Bellows

SPEZIAL

Circular-stitched bellows

Apart from spiral springs, different bellow versions are available for protecting shafts, columns, spindles and other round rotating parts.

The circular-stitched bellows consist of punched disks, which are stitched inside and outside. Especially good shape stability and high transverse stiffness are achieved by stitching. We take GN 807 as standard material, aluminium glass fibre or glass fibre Viton is used for high-temperature applications.

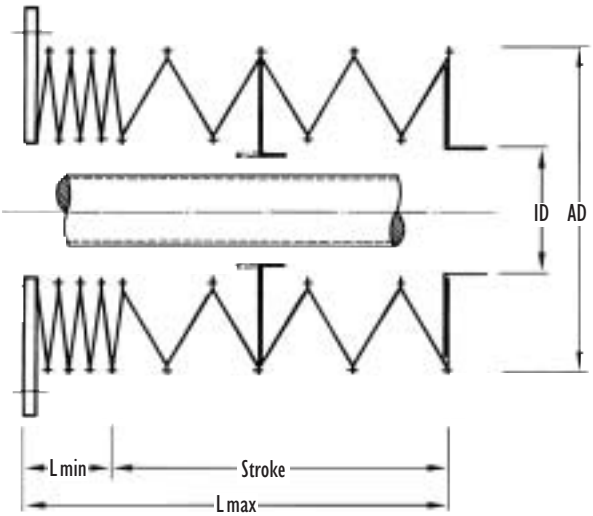
The circular-stitched bellows are extremely resistant and can withstand even exposure to sharp chips especially for smaller sizes. They are only conditionally suitable as protection against liquids or oil.

Circular-stitched bellows can be used horizontally or vertically. In the case of horizontal use, we recommend installing additional support and guide rings made of synthetics or aluminium which guarantee a uniform distance from the spindle and thus increase operating life. With large extensions, the stability of the bellows can be increased by installing a wire ring in every fold. We usually use metal frames for connection and mounting, sleeves are also possible as an alternative.

Design information:

It is important for the selection of the type of bellows that the diameter should be selected approx. 10 mm larger than the round part to be protected. Use the following formula for dimensioning:

Extension = (stroke / F stroke) x FAZ + 5.



Abbreviations:

AD = Outside diameter FB = Fold width
ID = Inside diameter FAZ = Fold extension
FZD = Fold compression Fstroke = stroke per fold

Data table:

HEMA-Type	AD	ID	FB	FAZ	FZD	Fstroke
RF 50	50	25	12,5	10	2,5	7,5
RF 72	72	33	19,5	18	2,5	15,5
RF 85	85	45	20	18	2,5	15,5
RF 95	95	53	21	18	2,5	15,5
RF 100	100	63	18,5	18	2,5	15,5
RF 120	120	82	19	18	2,5	15,5
RF 122	122	76	23	15	2,5	12,5
RF 130	130	90	20	18	2,5	15,5
RF 135	135	85	25	15	2,5	12,5
RF 140	140	102	19	18	2,5	15,5
RF 145/1	145	93	26	15	2,5	12,5
RF 145/2	145	105	20	18	2,5	15,5
RF 150	150	110	20	18	2,5	15,5
RF 160	160	112	24	18	2,5	15,5
RF 170	170	125	22,5	18	2,5	15,5
RF 180/1	180	132	24	20	2,5	17,5
RF 180/2	180	141	19,5	18	2,5	15,5
RF 190	190	150	20	18	2,5	15,5
RF 200	200	152	24	18	2,5	15,5
RF 220	220	170	25	18	2,5	15,5
RF 235	235	190	22,5	18	2,5	15,5
RF 245	245	200	22,5	20	2,5	17,5
RF 260	260	202	29	18	2,5	15,5
RF 266	266	216	25	20	2,5	17,5
RF 300	300	250	25	18	2,5	15,5
RF 365	365	320	22,5	18	2,5	15,5
RF 400	400	340	30	20	2,5	17,5

Soft-PVC-bellows

The soft-PVC bellows occupy a special position among the different types of bellows. Normally bellows offer extremely flexible design options with regard to material, dimensions and shape and can nevertheless also be produced economically in very small quantities. Soft-PVC bellows on the other hand are moulded parts, i.e. a certain minimum quantity or corresponding tooling must be available to justify economic production. Correspondingly, cost reduction can be achieved with larger quantities which makes these parts particularly well suited for large-series use.

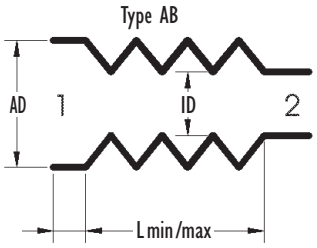
Because tooling is already available for many configurations, attractive prices are offered even for smaller quantities. The dimensions and shapes shown in the catalogue are available as standard; we would be pleased to assist you in the design of special types going beyond these.

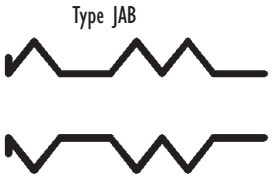
We use a special PVC as standard material. The bellows are resistant to alkalis and acids, they are water- and dust-proof. The operating temperature range is between –20°C and +80°C (maximum up to +120°C). Versions in transparent material are also possible (black is standard)

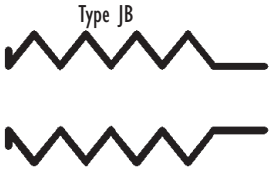
Soft-PVC-bellows

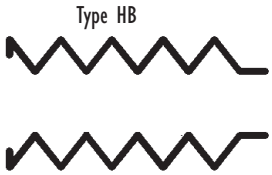
Abbreviations:

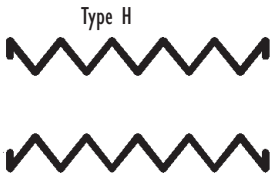
ID = Inside diameter
AD = Outside diameter
FZD = Fold compression
FAZ = Fold extension

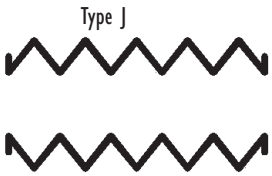












HEMA-Type	ID	AD	FZD	FAZ
10	10	20	4	12
18	18	28	4	12
20	20	36	4,5	18
22	22	40	5	20
25-1	25	36	5	15
25-2	25	45	5,5	24
28-1	28	40	5,5	19
28-2	28	50	5,5	23
32-1	32	46	5	16
32-1	32	56	6,5	26
36-1	36	50	5	17
36-1	36	63	7	28
40-1	40	56	6	21
40-1	40	71	7,5	34
45-1	45	63	6,5	22
45-2	45	80	7	34
50-1	50	71	6	23
50-2	50	89	8	39
56-1	56	80	6,5	27
56-2	56	89	7,5	36
56-3	56	100	8,5	45
63-1	63	89	6,5	26
63-2	63	100	7,5	36
63-3	63	110	7,5	40
63-4	63	125	7,5	48
71	71	100	7	30
75-1	75	100	7	28
75-2	75	110	7	32
75-3	75	125	7,5	42
75-4	75	140	7,5	55
75-5	75	150	7,5	58
80-1	80	100	7	24
80-2	80	110	7,5	32
80-3	80	125	7,5	44
80-4	80	140	7,5	53
80-5	80	150	8	58
80-6	80	160	8	65
89-1	89	110	7,5	24
89-2	89	125	8	36
89-3	89	140	8	46
89-4	89	150	8	55
89-5	89	160	8	60
89-6	89	170	8,5	65
100-1	100	128	7,5	29
100-2	100	140	8	40
100-3	100	150	8	46
100-4	100	160	8	55
100-5	100	170	8,5	60
100-6	100	180	9	65
110-1	110	130	7,5	24
110-2	110	140	7,5	30
110-3	110	150	8	40
110-4	110	160	8	47
110-5	110	170	8	56
110-6	110	180	8,5	60
110-7	110	190	9	65
110-8	110	200	9	70
120-1	120	140	7,5	24
120-2	120	150	8	30
120-3	120	160	8	40
120-4	120	170	8	47
120-5	120	180	8,5	55
120-6	120	190	9	60
120-7	120	200	9	65
125-1	125	150	7,5	28
125-2	125	160	8	38
125-3	125	170	8,5	42
125-4	125	180	8,5	52
125-5	125	190	8,5	57
125-6	125	200	8,5	62
125-7	125	210	9	68
140-1	140	160	7,5	24
140-2	140	170	8	30
140-3	140	180	8,5	40
140-4	140	190	9	47
140-5	140	200	10	56

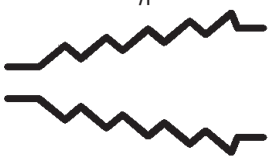
Standard types and dimensions

HEMA-Type	ID	AD	FZD	FAZ
140-6	140	210	10	60
140-7	140	220	10	65
150-1	150	170	8	24
150-2	150	180	8,5	30
150-3	150	190	9	40
150-4	150	200	9	47
150-5	150	210	10	56
150-6	150	220	10	60
150-7	150	230	10	65
150-8	150	240	10	70
160-1	160	190	8,5	30
160-2	160	200	9	40
160-3	160	210	10	47
160-4	160	220	10	56
160-5	160	230	10	60
160-6	160	240	10	65
160-7	160	250	10	70
170-1	170	200	9	30
170-2	170	210	10	40
170-3	170	220	10	47
170-4	170	230	10	56
170-5	170	240	10	60
170-6	170	250	10	65
170-7	170	260	10	70
180-1	180	210	9	30
180-2	180	220	10	40
180-3	180	230	10	47
180-4	180	240	10	56
180-5	180	250	10	60
180-6	180	260	10	65
190-1	190	220	9	30
190-2	190	230	10	40
190-3	190	240	10	47
190-4	190	250	10	60
190-5	190	260	10	70
190-6	190	280	10	75
200-1	200	230	9	30
200-2	200	240	10	40
200-3	200	250	10	47
200-4	200	260	10	57
200-5	200	280	10	70
210-1	210	240	10	30

HEMA-Type	ID	AD	FZD	FAZ
210-2	210	250	10	40
210-3	210	260	10	47
210-4	210	280	10	65
210-5	210	300	10	75
220-1	220	250	10	30
220-2	220	260	10	40
220-3	220	280	10	57
220-4	220	300	10	70
220-5	220	320	10	80
230-1	230	260	10	30
230-2	230	280	10	48
230-3	230	300	10	65
230-4	230	320	10	75
240-1	240	280	10	40
240-2	240	300	10	58
240-3	240	320	10	70
240-4	240	360	10	90
250-1	250	280	10	30
250-2	250	300	10	45
250-3	250	320	10	60
250-4	250	360	11	85
280-1	280	320	10	40
280-2	280	360	10	72
280-3	280	400	11	90
300-1	300	360	10	60
300-2	300	400	10	80
320-1	320	360	10	40
320-2	320	400	10	72
320-3	320	450	11	100
360-1	360	400	10	40
360-2	360	450	10	80
360-3	360	510	11	110
400-1	400	450	10	50
400-2	400	510	10	85
400-3	400	530	11	100
450-1	450	490	10	40
450-2	450	510	10	55
450-3	450	530	11	75
450-4	450	560	12	85
510	510	650	12	105
560	560	650	12	75
650	650	770	12	90

Type APB

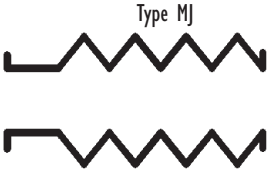
Type ABC



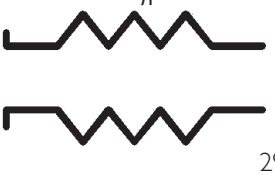
Type AMM

Type MM

Type MJ



Type MB



Rubber disk bellows

Rubber disk bellows are of the highest quality and optically the most attractive protective covers for pistons and spindles. They are completely leak-proof. Since each rubber disk lies on the other, excellent compression dimensions are achieved.

The production of rubber parts depends directly upon the control and monitoring of the production processes. Each process step, from mixing up to rolling out the material, from punching the disks up to the vulcanization process, is performed under the most accurate observation and attention. Stringent quality criteria lead to high process reliability. After vulcanizing, the rubber disk bellows are ground on the outside, so that they have an absolutely smooth surface when closed.

Technical data

The standard rubber disk bellows are produced from CSM rubber foil. CSM has especially good resistance to light and atmospheric conditions and is suited for outdoor use. If emphasis is on oil or coolant protection in your area of application, then we recommend the use of NBR rubber foil. Alternative materials are available for especially high temperature requirements.

Dimensions

Rubber disk bellows are delivered in standard sizes of inside diameters of 20 to 400 mm and outside diameters of 40 to 480 mm. We supply the bellows in 5 mm graduation up to a diameter of 200 mm and in 10 mm graduation above this. As an alternative square, rectangular or oval profiles can also be produced. The extended length of the rubber disk bellows can be up to 10 metres.

The rubber disk bellows are fastened with the aid of Velcro tape, sleeve or metal flange like the other bellows. The Velcro tape connection is the least expensive version. With large extension length and horizontal installation, it is usually necessary to use additional guide elements. In the most simple case, the bellows are stabilized by internally located wire rings. In the case of complex applications, guide plates by which the bellows are guided with the aid of rods or cable systems are drawn onto the bellows.

Calculation formula:

Lmax = FZ x FB

Lmin = FZ x 2,5

FB = (AD – ID) / 2

FZ = Lmax / FB

FZ = Stroke / (FB – 2,5)

Rubber fabric bellows

If bellows are subject to especially heavy wear, high pressure conditions or high temperatures up to 200°C, rubber fabric bellows can be used. Typical fields of application are piston rods with the resulting high ambient temperatures, or cardan shafts.

Rubber fabric bellows consist of a two-component structure, whereby the supporting fabric is coated with a special synthetic material. We use high-quality aluminium moulds, which are designed and built according to your special wishes.

In contrast to the rubber disk bellows, the fabric bellows have a structural reinforcement which withstands the mechanical forces acting. The external protective effect of the rubber is maintained completely. Nevertheless, the supporting fabric changes the character of the surface, so that the smoothness of the rubber disk type is lost. Rubber fabric bellows are delivered as standard in CR rubber fabric. All materials can be laminated with Teflon foil. A speciality are fabric bellows made from leather and carbon fibre with Aramid.

Sizes

We manufacture rubber fabric bellows in the standard sizes with inside diameters of 30 to 2,900 mm and an outside diameter of 50 to 3,000 mm. There are no tool costs for the customary round shapes. As an alternative square, rectangular or oval profiles can also be produced. The bellows are fastened like the rubber disk bellows.

Calculation formula:

(for material with 1 mm thickness)

Lmax = FB x FZ x 1,4

Lmin = FZ x 6

FB = (AD – ID) / 2

FZ = Lmax / FB / 1,4

Abbreviations:

FB	= Fold width / depth
FZ	= Number of folds
Lmax	= Maximum extension of bellow
Lmin	= Minimum compression of bellow
AD	= Outside diameter
ID	= Inside diameter