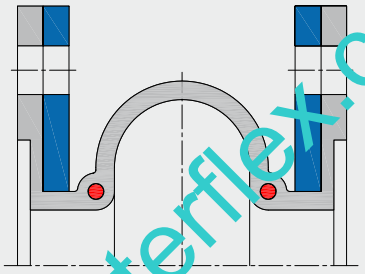
Version 1

Both sides with solid rubber flanges and vulcanised supporting ringes at the corrugation foot.



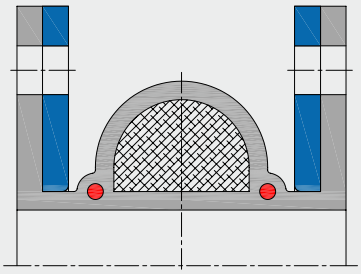
Version 2

Both sides with solid rubber flanges and negative recess for counter flanges with raised face and vulcanised supporting ringes at the corrugation foot.



Version 3

Both sides with solid rubber flanges, with filled corrugation vulcanised supporting ringes at the corrugation foot.



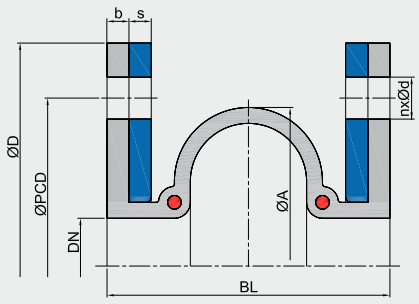
WILLBRANDT **Rubber Expansion Joint Type 42**

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 (see planning instructions in the appendix).

(Example illustration - version 3)



Dimensions for design A (Example values - may vary depending on specification)

DN	Overall length	Bellow			Flange PN 10*3					Movement absorption*4			
	BL*1	ØA	b	WF*2	ØD	ØPCD	Ød	n	s	axial +	axial -	lateral ±	angular ±
	mm	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	∠°
50	**200**	110	10	6360	165	125	18	4	20	10	20	15	10.0
65	**200**	125	10	8650	185	145	18	8	20	10	20	15	10.0
80	**200**	140	10	11300	200	160	18	8	20	10	20	15	10.0
100	**200**	160	10	15400	220	180	18	8	20	14	34	15	15.6
125	**200**	185	10	21370	250	210	18	8	20	10	34	15	12.6
150	**200**	210	10	28830	285	240	22	8	20	10	34	15	10.6
200	**250**	280	10	53066	340	295	22	8	25	20	34	26	8.0
250	**250**	330	10	75439	395	350	22	12	25	20	34	26	6.4
300	**250**	384	10	104009	445	400	22	12	25	20	34	28	5.3
350	**250**	432	10	133249	505	460	22	16	25	20	34	27	4.6
400	**250**	484	13	169007	565	515	26	16	25	20	34	27	4.0
450	**250**	532	13	197823	615	565	26	20	30	20	34	27	3.6
500	**250**	585	13	241800	670	620	26	20	30	20	34	27	3.2
600	**250**	685	13	336785	780	725	30	20	30	20	34	27	2.9
700	**250**	786	13	448656	895	840	30	24	30	20	34	26	2.7
800	**300**	917	13	617614	1015	950	33	24	30	22	41	34	3.1
900	**300**	1017	13	764724	1115	1050	33	28	30	22	41	33	2.8
1000	**300**	1117	13	927558	1230	1160	36	28	30	22	41	33	2.5
1100	**300**	1217	13	1096341	1345	1270	36	32	30	22	41	33	2.3
1200	**300**	1317	13	1280250	1455	1380	39	32	30	22	41	32	2.1
1300	**300**	1417	13	1510159	1565	1485	42	32	30	22	41	32	1.9
1400	**300**	1517	13	1735768	1675	1590	42	36	30	22	41	31	1.8
1500	**300**	1617	13	1977077	1795	1705	48	36	30	22	41	31	1.7
1600	**300**	1717	13	2234086	1915	1820	48	40	30	22	41	31	1.6
1700	**300**	1817	13	2478817	2015	1920	48	44	35	22	41	30	1.5
1800	**300**	1917	13	2765656	2115	2020	48	44	35	22	41	30	1.4
1900	**300**	2017	13	3068195	2220	2125	48	48	35	22	41	29	1.3
2000	**300**	2117	13	3386434	2325	2230	48	48	35	22	41	29	1.3
2100	**350**	2255	13	3851387	2440	2335	56	48	35	24	47	38	1.4
2200	**350**	2355	13	4206992	2550	2440	56	52	35	24	47	37	1.3
2400	**350**	2555	13	4965302	2760	2650	56	56	35	24	47	36	1.1
2500	**350**	2655	13	5368007	2860	2750	56	56	35	24	47	36	1.1
2600	**350**	2755	13	5786412	2960	2850	56	60	35	24	47	35	1.1
2800	**350**	2955	13	6670322	3180	3070	56	64	35	24	47	34	1.0
3000	**350**	3155	13	7617032	3405	3290	62	68	35	24	47	33	0.9

*1 Overall length range 150 mm to 500 mm. For larger overall lengths the feasibility must be checked. For smaller overall lengths, please also refer to our types 49, 50 and 55.
*2 The effective area (WF), the rubber flange thickness (b) and the outer diameter of the corrugation (ØA) may vary depending on the design.
*3 Other standards/dimensions possible.
*4 Movement absorption can be increased by changing the corrugated and overall length.

- Maximum size DN 5000.
- Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! Information on this can be found in our planning instruction (page 107 - 117). Regarding the bracing, please refer to the information in the technical appendix.

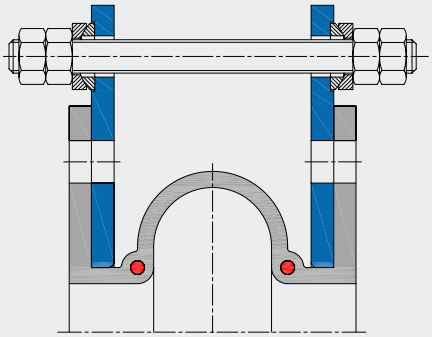
WILLBRANDT **Rubber Expansion Joint Type 42**

Design E - with tie rods

For absorbing the expansion joint's reaction force in the direction of expansion while also absorbing high lateral movement.

The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement. Can be used for vibration insulation and absorbing lateral movement.

Note: The number of tie rods is calculated from the available design data.

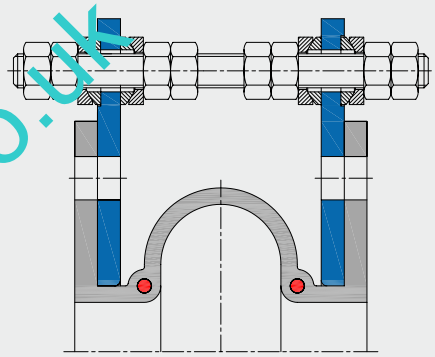


Design M - with tie rods/thrust limiters

For absorbing the expansion joint's reaction force in the direction of expansion while also absorbing high lateral movement and preventing the bellow from strong compression. The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement.

Can be used for vibration insulation and absorbing lateral movement. This design can also be used without spherical washers and conical sockets for dismantling (design T).

Note: The number of tie rods is calculated from the available design data.

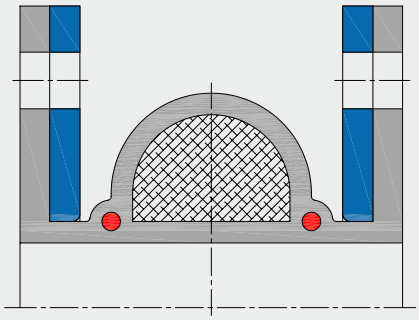


Design A - without tie rods, with filled corrugation

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 (see fitting instructions in the appendix).

Note: Limited movement absorption



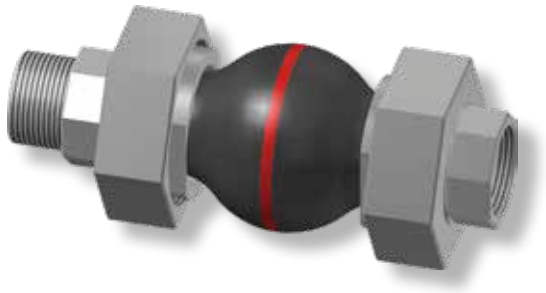
WILLBRANDT **Rubber Expansion Joint Type 46**

■ mainly in stock

DN 20 (3/4") to DN 50 (2")

Type 46 is a low corrugated rubber expansion joint. Its low corrugated shape minimises flow resistance. It is also characterised by its large axial movement absorption and the wide variety of rubber qualities, so that a suitable rubber compound is available for every application (see material descriptions on the following page).

Type 46 is used in building services engineering, water management, solar and wind energy systems and in engine construction, where it is used specifically for movement and vibration absorption as well as noise damping.



Bellow design
Low corrugated rubber bellow with reinforcement and shaped sealing bead with core ring, self-sealing (no additional seals required). Suitable for 3-piece screw connection.

Screw connection
Galvanized steel with female or male threads according to DIN EN 10226. Other standards and materials are possible.

Vacuum resistance
DN 20 to DN 50 vacuum-proof, type 46 black EPDM:
DN 20 to 40 up to -300 mbar, DN 50 only with vacuum supporting steel for vacuum application can be used

Approvals/Conformity
CE, shipbuilding approvals, TÜV tested in accordance with DIN 4809
(detailed overview on page 5)

Accessories
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover / sun protection cover

Further information on page 99 - 105.

Specifications

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
red Sp	■■	EPDM	PEEK	EPDM	-40	10	70	16	100	10	130	8	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	-40	10	50	16	70	12	100	10	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	-20	10	50	16	70	12	90	10	100	conductive	conductive
green	■	CSM	Polyamide	CSM	-20	10	50	16	70	12	100	10	110	insulating	insulating
black EPDM	◆	IIR	Polyamide	EPDM	-40	10	50	10	70	8	90	6	120	dissipative	dissipative
black CR	–	CR	Polyamide	CR	-25	10	50	16	70	12	90	10	100	insulating	insulating
yellow LT	■ LT	NBR LT	Polyamide	CR	-40	10	50	16	70	12	90	10	100	dissipative	conductive
yellow St	■■	NBR	Steel cord	CR	-20	10	60	16	70	12	90	10	100	conductive	insulating
yellow HNBR	■■■	HNBR	Steel cord	CR	-35	10	60	16	70	12	100	10	120	dissipative	insulating

Important information

**For aggressive media, please have the material resistance checked by our engineers.
Please note the appropriate fixed point constructions and plain bearings in your piping system.
For more information please refer to our planning instructions. The bellows must be installed free of torsion and must not be painted or insulated at media temperatures >50 °C.**

WILLBRANDT **Rubber Expansion Joint Type 46**

Application

Type 46 red Sp
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 46 red
For hot water, sea water, cooling water with glycol or other chemical additives for treating water, weak acids and weak 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 46 yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied) and DIN EN fuels with an aromatic content up to 50 %. Electrically conductive surface.

Type 46 green
For chemicals, aggressive chemical waste water and compressor air containing oil. Electrically insulating surface.

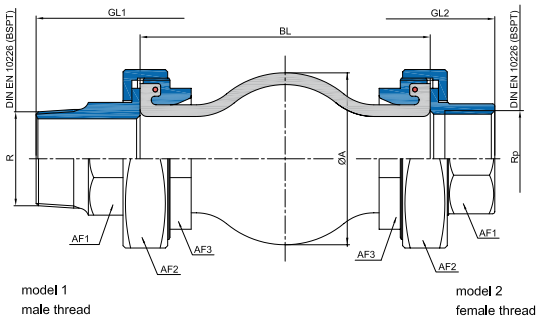
Type 46 black EPDM
Like type 46 red, but for maximum 10 bar operating pressure.

Type 46 black CR
For cold and hot water, swimming pool water, salt water, waste water, cooling water with coolant (e.g. glycool up to 60 °C) and anti-corrosive products containing oil, oil mixtures and compressed air containing oil. Electrically insulating surface.

Type 46 yellow LT
Like type 46 yellow. Also for liquid gas. Electrically dissipative inner suface, electrically insulating outer surface.

Type 46 yellow St
Like type 46 yellow with additional flame-resistance for up to 30 minutes at 800 °C. Electrically conductive inner surface, electrically insulating outer surface.

Type 46 yellow HNBR
Like type 46 yellow St, but for temperatures up to +100 °C. Electrically dissipative inner surface, electrically insulating outer surface.



model 1
male thread

model 2
female thread

Dimensions - polyamide reinforcement

DN	Length	Bellow			Total length		Wrench size			Movement absorption*2				Weight	
	BL	ØA	WF*1	R / RP	GL1	GL2	AF1	AF2	AF3	axial +	axial -	lateral ±	angular ±	Design 1	Design 2
	mm	mm	mm²	Inches	mm	mm	mm	mm	mm	mm	mm	mm	∠°	kg	kg
20	**130**	81	1700	3/4	214	190	36	80	54	15	30	10	30	2.3	2.5
25	**130**	81	1700	1	214	182	40	80	54	15	30	10	30	2.4	2.4
32	**130**	81	1700	1 1/4	240	190	48	80	54	15	30	10	30	2.6	2.1
40	**130**	86	1800	1 1/2	250	198	53	90	74	15	30	10	30	2.9	2.6
50	**130**	96	3200	2	260	198	66	110	90	15	30	10	30	4.4	3.9

*1 WF = effective area
*2 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).

Note: Reduced expansion for steel cord reinforement (type 46 yellow ST and yellow HNBR). Weights slightly increased.

WILLBRANDT **Rubber Expansion Joint Type 48**

■ mainly in stock

DN 50 to DN 200

Type 48 is a highly corrugated rubber expansion joint with a corrugated shape that minimises inherent resistance. It is also characterised by its large movement absorption in all directions.

Type 48 is mainly used in industry for movement and vibration absorption.

Bellow design	High corrugated rubber bellow with reinforcement and shaped sealing bead, self-sealing (no additional seals required). Suitable for 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.
Vacuum resistance	- DN 50 to 200 up to -200 mbar - With vacuum supporting spiral/ring, vacuum-proof
Approvals	There are no approvals available.
Accessories	- Tie rods - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99- 105.

Specifications

Bellow		Bellow design			Permissible operating data						
Colour code	Colour marking	Core (inner)	Reinforcement	Cover (outer))	°C	bar	°C	bar	°C	bar	Short-term °C
red	■	EPDM	Sp. Cord	EPDM	50	16	70	10	90	6	100

Bursting pressure DN 50 - 200 > 48 bar

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 48**

Application

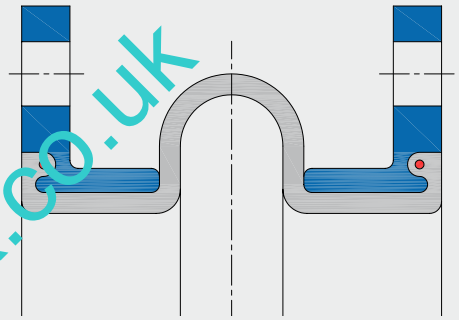
Type 48 red
For cooling water with glycol or other chemical additives for treating water, weak acids and weak alkalis, salt solutions.

Not suitable for oil products or cooling water with additives containing oil.

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 (see planning instructions in the appendix).



Dimensions

DN	Length	Bellow		Flange PN 10*2						Movement absorption*3				Weight
	BL	ØA	WF*1	ØD	ØLK	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ± ∠°	
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm		kg
50	**150**	133	11900	165	125	18	4	16	96	25	25	20	30	5.4
65	**150**	147	14700	185	145	18	8	16	116	25	25	20	30	6.7
80	**150**	167	19400	200	160	18	8	18	133	25	25	20	30	7.5
100	**155**	197	27500	220	180	18	8	18	153	40	30	25	30	8.9
150	**155**	248	44500	285	240	23	8	20	203	45	35	25	20	15.9
200	**160**	292	62400	340	295	23	8	20	261	45	35	25	20	20.7

*1 WF = effective area
*2 Other standards/dimensions possible.
*3 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! Information on this can be found in our planning instructions (page 107 - 117). Regarding the bracing, please refer to the information in the technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 49**

■ mainly in stock

DN 32 - 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
Approvals/Conformity	CE, drinking water approval, shipbuilding approvals, TÜV tested in accordance with DIN 4809 (detailed overview on page 5)
Accessories	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

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

Wichtige Hinweise

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.

WILLBRANDT **Rubber Expansion Joint Type 49**

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.

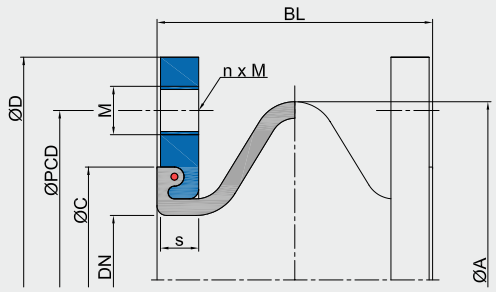
Type 49 green
For chemicals, aggressive chemical waste water and compressor air containing oil. Electrically insulating surface.

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

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 (see planning instructions in the appendix).



Dimensions for design A

DN	Length	Bellow		Flange PN 10*2						Movement absorption*3				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	5.0
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).

WILLBRANDT **Rubber Expansion Joint Type 49**

Bracings

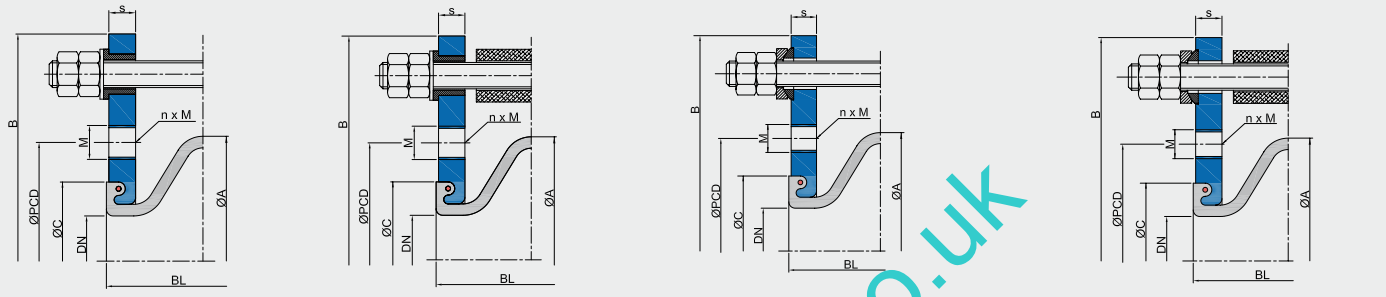
A selection of different bracings is available to absorb the reaction force and to protect the bellows from overstretching or excessive compression (detailed description on page 99 - 102).

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

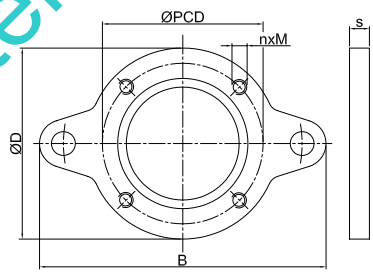
Design S
Tie rods, outside with spherical washers/conical sockets, inside with thrust limiters (plastic bushing)



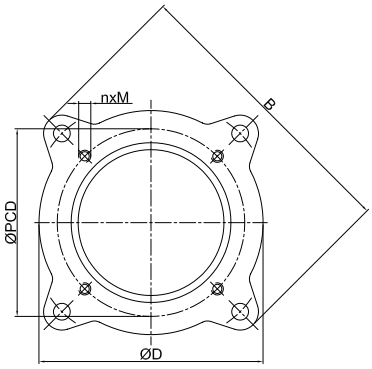
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

DN	Length BL	Flange PN 10 (example dimensions) B	ØD	ØPCD	M	n	s	ØC
	mm	mm	mm	mm			mm	mm
32	100	230	140	100	M16	4	16	[illegible]
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

Axial stiffness rates

DN	Length BL	Stiffness rates (average value form full way) 0 bar	1 bar	2.5 bar	3 bar	6 bar	10 bar	12 bar	16 bar	25 bar
	mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	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.

WILLBRANDT **Rubber Expansion Joint Type 49 S**

partly in stock

DN 40 - DN 500

Type 49 S is a high corrugated, highly elastic rubber expansion joint with a corrugated shape that achieves very low inherent resistance. It is also characterised by its high movement absorption with a short installation length.

Type 49 S is mainly used in building technology, where it is used for expansion and vibration absorption and noise damping. It is also used in industrial applications, especially 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 40 to DN 250 up to -200 mbar - With vacuum supporting spiral/ring, vacuum-proof
Approvals/Conformity	CE (A2), FDA, BfR and EG 1935/2004 conform
Accessories	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - 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								
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	°C	bar	°C	bar	°C	bar	°C	bar	Short-term °C
white	□	NBR light	Polyamide	CR	-20	10	50	16	70	12	90	10	100
white-orange	□ ■	EPDM light	Polyamide	CR	-40	10	50	16	70	12	90	10	100
white-blue	□ ■	NBR light	Aramid	CR	-20	16	50	25	70	18	90	12	100
white-white-orange	□ □ ■	EPDM light	Aramid	CR	-40	16	50	25	70	18	90	12	100
lilac	■	FPM	Aramid	ECO	-15	10	50	16	90	12	150	4	160

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 planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 49 S**

Application

Type 49 S white (NBR)
With light colored inner rubber in food-grade quality for fatty and oily media (FDA, BfR and EG 1935/2004 conform). Not approved for drining water.

Type 49 S white-orange (EPDM)
With light colored inner rubber in food-grade quality for fat and oil-free media (FDA, BfR and EG 1935/2004 conform). Not approved for drinking water.

Type 49 S white-blue (NBR)
Like type 49 S white, but with aramid fabric.

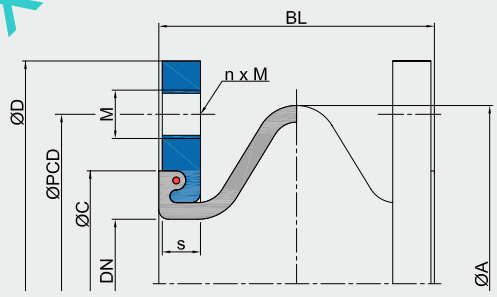
Type 49 S white-white-orange (EPDM)
Like type 49 S white-orange, but with aramid fabric.

Type 49 S 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.

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 (see planning instructions).



Dimensions for design A

DN	Length	Bellow		Flange PN 10*2						Movement absorption*3				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
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.

WILLBRANDT **Rubber Expansion Joint Type 49 S**

Lateral stiffness rates

DN	Length	Stiffness rates (average value form full way)								
	BL	0 bar	1 bar	2.5 bar	3 bar	6 bar	10 bar	12 bar	16 bar	25 bar
	mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm	N/mm
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	0 bar	1 bar	2.5 bar	3 bar	6 bar	10 bar	12 bar	16 bar	25 bar
	mm	Nm/°	Nm/°	Nm/°	Nm/°	Nm/°	Nm/°	Nm/°	Nm/°	Nm/°
40	**100**	0.1	0.3	0.6	0.6	1.[illegible]	1.8	1.6	1.7	1.8
50	**100**	0.2	0.4	0.9	1.0	1.[illegible]	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	[illegible].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	2[illegible]	27.8	45.9	25.3	27.1	28.9
200	**100**	5.7	12.1	24.0	27.[illegible]	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	13[illegible]	153.5	289.9	472.1	329.3	352.5	375.8
500	**110**	30.9	115.4	2[illegible]	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.

Frictional force

DN	Overall length	For design E	For design F
	BL	Frictional force	Frictional moment
	mm	N/bar	Nm/bar
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 frictional force 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 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 information in the technical instructions.

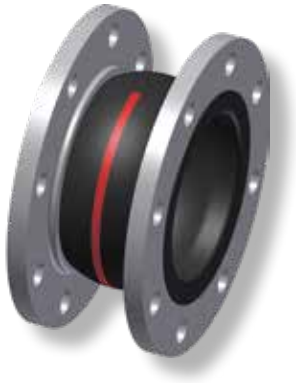
WILLBRANDT **Rubber Expansion Joint Type 50**

■ **mainly in stock**

DN 20 - DN 1000

Type 50 is a low corrugated, highly elastic rubber expansion joint that achieves minimal flow resistance due to its flat corrugation. It reduces structure-borne noise to a high degree and is characterised by its high movement absorption in all directions. 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 50 is used in building technology, plant engineering, water and wastewater technology, engine construction, shipbuilding and solar and wind energy plant construction. Here it is used specifically to absorb movement 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 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.

Approvals/Conformity
CE, drinking water approval, shipbuilding approvals, TÜV tested in accordance with DIN 4809 (detailed overview on page 5)

Vacuum resistance
- DN 20 to 50 vakuum-proof
- DN 65 to 250 up to -200 mbar
- DN 300 to 1000 not vacuum-proof with vacuum supporting spiral/ring from DN 65 to DN 1000 vacuum-proof
- Type 50 black EPDM:
  DN 20 to DN 40 up to -300 mbar
  from DN 50 can only used with vacuum supporting spiral for vaccum

Accessories
- Tie rods
- Vacuum supporting spiral/rings
- Guide sleeves
- PTFE lining
  (see type 50 PTFE on page 39)
- Potential equalisation
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover / sun protection cover

Further information on page 99 - 105.

Specifications for DN 20 - DN 400

Bellow		Bellow design			up to DN	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
red Sp	■■	EPDM	PEEK	EPDM	400	-40	10	70	16	100	10	130	8	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	400	-40	10	50	16	70	12	100	10	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	400	-20	10	50	16	70	12	90	10	100	conductive	conductive
green	■	CSM	Polyamide	CSM	400	-20	10	50	16	70	12	100	10	110	insulating	insulating
orange	■	NBR	Polyamide	CR	200	-20	10	50	25	70	20	90	15	100	conductive	conductive
black EPDM*	◆	IIR	Polyamide	EPDM	150	-40	10	50	10	70	8	90	6	120	dissipative	dissipative
black CR	–	CR	Polyamide	CR	400	-25	10	50	16	70	12	90	10	100	insulating	insulating
yellow LT	■ **LT**	NBR-LT	Polyamide	CR	300	-40	10	50	16	70	12	90	10	100	dissipative	conductive
yellow St	■■	NBR	Steel cord	CR	400	-20	10	60	16	70	12	90	10	100	conductive	insulating
yellow HNBR	■■■	HNBR	Steel cord	CR	300	-35	10	60	16	70	12	100	10	120	dissipative	insulating

Bursting pressure DN 20 - DN 400 > 48 bar
*Bursting pressure max. 30 bar, max. DN 150

For pressure loss see technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 50**

Specifications for DN 450 - DN 1000

Bellow		Bellow design			up to DN	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
red Sp	■■	EPDM	PEEK	EPDM	1000	-40	8	70	10	100	7,5	130	6	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	1000	-40	8	50	10	70	8	100	6	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	1000	-20	8	50	10	70	8	90	6	100	conductive	conductive
green	■	CSM	Polyamide	CSM	600	-20	8	50	10	70	8	90	6	100	insulating	insulating
black CR	–	CRN	Polyamide	CR	1000	-25	8	50	10	70	8	90	6	110	insulating	insulating
yellow St	■■	NBR	Steel cord	CR	600	-20	8	60	10	70	8	90	6	100	conductive	insulating

Bursting pressure DN 450 - 1000 > 30 bar

For pressure loss see technical appendix.

Application

Type 50 red Sp
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 50 red
For drinking water, hot water, sea water, cooling water with glycol or other chemical additives for treating water, weak acids and weak alkalis and salt solutions, technical alcohols, esters, ketones. Electrically dissipative surface. Not suitable for oil products or cooling water with additives containing oil.

Type 50 yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied) and DIN EN fuels with an aromatic content up to 50 %. Electrically conductive surface.

Type 50 green
For chemicals, aggressive chemical waste water and compressor air containing oil. Electrically insulating surface.

Type 50 orange
Like type 50 yellow, but for 25 bar operating pressure und for liquid petroleum gas acc. to DIN EN 589. Electrically conductive surface.

Type 50 black EPDM
Like type 50 red, but but max. 10 bar operating pressure.

Type 50 black CR
For cold and hot water, swimming pool water, sald water, waste water, cooling water with coolant (e.g. glycol up to 60 °C) and anti-corrosive product containing oil, oil mixtures and compressed air containing oil. Electrically insulating surface.

Type 50 yellow LT
Like type 50 yellow, but also for liquid gas. Electrically dissipate inner surface and electrically conductive outer surface.

Type 50 yellow St
Like type 50 yellow with additional flame-resistance for up to 30 minutes at 800 °C. Electrically conductive inner surface and electrically insulating outer surface.

Type 50 yellow HNBR
Like type 50 yellow St, but for temperatures up to +100 °C. Electrically dissipative inner surface and electrically insulating outer surface.

Important information

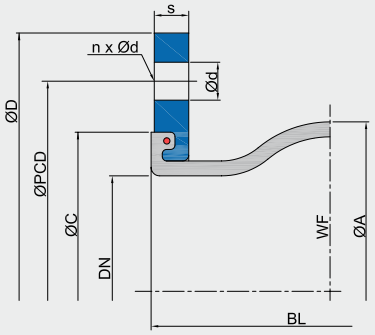
For aggressive media, please have the material resistance checked by our engineers.
The bellows must not be painted or insulated at media temperatures >50 °C.
Please also note the planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 50**

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.

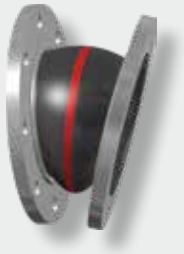
The expansion joint's reaction force must be absorbed through appropriate pipeline guidance (see planning instructions in the appendix).




axial -


axial +


lateral ±


angular ±

Dimensions for design A

DN	Length	Bellow		Flange PN 10*2						Movement absorption*3 (polyamide cord)				Movement absorption*3 (steel cord)				Weight*4
	BL	ØA	WF*1	ØD	ØPCD	Ød	n	s	C	axial +	axial -	lateral ±	angular ±	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	mm	mm	mm	∠°	kg
*5**20**	**130**	81	1700	105	75	M12	4	14	66	30	30	30	30	15	30	15	20	1.6
25	**130**	81	1700	115	85	14	4	14	66	30	30	30	30	15	30	15	20	1.8
32	**130**	81	1700	140	100	18	4	15	66	30	30	30	30	15	30	15	20	2.9
40	**130**	86	1800	150	110	18	4	15	74	30	30	30	30	15	30	15	20	3.4
50	**130**	96	3200	165	125	18	4	16	86	30	30	30	30	15	30	15	20	4.5
65	**130**	111	5300	185	145	18	8	16	106	30	30	30	30	15	30	15	20	5.2
80	**130**	122	8500	200	160	18	8	18	118	30	30	30	30	15	30	15	20	6.6
100	**130**	142	12800	220	180	18	8	18	138	30	30	30	20	15	30	15	15	7.6
125	**130**	168	18700	250	210	18	8	18	166	30	30	30	20	15	30	15	15	9.4
150	**130**	192	25900	285	240	22	8	18	192	30	30	30	20	15	30	15	15	11.7
200	**130**	252	41000	340	295	22	8	20	252	30	30	30	10	20	15	10	15	16.0
250	**130**	302	59600	395	350	22	12	20	304	30	20	20	5	20	15	10	15	18.7
300	**130**	354	82200	445	400	22	12	22	354	30	20	20	5	20	15	10	15	24.2
350	**200**	420	117600	505	460	22	16	24	412	35	50	30	8	30	30	25	10	40.0
400	**200**	480	154700	565	515	26	16	25	470	25	50	30	8	30	40	25	15	45.6
450	**200**	530	204200	615	565	26	20	28	520	35	50	30	8	-	-	-	-	57.0
500	**200**	580	227900	670	620	26	20	30	570	35	50	30	8	-	-	-	-	67.4
600	**200**	680	311500	780	725	30	20	30	675	35	40	30	8	-	-	-	-	81.3
700	*6**250**	800	434200	895	840	30	24	35	780	40	30	30	5	-	-	-	-	121.7
800	**250**	880	527400	1015	950	33	24	40	887	35	40	35	5	-	-	-	-	159.7
900	**300**	1038	737900	1115	1050	33	28	40	987	40	40	40	5	-	-	-	-	197.0
1000	**300**	1138	889400	1230	1160	36	28	40	1087	40	40	40	5	-	-	-	-	237.0

*1 WF = effective area
*2 Other standards/dimensions possible.
*3 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).
*4 Approx. weights with reinforcement from polyamide cord, with steel cord approx. + 3 - 7 %.
*5 Flange with threaded holes
*6 Building length 260 mm

Important information

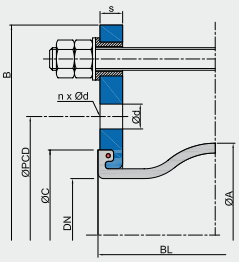
Please note the appropriate fixed point constructions and plain bearings in your piping system! Information on this can be found in our planning instructions. Regarding the bracing, please refer to the information in the technical appendix (page 99 - 102)!

WILLBRANDT **Rubber Expansion Joint Type 50**

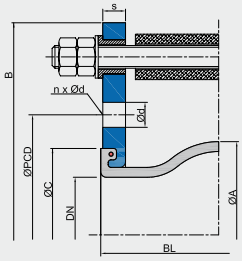
Bracings

A selection of different bracings are available to absorb the reaction force and to protect the bellows from overstretching or excessive compression (detailed description on page 99 - 102):

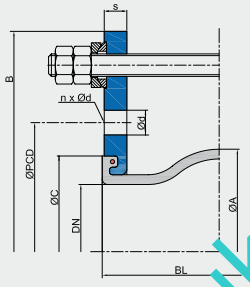
Design B*
Tie rods, mounted in rubber bushing



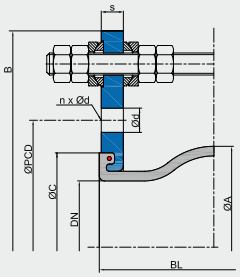
Design C*
Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



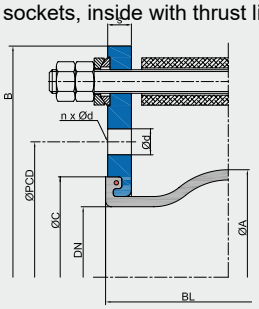
Design E
Tie rods, outside with spherical washers/conical sockets



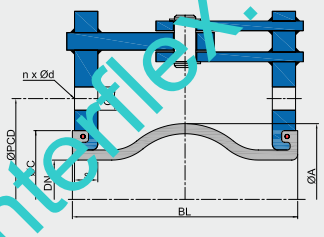
Design M
Tie rods, inside and outside with spherical washers/conical sockets



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



Design F
Hinge

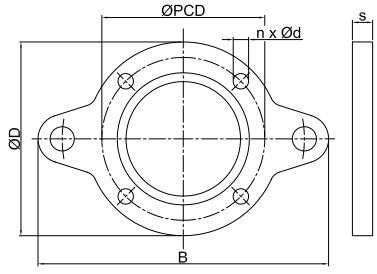


* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

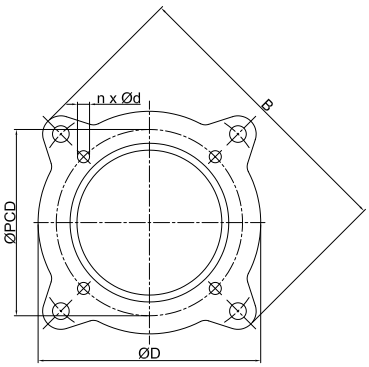
Flange dimensions for designs with tie rods

DN	Length	Flange PN 10 (example dimensions)						
	BL	B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm	mm		mm	mm
20	**130**	189	105	75	M12	4	14	66
25	**130**	205	115	85	14	4	14	66
32	**130**	230	140	100	18	4	15	66
40	**130**	240	150	110	18	4	15	74
50	**130**	255	165	125	18	4	16	86
65	**130**	275	185	145	18	8	16	106
80	**130**	290	200	160	18	8	18	118
100	**130**	310	220	180	18	8	18	138
125	**130**	340	250	210	18	8	18	166
150	**130**	375	285	240	22	8	18	192
200	**130**	440	340	295	22	8	20	252
250	**130**	509	395	350	22	12	20	304
300	**130**	559	445	400	22	12	22	354
350	**200**	619	505	460	22	16	24	412
400	**200**	700	565	515	26	16	25	470
450	**200**	760	615	565	26	20	30	520
500	**200**	810	670	620	26	20	30	570
600	**200**	930	780	725	30	20	30	675
700	***250**	1045	895	840	30	24	35	780
800	**250**	1175	1015	950	33	24	40	887
900	**300**	1285	1115	1050	33	28	40	987
1000	**300**	1400	1230	1160	36	28	40	1087

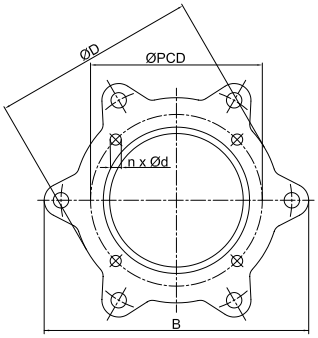
* Building length 260 mm



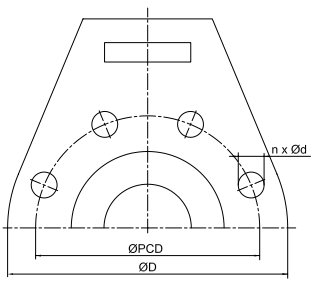
DN 20 - 200



DN 250 - 900



DN 1000



DN 50 - 1000 (Design F)

WILLBRANDT **Chemical Expansion Joint Type 50 PTFE**

■ not in stock

DN 25 - DN 500

Type 50 PTFE is a low corrugated rubber expansion joint lined with PTFE. Its low corrugation minimises flow resistance. The PTFE lining gives the expansion joint good anti-adhesive properties and is chemically resistant.

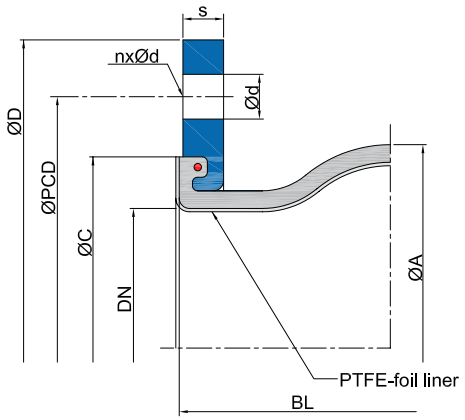
The PTFE lining can be used with any Type 50 rubber compound. However, it is important to ensure that the selected rubber compound achieves the highest possible resistance to the medium, as this is the only way to achieve an optimum service life.

Dimensions for design A

DN*1	Length	Bellow		Flange PN 10*3						Movement absorption				Weight
	BL	ØA	WF*2	ØD	ØLK	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	kg
25	**130**	81	1700	115	85	14	4	14	66	15	15	15	15	1.9
32	**130**	81	1700	140	100	18	4	15	66	15	15	15	15	3.1
40	**130**	86	1800	150	110	18	4	15	74	15	15	15	15	3.5
50	**130**	96	3200	165	125	18	4	16	86	15	15	15	15	3.8
65	**130**	111	5300	185	145	18	8	16	106	15	15	15	15	5.4
80	**130**	122	8500	200	160	18	8	18	118	15	15	15	15	6.9
100	**130**	142	12800	220	180	18	8	18	138	15	15	15	10	8.0
125	**130**	168	18700	250	210	18	8	18	166	15	15	15	10	9.7
150	**130**	192	25900	285	240	22	8	20	192	15	15	15	10	13.1
200	**130**	252	41000	340	295	22	8	20	252	15	15	15	6	16.4
250	**130**	302	59600	395	350	22	12	20	304	15	15	15	6	21.7
300	**130**	354	82200	445	400	22	12	20	354	15	15	15	6	24.8
350	**200**	420	117600	505	460	22	16	24	412	15	15	15	4	38.8
400	**200**	480	154700	565	515	26	16	25	470	15	15	15	4	38.6
450	**200**	530	204200	615	565	26	20	28	520	15	15	15	4	49.3
500	**200**	580	227900	670	620	26	20	30	570	15	15	15	4	57.2
600	**200**	680	311500	780	725	30	20	30	675	17	20	15	4	76.0
*4**700**	**250**	800	434200	895	840	30	24	35	780	20	15	15	3	129.0

*1 For larger nominal diameters, feasibility must be checked
*2 WF = effective area
*3 Other standards/dimensions possible.
*4 Building length 260 mm

Pressure resistance	Max. 6 bar operating pressure with polyamide cord reinforcement, max. 9 bar operating pressure with aramid or steel cord reinforcement.
Conformity	FDA and EG 1935/2004
Vacuum resistance	Only limited suitable for vacuum operation. A PTFE vacuum supporting ring, which allows full vacuum for small nominal diameters, can be used from DN 50. The PTFE supporting ring can only be used up to 50 °C. DN 25, DN 32, DN 40 and DN 350 expansion joints are not suitable for vacuum operation.



Important information

The bellows must not be painted or insulated at media temperatures >50 °C.
Please also note the planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 51**

■ partly in stock

DN 32 - 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 on the following pages).

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), FDA, EG 1935/2004 conform
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	Operating data depend on the nominal diameter and the total length.					
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						

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 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

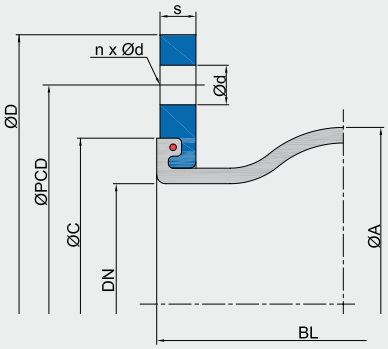
For aggressive media, please have the material resistance checked by our engineers. The bellows must not be painted or insulated at media temperatures >50 °C. Please also note the planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 51**

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**	116	5300	185	145	18	8	15	104	10	20	15	20	5.4
80	**130**	**150 / 160**	128	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

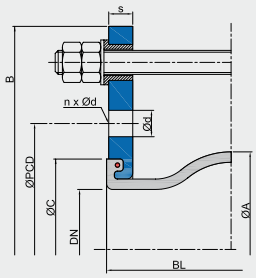
Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please refer to our planning instructions. Regarding the bracing, please refer to the technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 51**

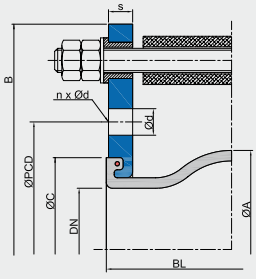
Length limiters

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

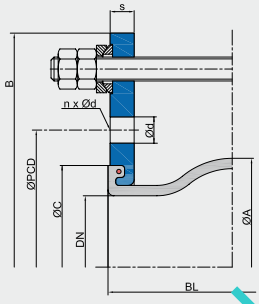
Design B*
Tie rods, mounted in rubber bushing



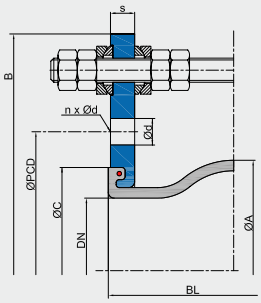
Design C*
Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



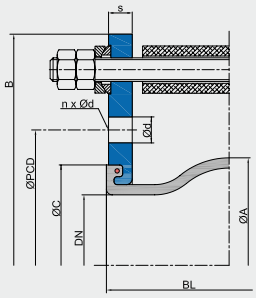
Design E
Tie rods, outside with spherical washers/conical sockets



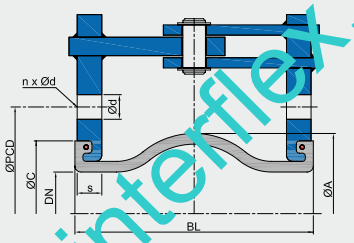
Design M
Tie rods, inside and outside with spherical washers/conical sockets



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



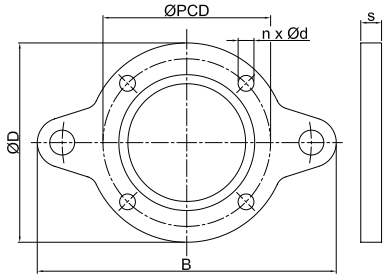
Design F
Hinge



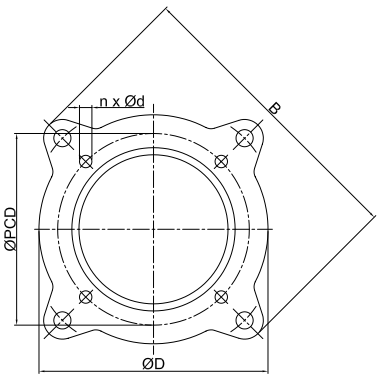
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

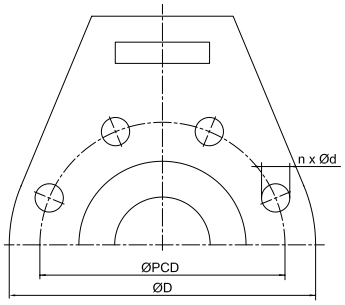
DN	Flange PN 10 (example dimensions)						
	B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm		mm	mm
32	230	140	100	18	4	15	79
40	240	150	110	18	4	15	79
50	255	165	125	18	4	16	88
65	275	185	145	18	8	16	104
80	290	200	160	18	8	18	119
100	310	220	180	18	8	18	142
125	340	250	210	18	8	18	169
150	375	285	240	23	8	18	195
200	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)

WILLBRANDT **Rubber Expansion Joint Type 52**

partly in stock

DN 32 - DN 600

Type 52 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 variety of lengths. Type 52 is produced in various rubber qualities, so that a suitable rubber compound is available for almost every application (see material descriptions on the following pages).

Type 52 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 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. 16 bar, depending on nominal diameter and total length
Approvals/Conformity	CE (A2), FDA, BfR EG 1935/2004 conform

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			Max. temperature °C	Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforcement	Cover (outer)		°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	90										
yellow	■	NBR	Polyamide	CR	90										
green	■	CSM	Polyamide	CR	90	Operating data depend on the nominal diameter and the total length.									
white	□	NBR light	Polyamide	CR	90										
white-orange	□■	EPDM light	Polyamide	CR	90										
red-red	■■	EPDM	Aramid	EPDM	130										
white-blue	□■	NBR light	Aramid	CR	120										
white-white-orange	□□■	EPDM light	Aramid	CR	130										

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 planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 52**

Application

Type 52 red
For hot water, sea water, cooling water with 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 52 yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied).

Type 52 green
For chemicals, aggressive chemical waste water and compressor air containing oil.

Type 52 white (NBR)
Like type 52 yellow, but with light-coloured internal rubber in food-grade (FDA, BfR and EG 1935/2004 conform). Not approved for drinking water.

Type 52 white-orange (EPDM)
Like type 52 red, but with light-coloured internal rubber in food-grade (FDA, BfR and EG 1935/2004 conform). Not approved for drinking water.

Type 52 red-red
Like type 52 red, but with aramid fabric.

Type 52 white-blue (NBR)
Like type 52 white, but with aramid fabric.

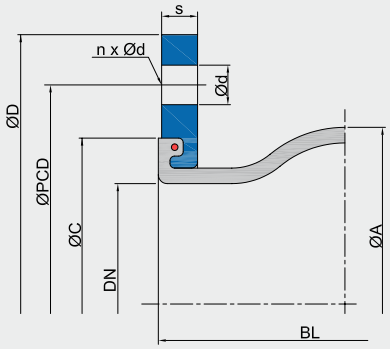
Type 52 white-white-orange (EPDM)
Like type 52 white-orange, but with aramid fabric.

WILLBRANDT **Rubber Expansion Joint Type 52**

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 ØA	Bellow WF*1	Flange PN 10*2 ØD	Flange PN 10*2 ØPCD	Flange PN 10*2 Ød	Flange PN 10*2 n	Flange PN 10*2 s	Flange PN 10*2 ØC	Movement absorption*3 axial +	Movement absorption*3 axial -	Movement absorption*3 lateral ±	Movement absorption*3 angular ±	Weight*4
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	kg
32	**130 / 150 / 160**	81	1800	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	3900	165	125	18	4	15	88	10	20	15	20	3.8
65	**130 / 150 / 160**	110	5100	185	145	18	8	15	104	10	20	15	20	5.4
80	**130 / 150 / 160 / 175**	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**	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	**150 / 165 / 175 / 200**	356	82200	445	400	23	12	22	351	15	20	15	10	25.2
350	**200**	420	117600	505	460	22	16	24	400	15	20	15	10	39.2
400	**200 / 250 / 300**	480	154700	565	515	26	16	25	450	15	20	15	8	43.0
450	**250**	530	204200	615	565	26	20	25	512	15	20	15	6	53.2
500	**250**	580	227900	670	620	26	20	30	563	15	20	15	4	60.0
600	**250**	680	311500	780	725	30	20	30	675	15	20	15	4	78.8

*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

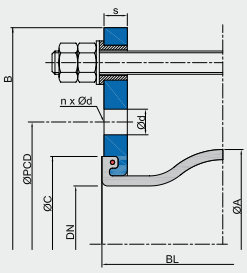
Please note the appropriate fixed point constructions and plain bearings in your piping system! For more information please refer to our planning instructions. Regarding the bracing, please refer to the technical appendix.

WILLBRANDT **Rubber Expansion Joint Type 52**

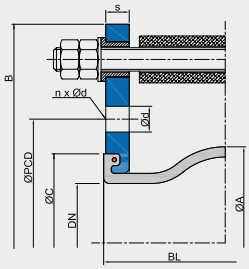
Length limiters

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

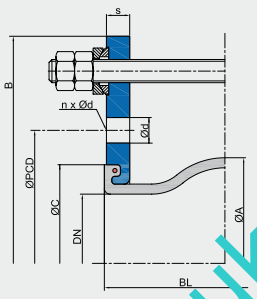
Design B*
Tie rods, mounted in rubber bushing



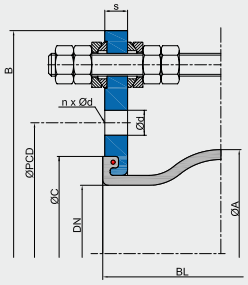
Design C*
Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



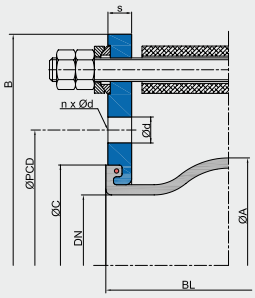
Design E
Tie rods, outside with spherical washers/conical sockets



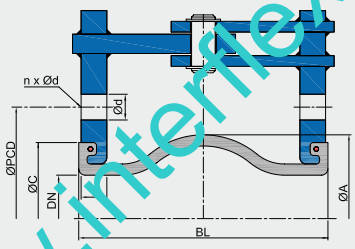
Design M
Tie rods, inside and outside with spherical washers/conical sockets



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



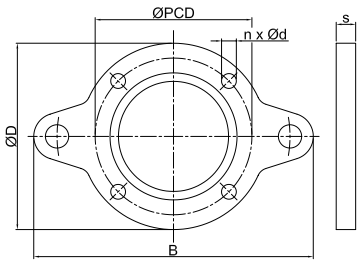
Design F
Hinge



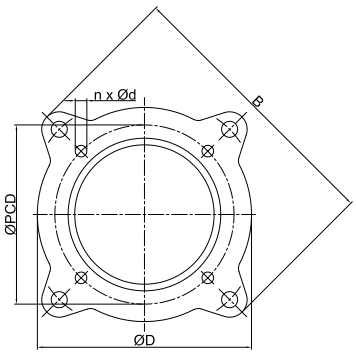
* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

Flange dimensions for designs with tie rods

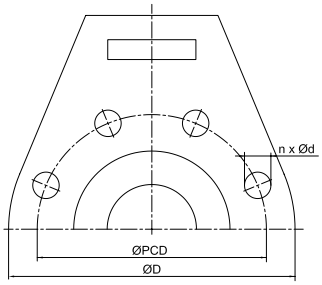
DN	Flange PN 10 (example dimensions)						
	B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm		mm	mm
32	230	140	100	18	4	15	79
40	240	150	110	18	4	15	79
50	255	165	125	18	4	16	88
65	275	185	145	18	8	16	104
80	290	200	160	18	8	18	119
100	310	220	180	18	8	18	142
125	340	250	210	18	8	18	169
150	375	285	240	23	8	18	195
200	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)

WILLBRANDT **Rubber Expansion Joint Type 52 PTFE**

■ not in stock

DN 32 - DN 300

Type 52 PTFE is a low corrugated rubber expansion joint lined with PTFE. Due to its low corrugation, the lowest possible flow resistance is achieved. The PTFE lining gives the expansion joint high chemical resistance and good non-stick properties.

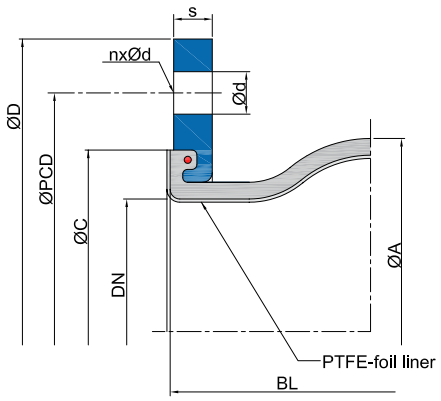
The PTFE lining can be used with any type 52 rubber compound. However, care must be taken to ensure that the selected rubber compound achieves the highest possible resistance to the medium, as this is the only way to achieve an optimum service life.

Dimensions

DN*1	Length	Bellow		Flange PN 10*3						Movement absorption			
	BL	ØA	WF*2	ØD	ØPCD	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ±
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°
32	**130**	81	2700	140	100	18	4	15	79	15	15	15	10
40	**130**	86	2700	150	110	18	4	15	79	15	15	15	10
50	**130**	96	3200	165	125	18	4	15	88	15	15	15	10
65	**130**	110	5300	185	145	18	8	15	104	15	15	15	10
80	**130**	122	8500	200	160	18	8	15	119	15	15	15	10
100	**130**	142	12800	220	180	18	8	15	142	15	15	15	10
125	**130**	170	18700	250	210	18	8	18	169	15	15	15	10
150	**130**	196	25900	285	240	23	8	18	195	15	15	15	10
200	**130**	256	40900	340	295	23	8	20	244	15	15	15	4
250	**130**	306	59900	395	350	23	12	20	295	15	15	15	4
300	**130**	356	82200	445	400	23	12	22	351	15	15	15	4

*1 Larger nominal diameters possible after technical inspection.
*2 WF = effective area
*3 Other standards/dimensions possible.

Pressure resistance	Max. 6 bar operating pressure with polyamide cord reinforcement, max. 9 bar operating pressure with aramid cord reinforcement
Conformity	FDA and EG 1935/2004
Vacuum resistance	Only limited suitable for vacuum operation. A PTFE vacuum supporting ring, which allows full vacuum for small nominal diameters, can be used from DN 50. The PTFE supporting ring can only be used up to 50 °C. DN 32 and DN 40 expansion joints are not suitable for vacuum operation.



Important information

The bellow must not be painted or insulated at media temperatures >50 °C.

WILLBRANDT **Rubber Expansion Joint Type 54**

■ mainly in stock

DN 25 to DN 100

Type 54 is a high corrugated rubber expansion joint for hydraulic systems. In combination with flanges according to SAE 3000 it is characterised by its large opening and large movement absorption. It is only available in an oil-resistable rubber compund.

Type 54 is almost exclusively used in the hydraulics and oil industries to absorb expansion and vibration, and to insulate sound.

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.
Pressure resistance	Max. 2 bar For higher pressures (max. 10 bar) please note our type 50 with SAE flanges.
Vacuum resistance	- DN 25 to 100 not vacuum-proof - With vacuum supporting spiral from DN 50 to DN 100 vacuum-proof - For nominal sizes DN 25 to DN 40, type 50 yellow must be used for a vacuum (overall length 130 mm).
Flange version	Both sides with swiveling flange made of galvanized steel, drilled according to SAE 3000.
Approvals	No approvals are available.
Accessories	- Vacuum supporting spiral/rings - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design			Permissible operating data			
Colour code	Colour marking	Core (inner)	Reinforcement	Cover (outer)	°C	bar	°C	bar
yellow		NBR	Polyamide	CR	-20	2	80	2

Application

Type 54 yellow NBR
Good resistance to heat and ageing, particularly in the absence of air (e.g. in oil). Excellent resistance to swelling (weak-polar and non-polar media, e.g. mineral oils, lubricating greases, animal and vegetable fats or oils). No resistance to esters, ketones, aromatic or chlorinated hydrocarbons or lead-free fuels.

Important information

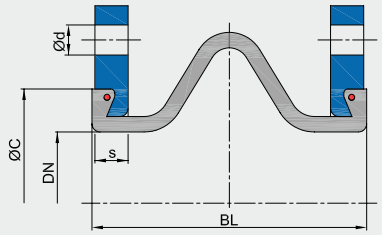
Only use DIN 7984 hexagon socket screws with a flat head to screw the expansion joints together.
The bellows must not be painted or insulated at media temperatures >50 °C.
Please also note the planning instructions.

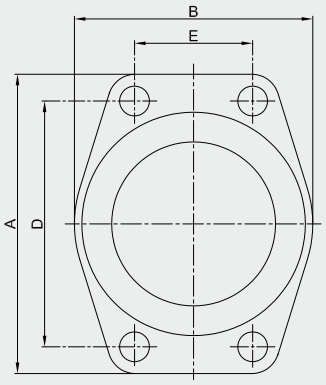
WILLBRANDT **Rubber Expansion Joint Type 54**

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 (see planning instructions in the appendix).





Dimensions for design A

DN	Length	Bellow		Flange SAE 3000							Movement absorption				Weight
	BL	Ødi	ØC	A	B	D	E	Ød	n	s	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	∠°	kg
25	**65**	25	43	70	59	52.4	26.2	11	4	11	5	5	5	7.5	0.4
32	**65**	32	50	81	73	58.7	30.2	13	4	11	5	5	5	7.5	0.5
40	**100**	40	62	95	83	70.0	35.7	13	4	13	10	10	10	10.0	0.8
50	**100**	48	72	103	97	77.8	42.9	13	4	13	10	10	10	10.0	1.0
65	**100**	63	87	115	109	89.0	50.8	13	4	14	10	10	10	10.0	1.2
80	**100**	80	104	136	131	106.4	63.0	17	4	14	10	10	10	10.0	1.8
90	**100**	80	104	152	140	120.6	70.0	17	4	14	10	10	10	10.0	1.9
100	**100**	100	130	162	152	130.2	77.8	17	4	16	10	10	10	10.0	2.5

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system! Information on this can be found in our planning instructions. For fastening the expansion joints, please use only flat-head hexagon socket screws DIN 7984.

WILLBRANDT **Rubber Expansion Joint Type 55**

■ mainly in stock

DN 20 to DN 1000

Type 55 is a low corrugated, highly elastic rubber expansion joint that achieves minimal flow resistance due to its flat corrugation. It reduces structure-borne noise to a high degree and is characterised by its high movement absorption in all directions. 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 55 is used in building technology, plant engineering, water and wastewater technology, engine construction, shipbuilding and solar and wind energy plant construction. Here it is used specifically to absorb movement 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 swiveling flanges.	**Vacuum resistance**	- DN 20 to 50 vacuum-proof - DN 65 to 250 up to -200 mbar - DN 300 to 1000 not vacuum-proof With vacuum supporting spiral/ring from DN 65 to DN 1000 vacuum-proof
Flange version	Both sides with swiveling flange made of galvanized steel, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.	**Accessories**	- Tie rods - Vacuum supporting spiral/rings - Guide sleeves - PTFE lining (see type 55 PTFE on page 66) - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.
Approvals/Conformity	CE, drinking water approval, shipbuilding approvals, TÜV tested in accordance with DIN 4809 (detailed overview on page 5)		

Specifications for DN 20 - DN 400

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
red Sp	■■	EPDM	PEEK	EPDM	-40	10	70	16	100	10	130	8	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	-40	10	50	16	70	12	100	10	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	-20	10	50	16	70	12	90	10	100	conductive	conductive
green	■	CSM	Polyamide	CSM	-20	10	50	16	70	12	100	10	110	insulating	insulating
yellow St	■■	NBR	Steel cord	CR	-20	10	60	16	70	12	90	10	100	conductive	insulating

Bursting pressure for DN 20 - 400: > 48 bar
DN 300 max. 10 bar working pressure / Bursting pressure >30 bar

Specifications for DN 450 - DN 1000

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
red Sp	■■	EPDM	PEEK	EPDM	-40	8	70	10	100	7.5	130	6	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	-40	8	50	10	70	8.0	100	6	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	-20	8	50	10	70	8.0	90	6	100	conductive	conductive
green	■	CSM	Polyamide	CSM	-20	8	50	10	70	8.0	100	6	110	insulating	insulating

Bursting pressure for DN 450 - 1000: > 30 bar
DN 450 only available in red or yellow.

WILLBRANDT **Rubber Expansion Joint Type 55**

Application

Type 55 red Sp
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 55 red
For drinking water, hot water, sea water, cooling water with glycol or other chemical additives for treating water, weak acids and weak alkalis, salt solutions, technical alcohols, esters and ketones. Electrically dissipative surface. Not suitable for oil products or cooling water with additives containing oil.

Type 55 yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied) and DIN EN fuels with an aromatic content up to 50 %. Electrically conductive surface.

Type 55 green
For chemicals, aggressive chemical waste water and compressor air containing oil. Electrically insulating surface.

Type 55 yellow St
Like type 55 yellow with additional flame-resistance for up to 30 minutes at 800 °C. Electrically conductive inner surface and electrically insulating outer surface.

Important information

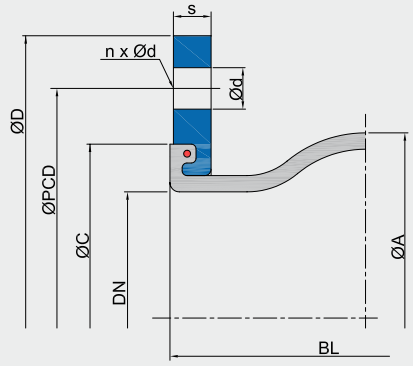
For aggressive media, please have the material resistance checked by our engineers.
The bellows must not be painted or insulated at media temperatures >50 °C.
Please also note the planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 55**

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.

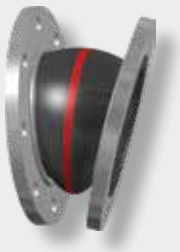
The expansion joint's reaction force must be absorbed through appropriate pipeline guidance (see planning instructions in the appendix).




axial -


axial +


lateral ±


angular ±

Dimensions for design A

DN	Length	Bellow		Flansch PN 10*2						Movement absorption*3 (Polyamide cord)				Movement absorption*3 (Steel cord)				Weight*4
	BL	ØA	WF*1	ØD	ØPCD	Ød	n	s	ØC	axial +	axial -	lateral ±	angular ±	axial +	axial -	lateral ±	angular ±	
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	∠°	mm	mm	mm	∠°	kg
*5**20**	*6**125**	81	1700	105	75	M12	4	14	66	35	25	30	30	15	30	15	20	1.6
25	*6**125**	81	1700	115	85	14	4	14	66	35	25	30	30	15	30	15	20	1.8
32	*6**125**	81	1700	140	100	18	4	15	66	35	25	30	30	15	30	15	20	2.9
40	*6**125**	86	1800	150	110	18	4	15	74	35	25	30	30	15	30	15	20	3.4
50	*6**125**/*7**150**	96	3200	165	125	18	4	16	86	35/30	25/35	30	30/15	15	30	15	20	4.5
65	*6**125**/*7**150**	111	5300	185	145	18	8	16	106	35/30	25/35	30	30/15	15	30	15	20	5.2
80	**150**	122	8500	200	160	18	8	18	118	30	35	30	30	20	35	15	15	6.7
100	**150**	142	12800	220	180	18	8	18	138	30	35	30	20	20	35	15	15	7.7
125	**150**	168	18700	250	210	18	8	18	166	30	35	30	20	20	35	15	15	9.4
150	**150**	192	25900	285	240	22	8	18	192	30	35	30	20	20	35	15	15	11.7
200	**150**/*7**175**	252	41000	340	295	22	8	20	252	30/35	15	30/15	15/5	20	25	15	15	16.2
250	**175**	302	59600	395	350	22	12	20	304	35	15	15	5	20	25	15	15	22.8
300	**200**	354	82200	445	400	22	12	22	354	35	40	30	10	30	30	25	10	27.7
350	**200**	420	117600	505	460	22	16	24	412	35	40	30	8	30	30	25	10	40.0
400	**200**	480	154700	565	515	26	16	25	470	35	40	30	8	30	40	25	15	45.6
450	**250**	530	204200	615	565	26	20	25	520	35	40	35	10	-	-	-	-	57.9
*8**500**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
*8**600**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
700	*9**275**	800	434200	895	840	30	24	35	780	15	55	30	5	-	-	-	-	121.8
800	**250**	880	527400	1015	950	33	24	40	887	35	40	35	5	-	-	-	-	159.7
900	**300**	1038	737900	1115	1050	33	28	40	987	40	40	40	5	-	-	-	-	197.0
1000	**300**	1138	889400	1230	1160	36	28	40	1087	40	40	40	5	-	-	-	-	237.0

*1 WF = effective area
*2 Other standards/dimensions possible.
*3 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).
*4 Approx. weights with reinforcement from polyamide cord, with steel cord approx. + 3 - 7 %.
*5 Flange with threaded holes.
*6 Building length 130 mm
*7 BL 150: only in red (IIR) or yellow (NBR) available.
*8 See type 39 and type 52
*9 Building length 260 mm

Important information

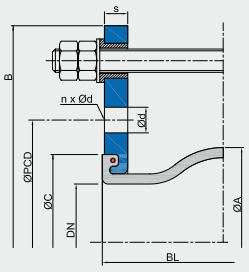
Please note the appropriate fixed point constructions and plain bearings in your piping system! Information on this can be found in our planning instructions. Regarding the bracing, please refer to the information in the technical appendix (page 99 - 102).

WILLBRANDT **Rubber Expansion Joint Type 55**

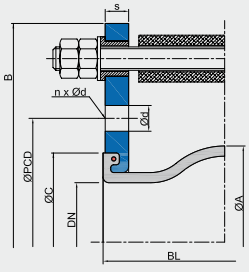
Bracings

A selection of different bracings are available to absorb the reaction force and to protect the bellows from overstretching or excessive compression (detailed description on page 99 - 102).

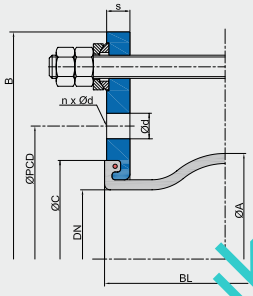
Design B*
Tie rods, mounted in rubber bushing



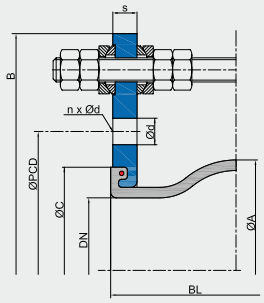
Design C*
Tie rods, mounted in rubber bushing, inside with thrust limiter (plastic bushing)



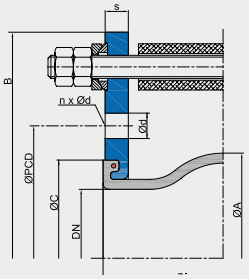
Design E
Tie rods, outside with spherical washers/conical sockets



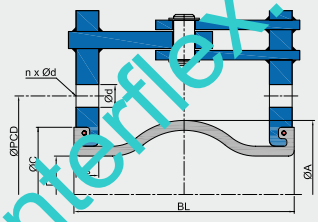
Design M
Tie rods, inside and outside with spherical washers/conical sockets



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



Design F
Hinge

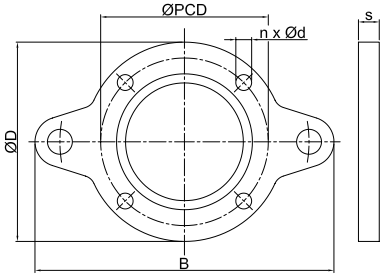


* Note: Design B and C only up to DN 200 PN 10. The lateral movement absorption is reduced by around 50 %.

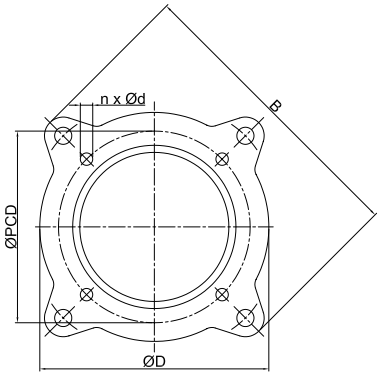
Flange dimensions for designs with tie rods

DN	Length BL	Flange PN 10 (example dimensions) B	ØD	ØPCD	Ød	n	s	ØC
	mm	mm	mm	mm	mm		mm	mm
20	*1**125**	189	105	75	M12	4	14	66
25	*1**125**	205	115	85	14	4	14	66
32	*1**125**	230	140	100	18	4	15	66
40	*1**125**	240	150	110	18	4	15	74
50	*1**125/150**	255	165	125	18	4	16	86
65	*1**125/150**	275	185	145	18	8	16	106
80	**150**	290	200	160	18	8	18	118
100	**150**	310	220	180	18	8	18	138
125	**150**	340	250	210	18	8	18	166
150	**150**	375	285	240	22	8	18	192
200	**175/150**	440	340	295	22	8	20	252
250	**175**	509	395	350	22	12	20	304
300	**200**	559	445	400	22	12	22	354
350	**200**	619	505	460	22	16	24	412
400	**200**	700	565	515	26	16	25	470
450	**250**	760	615	565	26	20	30	520
700	*2**275**	1045	895	840	30	24	35	780
800	**250**	1175	1015	950	33	24	40	887
900	**300**	1285	1115	1050	33	28	40	987
1000	**300**	1400	1230	1160	36	28	40	1087

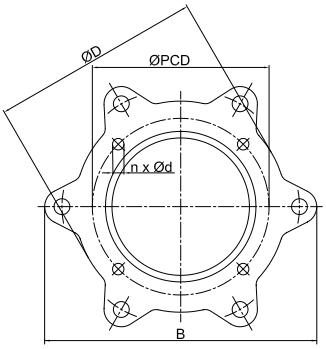
*1 Building length 130 mm
*2 Building length 260 mm



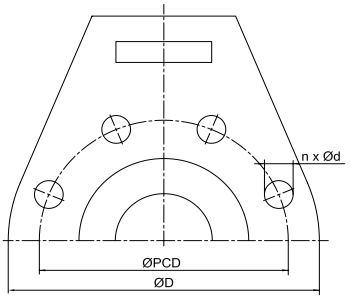
DN 20 - 200



DN 250 - 900



DN 1000

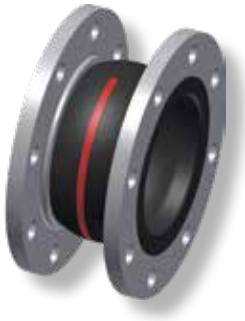


DN 50 - 1000 (Design F)

WILLBRANDT **Rubber Expansion Joint Type 55 SO for Shock Design**

DN 20 to DN 300

■ mainly in stock



The type 55 SO is a low corrugated, highly elastic rubber expansion joint. Its flat corrugated shape minimises flow resistance. It has been specially designed for the shipbuilding industry and is characterised by its high shock expansion absorption.

The type 55 SO is primarily used in naval shipbuilding, where it is used to absorb movement and vibrations and to dampen noise, while at the same time protecting the connected units in the event of a shock.

Bellow design
Low 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, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.

Approvals/Conformity
CE, drinking water approval, shipbuilding approvals, TÜV tested in accordance with DIN 4809 (detailed overview on page 5)

Vacuum resistance
- DN 20 to 50 vakuum-proof
- DN 65 to 250 up to -200 mbar
- DN 300 to 1000 not vacuum-proof
- With vacuum supporting spiral/ring from DN 65 to 1000 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 cover / sun protection cover

Further information on page 99 - 105.

Specifications

Bellow		Bellow design			Permissible operating data									Surface resistance Ro	
Colour code	Colour marking	SCore (inner)	Rein-forcement	Cover (outer)	°C	bar	°C	bar	°C	bar	°C	bar	Short-term °C	Core	Cover
red Sp	■■	EPDM	PEEK	EPDM	-40	10	70	16	100	10	130	8	150	dissipative	dissipative
red	■	IIR	Polyamide	EPDM	-40	10	50	16	70	12	100	10	120	dissipative	dissipative
yellow	■	NBR	Polyamide	CR	-20	10	50	16	70	12	90	10	100	conductive	conductive

Bursting pressure for DN 20 - DN 300: > 48 bar
DN 250 and DN 300 max. 10 bar operating pressure / bursting pressure 30 bar

Application

Type 55 SO red Sp
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 55 SO red
For drinking water, hot water, sea water, cooling water with glycol or other chemical additives for water treatment, weak acids, alkalis, salt solutions, technical alcohols, esters and ketones. Electrically dissipative surface. Not suitable for oil products or cooling water with additives containing oil.

Type 55 SO yellow
For oils, lubricants, fuels, gases, city and natural gas (not liquefied) and DIN EN fuels with an aromatic content up to 50 %. Electrically conductive surface.

Important information

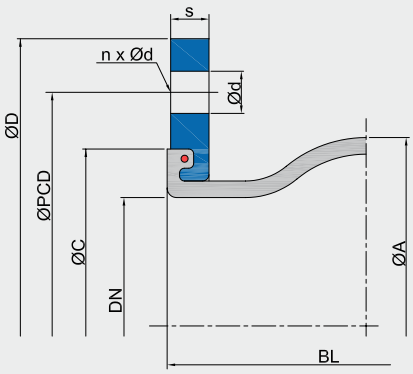
For aggressive media, please have the material resistance checked by our engineers. The bellows must not be painted or insulated at media temperatures >50 °C. Please also note the planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 55 SO for Shock Design**

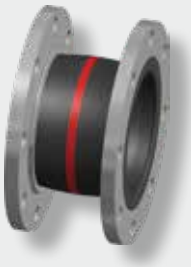
Design A - without tie rods

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 (see planning instructions in the appendix).

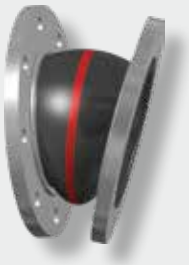


axial -



axial +

lateral ±



angular ±

Dimensions

DN	Length BL	Bellow ØA	Bellow WF*1	ØD	ØPCD	Flange Ød	Flange f	s	ØC	Movement absorption*3 axial +	axial -	lateral ±	angular ±	Weight*4
	mm	mm	mm²	mm	mm	mm	mm	mm	mm	mm	mm	mm	∠°	kg
20	**160**	81	1700	105	75	M12	4	14	66	35	30	35	15	1.6
25	**160**	81	1700	115	85	14	4	14	66	35	30	35	15	1.8
32	**160**	81	1700	140	100	18	4	15	66	35	30	35	15	2.9
40	**160**	86	1800	150	110	18	4	15	74	35	30	35	15	3.5
50	**160**	96	3200	165	125	18	4	16	86	35	30	35	15	4.5
65	**160**	111	5300	185	145	18	8	16	106	35	30	35	15	5.3
80	**160**	122	8500	200	160	18	8	18	118	35	30	35	15	6.7
100	**160**	142	12800	220	180	18	8	18	138	35	30	35	15	7.7
125	**160**	168	18700	250	210	18	8	18	166	35	30	35	15	9.4
150	**160**	192	25900	285	240	22	8	18	192	35	30	35	15	11.9
200	**160**	252	41000	340	295	22	8	20	252	35	30	35	15	16.2
250	**200**	302	59600	395	350	22	12	20	304	35	40	30	10	22.6
300	**200**	354	82200	445	400	22	12	22	354	35	40	30	10	27.7

Shock absorption in any direction ±50 mm

*1 WF = effective area
*2 Other standards/dimensions possible.
*3 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).
*4 Approx. weights with reinforcement from polyamide cord.

Important information

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

WILLBRANDT **Rubber Expansion Joint Type 55 PTFE**

■ not in stock

DN 25 to DN 700

Type 55 PTFE is a low corrugated rubber expansion joint lined with PTFE. Its low corrugation minimises flow resistance. The PTFE lining gives the expansion joint good anti-adhesive properties and is chemically resistant.

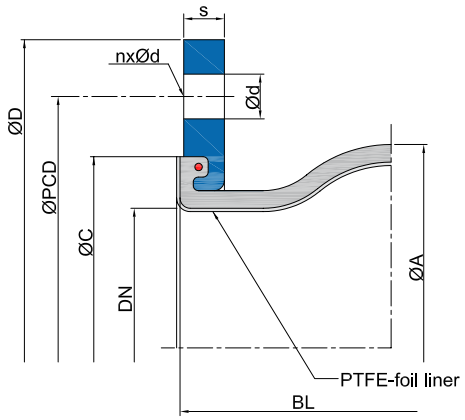
The PTFE lining can be used with any type 55 rubber compound. However, it is important to ensure that the selected rubber compound achieves the highest possible resistance to the medium, as this is the only way to achieve an optimum service life.

Dimensions for design A

DN*1	Overall length BL	Bellow ØA	Bellow WF*2	Flange PN 10*3 ØD	ØPCD	Ød	n	s	ØC	Movement absorption axial +	axial -	lateral ±	angular ±
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	mm	
25	*4**125**	81	1700	115	85	14	4	14	65	15	15	15	15.0
32	*4**125**	81	1700	140	100	18	4	15	65	15	15	15	15.0
40	*4**125**	86	1800	150	110	18	4	15	74	15	15	15	15.0
50	*4**125**	96	3200	165	125	18	4	16	86	15	15	15	15.0
65	*4**125**	111	5300	185	145	18	8	16	105	15	15	15	15.0
80	**150**	122	8500	200	160	18	8	18	118	15	15	15	15.0
100	**150**	142	12800	220	180	18	8	18	137	15	15	15	10.0
125	**150**	168	18700	250	210	18	8	18	166	15	15	15	10.0
150	**150**	192	25900	285	240	22	8	20	192	15	15	15	10.0
200	**175**	252	41000	340	295	22	8	20	252	15	15	15	6.0
250	**175**	302	59600	395	350	22	12	20	304	15	15	15	6.0
300	**200**	354	82200	445	400	22	12	20	354	15	15	15	6.0
350	**200**	420	117600	505	460	22	16	24	412	15	15	15	4.0
400	**200**	480	154700	565	515	26	16	25	470	15	15	15	4.0
450	**250**	530	204200	615	565	26	20	25	520	15	15	15	4.0
*5**500**	-	-	-	-	-	-	-	-	-	-	-	-	-
*5**600**	-	-	-	-	-	-	-	-	-	-	-	-	-
700	*6**275**	800	434200	895	840	30	24	35	780	15	15	15	4.0

*1 For larger nominal diameters, feasibility must be checked.
*2 WF = effective area
*3 Other standards/dimensions possible.
*4 Building length 130 mm
*5 See type 39 and type 52
*6 Building length 260 mm

Pressure resistance	Max. 6 bar operating pressure with polyamide cord reinforcement, max. 9 bar operating pressure with aramid or steel cord reinforcement.
Conformity	FDA and EG 1935/2004
Vacuum resistance	Only limited suitable for vacuum operation. A PTFE vacuum supporting ring, which allows full vacuum for small nominal diameters, can be used from DN 50. The PTFE supporting ring can only be used up to 50 °C. DN 25, DN 32, DN 40 and DN 350 expansion joints are not suitable for vacuum operation.



Important information

The bellows must not be painted or insulated at media temperatures >50 °C.
Please also note the planning instructions.

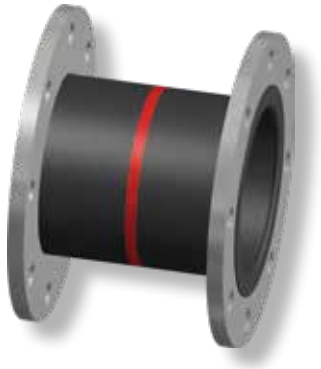
WILLBRANDT **Rubber Expansion Joint Type 56**

■ not in stock

DN 50 to DN 1000

Type 56 is a cylindrical rubber expansion joint that achieves very low flow resistance because of its uncorrugated bellow geometry. It is suitable for conveying media that contain solids, even at high flow rates. It is also characterised by its flexible installation length and variety of rubber qualities, which means that a suitable rubber compound is available for every application (see material descriptions on the following pages). Depending on its design, it may only be able to absorb minimal axial movement!

Type 56 is used in plant engineering, water technology and waste water technology absorb lateral movement and vibration and to insulate sound.



Bellow design
Smooth cylindrical 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, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.

Vacuum resistance
Vaccum-proof only for short installation lengths, longer versions should be fitted with a vulcanised vacuum supporting spiral.

Approvals/Conformity
FDA and EG 1935/2004 conform CE and drinking water approvals available on request.

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

Further information on page 99 - 105.

Specifications

Bellow		Bellow design*				Permissible operating data									
Colour code	Colour marking*	Core (inner)	Reinforce-ment	Cover (outer)	max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	100										
yellow	■	NBR	Polyamide	NBR	90										
green	■	CSM	Polyamide	CSM	100										
grey	■	CR	Polyamide	CR	90	Expansion joints will designed according to your operating parameters.									
red-white	■□	EPDM light	Polyamide	EPDM	100										
yellow-white	■□	NBR light	Polyamide	NBR	90										
lilac	■	FPM	Aramid	FPM	200										
Silicone		Silicone	Aramid	Silicone	200										

* Other rubber compounds/reinforcements on request.

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 56**

Application

Type 56 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 56 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 56 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 56 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 56 red-white (EPDM light)
Like type 56 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 56 yellow-white (NBR light)
Like type 56 yellow, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

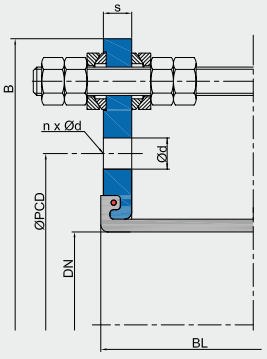
Type 56 lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. [illegible] temperatures of up to +180 °C.

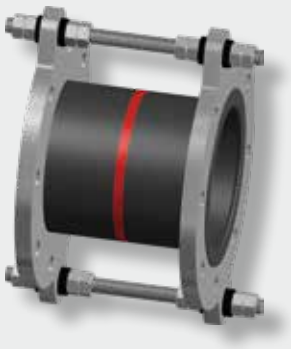
Type 56 silicone (silicone)
Suitable for h[illegible]acetic acid. Satisfactory resistance to aliphatic engine and ge[illegible]oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuels.

Design M - with tie rods/shear limiters

To accommodate the reaction force of the expansion joint in compression while simultaneously allowing for lateral movement.

The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement. Can be used for vibration insulation and absorbing lateral movement.



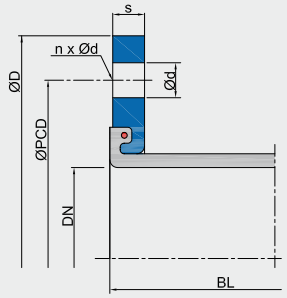


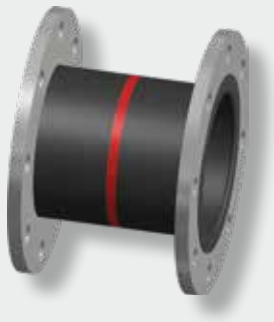
WILLBRANDT **Rubber Expansion Joint Type 56**

Design A - without tie rods

Can be used to absorb compression and lateral movement, as well as to insulate vibration and sound.

Can only absorb minimal expansion.





Dimensions for design A

DN*1	Overall length BL*2	Bellow WF*3	Flange PN 10*4						Movement absorption			Weight*6
			B	ØD	ØPCD	Ød	n	s	axial +	axial -	lateral*5 ±	
	mm	mm²	mm	mm	mm	mm		mm	mm	mm	mm	kg
50	**150 - 1000**	1963	255	165	125	18	4	16	3	5	12	4.3
65	**150 - 1000**	3317	275	185	145	18	8	18	3	5	11	5.2
80	**150 - 1000**	5024	290	200	160	18	8	18	3	5	10	7.0
100	**150 - 1000**	7850	310	220	180	18	8	18	3	5	10	7.9
125	**150 - 1000**	12266	340	250	210	18	8	18	3	5	9	10.0
150	**150 - 1000**	17663	375	285	240	22	8	18	3	5	12	12.0
200	**200 - 1000**	31400	440	340	295	22	8	20	6	10	11	17.0
250	**200 - 1000**	49063	509	395	350	22	12	20	6	10	11	20.0
300	**200 - 1000**	70650	559	445	400	22	12	20	6	10	10	25.0
350	**200 - 1000**	96163	619	505	460	22	16	25	6	10	10	38.0
400	**200 - 1000**	125600	700	565	515	26	16	25	6	10	10	38.0
450	**200 - 1000**	158963	760	615	565	26	20	30	6	10	10	52.0
500	**200 - 1000**	196250	810	670	620	26	20	30	6	10	10	57.0
600	**200 - 1000**	282600	930	780	725	30	20	30	6	10	9	75.0
700	**200 - 1000**	384650	1045	895	840	30	24	35	6	10	9	128.0
800	**200 - 1000**	502400	1175	1025	950	33	24	40	6	10	9	161.0
900	**200 - 1000**	635850	1285	1115	1050	33	28	40	6	10	9	197.0
1000	**200 - 1000**	785000	1400	1230	1160	36	28	40	6	10	8	235.0

*1 Intermediate diameters for other standards (e.g. ANSI) are also possible.
*2 Overall lengths available from 150/200 mm to 1000 mm.
*3 WF = effective area
*4 Other standards/dimensions possible.
*5 The lateral movement absorption applies to short overall length.
The lateral movement absorption increases by 6 mm every 100 mm.
*6 For short overall lengths.

Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! For more information please refer to our planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 57**

■ not in stock

DN 50 to DN 300

Type 57 is a conical or eccentric rubber expansion joint whose corrugation-free bellow geometry achieves a very low flow resistance. It is suitable for the conveying of media containing solids, even at high flow velocities.

Furthermore, it is characterised by the wide variety of rubber qualities, so that a suitable rubber compound is available for every application (see material descriptions on the following pages). Due to the design, only minimal compression movements can be absorbed! A deviation in the overall length is possible in individual cases and after prior testing.

Type 57 is used in plant engineering and in water and wastewater technology. Here it is used specifically for lateral movement absorption, vibration absorption and noise damping.

Bellow design	Smooth conical/eccentric rubber bellow with reinforcement and moulded 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, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Vacuum resistance	Only vacuum-proof with a vulcanised vacuum supporting spiral.
Approvals/Conformity	FDA and EG 1935/2004 conform GL and drinking water approvals available on request.
Accessories	- Tie rods - Vacuum supporting spiral/rings (vulcanised) - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design*			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamid	EPDM	100										
yellow	■	NBR	Polyamid	NBR	90										
green	■	CSM	Polyamid	CSM	100										
grey	■	CR	Polyamid	CR	90	Expansion joints will designed according to your operating parameters.									
red-white	■□	EPDM light	Polyamid	EPDM	100										
yellow-white	■□	NBR light	Polyamid	NBR	90										
lilac	■	FPM	Aramid	FPM	200										
Silicone		Silicone	Aramid	Silicone	200										

* Other rubber compounds/reinforcements on request.

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 57**

Type 57 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 57 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 57 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 57 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 57 red-white (EPDM light)
Like type 57 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 57 yellow-white (NBR light)
Like type 57 yellow, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 57 lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. ...temperatures of up to +180 °C.

Type 57 silicone (silicone)
Suitable for h... acetic acid. Satisfactory resistance to aliphatic engine and ge... oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuels.

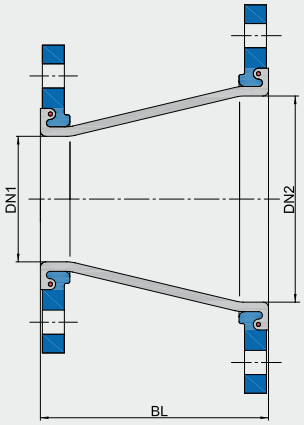
Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! For more information please refer to our planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 57**

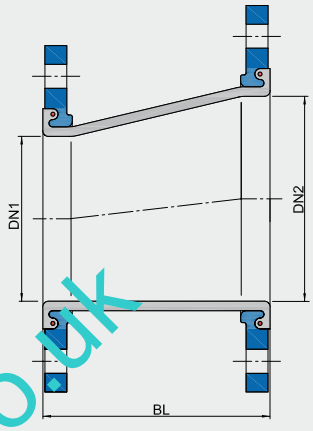
Design A - concentric, without tie rods

Can be used to absorb compression and lateral movement, as well as to insulate vibration and sound. Can only absorb minimal expansion.



Design A - eccentric, without tie rods

Can be used to absorb compression and lateral movement, as well as to insulate vibration and sound. Can only absorb minimal expansion.



Dimensions for design A Concentric/eccentric

DN1	DN2	Length BL	Bellow WF*	Movement absorption axial	lateral
		mm	mm²	- mm	± mm
50	**80**	**250**	5000	3	8
50	**100**	**250**	7900	3	8
65	**80**	**300**	5000	3	8
65	**100**	**300**	7900	3	8
80	**100**	**250**	7900	3	8
80	**125**	**250**	12300	3	7
100	**125**	**250**	12300	3	7
100	**150**	**250**	17700	3	7
100	**200**	**300**	31400	3	7
125	**150**	**250**	17700	3	7
125	**200**	**300**	31400	4	8
150	**200**	**300**	31400	4	8
150	**250**	**250**	49100	5	8
200	**250**	**250**	49100	4	8
200	**300**	**300**	70700	6	8
200	**350**	**300**	96200	9	12
250	**300**	**300**	70700	4	7
250	**350**	**300**	96200	6	9
300	**350**	**300**	96200	4	7
300	**400**	**400**	125600	7	9

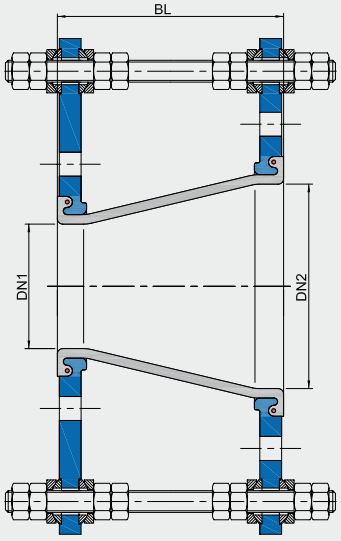
* WF = effective area

Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.
- Free choice of flange connection dimension (DIN, ASTM, JIS, etc.).
- Special overall lengths and nominal diameters are possible in individual cases.

Length limiters/Tie rods

It is advisable to use tie rods/shear limiters on these expansion joints (Design M - see illustration). The conical bellow is inflated by the rise in pressure, which shortens the expansion joint and applies high tensile force to the connections.

It is also available with tie rods only (design E).



WILLBRANDT **Rubber Expansion Joint Type 58**

■ not in stock

DN 50 to DN 3000

Type 58 is a cylindrical rubber expansion joint that achieves very low flow resistance because of its uncorrugated bellow geometry. It is suitable for conveying media that contain solids, even at high flow rates. It is also characterised by its flexible installation length and variety of rubber qualities, which means that a suitable rubber compound is available for every application (see material descriptions on the following pages). Its design means that it can only absorb minimal axial movement!

Type 58 is used in plant engineering, water technology and wastewater technology to absorb lateral movement and vibration and to insulate sound.

Bellow design	Smooth cylindrical rubber bellow with reinforcement and with solid rubber flange, self-sealing (no additional seals required). Suitable for backing flanges.
Flange version	Both sides with backing flange made of hot-dip galvanized steel, drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Vacuum resistance	Vaccum-proof only short overall lengths. Longer versions should be fitted with a vulcanised vaccuum supporting spir[illegible]
Approvals/Conformity	FDA and EG 1935/2004 conform CE and drinking water approvals available on request.
Accessories	- Tie rods - Vacuum supporting spiral/rings (vulcanised) - Guide sleeves - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design*			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamid	EPDM	100										
yellow	■	NBR	Polyamid	NBR	90										
green	■	CSM	Polyamid	CSM	100										
grey	■	CR	Polyamid	CR	90										
red-white	■□	EPDM light	Polyamid	EPDM	100										
yellow-white	■□	NBR light	Polyamid	NBR	90										
lilac	■	FPM	Aramid	FPM	200										
Silicone		Silicone	Aramid	Silicone	200										

Expansion joints will designed according to your operating parameters.

* Other rubber compounds/reinforcements on request.

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 58**

Application

Type 58 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 58 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 58 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 58 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 58 red-white (EPDM light)
Like type 58 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

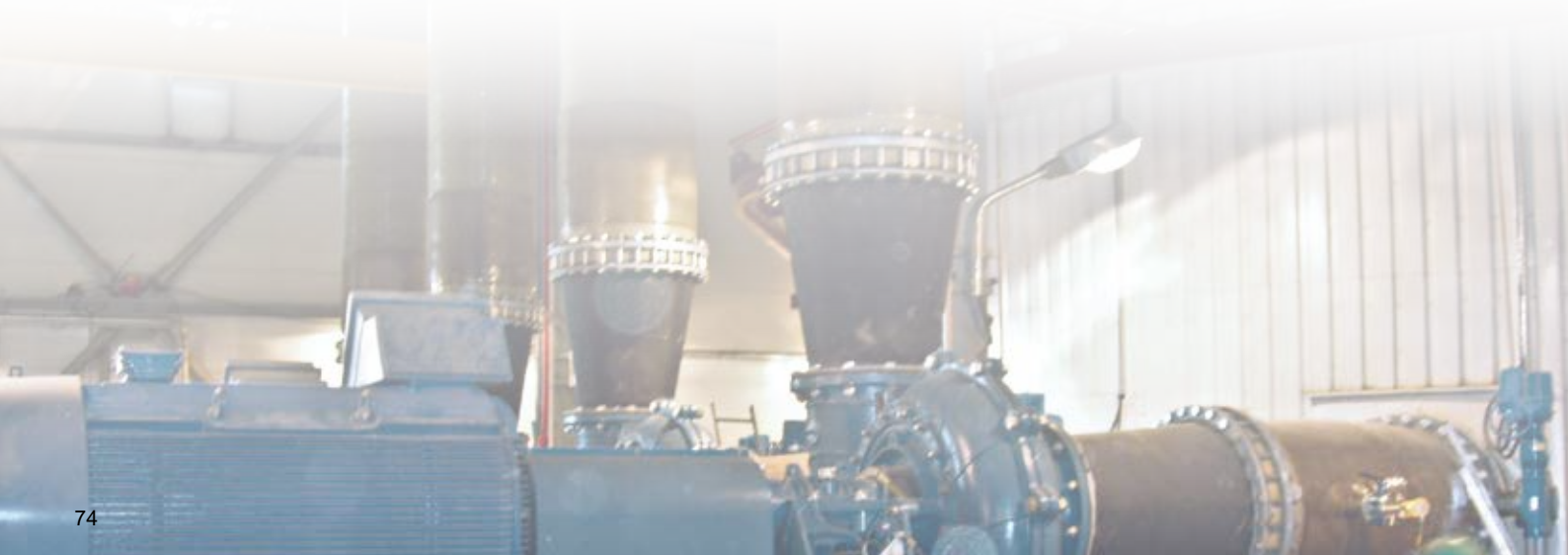
Type 58 yellow-white (NBR light)
Like type 58 yellow, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 58 lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. For temperatures of up to +180 °C.

Type 58 silicone (silicone)
Suitable for hot air, acetic acid. Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuel.

Important information

Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the distances as per the FSA Handbook (see the technical appendix on page 117)! For more information please refer to our planning instructions (page 107 - 117).

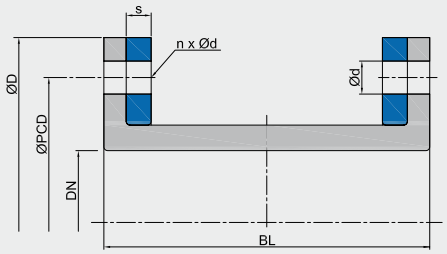


WILLBRANDT **Rubber Expansion Joint Type 58**

Design A - without tie rods

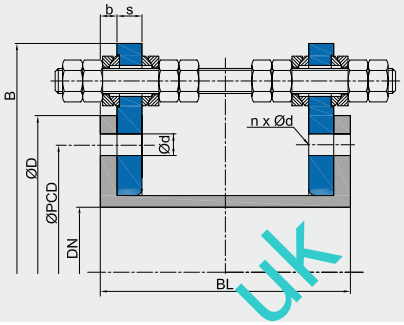
Can be used to absorb compression and lateral movement, as well as to absorb vibration and insulate sound.

Can only absorb minimal expansion.



Design M - with tie rods / shear limiters

To accommodate the reaction force of the expansion joint in compression while simultaneously allowing for lateral movement. The use of PTFE-coated spherical washers and conical sockets reduces the frictional force considerably during lateral movement. Can be used to absorb vibration and lateral movement.



Note: Can only absorb lateral movement!

Dimensions for design A / design M

DN	Overall length BL*1	Bellow b	Bellow WF*2	ØD	ØPCD	Flange PN 10*3 Ød	Flange PN 10*3 n	s	B	Movement absorption axial -	Movement absorption lateral*4 ±	Weight
	mm	mm	mm²	mm	mm	mm		mm	mm	mm	mm	kg
50	200 - 1000		1963	165	125	18	4		255	5	10	4
65	200 - 1000		3317	185	145	18	8		275	5	10	5
80	200 - 1000		5024	200	160	18	8		290	5	10	5
100	200 - 1000		7850	220	180	18	8		310	5	10	6
125	200 - 1000		12266	250	210	18	8		340	5	10	7
150	200 - 1000		17663	285	240	22	8		375	5	10	9
200	200 - 1000		31400	340	295	22	8		462	13	14	11
250	200 - 1000		49063	395	350	22	12		517	13	14	13
300	200 - 1000		70650	445	400	22	12		567	13	13	12
350	200 - 1000		96163	505	460	22	16		627	13	13	14
400	200 - 1000	Dependent on operating presre	125600	565	515	26	16	Dependent on operating presre	703	13	13	18
450	200 - 1000		158963	615	565	26	20		753	13	12	25
500	200 - 1000		196250	670	620	26	20		808	13	12	17
600	200 - 1000		282600	780	725	30	20		942	13	12	22
700	200 - 1000		384650	895	840	30	24		1057	13	11	29
800	200 - 1000		502400	1015	950	33	24		1117	15	13	81
900	200 - 1000		635850	1115	1050	33	28		1277	15	13	90
1000	200 - 1000		785000	1230	1160	36	28		1392	15	13	106
1100	200 - 1000		949850	1345	1270	36	32		1507	15	12	123
1200	200 - 1000	Dependent on operating pressure	1130400	1455	1380	39	32	Dependent on operating pressure	1617	15	12	139
1300	200 - 1000		1326650	1565	1485	42	32		1727	15	12	155
1400	200 - 1000		1538600	1675	1590	42	36		1837	15	12	172
1500	200 - 1000		1766250	1795	1705	48	36		1957	15	12	195
1600	200 - 1000		2009600	1915	1820	48	40		2100	15	11	222
1700	200 - 1000		2268650	2015	1920	48	44		2200	15	11	290
1800	200 - 1000		2543400	2115	2020	48	44		2300	15	11	306
1900	200 - 1000		2833850	2220	2125	48	48		2406	15	11	327
2000	200 - 1000		3140000	2325	2230	48	48		2511	15	11	350
2100	200 - 1000		3461850	2440	2335	56	48		2626	18	13	386
2200	200 - 1000		3799400	2550	2440	56	52		2736	18	13	416
2400	200 - 1000		4521600	2760	2650	56	56		2946	18	12	465
2500	200 - 1000		4906250	2860	2750	56	56		3046	18	12	485
2600	200 - 1000		5306600	2960	2850	56	60		3146	18	12	501
2800	200 - 1000		6154400	3180	3070	56	64		3366	18	12	572
3000	200 - 1000		7065000	3405	3290	62	68		3591	18	12	644

*1 Overall lengths available from 200 mm to 1000 mm.
*2 WF = effective area
*3 Other standards/dimensions possible.
*4 The lateral movement absorption applies to short installation lengths.
The lateral movement absorption increases by 6 mm every 100 mm.

Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.

WILLBRANDT **Rubber Expansion Joint Type 59**

■ not in stock

DN 350 to DN 1500

Type 59 is a conical or eccentric rubber expansion joint whose corrugation-free bellow geometry achieves a very low flow resistance. It is suitable for the conveying of media containing solids, even at high flow velocities. Furthermore, it is characterised by the wide variety of rubber qualities, so that a suitable rubber compound is available for every application (see material descriptions on the following pages). Due to the design, only minimal compression movements can be absorbed! A deviation in the overall length is possible in individual cases and after prior testing.

Type 59 is used in plant engineering and in water and wastewater technology. Here it is used specifically for lateral movement absorption, vibration absorption and noise damping.

Bellow design	Smooth conical or eccentric rubber bellow with reinforcement and both sides solid rubber flange or one side solid rubber flange (small side) and one side moulded sealing bead with core ring, self-sealing (no additional seals required). Suitable for backing flanges or swiveling flanges.
Flange version	On one side a galvanized steel backing flange, on the other, a swiveling galvanized steel flange,drilled according to DIN PN 10 (standard). Other materials and dimensions are possible.
Vacuum resistance	Only vacuum-proof with a vulcanised vacuum supporting spiral.
Approvals/Conformity	FDA and EG 1935/2004 conform CE and drinking water approvals available on request.
Accessories	- Tie rods - Vacuum supporting spiral/rings (vulcanised) - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design*				Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamid	EPDM	100										
yellow	■	NBR	Polyamid	NBR	90										
green	■	CSM	Polyamid	CSM	100										
grey	■	CR	Polyamid	CR	90										
red-white	■□	EPDM light	Polyamid	EPDM	100										
yellow-white	■□	NBR light	Polyamid	NBR	90										
lilac	■	FPM	Aramid	FPM	200										
Silicone		Silicone	Aramid	Silicone	200										

Expansion joints will designed according to your operating parameters.

* Other rubber compounds/reinforcements on request..

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 59**

Application

Type 59 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 59 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 59 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 59 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 59 red-white (EPDM light)
Like type 59 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 59 yellow-white (NBR light)
Like type 59 yellow, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 59 lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. For temperatures of up to +180 °C.

Type 59 silicone (silicone)
Suitable for h[illegible]etic acid. Satisfactory resistance to aliphatic engine and g[illegible]ils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuel.

Important information

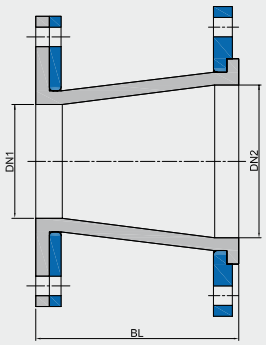
Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! You can find information on this in our planning instructions (page 107 - 117).

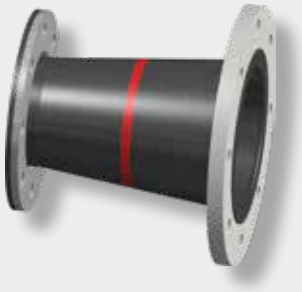
WILLBRANDT **Rubber Expansion Joint Type 59**

Design A - concentric, without tie rods

Can be used to absorb compression and lateral movement, as well as to absorb vibration and insulate sound.

Can only absorb minimal expansion.





Dimensions - design A, concentric

DN1	DN2	Length BL	Bellow WF*	Movement absorption axial -	Movement absorption lateral ±
		mm	mm²	mm	mm
350	400	300	125600	4	7
350	500	350	196250	10	12
400	500	400	196250	7	8
400	600	650	282600	13	13
500	600	340	282600	7	8
500	700	650	384650	13	13
500	800	900	502400	20	17
500	900	1150	635850	26	21
500	1000	1400	785000	33	25
500	1100	1650	949850	41	29
500	1200	1900	1130400	48	32
600	700	400	384650	8	8
600	800	650	502400	14	12
600	900	900	635850	21	16
600	1000	1150	785000	28	20
600	1100	1400	949850	35	24
600	1200	1650	1130400	42	28
700	800	400	502400	8	8
700	900	650	635850	15	12
700	1000	900	785000	21	16
700	1100	1150	949850	28	20
700	1200	1400	1130400	36	24
700	1300	1650	1326650	43	27
800	900	400	635850	8	7
800	1000	650	785000	15	12
800	1100	900	949850	22	16
800	1200	1150	1130400	29	20
800	1300	1400	1326650	37	23

DN1	DN2	Length BL	Bellow WF*	Movement absorption axial -	Movement absorption lateral ±
		mm	mm²	mm	mm
800	1400	1650	1538600	45	27
900	1000	400	785000	8	7
900	1100	650	949850	15	11
900	1200	900	1130400	23	15
900	1300	1150	1326650	30	19
900	1400	1400	1538600	38	23
900	1500	1650	1766250	46	27
1000	1100	400	949850	9	7
1000	1200	650	1130400	16	11
1000	1300	900	1326650	23	15
1000	1400	1150	1538600	31	19
1000	1500	1400	1766250	39	22
1000	1600	1650	2009600	47	26
1100	1200	400	1130400	9	7
1100	1300	650	1326650	16	11
1100	1400	900	1538600	24	15
1100	1500	1150	1766250	32	18
1100	1600	1400	2009600	40	22
1200	1300	400	1326650	9	7
1200	1400	650	1538600	17	11
1200	1500	900	1766250	25	14
1200	1600	1150	2009600	33	18
1300	1400	400	1538600	9	7
1300	1500	650	1766250	17	10
1300	1600	900	2009600	25	14
1400	1500	400	1766250	9	6
1400	1600	650	2009600	17	10
1500	1600	400	2009600	10	6

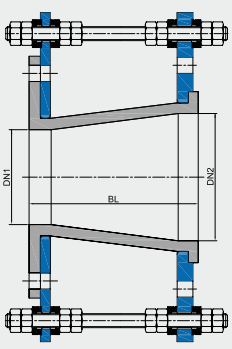
* WF = effective area

- Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.
- Other flange connection dimensions available on request.
- Special overall lengths and nominal diameter are possible in individual cases.

Length limiters / Tie rods

It is advisable to use tie rods / shear limiters on these expansion joints (Design M - see illustration). The conical bellow is inflated by the rise in pressure, which shortens the expansion joint and applies high tensile force to the connections.

It is also available with tie rods only (design E).

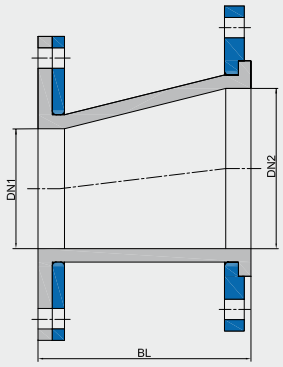


WILLBRANDT **Rubber Expansion Joint Type 59**

Design A - eccentric, without tie rods

Can be used to absorb compression and lateral movement, as well as to absorb vibration and insulate sound.

Can only absorb minimal expansion.



Dimensions - design A, eccentric

DN1	DN2	Length BL	Bellow WF*	Movement absorption axial -	Movement absorption lateral ±
		mm	mm²	mm	mm
350	400	350	1125600	5	8
350	500	650	196250	11	14
400	500	500	196250	8	11
400	600	750	282600	14	15
500	600	500	282600	8	10
500	700	750	384650	14	15
500	800	1050	502400	21	20
500	900	1300	635850	28	24
500	1000	1550	785000	35	28
500	1100	1850	949850	43	32
500	1200	2100	1130400	50	36
600	700	500	384650	9	1[illegible]
600	800	800	502400	15	1[illegible]
600	900	1050	635850	22	19
600	1000	1300	785000	29	23
600	1100	1600	949850	37	28
600	1200	1850	1130400	44	31
600	1300	2100	1326650	52	35
700	800	550	502400	9	10
700	900	800	635850	16	15
700	1000	1050	785000	23	19
700	1100	1350	949850	30	23
700	1200	1600	1130400	38	27
700	1300	1850	1326650	45	31
700	1400	2150	1538600	54	35
800	900	550	635850	10	10
800	1000	800	785000	16	14
800	1100	1100	949850	24	19

DN1	DN2	Length BL	Bellow WF*	Movement absorption axial -	Movement absorption lateral ±
		mm	mm²	mm	mm
800	1200	1350	1130400	31	23
800	1300	1600	1326650	38	27
800	1400	1900	1538600	47	31
800	1500	2150	1766250	55	35
900	1000	550	785000	10	10
900	1100	850	949850	17	15
900	1200	1100	1130400	25	19
900	1300	1150	1326650	32	22
900	1400	1650	1538600	40	27
900	1500	1900	1766250	48	31
900	1600	2150	2009600	57	34
1000	1100	600	949850	11	10
1000	1200	850	1130400	18	14
1100	1200	600	1130400	11	10
1100	1300	850	1326650	18	14
1100	1400	1150	1538600	27	19
1100	1500	1400	1766250	34	22
1100	1600	16500	2009600	42	26
1200	1300	600	1326650	11	10
1200	1400	900	1538600	19	15
1200	1500	1150	1766250	27	18
1200	1600	1400	2009600	35	22
1300	1400	650	1538600	12	11
1300	1500	900	1766250	20	14
1300	1600	1150	2009600	28	18
1400	1500	650	1766250	12	10
1400	1600	900	2009600	20	14
1500	1600	650	2009600	12	10

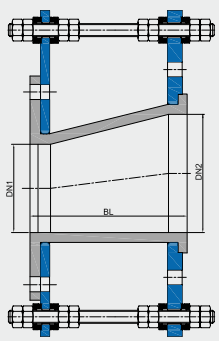
* WF = effective area

- Table values correspond to a bellows design with 6 bar operating pressure at 60 °C.
- Other flange connection dimensions available on request.
- Special overall lengths and nominal diameter are possible in individual cases.

Length limiters / Tie rods

It is advisable to use tie rods/shear limiters on these expansion joints (Design M - see illustration), as the conical bellow is inflated by the rise in pressure, which shortens the expansion joint and applies high tensile force to the connections.

It is also available with tie rods only (design E).



WILLBRANDT **Pipe Connector Type 60 WRG**

■ mainly in stock

DN 20 to DN 200

Type 60 is a uncorrugated solid rubber pipe connector with vulcanised steel flanges. The straight, corrugation-free passage achieves a very low flow resistance. Due to its design, it can only dampen slight surface vibrations and noise, but cannot be used as an expansion joint to absorb movement. It is only manufactured in one rubber quality (EPDM).

Type 60 is mainly used in building technology for noise and surface vibration damping on pumps, machines and apparatus. It can also be used for galvanic separation of pipework made of various materials in order to prevent damage to them.

Bellow design	Smooth, cylindrical rubber body with vulcanised flange rings and tear-off protection. The rubber-metal pipe connector is self-sealing (no additional seals required).	**Flange version**	Vulcanised steel flanges with threaded blind holes (drilled according to DIN PN 6 or PN 10).
		Approvals	TüV certification according to DIN 4809 standard for heating systems.
Temperature/Pressure	100/110 °C at 10/6 bar		

Dimensions

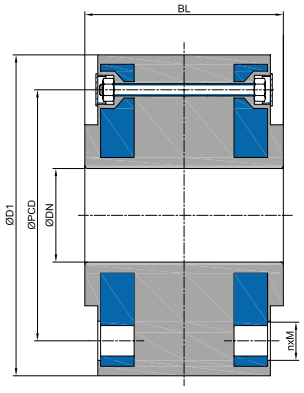
DN	Length	Bellow	Flange PN 6				Flange PN 10			
		WF*	ØD	ØPCD	Screw dimensions	Weight	ØD	ØPCD	Screw dimensions	Weight
	mm	mm²	mm	mm		kg	mm	mm		kg
20	**70**	300	90	65	4 x M10 x 35	1.0	105	75	4 x M12 x 35	1.8
25	**70**	300	100	75	4 x M10 x 35	1.5	115	85	4 x M12 x 35	2.2
32	**70**	800	120	90	4 x M12 x 35	2.2	140	100	4 x M16 x 35	3.3
40	**70**	1300	130	100	4 x M12 x 35	2.6	150	110	4 x M16 x 35	3.7
50	**70**	2000	140	110	4 x M12 x 40	2.8	165	125	4 x M16 x 40	4.2
65	**70**	3300	160	130	4 x M12 x 40	3.7	185	145	4 x M16 x 40	5.2
80	**70**	5000	190	150	4 x M16 x 40	5.2	200	160	8 x M16 x 40	5.7
100	**70**	7900	210	170	4 x M16 x 40	5.8	220	180	8 x M16 x 40	6.5
125	**70**	12300	240	200	8 x M16 x 40	6.9	250	210	8 x M16 x 40	8.1
150	**70**	17700	265	225	8 x M16 x 40	8.3	285	240	8 x M20 x 40	10.0
200	**90**	31400	-	-	-	-	340	295	8 x M20 x 45	14.7

* WF = effective area

Important planning and installation instructions

Type 60 CANNOT absorb any axial, lateral or angular movement. It is only suitable for insulating against high-frequency vibration and for a galvanic separation of two pipes.

It must be installed completely stress-free in the pipe. To do this, it is necessary to include the appropriate fixed points and plain bearings. When tightening the flange bolts, ensure that you use the criss-cross tightening sequence. The maximum tightening torque is 30 N/m. It should only be fitted using hexagon head bolts according to ISO 4017 and a washer. The correct bolt length must be used (see installation instructions).



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 note the appropriate fixed point constructions and plain bearings in your piping system. For more information please refer to our planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 61**

partly in stock

DN 50 to DN 1500

Type 61 is a handmade, low corrugated rubber expansion joint with a low corrugation shape to minimise flow resistance. Both sides of the bellow are designed with cylindrical ends for clamp fastening. It is characterised by its large movement absorption in all directions and a variety of rubber qualities, so that a suitable rubber compound is available for almost every application (see material descriptions on the following pages).

Type 61 is used in plant engineering, waste water technology, engine construction and ventilation technology. Here it is used especially for movement and vibration absorption and for noise damping.

Bellow design	Low corrugated rubber bellow with reinforcement, both ends cylindrical for fixing clamps. The bellow is designed with a corrugation as standard. Uncorrugated and multi-corrugated versions for greater movement absorption are possible.
Connections	Sleeve ends for ISO pipes (standard) for fixing clamps. The clamp width should be at least 20 mm (up to 3 bar: one clamp per side; above 3 bar: two clamps per side).
Vacuum resistance	Only vacuum-proof with vacuum supporting spiral/rings
Approvals/Conformity	FDA and EG 1935/2004 conform CE and drinking water approvals available on request.
Accessories	- Vacuum supporting spiral/rings - Potential equalisation - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Specifications

Bellow		Bellow design*			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red		EPDM	Polyamid	EPDM	100									
yellow		NBR	Polyamid	NBR	90									
green		CSM	Polyamid	CSM	100									
grey		CR	Polyamid	CR	90	Expansion joints will designed according to your operating parameters.								
red-white		EPDM light	Polyamid	EPDM	100									
yellow-white		NBR light	Polyamid	NBR	90									
lilac		FPM	Aramid	FPM	200									
Silicone		Silicone	Aramid	Silicone	200									

* Other rubber compounds/reinforcements on request.

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 61**

Application

Type 61 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 61 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 61 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 61 grey (CR)
For water, waste water, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 61 red-white (EPDM light)
Like type 61 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 61 yellow-white (NBR light)
Like type 61 yellow, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 61 lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. For temperatures of up to +180 °C.

Type 61 silicone (silicone)
Suitable for hydrochloric acid. Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing, UV, ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuel.

Important information

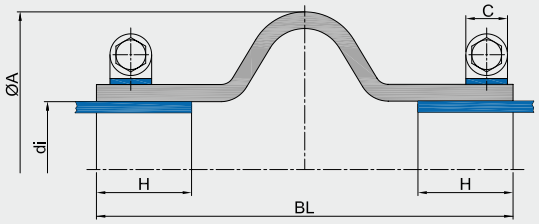
Please note the appropriate fixed point constructions and plain bearings in your piping system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! You can find information on this in our planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 61**

Type 61-1 - single-corrugated

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 (see planning instructions in the appendix).



Dimensions - Type 61-1

DN	Length	Bellow		Flange PN 10		Movement absorption*2				Pressure
	BL	di	WF*1	Cylinder end H	Clamp C	axial +	axial -	lateral ±	angular ±	Max.
	mm	mm	cm²	mm	mm	mm	mm	mm	∠°	bar
50	**250**	60.3	155	55	20	15	30	25	21.8	6
65	**250**	76.1	191	55	20	15	30	25	17.1	6
80	**250**	88.9	224	55	20	15	30	25	14.0	6
100	**250**	114.1	297	55	20	15	30	25	11.3	6
125	**250**	139.7	379	55	20	15	30	25	9.1	6
150	**250**	168.3	484	55	20	15	30	25	7.6	6
200	**250**	219.1	703	55	20	15	30	25	5.7	6
250	**250**	273.0	979	55	20	15	30	25	4.6	6
300	**250**	323.9	1281	55	20	15	30	25	3.8	6
350	**250**	355.6	1292	65	25	15	30	15	3.3	6
400	**250**	406.4	1636	65	25	10	30	15	2.9	6
450	**250**	457.0	2020	65	25	10	30	15	2.5	6
500	**250**	508.0	2445	65	25	10	30	15	2.3	6
600	**250**	610.0	3417	65	25	10	30	15	1.9	4
650	**250**	660.4	3964	65	25	10	30	15	1.8	4
700	**250**	711.0	4551	65	25	10	30	15	1.6	4
750	**250**	762.0	5178	65	25	10	30	15	1.5	4
800	**250**	813.0	5847	65	25	10	30	15	1.4	4
900	**250**	914.0	7305	65	25	10	30	15	1.3	4
1000	**250**	1016.0	8925	65	25	10	30	15	1.3	4
1100	**250**	1117.6	10496	65	25	10	30	15	1.1	3
1200	**250**	1219.0	12370	65	25	10	30	15	1.0	3
1300	**250**	1320.8	14420	65	25	10	30	15	0.9	2
1400	**250**	1422.0	16627	65	25	10	30	15	0.8	2
1500	**250**	1524.0	18991	65	25	10	30	15	0.8	2

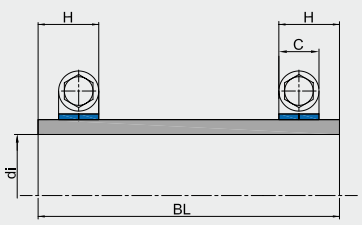
*1 WF = effective area
*2 Utilisation rate of movement absorption decreases at higher temperatures (see technical appendix).

- Intermediate sizes and overall length changes possible on request.
- Greater movement absorption possible by changing the overall length/corrugation profile and by changing to a multi-corrugated type (up to 5 corrugations).
- The use of a vacuum supporting ringe (Typ 61-...V) reduces the movement aporption axial+ und angular+/- by 60 %.

Designs

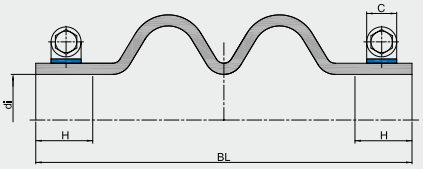
Type 61-0 - uncorrugated

Can be used to absorb vibration and insulate sound. Cannot be used to absorb axial movement.



Type 61-2 - double-corrugated

Can be used to absorb movement in any direction (for combined movements, see the movement diagram in the technical appendix), to absorb vibration and to insulate sound.



WILLBRANDT **Drainage Hose Type 62**

■ not in stock

DN 50 to DN 600

Type 62 is a handmade, slightly multi-corrugated rubber hose. Due to the multiple corrugation, it is very flexible and has a very low inherent resistance. It is also characterised by its flexibility in length. Both ends of the hose are fitted with cylindrical ends for clamp fastening.

Type 62 is used to absorb expansions and vibrations in bridge and building drainage. It is designed for the high temperature fluctuations and different types of media used in these applications.

Construction	Continuous slightly corrugated rubber hose with reinforcement; integrated, covered steel wire spiral and spiral-free cylindrical sleeve ends.
Connections	Sleeve ends for ISO pipes (standard) for fastening clamps. Other connection standards (e.g. SML pipe or special dimensions) are possible.
Material	Chloroprene (CR) with reinforcement from polyamide cord. Other rubber compounds on request.
Temperature	Max. 70 °C, short-term up to 90 °C
Pressure resistance	Max. 0.5 bar working pressure
Vacuum resistance	0.3 bar vacuum
Approvals	None
Accessories	- Fatening clamps (the width of the clamps should be be at least 20 mm) - Potential equalisation (vulcanised braid)

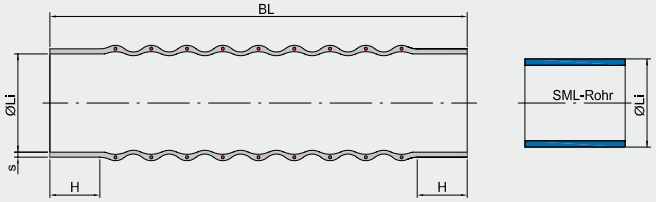
Dimensions

DN	Bellow Di ISO pipe mm	Di SML pipe mm	Dimensions H mm	S mm	Installation length
50	60.3	58	50	5 - 6	300 - 3000
65	76.1	-	50	5 - 6	300 - 3000
70	-	78	50	5 - 6	300 - 3000
80	88.9	83	50	5 - 6	300 - 3000
100	114.3	110	50	5 - 6	300 - 3000
125	139.7	135	50	5 - 6	300 - 3000
150	168.3	160	50	5 - 6	300 - 3000
200	219.1	210	50	5 - 6	300 - 3000
250	273.0	274	50	5 - 6	300 - 3000
300	323.9	326	75	5 - 6	300 - 3000
350	355.6	429	75	5 - 6	300 - 3000
400	406.4	-	75	5 - 6	300 - 3000
500	508.0	532	100	5 - 6	300 - 3000
600	610.0	635	100	5 - 6	300 - 3000

Permissible movement absorption (not in combination):

Max. axial - = (installation length - 2 x H) x 0.3 [mm]
Max axial + = only possible with pre-compressed installation length
lateral +/- = (installation length - 2 x H) x 0.15 [mm] = perm. lateral +/-

Special connection dimensions available upon request.

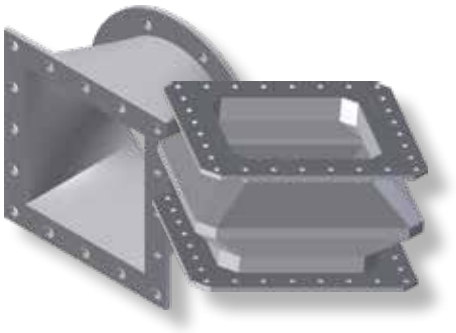


Important information

During installation, make a note of the existing temperatures and pre-stress accordingly. Clamp torque for GBS clamps: 25 Nm. When ordering, specify the pipe diameter for the sleeve extension. The bellows should not be painted or insulated. Please note the planning instructions and tolerances as per the FSA Handbook (page 117) in the technical appendix!

WILLBRANDT **Rubber Expansion Joint Type 63**

■ not in stock



Type 63 is a free moulded rubber expansion joint that is specially designed and manufactured to your specification and design dimensions. The cross-sections can be round, square, oval or a combination of these. The bellow can be designed with multiple corrugations to absorb a large amount of movement.

A variety of rubber qualities are available for production, so that a suitable rubber compound can be found for almost every application (see material descriptions on the following pages).

Type 63 is used in air, water and chemical plants to absorb movements, vibrations and structural displacements.

Bellow design
Reinforced rubber bellow. Optionally with cylindrical ends for fastening with clamps or tension band or with molded solid rubber flanges, self-sealing (no additional seal necessary), suitable for backing flanges. The bellow can be smooth, single or multi-corrugated or pleated.

Pressure resistance
Max. 10 bar working pressure → As this is a free-form product, the max. permissible pressure is very highly dependent on its shape.

Vacuum resistance
Only vacuum-proof with a vacuum supporting ring.

Fixing
The type of clamp / tension bands and the type of holes for the backing flange can be freely selected.

Approvals/Conformity
Drinking water approval
FDA and EG 1935/2004 conform

Accessories
- Potential equalisation (vulcanised braid)
- Guide sleeves
- Flame-resistant protective covers
- Dust and splash protection covers
- Earth cover / sun protection cover
- Tie rods

Further information on page 99 - 105.

Specifications

Bellow		Bellow design			Permissible operating data									
Colour code	Colour marking	Core (inner)	Reinforce-ment	Cover (outer)	Max. temperature °C	°C	bar	°C	bar	°C	bar	°C	bar	°C	bar
red	■	EPDM	Polyamide	EPDM	100										
blue	■	EPDM TW	Polyamide	EPDM	100										
white-red	□ ■	EPDM beige	Polyamide	EPDM	100										
green	■	CSM	Polyamide	CSM	100										
yellow	■	NBR	Polyamide	NBR	100										
white	□	NBR beige	Polyamide	NBR	100										
grey	■	CR	Polyamide	CR	90										
red-blue-red	■ ■ ■	EPDM	Aramid	EPDM	100										
blue-blue-blue	■ ■ ■	EPDM TW	Aramid	EPDM	100	Expansion joints will designed according to your operating parameters.									
white-blue-red	□ ■ ■	EPDM beige	Aramid	EPDM	100										
orange-blue-orange	■ ■ ■	EPDM HT	Aramid	EPDM HT	125										
green-blue-green	■ ■ ■	CSM	Aramid	CSM	100										
yellow-blue-yellow	■ ■ ■	NBR	Aramid	NBR	100										
white-blue-white	□ ■ □	NBR beige	Aramid	NBR	100										
grey-blue-grey	■ ■ ■	CR	Aramid	CR	90										
lilac-blue-lilac	■ ■ ■	FPM	Aramid	FPM	180										
-	-	Silicone	Aramid	Silicone	180										
-	-	Silicone	Glass fabric	Silicone	200										

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 planning instructions.

WILLBRANDT **Rubber Expansion Joint Type 63**

Application

Type 63 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 63 blue (EPDM TW)
Like type 63 red, but approved for drinking water.

Type 63 white-red (EPDM beige)
Like type 63 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not approved for drinking water.

Type 63 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 63 yellow (NBR)
For oils, fats. gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

Type 63 white (NBR beige)
Like type 63 yellow, but with light-coloured internal rubber in food grade (FDA and EG 1935/2004 conform). Not approved for drinking water!

Type 63 grey (CR)
For water, wastewater, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

Type 63 red-blue-red (EPDM/aramid)
Like type 63 red, but with aramid fabric.

Type 63 blue-blue-blue (EPDM TW/aramid)
Like type 63 blue, but with aramid fabric.

Type 63 white-blue-red (EPDM beige/aramid)
Like type 63 white-red, but with aramid fabric.

Type 63 orange-blue-orange (EPDM HT/aramid)
Like type 63 red, but with aramid fabric and for temperatures up to +125 °C.

Type 63 red-blue-red AF (EPDM AF/aramid)
Like type 63 red AF, but with aramid fabric.

Type 63 green-blue-green (CSM/aramid)
Like type 63 green, but with aramid fabric.

Type 63 yellow-blue-yellow (NBR/aramid)
Like type 63 yellow, but with aramid fabric.

Type 63 white-blue-white (NBR beige/aramid)
Like type 63 white-grey, but with aramid fabric.

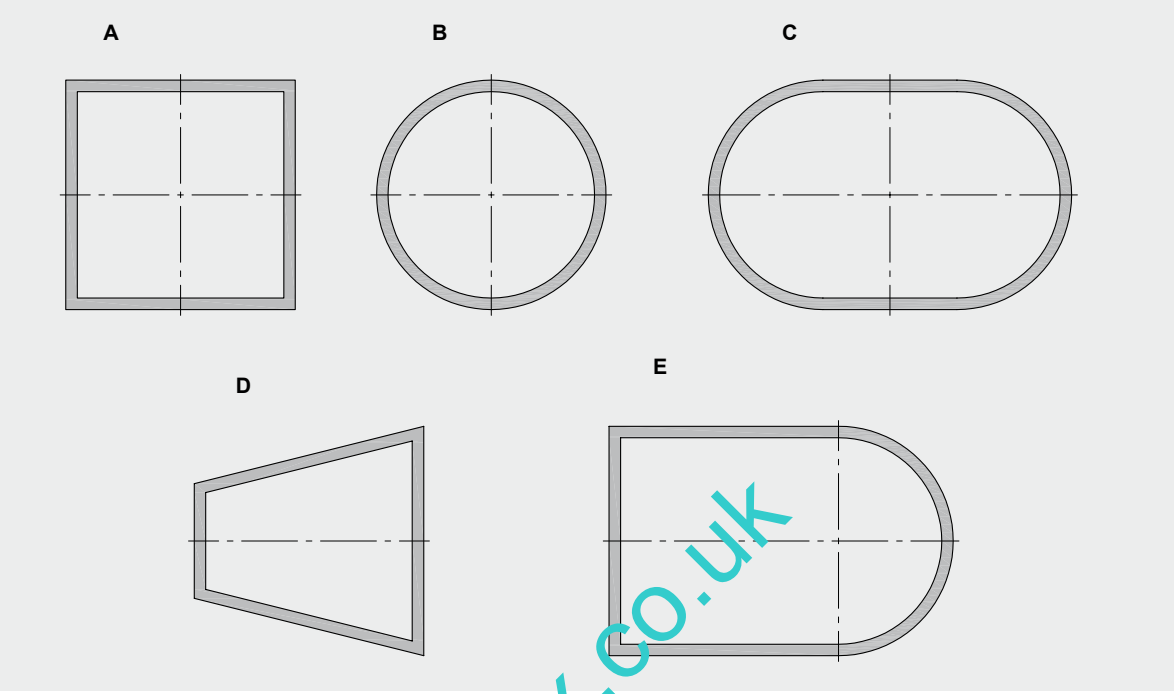
Type 63 grey-blue-grey (CR/aramid)
Like type 63 grey, but with aramid fabric.

Type 63 lilac-blue-lilac (FPM)
For flue gas desulphurisation systems and bio-diesel. High chemical resistance to benzene, xylene, toluene, aromatic, chlorinated hydrocarbons, mineral acids and fuels with an aromatic content of more than 50 %. For temperatures of up to +180 °C.

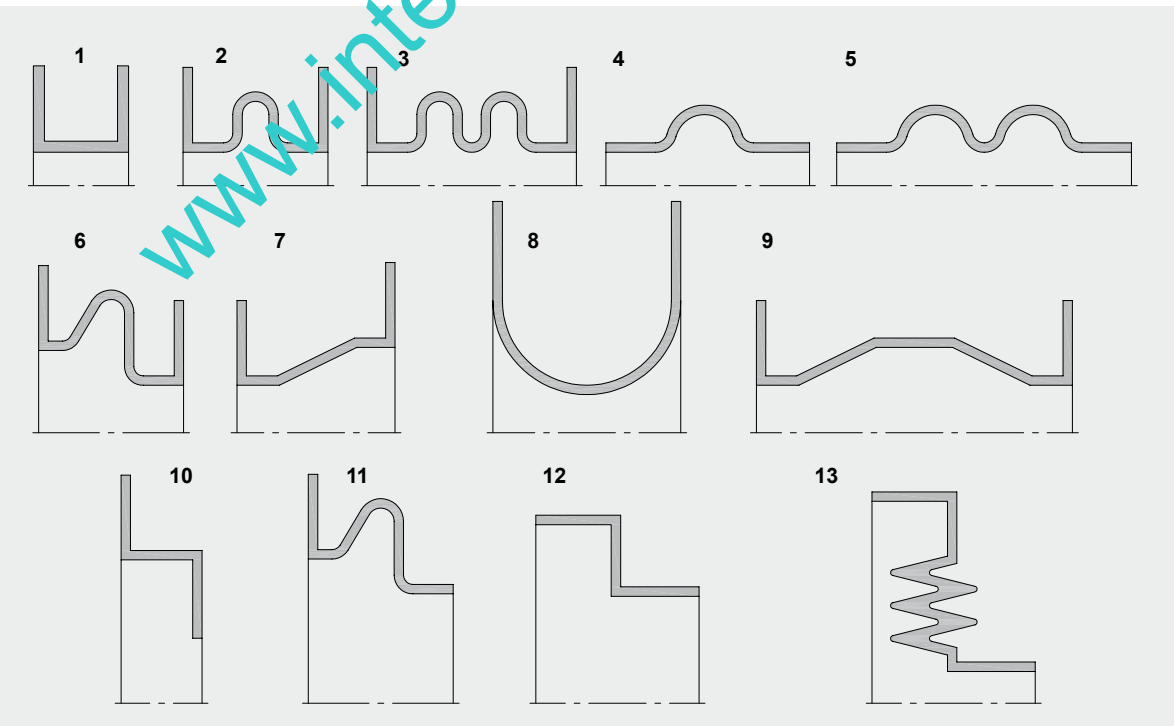
Type 63 silicone (silicone/glass fibre)
Suitable for hot air, acetic acid, Satisfactory resistance to aliphatic engine and gear oils. Also available in foodstuff quality. Excellent resistance to ageing. UV. ozone and weather. Very good radiation resistance. Not for use with steam above 120 °C. No resistance to fuels.

WILLBRANDT **Rubber Expansion Joint Type 63**

Examples of cross-sections



Examples of bellow designs



Important information

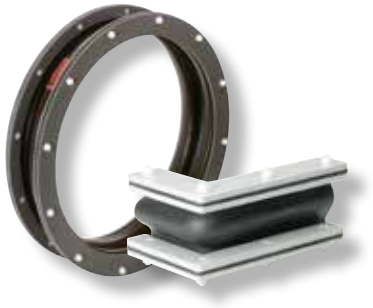
Please note the appropriate fixed point constructions and plain bearings in your pipe system, as well as the tolerances as per the FSA Handbook (see the technical appendix on page 117)! For more information please refer to our planning instructions (page 107 - 117).

WILLBRANDT **Rubber Expansion Joint Type 64**

■ not in stock

Type 64 is a very flexible rubber expansion joint that is manufactured from prefabricated foils and vulcanised or cold-vulcanised (glued) in the final form, depending on the material. The expansion joint dimensions depend on your design dimensions and the movement to be absorbed. There are no standard dimensions for this type.

Areas of application are the stress-free installation of fans and blowers, bulk goods and conveyor technology.



Bellow design
The bellow consists of a layer of rubber sheeting with or without a fabric insert. The joint is either hot-vulcanised or glued (cold-vulcanised). Bellow moulds are available with and without a preformed corrugation (a corrugation is only possible in EPDM).

Fixing
The type of clamp/tension bands and the type design/perforation of the backing flanges can be freely selected.

Pressure resistance
Depending on the closure of the joint and the rubber material up to +/-0.2 bar (cold vulcanised) or +/- 0.33 bar (hot vulcanised)

Approvals/Conformity
FDA and EG 1935/2004 conformity possible on request.

Accessories
- Guide sleeves
- Dust and splash protection covers
- Earth cover / sun protection cover

Further information on page 99 - 105.

Specifications

Bellow		Bellow design*1			Thickness	Max. temperature	Max. pressure		Version
Colour code	Colour marking	Core (inner)	Rein-forcement	Cover (outer)	mm	°C	bar	bar	
red		EPDM	Polyamide	EPDM	3.0	120	-0.4	+0.4	1 - 4
red		EPDM	Polyamide	EPDM	4.0	120	-0.4	+0.4	1 - 4
lilac*2		FPM	Aramide	FPM	3.0	200	-0.4	+0.4	1 + 3
yellow*2		NBR	without	NBR	4.0	90	-0.4	+0.4	1 + 3
grey*2		CR	without	CR	4.0	90	-0.4	+0.4	1 + 3

*1 Other rubber compounds on request.
*2 Only without convolution (bellow profiles type 64-2 and type 64-4).

Application

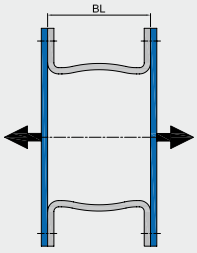
Type 64 red
For hot and cold air and bulk materials. Good resistance to weather, ageing and ozone. Not suitable for oil products of any kind or cooling water with additives containing oil.

Type 64 lilac
For aggressive exhaust air, flue gas and bulk materials.

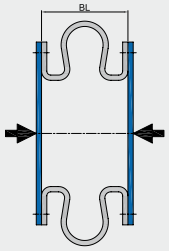
Type 64 yellow
For air containing oils/fats, gases and bulk materials.

Type 64 grey (CR)
For air containing oils/fats, flue gases from treatment plants and bulk materials.

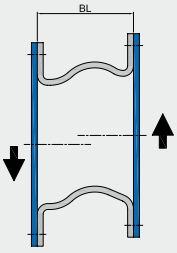
axial +
Δ » 0.3 x BL



axial -
Δ » 0.5 x BL



lateral ±
Δ » 0.1 x BL

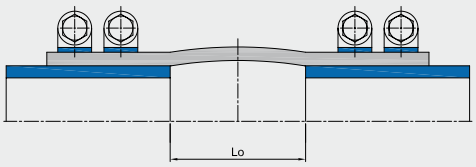


WILLBRANDT **Rubber Expansion Joint Type 64**

Bellows profiles

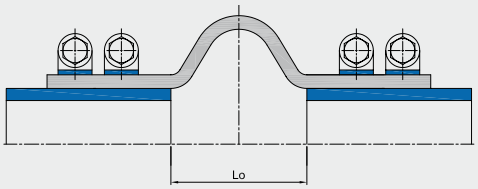
Type 64-1

Uncorrugated with straight ends for round or square versions



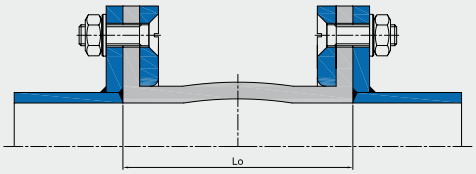
Type 64-2

Corrugated with straight ends for round or square versions



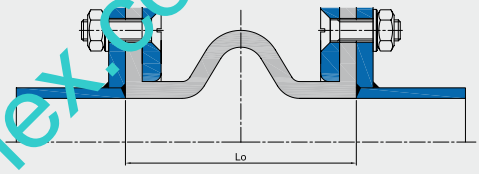
Type 64-3

Uncorrugated with flange connection for round or square versions



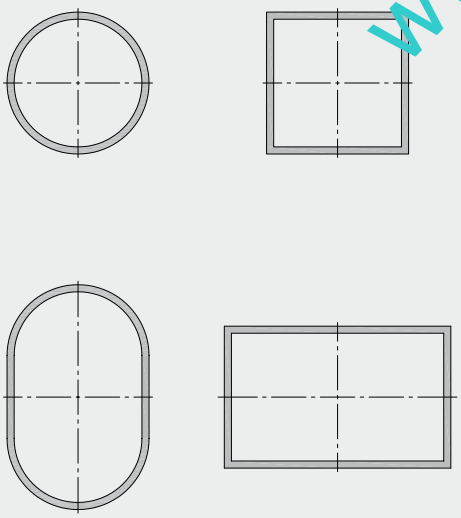
Type 64-4

Corrugated with flange connection for round or square versions

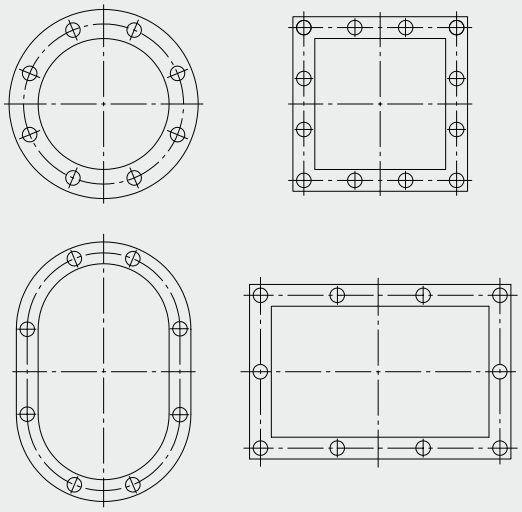


Cross-sections

Cross-sections with straight ends for fixing clamps and mounting bars



Cross-sections for flange mounting



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 planning instructions.

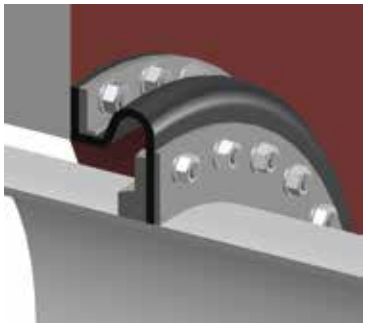
WILLBRANDT **Wall Seal Type 65**

■ not in stock

DN 80 to DN 5000

Type 65 is a freely moulded rubber wall seal that is designed and manufactured according to your specifications and construction dimensions. The connection can be via clamp, flange or a combination of these. There are also a large number of rubber qualities available, which means that you can select a suitable rubber compound for almost any application (see the material descriptions on the following pages).

Type 65 is used in power stations, plant engineering, valve shafts, power houses and pumping stations, where it is used to seal pipes from groundwater, and to compensate building settlement and shear forces.



Bellow design
Reinforced rubber bellow available in corrugated and uncorrugated versions. The connection is optionally made with cylindrical ends for clamp fastening and/or with solid rubber flanges facing inwards or outwards to accommodate backing/clamping flanges.

Fixing
The type of clamps or tensioning bands and the design/perforation of the backing flanges can be freely selected.

Pressure resistance
Max. 2.5 bar internal pressure. In the case of external pressure (e.g. groundwater) please use a supporting ring.

Accessoires
- Supporting ring
- Potential equalisation
- Drainage hose
- Earth cover / sun protection cover

Further information on page 99 - 105.

Specifications

Bellow		Bellow design			
Colour-code	Colour marking	Core (inner)	Reinforcement	Cover (outer)	Max. temperature °C
red	■	EPDM	Polyamide	EPDM	100
blue	■	EPDM TW	Polyamide	EPDM	100
white-red	□ ■	EPDM beige	Polyamide	EPDM	100
green	■	CSM	Polyamide	CSM	100
yellow	■	NBR	Polyamide	NBR	90
grey	■	CR	Polyamide	CR	80

Appliction

Type 65 red (EPDM)
For water, sea water, cooling water with glycol or other chemical additives for treating water, salt solutions, weak acids and weak alkalis. Unsuitable for aliphatic, aromatic and chlorinated hydrocarbons, oil or oily media.

Type 65 blue (EPDM TW)
Like type 65 red, but approved for drinking water.

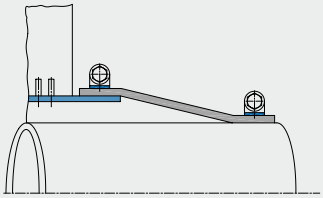
Type 65 white-red (EPDM beige)
Like type 65 red, but with light-coloured rubber in food-grade (FDA and EG 1935/2004 conform). Not for drinking water approved.

Type 65 green (CSM)
For chemicals, aggressive, chemical waste water and compressor air containing oil.

Type 65 yellow (NBR)
For oils, fats, gases, diesel fuels, kerosene and crude oil. Not suitable for aromatic and chlorinated hydrocarbons, esters and ketones.

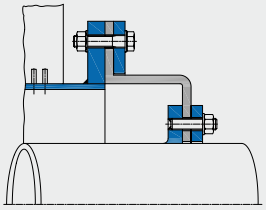
Type 65 grey (CR)
For water, wastewater, swimming pool water, salt water, cooling water with anti-corrosive products containing oil, oil mixtures and compressed air containing oil.

WILLBRANDT **Wall Seal Type 65**



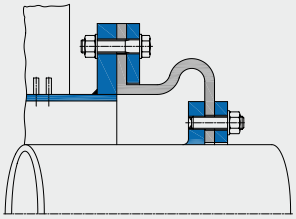
Type 65-0

With cylindrical ends on both sides for fatening clamps, pressure: 1 bar. up to DIN 1000



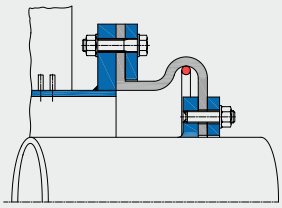
Type 65-1

Flange connection on both sides, freely selectable flange standard, pressure: -0.5 to +2.5 bar, up to DN 4000



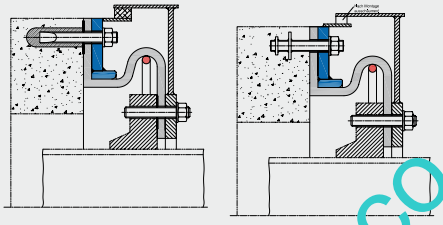
Type 65-2

Flange connection on both sides, corrugated, freely selectable flange standard, pressure: 2.5 bar, without supporting ring. up to DN 4000



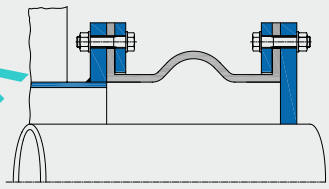
Type 65-2S

Flange connection on both sides, corrugated, with supporting ring, freely selectable flange standard, pressure: -1 to +2.5 bar, up to DN 4000



Example of installation - Earth protection cover

In ground with earth protection cover and bellow with inner supporting ring, up to DN 4000



Recommended installation

For wall seals with pressures greater than 2.5 bar. We recommend a rubber expansion joint solution up to DN 4000, this makes pressures up to 30 bar possible.

Example of dimensions - Type 65-2

Wall pipe*1	Medium pipe*1		Overall length*2	Bellow	Movement absorption*4			
DN 1 min.	DN 2	PN	BL	WF*3	axial -	axial*5 +	lateral ±	angular ±
			mm	mm²	mm	mm	mm	∠°
200	80	PN 10	**200**	1057	45	17	26	7.7
250	100	PN 10	**200**	1057	45	26	26	7.7
300	125	PN 10	**200**	1365	45	26	36	9.8
350	150	PN 10	**200**	1712	45	26	35	7.4
400	200	PN 10	**200**	2098	45	26	35	7.4
450	250	PN 10	**200**	2524	45	26	34	5.9
500	300	PN 10	**200**	2988	45	26	34	5.9
600	350	PN 10	**200**	4036	45	26	33	5.0
700	450	PN 10	**200**	5240	45	26	33	4.2
700	500	PN 10	**200**	5240	45	26	33	4.2
800	600	PN 10	**200**	6601	45	26	33	3.7
1000	700	PN 10	**200**	9794	45	26	32	3.0
1000	750	PN 10	**200**	9794	45	26	32	3.0
1050	800	PN 10	**200**	10691	45	26	31	2.5
1200	900	PN 10	**200**	13616	45	26	31	2.5
1300	1000	PN 10	**200**	15762	45	26	31	2.1
1500	1100	ANSI B16 150 lbs	**200**	20525	45	26	31	1.9
1500	1200	PN 6	**200**	20525	45	26	31	1.9
1700	1300	ANSI B16 150 lbs	**200**	25917	45	26	30	1.7
1700	1400	PN 6	**200**	25917	45	26	30	1.7
2000	1500	ANSI B16 150 lbs	**200**	35181	45	26	30	1.5

*1 Catalogue example for a medium pipe according to DIN standards. Other standards (e.g. ANSI. BS. JIS) are also available.
*2 Other overall lengths possible.
*3 WF = effective area
*4 It is also possible to provide the wall seal with greater movement by altering the overall length.
*5 If an internal supporting ring (type 65-2S) is used, the axial+ movement is reduced to 9 mm.

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 planning instructions.

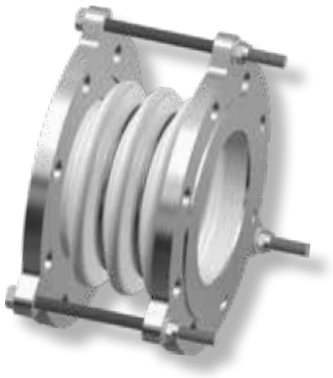
WILLBRANDT **PTFE Expansion Joint Type 81**

■ partly in stock

DN 20 to DN 500

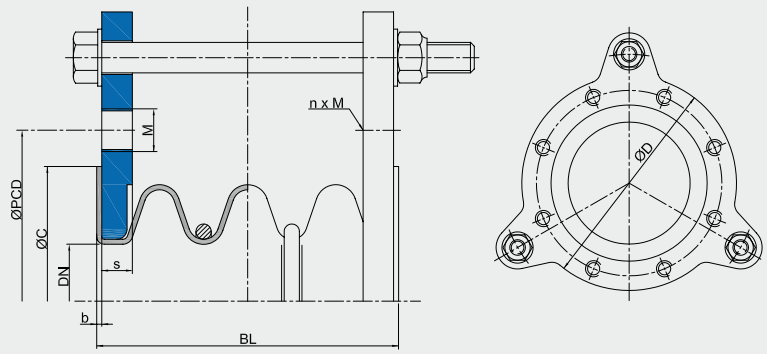
Type 81 is a 2 to 7 corrugated PTFE expansion joint that is hot-formed from an extruded PTFE tube under pressure. It is characterised by its large movement absorption (depending on the number of corrugations), high media resistance and good non-stick properties.

Type 81 is mainly used in chemical plants, where it compensates for movements and assembly inaccuracies and dampens noise. Due to its high elasticity and very low adjustment forces, it can also be used in pipework made of fragile materials such as glass, graphite or enamel.



Bellow design	Multi-corrugated, PTFE bellow with external stainless steel supporting rings from 1.4571. PTFE bead on both sides for steel flanges with integrated tie rods. Standard version: white PTFE, electrically insulating. Special version: black PTFE, electrically conductive.
Flange version	With bracing flange on both sides made of primed, galvanised steel, drilled to DIN PN 16 from DN 200 DIN PN 10 (standard). Other materials and dimensions are possible.
Conformity	FDA and EG 1935/2004 conform
Pressure resistance	Max. 13 bar working pressure (highly dependent on nominal diameter, number of corrugations and temperature – see tables)
Vacuum resistance	With vacuum supporting rings, vacuum-proof
Special accessories	- PTFE guide sleeves - Flame-resistant protective covers - Dust and splash protection covers - Earth cover / sun protection cover Further information on page 99 - 105.

Standard version. 3-corrugated - with tie rods



From to DN 200, a threaded rod is used as a tie rod instead of a hexagon bolt.

Important information

No additional seals are required for normal, flat flange connections up to DN 300.
From DN 350 and in the case of glass components or other connecting parts it is necessary to use elastic seals made of TFM with reinforcement (please refer to the required surface pressure).
PTFE expansion joints may not be subject to torsion or vibration.
The bellows should not be painted. Please refer to the planning instructions.

WILLBRANDT **PTFE Expansion Joint Type 81**

Dimensions

DN	Di	Overall length BL						Bellow			Flange PN 10*2				
	(bellow)	2-corrugated	3-corrugated	4-corrugated	5-corrugated	6-corrugated	7-corrugated	b	ØC	WF*1	ØD	ØLK	Ød	n	s
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm²	mm	mm	mm		mm
20	**20**	40	45	55	70	-	100	2.4	68	740	105	75	M12	4	8
25	**25**	40	45	55	70	-	100	2.4	68	740	115	85	M12	4	10
***3 32**	**31**	40	50	65	-	-	105	2.4	78	1280	140	100	M16	4	10
40	**38**	45	50	65	75	-	105	2.4	88	1800	150	110	M16	4	10
50	**47**	45	70	80	100	150	-	2.8	102	2820	165	125	M16	4	12
65	**61**	55	80	90	110	-	150	2.8	122	4530	185	145	18 / M16	8	12
80	**77**	60	95	115	140	175	-	2.8	138	7020	200	160	18 / M16	8	12
100	**95**	70	95	115	140	175	-	3.2	158	10020	220	180	18 / M16	8	14
125	**117**	80	100	140	175	-	-	3.2	188	14290	250	210	18 / M16	8	14
150	**142**	90	120	-	-	-	-	3.6	212	19670	285	240	22	8	16
200	**188**	95	130	150	175	-	200	3.6	268	35450	340	295	22	8	16
250	**238**	100	130	-	-	-	-	4.0	320	54040	395	350	22	12	18
300	**285**	110	145	-	-	-	-	4.0	370	82100	445	400	22	12	18
350	**324**	110	150	-	-	-	-	4.0	430	96320	505	460	22	16	18
400	**374**	115	155	180	225	-	320	4.8	488	130620	565	515	26	16	20
500	**448**	120	160	-	-	-	-	4.4	585	198850	670	620	26	20	30

*1 WF = effective area
*2 In the 2-corrugated version, the nominal sizes DN 65 to DN 125 have a flange with through holes on one side and threaded holes on the other side.
From DN 150, the flanges are equipped with through-holes.
Other dimensions such as DIN PN 6, PN 16, ANSI B16.5 - 150 lbs are possible.
*3 With bellow DN 40

Movement absorption

DN	2-corrugated			3-corrugated			4-corrugated			5-corrugated			6-corrugated			7-corrugated		
	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°
20	6.5	4	4	12.5	10	18	15	10	18	15	12	18	-	-	-	20	20	20
25	6.5	4	4	12.5	10	18	15	10	18	15	12	18	-	-	-	20	20	20
***32**	6.5	4	4	12.5	10	20	15	15	20	-	-	-	-	-	-	20	25	25
40	6.5	5	8	12.5	15	25	15	15	20	15	17	20	-	-	-	20	25	25
50	6.5	6	8	19.0	20	25	20	20	25	20	20	25	25	25	30	-	-	-
65	7.5	9	10	21.0	20	30	22	20	30	22	25	30	-	-	-	25	25	30
80	10.0	10	10	25.0	25	30	25	25	30	27	25	30	30	30	30	-	-	-
100	10.0	12	20	25.0	25	30	25	25	30	27	27	30	30	35	35	-	-	-
125	15.0	14	15	28.5	25	30	28	25	30	27	27	30	-	-	-	-	-	-
150	15.0	10	10	28.5	20	30	-	-	-	-	-	-	-	-	-	-	-	-
200	15.0	10	10	28.5	20	20	30	20	20	35	20	20	-	-	-	40	35	35
250	18.0	10	10	28.5	10	10	-	-	-	-	-	-	-	-	-	-	-	-
300	18.0	8	8	30.0	8	10	-	-	-	-	-	-	-	-	-	-	-	-
350	20.0	5	6	30.0	5	10	-	-	-	-	-	-	-	-	-	-	-	-
400	20.0	5	6	30.0	5	10	30	8	10	40	7	13	-	-	-	40	35	35
500	20.0	5	6	30.0	5	10	-	-	-	-	-	-	-	-	-	-	-	-

* With bellow DN 40

The movement absorption values are maximum values and must not occur in combination. Please refer to the movement diagram in the technical appendix.

Permissible pressure load under temperature

Temp. / DN	Pressure (bar)																	
	2-corrugated			3-corrugated			4-corrugated			5-corrugated			6-corrugated			7-corrugated		
	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C
20 - 50	13.0	9.0	5.0	8.6	5.5	3.2	7.6	5.1	3.2	6.8	4.8	3.2	5.9	3.6	2.0	5.9	3.6	2.0
65 - 150	11.0	7.5	3.8	7.7	4.7	2.7	6.7	4.3	2.6	5.8	3.9	2.5	5.3	3.1	1.6	5.3	3.1	1.6
200 - 400	5.2	4.5	3.0	6.8	4.1	2.3	5.8	3.5	2.0	4.8	3.0	1.8	4.7	2.7	1.4	4.7	2.7	1.4
450 - 500	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.

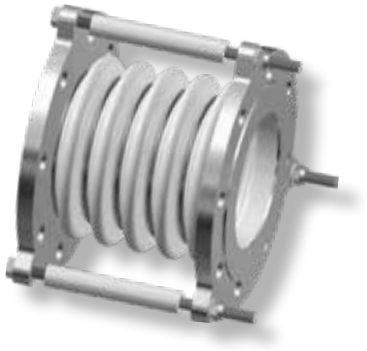
WILLBRANDT **PTFE Expansion Joint Type 81 HD**

■ not in stock

DN 20 to DN 1500

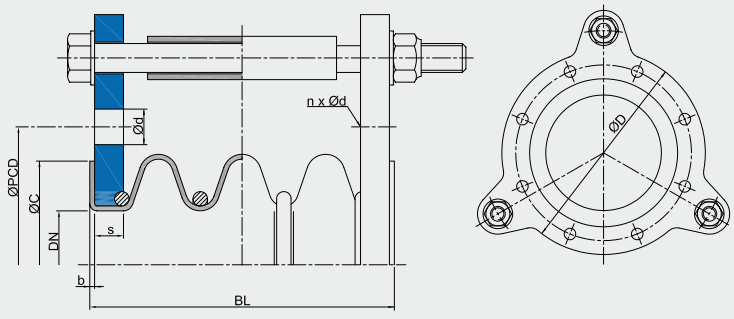
Type 81 HD is a 1 to 6 corrugated PTFE expansion joint with a constant wall thickness over the whole bellows area. It is characterised by its high resistance to pressure and temperature and its large movement absorption (depending on the number of corrugations). The PTFE material ensures high media resistance and good non-stick properties.

Type 81 HD is mainly used in chemical plants, where it absorbs movements and assembly inaccuracies and dampens noise. Due to its high elasticity and very low adjustment forces, it can also be used in pipework made of fragile materials such as glass, graphite or enamel.

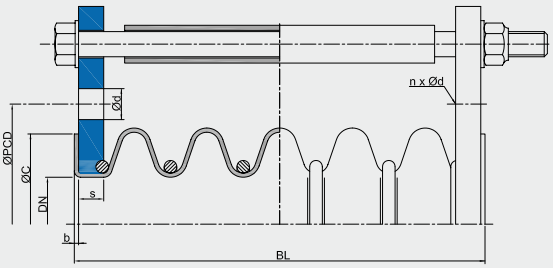


Bellow design	Multi-corrugated, PTFE bellow with stainless steel external stainless steel supporting rings, PTFE bead on both sides for steel flanges with integrated tie rods. Standard version: white PTFE, electrically insulating. Special version: black PTFE, electrically conductive.	**Pressure resistance**	Max. 13 bar working pressure (highly dependent on nominal diameter, number of corrugations and temperature – see tables)
Flange version	With bracing flange on both sides made of primed, galvanised steel, drilled to DIN PN 16 from DN 200 DIN PN 10 (standard). Other materials and dimensions are possible.	**Vacuum resistance**	With vacuum supporting rings, vacuum-proof
Conformity	FDA and EG 1935/2004	**Special accessories**	- PTFE guide sleeves - Flame-resistant protective covers - Dust and splash protection covers - Earth cover/sun protection cover Further information on page 99 - 105.

Standard version, 3-corrugated - with tie rods



Standard version, 5-corrugated - with tie rods



From DN 200, a threaded rod is used as a tie rod instead of a hexagon bolt.

Important information

No additional seals are required for normal, flat flange connections up to DN 300. From DN 350 and in the case of glass components or other connecting parts it is necessary to use elastic seals made of TFM with reinforcement (please refer to the required surface pressure). PTFE expansion joints may not be subject to torsion or vibration. Please refer to the planning instructions.

WILLBRANDT **PTFE Expansion Joint Type 81 HD**

Dimensions

DN	Di	Overall length BL						Bellow			Flange PN 10*2				
	(bellow)	1-corrugated	2-corrugated	3-corrugated	4-corrugated	5-corrugated	6-corrugated	b	ØC	WF*1	ØD	ØLK	Ød	n	s
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm²	mm	mm	mm		mm
20	**25**	40	54	70	85	100	115	2.4	68	740	105	75	M12*3	4	8
25	**25**	40	54	70	85	100	115	2.4	68	740	115	85	M12*3	4	10
32	**33**	40	56	75	90	105	125	2.4	78	1280	140	100	M16*3	4	10
40	**39**	40	56	80	98	115	132	2.4	88	1800	150	110	M16*3	4	10
50	**47**	48	68	85	105	125	145	2.8	102	2820	165	125	M16*3	4	12
65	**62**	54	78	100	122	145	168	2.8	122	4530	185	145	(M16*3) 18	8	12
80	**77**	60	88	110	135	160	185	2.8	138	7020	200	160	(M16*3) 18	8	12
100	**96**	64	88	110	137	165	192	3.2	158	10020	220	180	(M16*3) 18	8	14
125	**121**	70	95	120	145	170	200	3.2	188	14290	250	210	(M16*3) 18	8	14
150	**144**	75	105	130	155	180	210	3.6	212	19670	285	240	(M20*3) 22	8	16
200	**190**	85	110	140	175	210	-	3.6	268	35450	340	295	(M20*3) 22	8	20
250	**240**	93	128	165	195	240	-	4.0	320	54040	395	350	(M20*3) 22	12	22
300	**289**	100	140	175	215	250	-	4.0	370	82100	445	400	(M20*3) 22	12	25
350	**329**	103	145	190	235	265	-	4.8	430	104100	505	460	(M20*3) 22	16	30
400	**378**	103	145	190	235	265	-	4.8	482	134600	565	515	(M24*3) 26	16	30
450	**434**	103	145	190	235	280	-	4.8	532	181050	670	620	(M24*3) 26	20	30
500	**484**	103	145	190	235	280	-	4.8	585	207500	670	620	(M24*3) 26	20	30
600	**584**	103	145	190	235	280	-	4.8	685	296100	780	725	(M27*3) 30	20	30
700	**684**	-	-	190	-	-	-	4.8	800	400400	895	840	30	24	*4
800	**784**	-	-	190	-	-	-	4.8	905	520400	1015	950	33	24	*4
900	**884**	-	-	190	-	-	-	4.8	1005	656100	1115	1050	33	28	*4
1000	**984**	-	-	190	-	-	-	4.8	1110	807500	1230	1160	36	28	*4
1200	**1184**	-	-	190	-	-	-	4.8	1330	-	1455	1380	39	32	*4
1300	**1284**	-	-	190	-	-	-	4.8	-	-	1565	1485	42	32	*4
1400	**1384**	-	-	190	-	-	-	4.8	1535	-	1675	1590	42	36	*4
1500	**1484**	-	-	190	-	-	-	4.8	-	-	1795	1705	48	36	*4

*1 WF = effective area
*2 Other dimensions such as DIN PN 6, PN 16, ANSI B16.5 - 150 lbs are possible
*3 Up to and including DN 50 and for the 1-corrugated version (all nominal sizes), both flanges are designed with threaded holes.
For the 2-corrugated version DN 65 and DN 80, there is one flange with through holes and one flange with threaded holes.
*4 Designed according to operating data.

Movement absorption

DN	1-corrugated			2-corrugated			3-corrugated			4-corrugated			5-corrugated			6-corrugated		
	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°	axial +/- mm	lateral +/- mm	angular +/- <°
20	3	2	2	6	3	4	10	5	6	13	6	8	15	8	10	20	10	13
25	3	2	2	6	3	4	10	5	6	13	6	8	15	8	10	20	10	13
32	3	2	2	6	3	4	10	5	6	13	6	8	15	8	10	20	10	13
40	3	2	2	6	3	4	15	5	6	18	6	8	20	8	12	30	10	15
50	5	2	2	10	5	5	15	8	8	20	10	9	25	12	12	30	14	16
65	6	3	3	12	5	5	20	8	8	25	10	10	30	12	14	40	14	16
80	7	3	3	15	5	6	20	8	10	26	12	11	35	15	16	40	18	20
100	7	3	4	15	8	6	25	12	10	33	15	13	40	18	16	50	22	20
125	8	4	4	15	8	5	25	12	10	33	15	13	40	18	14	50	22	18
150	9	4	4	15	8	5	25	12	8	33	15	12	40	18	13	50	22	16
200	10	4	3	15	10	5	30	14	8	35	18	10	40	22	13	-	-	-
250	10	5	3	20	10	4	30	14	6	40	18	10	50	22	12	-	-	-
300	10	5	3	20	10	4	30	14	6	40	18	9	50	22	10	-	-	-
350	-16/+10	5	2	20	10	4	-44/+35	18	6	-60/+42	22	8	-62/+56	25	10	-	-	-
400	-16/+10	5	2	20	12	3	-44/+35	18	6	-60/+42	22	8	-62/+56	25	8	-	-	-
450	-16/+10	5	2	20	12	3	-44/+35	18	5	-60/+42	22	7	-75/+50	25	8	-	-	-
500	-16/+10	5	2	20	12	3	-44/+35	20	5	-60/+42	22	6	-75/+50	25	7	-	-	-
600	-16/+10	5	2	20	12	2	-44/+35	20	4	-60/+42	22	6	-75/+50	25	6	-	-	-
700	-	-	-	-	-	-	-44/+35	20	4	-	-	-	-	-	-	-	-	-
800	-	-	-	-	-	-	35	20	3	-	-	-	-	-	-	-	-	-
900	-	-	-	-	-	-	35	20	3	-	-	-	-	-	-	-	-	-
1000	-	-	-	-	-	-	-25/+35	20	3	-	-	-	-	-	-	-	-	-
1200	-	-	-	-	-	-	-25/+35	20	3	-	-	-	-	-	-	-	-	-
1300	-	-	-	-	-	-	-25/+35	20	2	-	-	-	-	-	-	-	-	-
1400	-	-	-	-	-	-	-25/+35	20	2	-	-	-	-	-	-	-	-	-
1500	-	-	-	-	-	-	-25/+35	20	2	-	-	-	-	-	-	-	-	-

The movement absorption values are maximum values and must not occur in combination. Please refer to the movement diagram in the technical appendix.

WILLBRANDT **PTFE Expansion Joint Type 81 HD**

Permissible pressure load under temperature

DN \ Temp.	Pressure (bar)																	
	1-corrugated			2-corrugated			3-corrugated			4-corrugated			5-corrugated			6-corrugated		
	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C
20	16.0	12.8	7.3	16.0	12.9	6.9	16.0	12.3	6.2	16.0	12.3	6.2	12.9	8.4	4.2	11.7	6.3	3.8
25	16.0	12.8	7.3	16.0	12.9	6.9	16.0	12.3	6.2	16.0	12.3	6.2	12.9	8.4	4.2	11.7	6.3	3.8
32	16.0	12.1	6.7	16.0	12.3	6.4	16.0	11.5	5.8	16.0	11.5	5.8	12.3	8.0	4.0	11.7	6.3	3.8
40	16.0	11.5	6.2	16.0	11.7	6.0	16.0	10.9	5.4	16.0	10.9	5.4	11.8	7.6	3.8	11.7	6.3	3.8
50	16.0	10.9	5.8	16.0	11.2	5.6	16.0	10.3	5.1	16.0	10.3	5.1	11.2	7.2	3.7	11.7	6.3	3.8
65	16.0	10.2	5.3	16.0	10.6	5.2	16.0	9.6	4.8	16.0	9.6	4.8	10.6	6.8	3.5	11.7	6.3	3.8
80	16.0	9.7	4.9	16.0	10.2	4.9	15.9	9.1	4.5	15.9	9.1	4.5	10.2	6.5	3.3	11.7	6.3	3.8
100	16.0	9.1	4.5	16.0	9.7	4.6	14.9	8.5	4.3	14.9	8.5	4.3	9.6	6.2	3.1	11.7	6.3	3.8
125	15.3	8.6	4.1	16.0	9.3	4.3	14.0	8.0	4.0	14.0	8.0	4.0	9.1	5.8	2.9	11.7	6.3	3.8
150	14.8	8.2	3.9	16.0	8.9	4.0	13.2	7.6	3.8	13.2	7.6	3.8	8.7	5.5	2.8	11.7	6.3	3.8
200	13.9	7.6	3.4	15.0	8.4	3.7	12.1	6.9	3.5	12.1	6.9	3.5	8.1	5.1	2.6	-	-	-
250	13.3	7.2	3.1	14.3	8.0	3.4	11.2	6.4	3.3	11.2	6.4	3.3	7.6	4.7	2.4	-	-	-
300	12.8	6.8	2.9	13.8	7.7	3.2	10.5	6.0	3.1	10.5	6.0	3.1	7.2	4.5	2.3	-	-	-
350	12.4	6.5	2.7	13.3	7.4	3.1	9.9	5.7	3.0	9.9	5.7	3.0	[illegible]	4.2	2.2	-	-	-
400	12.0	6.3	2.6	12.9	7.2	2.9	9.4	5.5	2.9	9.4	5.5	2.9	[illegible]	4.0	2.1	-	-	-
450	11.7	6.1	2.4	12.6	7.0	2.9	9.0	5.2	2.8	9.0	5.2	2.8	6.2	3.9	2.0	-	-	-
500	11.4	5.9	2.3	12.3	6.9	2.7	8.6	5.0	2.7	8.6	5.0	2.7	6.0	3.7	1.9	-	-	-
600	11.0	5.6	2.1	11.8	6.6	2.6	7.9	4.7	2.6	7.9	4.7	2.6	5.6	3.4	1.8	-	-	-
700	-	-	-	-	-	-	7.4	4.4	2.4	-	-	-	-	-	-	-	-	-
800	-	-	-	-	-	-	6.9	4.1	2.3	-	-	-	-	-	-	-	-	-
900	-	-	-	-	-	-	6.5	3.9	2.3	-	-	-	-	-	-	-	-	-
1000	-	-	-	-	-	-	6.2	3.7	2.2	-	-	-	-	-	-	-	-	-
1200	-	-	-	-	-	-	5.6	3.4	2.1	-	-	-	-	-	-	-	-	-
1300	-	-	-	-	-	-	5.1	3.2	2.0	-	-	-	-	-	-	-	-	-
1400	-	-	-	-	-	-	5.1	3.2	2.0	-	-	-	-	-	-	-	-	-
1500	-	-	-	-	-	-	5.1	3.2	2.0	-	-	-	-	-	-	-	-	-

For flow velocities above 3 m/s, a guide sleeve should be used.
This can be designed in PTFE up to 5 m/s and in stainless steel above this.

Permissible vacuum load under temperature

DN* \ Temp.	Pressure (bar)																	
	1-corrugated			2-corrugated			3-corrugated			4-corrugated			5-corrugated			6-corrugated		
	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C	20 °C	100 °C	200 °C
20	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
25	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
32	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
40	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
50	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
65	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.90
80	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.83	-1	-1	-0.79
100	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.74	-1	-0.90	-0.70
125	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-0.72	-1	-0.90	-0.65	-0.90	-0.79	-0.61
150	-1	-1	-1	-1	-1	-1	-1	-1	-0.77	-1	-1	-0.63	-0.90	-0.80	-0.56	-0.79	-0.70	-0.53
200	-1	-1	-0.81	-1	-1	-0.72	-1	-1	-0.62	-1	-0.90	-0.54	-0.80	-0.70	-0.47	-0.70	-0.61	-0.43
250	-1	-1	-0.62	-1	-1	-0.60	-1	-0.84	-0.47	-0.90	-0.76	-0.45	-0.70	-0.67	-0.38	-0.61	-0.59	-0.36
300	-1	-1	-0.46	-1	-0.84	-0.48	-0.85	-0.70	-0.40	-0.77	-0.63	-0.36	-0.68	-0.56	-0.32	-0.60	-0.49	-0.29
350	-	-	-	-	-	-	-0.71	-0.57	-0.30	-	-	-	-	-	-	-	-	-
400	-	-	-	-	-	-	-0.60	-0.48	-0.20	-	-	-	-	-	-	-	-	-
450	-	-	-	-	-	-	-0.52	-0.39	-0.12	-	-	-	-	-	-	-	-	-
500	-	-	-	-	-	-	-0.44	-0.33	-0.10	-	-	-	-	-	-	-	-	-
600	-	-	-	-	-	-	-0.32	-0.24	-0.02	-	-	-	-	-	-	-	-	-

* No use under vacuum is possible from DN 700

For flow velocities above 3 m/s, a guide sleeve should be used.
This can be designed in PTFE up to 5 m/s and in stainless steel above this.

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.

WILLBRANDT **Bracings**

Rubber expansion joints are to be considered as elastic elements in the pipework. In the unrestrained version ‘A’, the rubber expansion joint generates reaction forces in the direction of expansion (effective area x operating pressure) under pressure and forces in the direction of compression under negative pressure.

These forces must be absorbed by the nearest fixed points, transverse plain bearings or the aggregate flange.

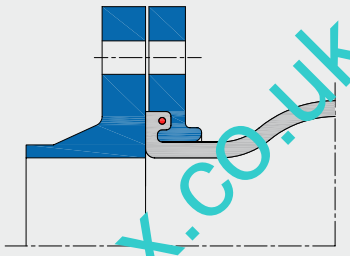
If this is not possible, there are a number of different bracing options that absorb the corresponding reaction forces but do not restrict the freedom of movement of the expansion joint, with the exception of axial expansion or compression.

In the case of a braced design, only the adjustment forces from the rubber bellows and the frictional forces from the bearings need to be taken into account for the fixed points. We have shown you a number of examples of bracing below:

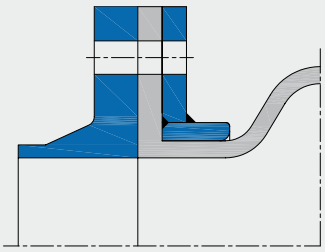
Design A

Rubber expansion joints without tie rods, with swivel flanges or solid rubber flanges, suitable for movement absorption in any direction.

Fixed point load: Reaction force plus stiffness rates
Production: 1. DN 20 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.)

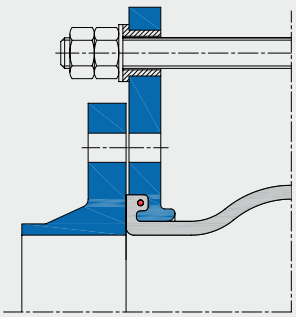


Solid rubber flange (2.)

Design B

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in rubber bushes, secured with lock nuts. Suitable for noise and vibration damping and for lateral movement absorption.

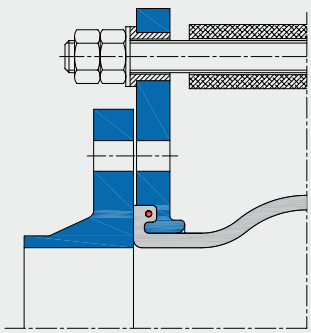
Fixed point load: Lateral stiffness rate plus bearing stiffness rate
Production: DN 20 - DN 200
Permissible pressure: DN 20 - DN 150: 16 bar
DN 200: 10 bar



Design C

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in rubber bushes, secured with lock nuts and with thrust limiter (plastic bushing) to secure the bellow. Suitable for noise and vibration damping and for lateral movement absorption.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate
Production: DN 20 - DN 200
Permissible pressure: DN 20 - DN 150: 16 bar
DN 200: 10 bar



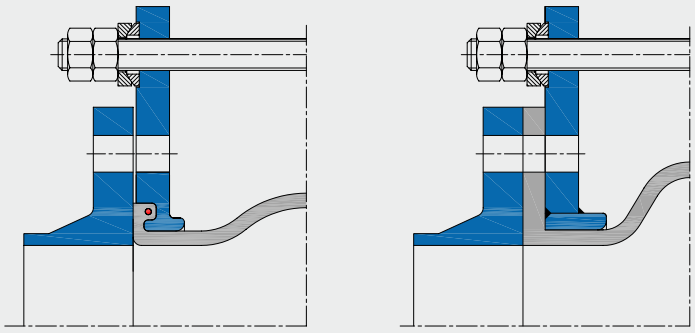
WILLBRANDT **Bracings**

Design E

Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for lateral movement absorption.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



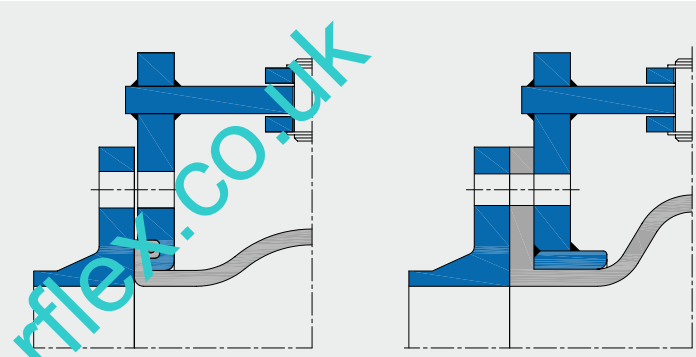
Swivel flange (1.) Solid rubber flange (2.)

Design F

Rubber expansion joint with hinge bracing to absorb the reaction force, suitable for angular movement absorption in one plane. Two hinge expansion joints with intermediate tube can absorb very large lateral expansions. In a combination of three, soft corners can be created to absorb movements from two planes (see installation examples).

Fixed point load: Angular stiffness torque and frictional torque from bearings

Production: 1. DN 32 - DN 1000
2. DN 200 - DN 5000



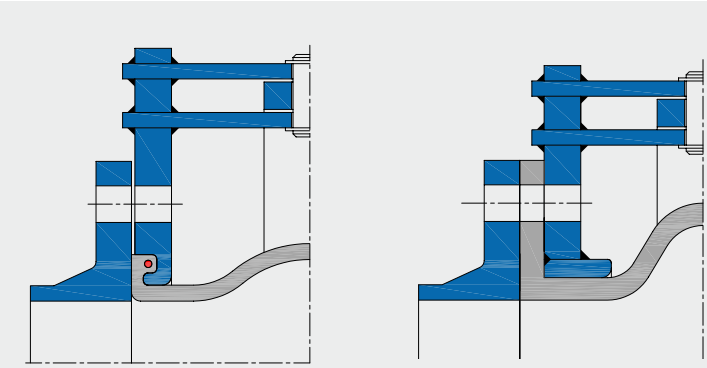
Swivel flange (1.) Solid rubber flange (2.)

Design G

Rubber expansion joint with cardan hinge bracing to absorb the reaction force, suitable for angular movement absorption in a circular plane. Two cardan hinge expansion joints with intermediate tube can absorb very large lateral movements from two planes. In a 3-way combination, soft corners can be created to absorb expansion from three planes (see installation examples).

Fixed point load: Angular stiffness torque and frictional torque from bearings

Production: 1. DN 32 - DN 1000
2. DN 200 - DN 5000



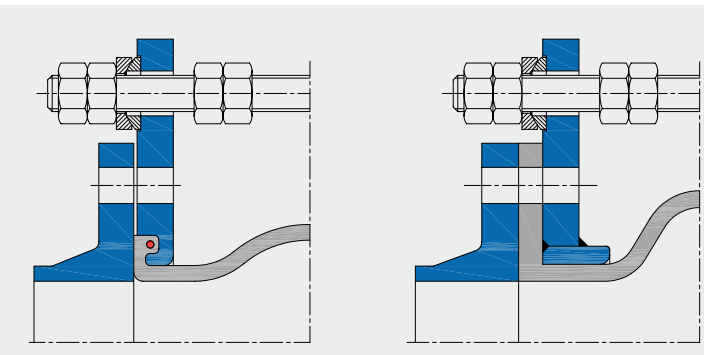
Swivel flange (1.) Solid rubber flange (2.)

Design H

Rubber expansion joints with tie rods to absorb the reaction force. Tie rods are mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces), secured with lock nuts and with adjustable internal stop (lock nuts) to secure the bellow. Suitable for large lateral movement absorption.

Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.) Solid rubber flange (2.)

WILLBRANDT **Bracings**

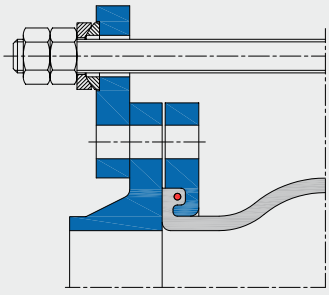
Design K

Segment bracing from counter flange to counter flange, with tie rods to absorb the reaction force of the expansion joint. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for lateral expansion absorption.

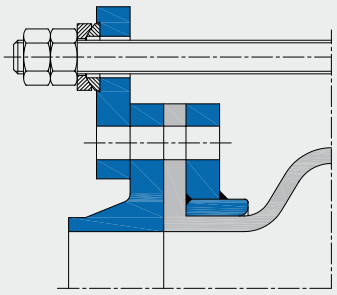
Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000

Note: In the case of large expansion joints and high pressure, the undulating load on the rubber flange must be taken into account.



Swivel flange (1.)



Solid rubber flange (2.)

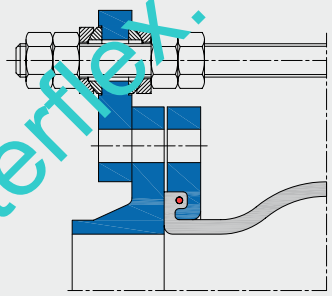
Design L

Segment bracing from counter flange to counter flange, with tie rods to absorb thrust and tensile forces (reaction force). Tie rods mounted in internal and external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for large, lateral movement absorption in the pressure and vacuum range.

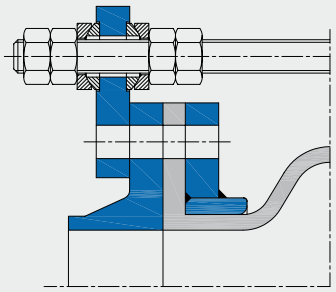
Fixed point load: Lateral stiffness rates plus bearing stiffness rates

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000

Note: In the case of large expansion joints and high pressure, the undulating load on the rubber flange must be taken into account.



Swivel flange (1.)



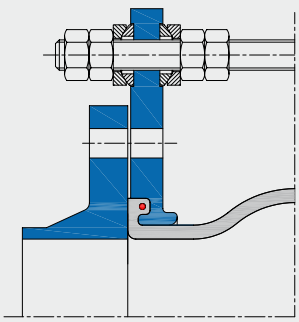
Solid rubber flange (2.)

Design M

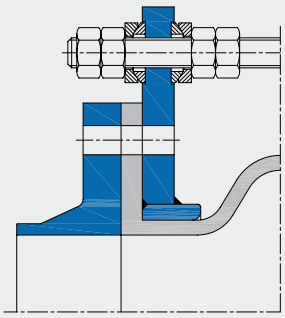
Rubber expansion joint with tie rods to absorb thrust and tensile forces (reaction force). Tie rods mounted in internal and external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces) and secured with lock nuts. Suitable for large, lateral movement absorption in the pressure and vacuum range.

Fixed point load: Lateral stiffness rate plus bearing stiffness rate

Production: 1. DN 200 - DN 1000
2. DN 40 - DN 5000



Swivel flange (1.)



Solid rubber flange (2.)

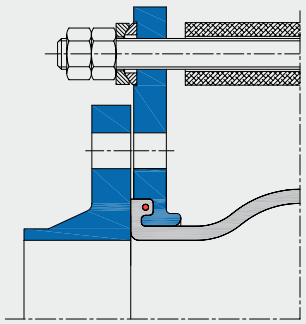
WILLBRANDT **Bracings**

Design S

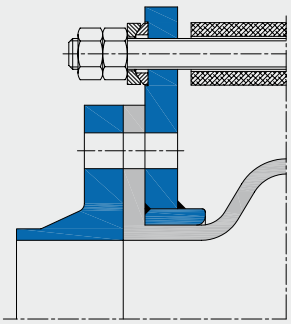
Rubber expansion joint with length limiter to absorb the reaction force. Tie rods mounted in external, PTFE-coated spherical washers and conical sockets (PTFE coating reduces frictional forces), secured with lock nuts and with thrust limiter (plastic bushing) to secure the bellow. Suitable for large, lateral expansion mounts.

Fixed point load: For external end stops, lateral stiffness rates and bearing stiffness rates, full reaction force and axial stiffness rates in the case of compression.

Production: 1. DN 200 - DN 500
2. DN 40 - DN 500



Swivel flange (1.)

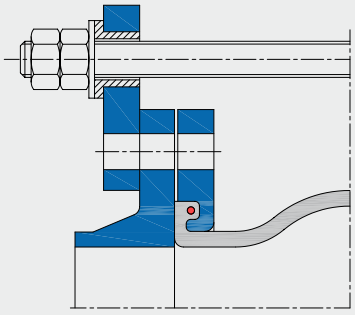


Solid rubber flange (2.)

Design R

Segment bracing from counter flange to counter flange, with tie rods to absorb the reaction force of the expansion joint. Tie rods mounted in rubber bushes and secured with lock nuts. Suitable for noise and vibration damping and for lateral expansion absorption.

Production: DN 20 - DN 200
Max. operating pressure: 10 bar



WILLBRANDT **Supporting Rings**

As rubber expansion joints are highly elastic elements, the rubber expansion joint must be equipped for vacuum operation with a corresponding vacuum supporting ring. Different designs are available.

Vacuum supporting spiral

A loose internal vacuum spiral made from 1.4571 stainless steel. The spiral is used for high corrugated expansion joints up to DN 500 (type 49) and for low corrugated expansion joints up to DN 300 (type 50/55) and from DN 65 to DN 125 (type 40).

DN 32 - DN 300 (500)

Vacuum supporting rings with bumper plate

Vacuum supporting ring made from 1.4571, 1.4539 stainless steel or special steel according to customers request. Can e used for DN 150 to DN 350.

DN 150 - DN 350

Vacuum supporting ring with lock

Vacuum supporting ring with lock made from 1.4571, 1.4539 stainless steel or special steel according to customer request. These supporting rings are used for DN 150/500 - DN 5000.

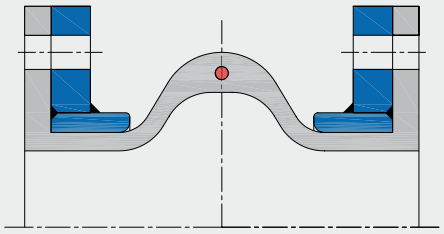
DN 150 - DN 450

from DN 5000

Vulcanised vacuum supporting ring

This version is used in applications in which heavily abrasive media may affect the supporting ring or in which media with fibrous materials are transported. It is also used where the expansion joint is operated in vacuum and overpressure range or at critical points where turbulence could cause the support ring to break or be flushed out.

Please bear in mind that vulcanized vacuum supporting rings significantly reduce the elasticity of the expansion joint and therefore limit the movement and pressure absorption. This version can only be used for hand-made expansion joints.



Typ 40 DN 100 - DN 5000

PTFE vacuum supporting ring

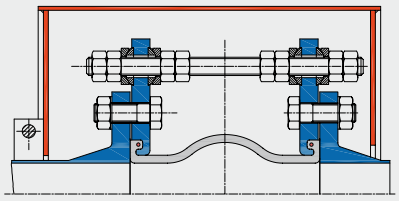
PTFE vacuum supporting ring for high chemical loads. However, please note that because the supporting ring is made from 100 % PTFE, the vacuum resistance falls as the temperature increases. In nominal diameters from DN 65 to DN 300, this version is used for low corrugated expansion joints (our low corrugated expansion joints up to DN 50 are vacuum-resistant without a supporting ring).

Typ 50/55 DN 50 - DN 300

WILLBRANDT **Accessories**

Earth protection cover

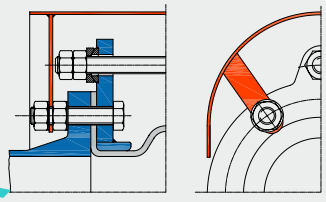
The earth protection cover is necessary when rubber expansion joints are installed in the ground and the bellow must be protected from direct contact with sand. The earth protection cover allows the expansion joint to retain its mobility so that it can absorb building subsidence and pipe displacements. The cover is manufactured in two parts so that it can be fitted after the expansion joint has been completely installed. It is attached to one side of the pipework, preferably on the non-moving side.



Earth protection cover

Sun protection cover

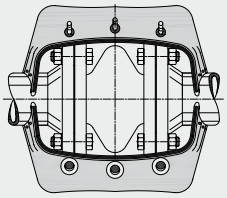
It is used wherever strong sunlight is to be expected, to prevent hardening (aging). The cover is manufactured as a single piece with ¾ circumference. Fastening can be done directly with the flange connection bolts. It is important to ensure that longer bolts than usual are used for fastening the cover, as an additional locknut needs to be accommodated. The covers are made from stainless steel 1.4301, with other materials available on request.



Sun protection cover

Flame protection cover

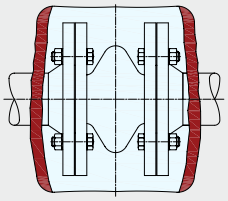
The flame protection cover is used where open fire is to be expected in order to protect the system. The main area of application is the engine room of ships. The cover is supplied in one piece with a resealable opening. After final installation of the expansion joint, it is placed around the expansion joint and the mating flanges and closed.



Flame protection cover

Splash protection cover (acid-resistant)

The splash protection cover should be used where hot and/or aggressive media are conveyed and personal protection is required. The cover is preferably made of PTFE and can be fitted with a viewing window and a drain valve. The cover is designed so that the expansion joint can be completely fitted first. The cover is placed around the expansion joint in the shape of a jacket and closed.



Splash protection cover

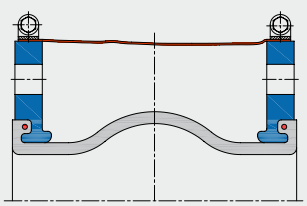
Adapter disc

A adapter disc made of steel is used if the inside diameter of the sealing surface of the counter flange is larger than that of the rubber bellow (please refer to the table Rubber bellow sealing profiles on page 101). This may be the case when using crimped flanges or slip-on flanges. An additional seal between the counter flange and the adapter disc is necessary.

Adapter disc

Ember and dust protection

This is a simple protective band made of aluminium-glass fabric, which is intended to prevent hot ash or embers falling down and damaging the expansion joint during heavy-duty operation, e.g. in steelworks. It is also intended to prevent heavy soiling between the bellow and flange, which can lead to excessive abrasion during movement. The dust protection cover is supplied as a sleeve and attached to the flange using hose clamps. All covers are designed in such a way that the freedom of movement of the expansion joints is not restricted.



Ember and dust protection cover

WILLBRANDT **Guide Sleeves**

Guide sleeve

Rubber expansion joints are elastic tubular elements with an integrated corrugation. This shaft can cause turbulence in the expansion joint at high flow velocities, resulting in increased pressure loss. The bellow can also be damaged. We also recommend the use of a guide tube to protect the bellow in the case of media containing solids. For normal liquids, a guide tube should be used from a flow velocity of 4 or 5 m/s and for gases from 20 m/s. The use of a guide tube is generally recommended as wear protection for pipes carrying solids.

The guide sleeves are manufactured in different shapes. If the expansion joint only absorbs axial movement, a close-fitting cylindrical guide sleeve can be selected. If the expansion joint is to absorb lateral movement, the guide sleeve must be cranked at the inlet, or a conical guide sleeve is recommended for large lateral expansions.

For expansion joints with a sealing bead and swivelling flanges, the guide sleeves are manufactured as slide-in sleeves with a collar. For expansion joints with solid flanges, the guide tube has also a flange.

For swiveling flanges

For solid flanges

PTFE guide sleeve

This material is used if high chemical resistance to aggressive media is required.

Important note

The standard material for guide sleeves is 1.4571 stainless steel. Guide sleeves can also be made from 1.4539 stainless steel for seawater or hardcover abrasive materials. Other materials are available upon request. Guide sleeves must be fitted with additional seals.

In order to prevent vacuums forming or dust settling between the guide sleeve and the bellow, guide sleeves are manufactured with corresponding relief holes.

- Cylindrical version for axial movement only
- Cylindrical version with conical neck (inlet) for axial and lateral movement
- Telescopic guided sleeve for axial and lateral movement and complete bellow protection
- Conical version for large inlet opening and for axial and lateral movement

We recommend guide sleeves for:

	Liquids	Gases
• Type 49	up from 4 m/s	up from 20 m/s
• Types 39, 50, 51, 52, 55	up from 5 m/s	up from 30 m/s
• Type 40	up from 5 m/s	up from 30 m/s

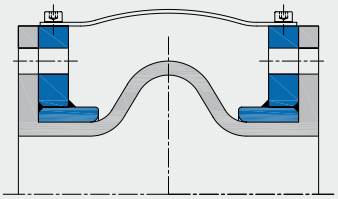
Please note that the standard guide sleeve (type 49, 50 and 55) is designed for axial movement. The max. lateral movement absorption is +/- 5 mm. If higher lateral movement is required, please note that the sleeve is reduced by double the value of the lateral movement in the external diameter of the pipe in order to prevent contact between the bellow and the guide sleeve at maximum load.

WILLBRANDT **Potential equalisation**

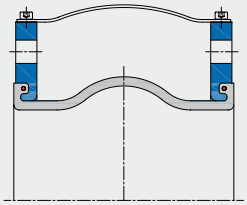
Rubber expansion joints have different electrically conductive resistances. It can be seen in the data sheets, there are rubber compounds that are electrically conductive and those that only a low condutive electrically surface. The rubber compounds made of CSM, CR and NBR white have an insulating effect.

In order to achieve conductivity of non-conductive or only low conductive expansion joints, we recommend flange-to-flange potential equalisation. This guarantees that the corresponding levels can be tolerated in the piping system and that the system is earthed.

Type 40 A



Type 50 A

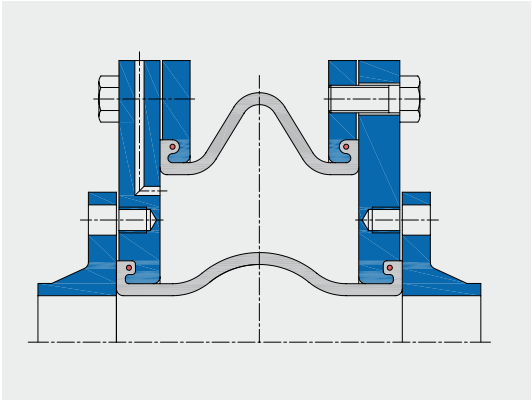


WILLBRANDT **Special Designs**

Safety expansion joint

Safety expansion joints are used wherever highly aggressive media are transported and where human life or production plants are at risk if the expansion joint fails. The safety expansion joint consists of two pressure-resistant expansion joints that must be selected according to the medium. The bellows are mounted together in such a way that a tight gap is created, which can be monitored by a pressure gauge or pressure sensor. This expansion joint can be produced with or without a length limiter and for axial, lateral or angular expansion.

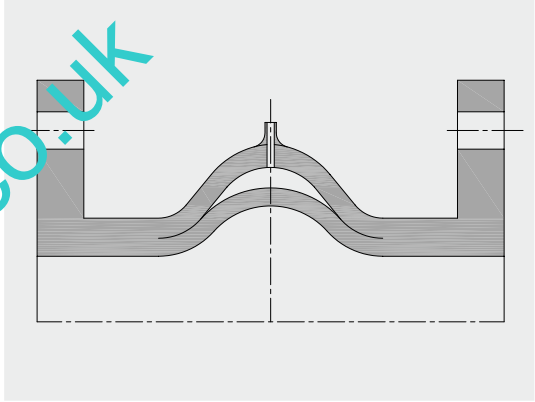
Both expansion joints are designed for the full operating pressure. If the inner expansion joint is damaged, the outer expansion joint cover is still fully operational.



Safety bellow

Rubber expansion joints with safety bellow are used where highly abrasive or aggressive media are transported and where human life or production plants are at risk if the expansion joint fails.

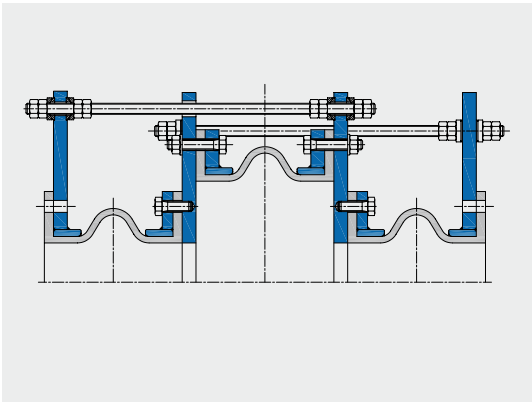
The safety bellow is a rubber bellow with an intermediate separating layer and an outlet sleeve incorporated into the outer layer. This can be fitted with a measuring probe, a pressure gauge or a drain so that a corresponding signal can be given when the inner layer is worn.



Axial balanced expansion joint

The axially balanced rubber expansion joint is used when axial movement occurs in the pipe system and cannot be absorbed by fixed points such as on turbine nozzles, pump housings and tank nozzles.

The principle of this expansion joint is to neutralise the reaction forces caused by the two small working expansion joints (DN pipe) in the plus direction by the expansion joint twice the size. This means that only the axial adjustment forces of the expansion joint unit have to be taken into account when loading the nozzle.



Pressure-balanced expansion joint

This type of expansion joint is always used when axial expansion occurs but high nozzle loads are not permitted, e.g. on turbine nozzles or tank nozzles, which are very sensitive to axial shear forces.

The way the pressure-balanced expansion joint works is that the medium is deflected at a 90° angle between the bellows and an expansion joint with a blind flange absorbs the reaction force of the expansion joint absorbing the movement.

The connecting rod between the two expansion joints is to be regarded as a cardanic cage that absorbs the reaction force. The stiffness rates from axial and lateral movement are still transmitted to the fixed point or connection nozzles.