

WILLBRANDT PTFE Expansion Joint Type 81 HD

■ not in stock

DN 20 to DN 1500

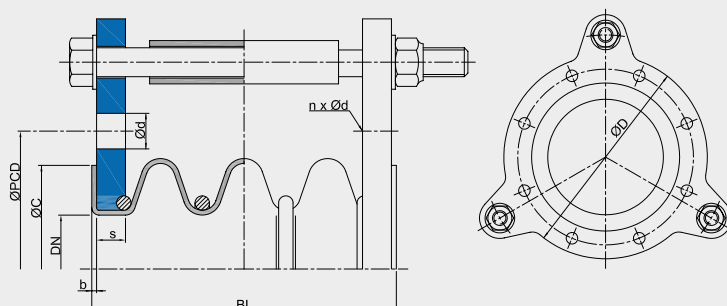
Type 81 HD is a 1 to 6 corrugated PTFE expansion joint with a constant wall thickness over the whole bellows area. It is characterised by its high resistance to pressure and temperature and its large movement absorption (depending on the number of corrugations). The PTFE material ensures high media resistance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

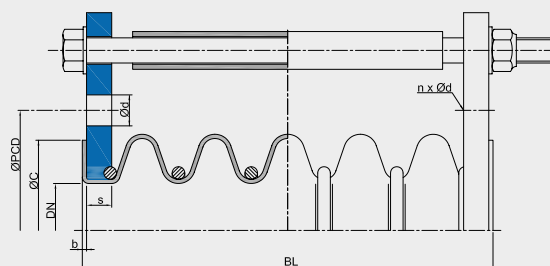


Bellow design	Multi-corrugated, PTFE bellow with stainless steel external stainless steel supporting rings, PTFE bead on both sides for steel flanges with integrated tie rods. Standard version: white PTFE, electrically insulating. Special version: black PTFE, electrically conductive.	Pressure resistance	Max. 16 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
Approvals/conformity	FDA and EG 1935/2004 (Detailed overview on page 5.)	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 and installation instructions.

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Dimensions

DN	Di (bellow) mm	Length BL						Bellow			Flange PN 10 ^{*2}					
		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	mm ²	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.

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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	10.7	5.8	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	10.7	5.8	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	10.2	5.4	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	9.7	5.1	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	15.5	9.2	4.7	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	14.6	8.7	4.4	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	13.9	8.2	4.1	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	13.2	7.7	3.9	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	12.4	7.3	3.6	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	11.8	6.9	3.4	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	10.9	6.3	3.1	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	10.2	5.9	2.9	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	9.6	5.5	2.8	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	9.2	5.2	2.6	6.8	4.2	2.2	-	-	-
400		12.0	6.3	2.6	12.9	7.2	2.9	9.4	5.5	2.9	8.8	5.0	2.5	6.5	4.0	2.1	-	-	-
450		11.7	6.1	2.4	12.6	7.0	2.9	9.0	5.2	2.8	8.4	4.8	2.4	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	8.1	4.6	2.4	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	7.5	4.2	2.2	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.

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Stiffness rates (1 to 3 corrugations)

DN*	1-corrugated				2-corrugated				3-corrugated			
	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°
20	330	330	225	4.5	165	165	113	2.3	110	110	75	1.5
25	330	330	225	4.5	165	165	113	2.3	110	110	75	1.5
32	342	342	324	6.6	171	171	162	3.3	114	114	108	2.2
40	366	366	426	8.7	183	183	213	4.4	122	122	142	2.9
50	558	558	495	9.9	279	279	247	5.0	186	186	165	3.3
65	462	462	588	11.4	231	231	294	5.7	154	154	196	3.8
80	462	462	693	14.1	231	231	347	7.1	154	154	231	4.7
100	576	576	780	16.2	288	288	390	8.1	192	192	260	5.4
125	900	900	1005	21.3	450	450	503	10.7	300	300	335	7.1
150	1098	1098	1155	31.8	549	549	578	15.9	366	366	385	10.6
200	393	261	1260	33.6	197	131	630	16.8	131	87	420	11.2
250	507	333	1524	47.4	254	167	762	23.7	169	111	508	15.8
300	630	417	1830	69.3	315	209	915	34.7	210	139	610	23.1
350	720	477	2100	82.5	360	239	1050	41.3	240	159	700	27.5
400	819	540	2400	99.3	410	270	1200	49.7	273	180	800	33.1
450	960	633	2700	114.0	480	317	1350	57.0	320	211	900	38.0
500	1047	690	3000	129.0	524	345	1500	64.5	349	230	1000	43.0
600	1272	840	3600	180.0	636	420	1800	90.0	424	280	1200	60.0
700	-	-	-	-	-	-	-	-	500	330	1400	78.0
800	-	-	-	-	-	-	-	-	576	380	1600	97.0
900	-	-	-	-	-	-	-	-	652	430	1800	118.0
1000	-	-	-	-	-	-	-	-	728	580	2000	142.0

* Values for DN 1100 to 1500, 3-corrugated on request

The stiffness rates are valid for 20 °C +/- 30 %.
For higher temperatures, please note the correction factors below.

Stiffness rates (4 to 6 corrugations)

DN	3-corrugated				4-corrugated				5-corrugated			
	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°	axial compression N/mm	axial elongation N/mm	lateral N/mm	angular Nm/°
20	83	83	57	1.2	66	66	45	0.9	55	55	38	0.8
25	83	83	57	1.2	66	66	45	0.9	55	55	38	0.8
32	86	86	81	1.7	69	69	65	1.4	57	57	54	1.1
40	92	92	107	2.2	74	74	86	1.8	61	61	71	1.5
50	140	140	124	2.5	112	112	99	2.0	93	93	83	1.7
65	116	116	147	2.9	93	93	118	2.3	77	77	98	1.9
80	116	116	174	3.6	93	93	139	2.9	77	77	116	2.4
100	144	144	195	4.1	116	116	156	3.3	96	96	130	2.7
125	225	225	252	5.4	180	180	201	4.3	150	150	168	3.6
150	275	275	289	8.0	220	220	231	6.4	183	183	193	5.3
200	99	66	315	8.4	79	53	252	6.8	-	-	-	-
250	127	84	381	11.9	102	67	305	9.5	-	-	-	-
300	158	105	458	17.4	126	84	366	13.9	-	-	-	-
350	180	120	525	20.7	144	96	420	16.5	-	-	-	-
400	205	135	600	24.9	164	108	480	19.9	-	-	-	-
450	240	159	675	28.5	192	127	540	22.8	-	-	-	-
500	262	173	750	32.3	210	138	600	25.8	-	-	-	-
600	318	210	900	45.0	255	168	720	36.0	-	-	-	-

The stiffness rates are valid for 20 °C +/- 30 %.
For higher temperatures, please note the correction factors below.

Correction factor for temperatures

Temperature	80 °C	120 °C	150 °C
Factor	0.65	0.50	0.40