

Edge Welded Bellows

Standard Edge Welded Bellows



Special Edge Welded Bellows



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Introduction



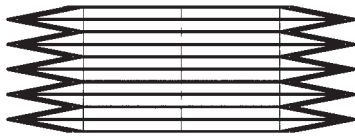
Edge welded bellows are flexible connecting elements between vacuum flanges or arbitrary end fittings. They counterbalance differences in height or angular offsets and serve as vibration dampers or lifting elements. Furthermore, they are used in linear feedthroughs, as valve seals, in handling systems and in process automation.

Edge welded bellows consist of a number (depending on the application) of moulded thin metal plates (diaphragms) which are welded together alternately at their inner and outer diameter. Two of these at the inner diameter welded bellows form a convolution.

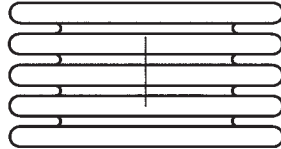
In comparison to flexible hoses, which are made of a thin-walled, partly straight bead welded and hydroformed tube, edge welded bellows can execute significantly larger lateral, axial and angular motions in relation to their size and have a lower spring rate.

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Schematic Comparison of Edge Welded Bellows and Flexible Hoses



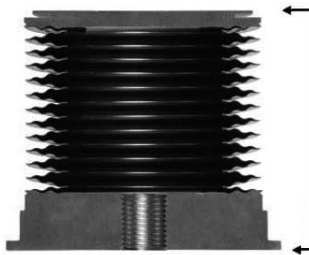
Edge welded bellows



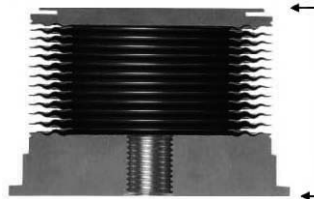
Flexible hose

Schematic Comparison of the Elongation of Edge Welded Bellows

L_e = stretched length ~ +30 %



L_f = free length 100 %



L_c = press formed length ~ -70 %



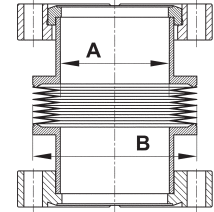
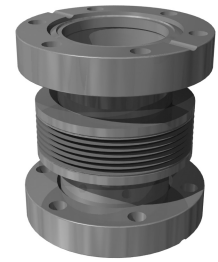
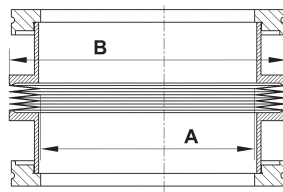
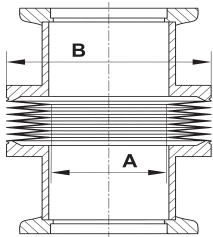
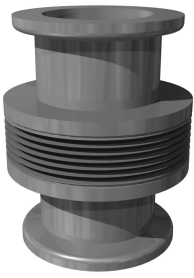
Edge Welded Bellows Service and Repair



Besides the fabrication of special edge welded bellows, we offer the possibility of manufacturing replacement edge welded bellows or repair damaged bellows. This also includes for instance bellows feedthroughs of valve drives, coupling elements or manipulators.

A precise draft or sketch (if possible a photo) is essential for quotation. You could also send a sample or the damaged bellows for the estimate of costs directly. In this case please contact us before shipment.

Standard Edge Welded Bellows



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Technical data

- Bellows material
- KF flange material
- CF flange material
- Number of cycles
- Pressure difference
- Operating temperature
- Bakeout temperature
- Options

stainless steel 316L
 stainless steel 316L
 stainless steel 304
 10,000 cycles
 1 bar (vacuum inside)
 20 °C
 80 °C

higher bakeout temperatures, extended number of cycles, different materials, construction for overpressure (special edge welded bellows on page 5-5)

Order code	Flange	A	B	Convo- lutions	L _{min} (base)	Free length	L _{max} (base)	Base stroke	Additional stroke	Additional L _{min}	Additional convolutions
KF16EWB-X	DN16KF	16	31.5	8	32	38	42	10	10	3.6	8
KF25EWB-X	DN25KF	26	46	6	31	39	41	10	10	2.5	6
KF40EWB-X	DN40KF	39	59	6	33	43	45	10	10	2.2	5
ISO63EWB-X	DN63ISO	75	100	4	73	81	85	10	10	2.4	4
ISO100EWB-X	DN100ISO	102	132	4	83	92	95	10	10	2	4
ISO160EWB-X	DN160ISO	150	185	4	94	102	106	10	10	2.3	3
EWB16R-X	DN16CF	16	31.5	8	44	-	54	10	10	3.6	4
EWB40R-X	DN40CF	39	59	6	63	-	75	10	10	2.2	4
EWB63R-X	DN63CF	65	90	4	73	-	85	10	10	2.7	3
EWB100R-X	DN100CF	102	132	4	83	-	95	10	10	2.0	4
EWB160R-X	DN160CF	150	185	4	94	-	106	10	10	2.3	3

Please specify the required stroke in millimetres in the order code instead of the "X". (e. g.: X = 40 means 40 mm stroke)

Attention: The bellows' data and sizes are subject to re-engineering and therefore can not be assured. Please ask for the active data.

Special Edge Welded Bellows

Introduction

Besides the standard edge welded bellows we deliver custom edge welded bellows suited to your special requirements. The following lists technical data for the available diaphragm profiles and their materials as well as the selection of end fittings.

The following criteria need to be considered in order to design custom bellows:

- **Features of the surrounding area**
such as bakeout temperature, operating pressure, operating temperature, possible torsion and inspection pressures influence the life cycle directly.
- **Vacuum inside the edge welded bellows (outside overpressure)**
Edge welded bellows are stabilised by the vacuum inside. They can be ten times as long as its outside diameter in case of horizontal installation. In case of zero pressure difference, the bellow will get an unstable position.
- **Vacuum outside of the edge welded bellows (inside overpressure)**
In this case the diaphragm bellows are very unstable and buckle soon. The bellows need to be axially stabilised by a guidance.
- **Horizontal installation of long edge welded bellows**
The deflection of the edge welded bellows has to be considered especially in this installation position. It is recommended to split the bellows with intermediate rings into fragment bellows and put up the intermediate rings into the guidance system.
- **Vertical installation of long edge welded bellows**
It needs to be considered, that the diaphragm on top has always to carry the weight of the whole edge welded bellows. The edge welded bellows should also be split into fragment bellows by intermediate rings and should be released by rods or wires for traction relief.

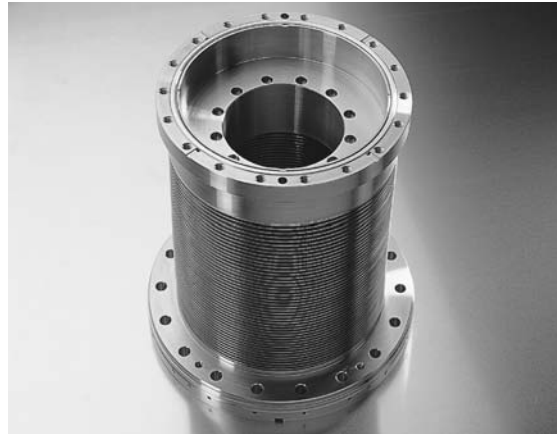
Please see the request form for your custom edge welded bellows at the end of this chapter. Please fill in as correctly as possible that we can give you a correct and attractive quote as soon as possible.

Materials

Materials	Temperature range	Corrosion resistance	Applications/Comments
Austenitic stainless steels			
Stainless steel 304L	-250 to +425 °C	Good resistance, except to halogen hydrogen and halogen salts	Low carbon content prevents carbide deposition. Usage in connecting elements in cryo technics, expansion elements and with connecting elements of smaller spring constants
Stainless steel 316L	-250 to +425 °C	Good resistance to hydrogen flouride, seawater	Usage in feedthroughs for cryo technics, connecting elements, expansion elements, pure gas valves, measuring and medical devices
Stainless steel 347L	-250 to +425 °C	Good resistance, except to halogen hydrogen and halogen salts	Usage in manipulators in cryo technics, feedthroughs, vibration isolators and travelling wave tube couplings, suited for applications with small spring constant over a large range
Precipitation hardened stainless steels			
AM 350	-73 to +425 °C	NOT resistant to strong inorganic acids (sulfur, salpêtre), rusting in salt-water containing atmosphere	Good stability, slightly magnetic, excellent universal alloy, operation in couplings, compensators, feedthroughs and vacuumvalves
AM 350 (SCT 850)	-73 to +425 °C		Good stability, magnetic, low hysteresis, usage as sealing in instantaneous couplings, sensors/aneroids, valves with long lifetime, manipulators and feedthroughs
Corrosion-/heat resistant alloys based on nickel			
Hastelloy	-250 to +540 °C	High resistance to acid chlorides and oxidation	Ideal for highly corrosive applications in petrochemistry, process industry, vessel valves, expansion elements and connecting elements
Inconel 625	-250 to +815 °C	High resistance at high temperatures, to acids/, bakeable in atmosphere	Usage in corrosive high temperature applications as guidances, expansion elements, compensators, special connections and valves
Inconel 718	-250 to +700 °C	High resistance to oxidation, in acids and atmosphere	Good stability, temperature resistance and low hysteresis, usage in aviation and shipbuilding, sealings, fuel draining sensors and components with long lifetime
Commercial pure titanium			
Titanium CP4	+20 to +425 °C	High resistance to salt-water, chloride gas, hydrogen flouride	Light and inert, suitable for use in aviation, laser and medical applications

Special Edge Welded Bellows

Examples for customised edge welded bellows assemblies:



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Edge welded bellows for floating-ring seals

- Small mounting length
- Pressure resistant
- Chemically resistant materials (e. g. Hastelloy)
- Temperature resistant materials (e. g. Inconel)

Edge welded bellows with custom end fittings

- Produced to customer's drawing
- Direct mounting without further prework
- Maximum design freedom
- Optimal system integration



Edge welded bellows with rod feedthroughs

- Valve drives
- Linear motion feedthroughs
- Handling systems inside vacuum
- Components in process automation

Edge welded bellows with non-circular shapes

- Racetrack, elliptical, other shapes
- Maximum design freedom
- Precise geometric shapes
- Optimal system integration

Please ask for the special catalogue "Replacement Edge Welded Bellows for the Semiconductor Industry": www.vacom-vacuum.com.

Special Edge Welded Bellows

Standard

■ Material	stainless steel 316L or AM350
■ Pressure difference	1 bar (inside pressure < outside pressure)
■ Number of stress cycles	10,000
■ Operating temperature	20 °C
■ Bakeout temperature	80 °C (optional: 316L to 450°C, AM350 to 250 °C)
■ Options	different numbers of cycles, bakeout temperatures, materials and differential pressures

Standard Type, Stainless Steel 316L (1.4435)

- Large strokes with small deflection forces, narrow shape
- For universal use in vacuum and semiconductor industry
- Differential pressure up to approx. 7 bar

Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)
DN10	6	13	0.08	0.35	0.55	0.25	0.60	0.74	130	1.10	24.7
	8	16	0.08	0.35	0.60	0.40	0.75	1.17	80	1.43	22.0
	9	20	0.10	0.40	0.80	0.60	1.00	1.7	87	1.72	23.3
	10	20	0.10	0.40	0.85	0.60	1.00	1.83	79	1.72	23.3
	13	26	0.10	0.34	0.86	0.86	1.20	3.10	88	1.90	23.3
DN16	16	31.5	0.13	0.43	1.18	1.21	1.64	4.59	50	2.20	26.9
	19	37	0.13	0.45	1.60	1.70	2.15	6.37	91	2.63	28.3
	21	41	0.13	0.48	1.83	1.80	2.28	7.81	54	2.52	31.4
DN25	26	46	0.13	0.40	1.75	1.90	2.30	10.4	62	2.37	32.7
	31	51	0.13	0.50	2.20	1.90	2.40	13.5	39	2.13	38.9
	36	56	0.13	0.50	1.90	1.95	2.45	16.9	33	2.00	42.4
DN40	39	59	0.13	0.44	2.19	2.00	2.44	19.1	41	1.94	42.5
	46	62.5	0.13	0.50	1.60	1.50	2.00	23.3	90	1.38	52.1
	46	71	0.13	0.50	2.50	2.30	2.80	27.3	44	1.86	50.9
DN50	51	76	0.13	0.50	2.75	2.40	2.90	32.1	38	1.81	53.8
	60	88	0.15	0.51	2.50	2.80	3.31	43.5	65	1.82	60.0
DN63	65	90	0.15	0.70	2.70	2.70	3.40	47.6	72	1.72	68.3
	70.5	95	0.15	0.75	2.50	2.65	3.40	54.2	81	1.60	74.7
	75	100	0.15	0.60	2.80	2.90	3.50	60.5	69	1.66	70.7
	77	107	0.15	0.74	2.60	2.86	3.60	67.1	50	1.53	81.2
	83.5	108	0.15	0.66	2.11	2.53	3.19	72.4	77	1.34	82.2
	90	120	0.15	0.65	2.87	2.80	3.45	87.2	55	1.34	87.9
DN100	102	132	0.15	0.51	2.91	3.10	3.61	108	60	1.35	88
	127	157	0.20	0.75	2.96	3.20	3.95	159	130	1.17	115
DN160	150	185	0.20	0.75	3.40	3.40	4.15	221	112	1.05	133
	162.5	195	0.20	0.75	3.10	3.00	3.75	252	144	0.88	146
	180	215	0.20	0.75	2.90	3.40	4.15	307	124	0.91	155
DN200	200	235	0.20	0.75	3.30	3.40	4.15	372	120	0.83	169
DN250	250	285	0.20	0.80	3.30	3.20	4.00	563	180	0.64	214
	270	310	0.20	0.75	3.50	3.70	4.45	662	140	0.68	218
DN320	320	360	0.20	0.80	3.80	3.80	4.60	909	145	0.60	256

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

Other sizes, materials and specifications on request.

Special Edge Welded Bellows

Standard Type, Stainless Steel 633 (AM350)

Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)
DN10	6	13	0.08	0.40	0.75	0.50	0.90	0.74	130	2.20	16.9
	8	16	0.08	0.40	0.90	0.50	0.95	1.17	99	1.9	22.4
	9	20	0.08	0.40	1.05	1.30	1.70	1.73	59	3.72	16.2
	10	20	0.08	0.30	1.00	1.00	1.30	1.83	80	2.86	16.0
	13	26	0.08	0.40	1.45	1.70	2.10	3.10	42	3.75	19.1
DN16	16	31.5	0.10	0.50	1.52	1.72	2.06	4.59	37	3.13	22.0
	19	37	0.10	0.40	1.90	2.30	2.70	6.37	68	3.56	24.9
	21	41	0.10	0.40	2.24	2.50	2.90	7.81	36	3.49	27.1
DN25	26	46	0.10	0.50	2.10	2.90	3.40	10.4	49	3.61	30.9
	31	51	0.10	0.50	2.40	3.10	3.60	13.5	39	3.48	33.7
	36	56	0.10	0.50	2.40	3.20	3.70	16.9	49	3.27	36.8
DN40	39	59	0.10	0.50	2.55	3.30	3.80	19.1	37	3.20	38.4
	46	62.5	0.10	0.50	2.10	1.90	2.40	23.3	115	1.74	47.7
DN50	46	71	0.13	0.55	2.90	4.00	4.55	27.3	54	3.23	45.3
	51	76	0.13	0.60	2.95	3.18	3.78	32.1	41	2.40	52.3
	60	88	0.13	0.60	2.80	3.70	4.30	43.5	75	2.41	58.3
DN63	65	90	0.13	0.75	2.72	3.80	4.65	47.6	63	2.48	62.3
	70.5	95	0.13	0.80	2.70	3.20	4.00	54.2	52	1.93	71.3
	75	100	0.13	0.60	2.60	4.10	4.70	60.5	50	2.35	64.6
	77	107	0.13	0.73	3.05	4.27	5.00	67.1	42	2.29	71.8
	90	120	0.13	0.76	3.30	3.74	4.50	87.2	43	1.79	84.4
DN100	102	132	0.13	0.70	2.81	3.85	4.55	108	46	1.67	90
	127	157	0.15	0.75	3.40	4.20	4.95	159	94	1.53	107
DN160	150	185	0.15	0.75	3.60	4.40	5.15	221	166	1.36	124
	162.5	195	0.15	0.70	3.30	4.00	4.70	252	140	1.18	132
	180	215	0.15	0.70	3.85	4.40	5.10	307	142	1.17	142
DN200	200	235	0.15	0.70	3.80	4.40	5.10	372	71	1.07	155
DN250	250	285	0.15	0.70	3.80	4.40	5.10	563	78	0.88	188
	270	310	0.20	0.80	3.50	4.60	5.40	662	90	0.85	209
DN320	320	360	0.20	0.80	4.20	4.80	5.60	909	95	0.76	240

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

Other sizes, materials and specifications on request.

Special Edge Welded Bellows

Wide Type, Stainless Steel 316L (1.4435)

- Large strokes with small deflection forces, wide shape
- For use in vacuum, semiconductor and food industry
- Differential pressure up to approx. 3 bar

Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)
8	9	31.5	0.13	0.48	1.90	1.40	1.88	3.55	52	2.55	26.6
20	21	49	0.13	0.50	1.75	2.10	2.60	10.1	55	2.46	36.2
35	36.8	72	0.15	0.60	3.05	3.00	3.60	24.1	72	2.39	50.4
40	41.5	81	0.20	0.70	3.06	3.40	4.10	30.5	97	2.41	57.2
45	48	88	0.20	0.70	3.95	3.40	4.10	36.9	86	2.21	52.1
50	2" 52	95	0.20	0.80	3.65	3.60	4.40	43.6	88	2.17	68.6
55	56	102	0.20	0.75	4.20	3.70	4.45	50.4	81	2.08	71.7
70	72	115	0.20	0.75	4.10	3.60	4.35	69.9	77	1.79	81.5
75	3" 77.5	120	0.20	0.75	3.60	3.40	4.15	77.8	88	1.62	86.5
80	82	125	0.20	0.85	3.71	3.45	4.30	85.3	70	1.58	93.3
90	90.5	135	0.20	0.75	4.45	4.20	4.95	101	73	1.78	91.6
100	4" 102.5	150	0.20	0.95	5.20	5.00	5.95	127	56	1.91	104
105	107.5	155	0.20	1.10	5.10	4.90	6.00	130	65	1.81	112
130	5" 132.5	165	0.20	0.75	3.10	3.25	4.00	174	120	1.13	121
150	6" 162.5	210	0.20	1.00	5.15	5.00	6.00	274	49	1.36	147
275	280	330	0.20	1.28	4.60	5.00	6.28	732	55	0.87	249
400	403	462	0.30	1.00	3.70	5.00	6.00	1471	200	0.62	323
500	506	564	0.30	1.00	3.80	5.20	6.20	2250	250	0.53	390

Wide Type, Stainless Steel 633 (AM 350)

Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)
8	9	31.5	0.13	0.45	1.90	2.10	2.55	3.55	51	3.82	22.5
20	21	49	0.13	0.60	3.40	3.50	4.10	10.1	43	4.09	32.9
35	36.8	72	0.13	0.60	3.90	3.80	4.40	24.1	68	3.02	47.4
40	41.5	81	0.13	0.60	3.60	4.20	4.80	30.5	45	2.97	52.1
45	47	88	0.13	0.60	4.70	4.40	5.00	36.9	75	2.86	56.0
50	2" 52	95	0.13	0.60	4.70	4.40	5.00	43.6	80	2.65	60.5
55	56	102	0.13	0.60	5.10	5.10	5.70	50.4	40	2.86	6.30
70	72	115	0.15	0.68	4.60	4.80	5.48	69.9	55	2.39	73.8
75	3" 77.5	120	0.15	0.68	4.30	4.00	4.68	77.8	72	1.91	80.4
80	82	125	0.15	0.75	4.50	4.60	5.35	85.3	100	2.11	82.9
90	90.5	135	0.15	0.75	4.20	4.10	4.85	101	80	1.74	92.2
100	4" 102.5	150	0.20	1.20	5.00	5.00	6.20	127	55	1.91	111
105	107.5	155	0.20	1.20	5.50	5.00	6.20	137	65	1.85	115
130	5" 132.5	165	0.20	0.75	3.60	3.80	4.55	174	80	1.32	115
150	6" 162.5	210	0.20	1.10	5.15	7.00	8.10	274	85	1.91	138
400	403	462	0.20	0.80	4.00	6.00	6.80	1471	150	0.74	293

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

Other sizes, materials and specifications on request.

Special Edge Welded Bellows

Small Type, Stainless Steel 316L (1.4435)

- Small strokes with relatively large deflection forces, very narrow shape
- For slide ring seal manufacturing, vacuum and semiconductor industry
- Differential pressure up to 30 bar

Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)	
18	5/8"	19	31.7	0.13	0.43	1.00	1.00	1.43	5.15	175	1.81	29.5
20	3/4"	21.3	34.0	0.10	0.40	0.90	0.75	1.15	6.11	113	1.26	35.1
22	7/8"	23.8	36.5	0.10	0.40	0.90	0.75	1.15	7.25	116	1.18	37.7
24	7/8"	25.4	38.1	0.10	0.40	0.90	0.75	1.15	8.02	110	1.13	39.4
25	1"	27.0	39.7	0.10	0.40	1.15	0.80	1.20	8.84	94	1.15	39.7
28	1 1/8"	30.2	42.9	0.10	0.40	1.15	0.80	1.20	10.6	109	1.07	42.9
30	1 1/8"	31.8	44.5	0.10	0.40	1.15	0.85	1.25	11.5	96	1.09	43.2
32	1 1/4"	33.3	46.0	0.10	0.40	1.15	0.85	1.25	12.5	126	1.06	44.6
33	1 1/4"	34.3	47	0.10	0.40	1.15	0.85	1.25	13.1	91	1.04	45.6
35	1 3/8"	36.5	49.2	0.10	0.40	1.15	0.85	1.25	14.5	106	0.99	47.8
38	1 1/2"	39.7	52.4	0.10	0.40	1.15	0.90	1.30	16.8	137	0.98	49.5
40	1 5/8"	42.8	55.5	0.13	0.44	1.20	0.90	1.34	19.1	194	0.93	54.9
45	1 3/4"	46	57	0.13	0.44	1.10	0.80	1.24	20.9	197	0.80	59.9
45	1 3/4"	46.0	58.7	0.13	0.44	1.20	0.90	1.34	21.6	179	0.88	58.0
48	1 3/4"	49.2	61.9	0.13	0.44	1.20	0.90	1.34	24.3	198	0.83	61.2
50	2"	52.4	65.1	0.13	0.44	1.20	0.90	1.34	27.2	209	0.79	64.4
53	2 1/8"	55.0	67.0	0.13	0.44	1.10	0.80	1.24	29.3	232	0.68	70.4
55	2 1/4"	58.7	71.4	0.13	0.44	1.20	0.95	1.39	33.3	230	0.76	68.8
60	2 3/8"	61.9	74.6	0.13	0.44	1.20	0.95	1.39	36.7	321	0.73	71.9
63	2 1/2"	65.1	81.0	0.13	0.44	1.40	0.95	1.39	42.1	150	0.67	78.0
65	2 5/8"	68.3	84.1	0.13	0.44	1.40	1.00	1.44	45.8	226	0.68	79.1
70	2 3/4"	70.5	84.1	0.13	0.44	1.25	0.85	1.29	47.1	213	0.58	85.6
75	2 7/8"	76.2	92.1	0.13	0.44	1.60	1.20	1.64	55.8	142	0.75	79.8
80	3 1/8"	84.0	98.4	0.13	0.44	1.40	0.90	1.34	65.5	205	0.52	97.3
85	3 3/8"	88.9	104.8	0.13	0.44	1.50	1.10	1.54	73.8	174	0.60	94.3
90	3 1/2"	92.1	108.0	0.13	0.44	1.45	1.15	1.59	78.8	189	0.61	95.3
95	3 3/4"	98.4	114.3	0.13	0.44	1.45	1.10	1.54	89.0	197	0.55	103
100	3 7/8"	101.6	117.5	0.13	0.44	1.45	1.15	1.59	94.4	203	0.56	104
105	4 1/8"	107.9	123.8	0.13	0.44	1.45	1.15	1.59	106	216	0.53	109
110	4 1/4"	111.1	127.0	0.13	0.44	1.45	1.15	1.59	111	210	0.52	112
125	4 7/8"	127.0	143.0	0.13	0.44	1.45	1.15	1.59	143	246	0.46	126
158	6 3/4"	160	180	0.15	0.51	1.20	1.00	1.50	227	280	0.32	182

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

Other sizes, materials and specifications on request.

Special Edge Welded Bellows

Small Type, Stainless Steel 633 (AM350)

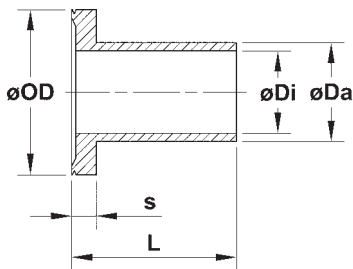
	Nominal diameter	Inner diameter	Outer diameter	Standard wall thickness of diaphragm	Compressed length per convolution	Free length per convolution	Operating stroke per convolution	Extended length per convolution	Effective area of differential pressure (cm ²)	Spring rate per convolution (N/mm)	Largest bending angle per convolution (°)	Smallest bending radius (°)
13	1/2"	14	26.7	0.08	0.35	1.45	1.35	1.70	3.36	60	2.90	20.3
18	5/8"	19	31.7	0.10	0.40	1.40	1.20	1.60	5.15	120	2.17	26.4
20	3/4"	21.3	34.0	0.10	0.40	1.40	1.00	1.40	6.11	125	1.69	30.6
22	7/8"	23.8	36.5	0.10	0.40	1.40	1.00	1.40	7.25	129	1.57	32.9
24	7/8"	25.4	38.1	0.10	0.40	1.45	1.20	1.60	8.02	135	1.80	31.8
25	1"	27.0	39.7	0.10	0.40	1.45	1.10	1.50	8.84	140	1.59	34.3
28	1 1/8"	30.2	42.9	0.10	0.40	1.40	1.05	1.45	10.6	157	1.40	37.8
30	1 1/8"	31.8	44.5	0.10	0.40	1.45	1.20	1.60	11.5	113	1.55	37.1
32	1 1/4"	33.3	46.0	0.10	0.35	1.38	1.65	2.00	12.5	134	2.08	32.8
33	1 1/4"	34.3	47.0	0.10	0.40	1.50	1.20	1.60	13.1	107	1.46	39.2
35	1 3/8"	36.5	49.2	0.10	0.40	1.55	1.20	1.60	14.5	112	1.40	41.0
38	1 1/2"	39.7	52.4	0.10	0.40	1.40	1.20	1.60	16.8	164	1.31	43.7
40	1 5/8"	42.8	55.5	0.10	0.33	1.55	1.60	1.93	19.1	105	1.65	39.2
45	1 3/4"	46	57	0.10	0.40	1.30	1.10	1.50	20.9	146	1.11	49.2
45	1 3/4"	46.0	58.7	0.10	0.40	1.40	1.25	1.65	21.6	178	1.22	48.1
48	1 7/8"	49.2	61.9	0.10	0.40	1.40	1.25	1.65	24.3	192	1.16	50.8
50	2"	52.4	65.1	0.10	0.40	1.50	1.25	1.65	27.2	131	1.10	53.4
53	2 1/8"	55.0	67.0	0.10	0.40	1.40	1.20	1.60	29.3	173	1.03	55.8
55	2 1/4"	58.7	71.4	0.10	0.40	1.40	1.30	1.70	33.3	167	1.04	57.7
60	2 3/8"	61.9	74.6	0.13	0.44	1.40	1.30	1.74	36.7	371	1.00	62.5
63	2 1/2"	65.1	81	0.13	0.50	1.80	1.50	2.00	42.1	170	1.06	67.5
65	2 5/8"	68.3	84.1	0.13	0.44	1.45	1.30	1.74	45.8	266	0.89	70.5
70	2 3/4"	70.5	84.1	0.13	0.44	1.55	1.30	1.74	47.1	251	0.89	70.5
75	2 7/8"	76.2	92.1	0.13	0.44	1.95	1.55	1.99	55.8	171	0.96	72.2
80	3 1/8"	84.0	98.4	0.13	0.44	1.90	1.50	1.94	65.5	234	0.87	78.1
85	3 3/8"	88.9	104.8	0.13	0.44	1.70	1.40	1.84	73.8	205	0.77	85.3
90	3 1/2"	92.1	108.0	0.13	0.44	1.95	1.55	1.99	78.8	201	0.82	84.7
95	3 3/4"	98.4	114.3	0.13	0.44	1.85	1.50	1.94	89.0	219	0.75	90.7
100	3 7/8"	101.6	117.5	0.13	0.44	1.70	1.40	1.84	94.4	226	0.68	95.7
105	4 1/8"	107.9	123.8	0.13	0.44	1.40	1.30	1.74	106	219	0.60	104
110	4 1/4"	111.1	127.0	0.13	0.44	1.70	1.40	1.84	111	249	0.63	103
125	4 7/8"	127.0	143.0	0.13	0.44	1.70	1.40	1.84	143	274	0.56	116

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

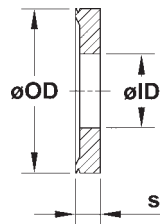
Other sizes, materials and specifications on request.

Special Diaphragm Bellows

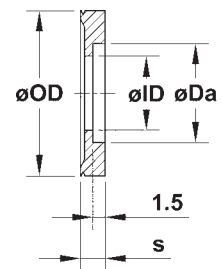
Standard End Pieces, Stainless Steel 316L-ESR



Typ H (Hals)



Typ R1 (Ring1)



Typ R2 (Ring 2)

Nominal diameter	Inner diameter bellows	Outer diameter bellows	Inner diameter mounting tube	Outer diameter mounting tube	Coil width	Length
DN	ID	OD	Di	Da	S	L
	6	13	6	8	4	25
DN10	9	20	10	12	4	25
	13	26	14	16	4	32
DN16	16	31.5	16	18	4	32
	19	37	20	23	4	32
	21	41	22	25	4	32
	21	49	22	25	4	32
DN25	26	46	27	30	4	40
	31	51	31	35	4	40
	36	56	35	38	4	50
DN40	39	59	38.4	42.4	4	50
	46	71	46	50	4	60
DN50	51	76	51	54	4	60
	65	90	66	70	5	75
	75	100	72.1	76.1	5	75
	90	120	100	104	5	75
DN100	102	132	100	104	5	75
	127	157	134.4	139.7	5	91
DN160	150	185	150	154	5	91
	180	215	200	206	6	91
DN200	200	235	200	206	6	91
DN250	250	285	250	256	6	91
DN320	320	360	317.4	323.9	6	91

Attention: The bellows' data and sizes are subject to re-engineering and therefore cannot be assured. Please ask for the active data.

Request for Quotation

Fax: +49 3641 4275-24

Web: www.vacom-vacuum.com

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Vakuum Komponenten &
Messtechnik GmbH

Gabelsbergerstrasse 9
 07749 Jena/Germany

Tel. +49 3641 4275-0
www.vacom-vacuum.com

Your data

Name
Company
Department
Street
Postcode / City
Telephone
Fax
E-Mail

Edge Welded Bellow

■ Inner diameter ID	mm	
■ Outer diameter AD	mm	
■ Compressed length Lc	mm	
■ Extended length Le	mm	
■ Material		
■ Axial stroke Z	mm	
■ Lateral stroke Y	mm	
■ Angular stroke α	m m	

■ Operating temperature	°C	
■ Bakeout temperature	°C	
■ Operating pressure inside	bar	
■ Operating pressure outside	bar	
■ Number of stress cycles		
■ Spring rate	N/mm	

End fittings / flanges

■ Please choose type
■ Please choose standard
■ Nominal diameter compensator
■ Number of pieces

<input type="checkbox"/>	Yes
<input type="checkbox"/>	N
<input type="checkbox"/>	KF
<input type="checkbox"/>	DN

<input type="checkbox"/>	No
<input type="checkbox"/>	R1
<input type="checkbox"/>	ISO K
<input type="checkbox"/>	DN

<input type="checkbox"/>	R2
<input type="checkbox"/>	CF
<input type="checkbox"/>	DN

Please add sketch if applicable!

Comments

Date:

Signature and company stamp: