Bellows

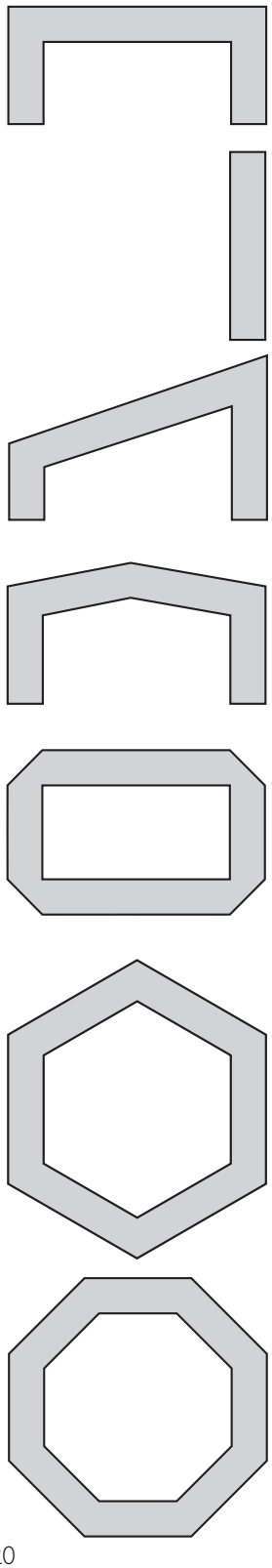
LAMINAT
KAMERA

LAMINAT bellows

In former times, many bellows were manufactured by the LAMINAT principle (= several layers of foil bonded together). The LAMINAT bellows are used because of their variety of shapes and their inherent stiffness.

The production of many thousands of LAMINAT bellows proves our experience and application competence. Especially for older tooling machines we are able to provide many spare parts by the drawing number or to make a new design according to the former specifications and to reproduce them.

Standard shapes:



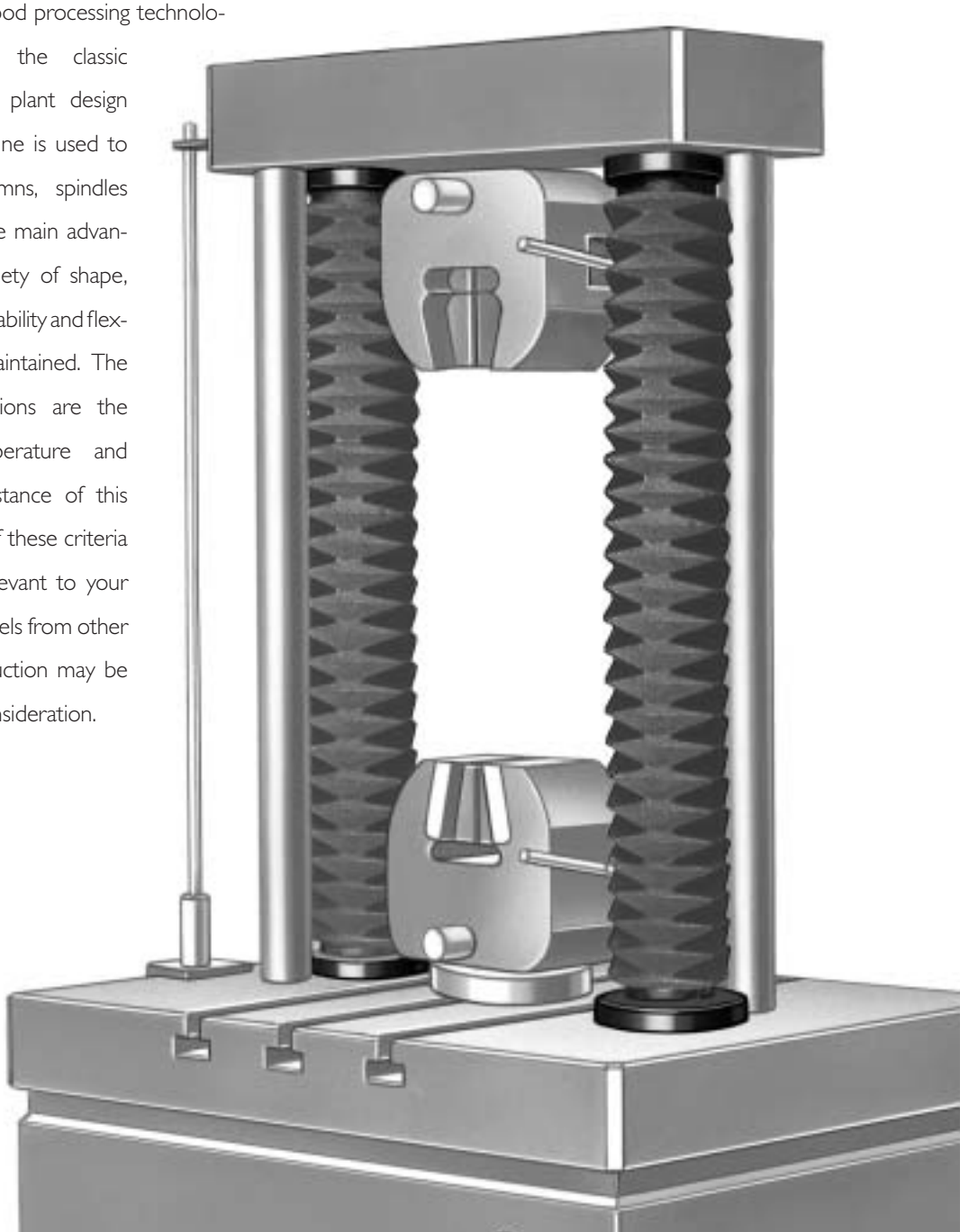
Applications

LAMINAT bellows are nowadays deployed within camera, medicine, measuring, musical instruments, control and food processing technologies. Within the classic machine and plant design this product line is used to protect columns, spindles and shafts. The main advantages are variety of shape, dimensional stability and flexibility are maintained. The design limitations are the limited temperature and humidity resistance of this product line. If these criteria should be relevant to your problem, models from other lines of production may be taken into consideration.

Technical data

LAMINAT bellows can be adapted by selecting their basic components material, shape, colour and dimensions to suit your problem.

The basic design concept of the LAMINAT bellows is founded on material with a two-component structure. A manufacturing technique developed to perfection enables the combination of the outer material according to customer's wishes with the appropriate interior material selected to fit by the HEMA designer. For the interior material, there are different varieties available based on synthetic or Triflexil fabrics (Triflexil = Nomex/Aramid compound). The bonding between outer and interior material is insoluble under ordinary application conditions. All LAMINAT bellows can be used in



Design information for technical layout

vertical or horizontal position (mixed forms as well). They permit smooth and very quiet running properties. The surface structure and the regularity of contours provide an appealing overall appearance.

Many bellows are deliverable in rectangular, hexagonal, octagonal and twelve-angled shape. Furthermore we produce U, roof and inclined shapes and Venetian blind style as standards. The bellows are available in split-design as well. This allows retrofitting and easy maintenance. The bellows can be closed afterwards with the help of adhesive tape, Velcro tape or bonding.

The gliding properties of the LAMINAT bellows (standard design) on the guiding rails differ only slightly from the ELASTIC bellows, when optionally fitted with a PVC frame or a wire hoop in every second or third fold. Furthermore they can be supported by special gliders or roller systems, usually at a speed higher than 30 m/min.

With the polygon shapes, using spacers and circular guide/support systems ensures optimum gliding efficiency on columns, spindles and shafts.

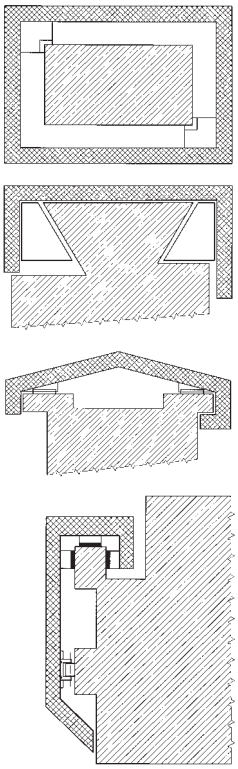
Large machining centres

LAMINAT types are prefered for outer widths of more than 2000 mm, because they provide a more rigid basic structure compared to the ELASTIC types. Another advantage is their segmental structure, allowing an exchange of damaged segments of the LAMINAT bellow at any time. This reduces maintenance costs considerably, which ofsets the somewhat higher initial purchase price.

open for mounting

retrofit possible without dismantling the machine

closed after mounting



LAMINAT bellows

Design information for technical layout

Abbreviations:

FB = fold width of bellows

FAZ = extension per fold

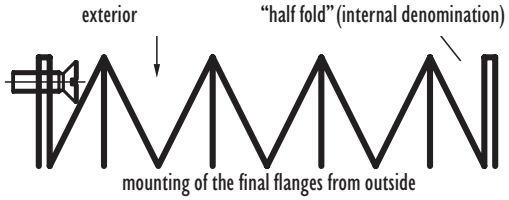
FZD = compression per fold (depends on material)

Dimensions:

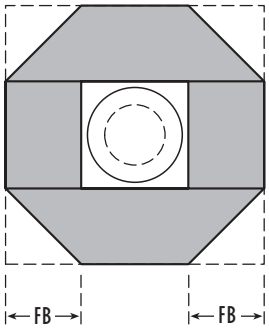
FB (mm)	FAZ (mm)	FZD (mm)
7,5	10	3
10	13	3
12,5	17	3
15	20	3
17,5	23	3
20	25	3
25	30	3,5
30	35	3,5
35	40	4
40	45	4
45	50	4
50	55	4

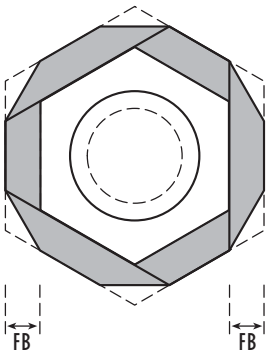
Mounting

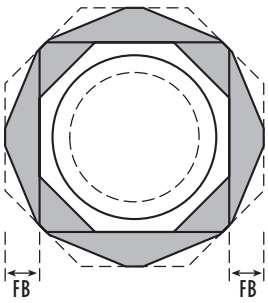
Mounting of the LAMINAT bellows to the machines is easily achieved by components usually supplied ex works. Normally a frame made from metal or synthetic material, designed according to customer's specifications, is attached to both ends, and is used for fixing. The mounting by Velcro tape is even easier, providing fast and efficient maintenance work. Further alternatives are clip fasteners and fixing straps.



Examples of the wide variety of shapes enabled by LAMINAT construction:



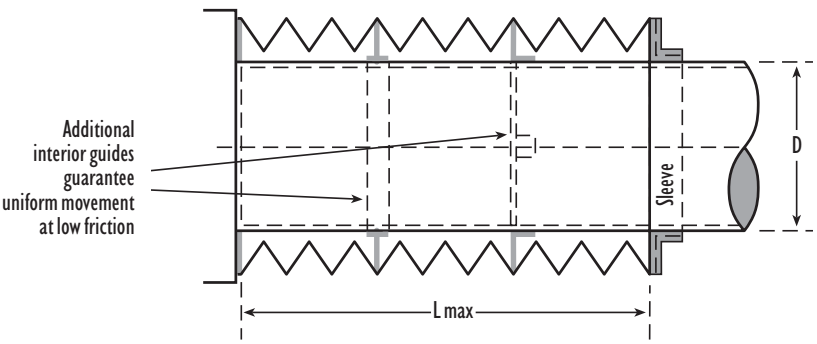




Cross section:

Polygonal shape with support elements:

This sectional view shows an example of a design solution for horizontal application. Subframes with guides or guide rings are employed here for support on the shaft or spindle.



Alternative solutions:

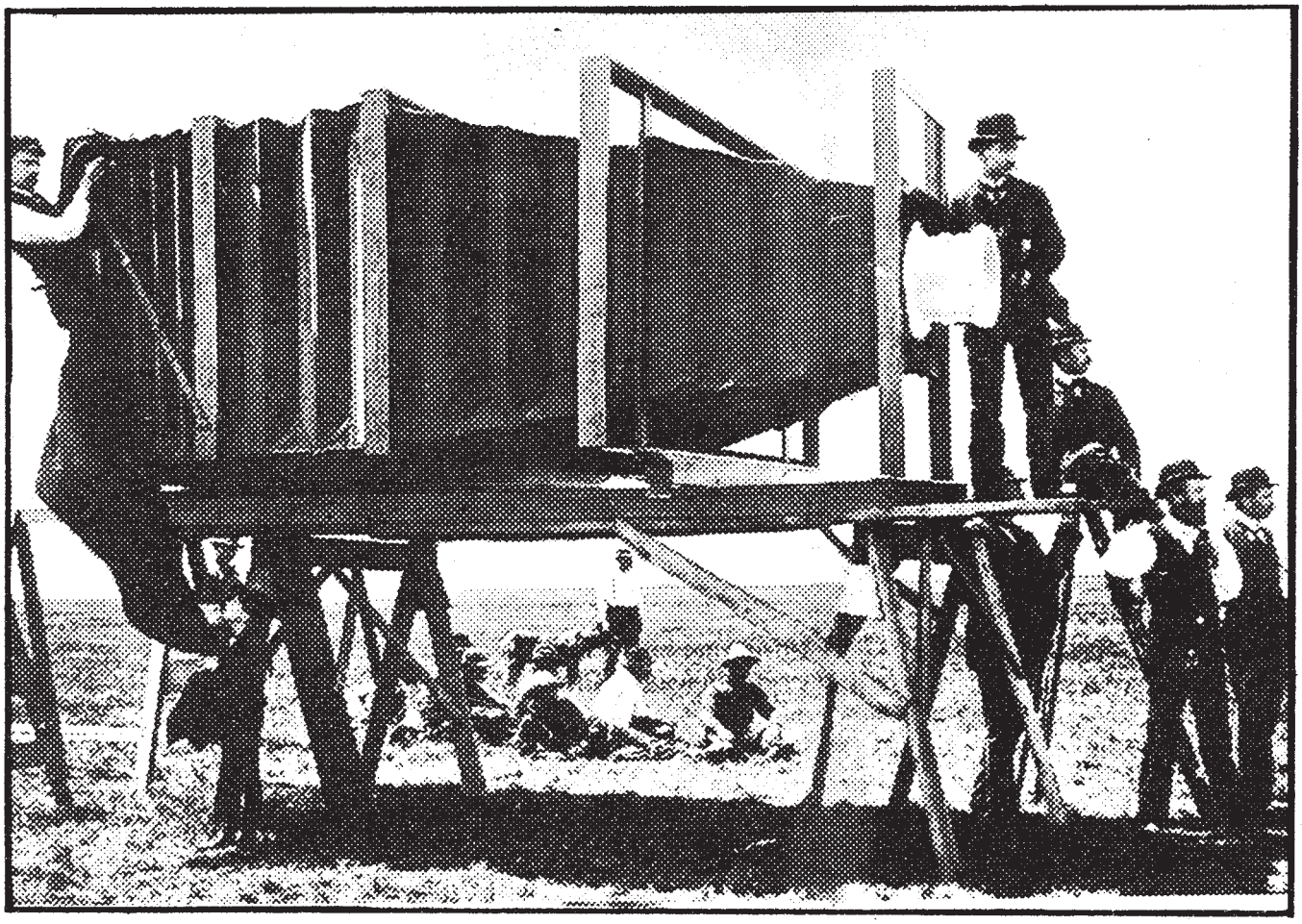
HEMA offers a great variety of different approaches to solutions for protecting columns, spindles, shafts and other round parts. As an alternative, you can also use flat coil springs, circular-stitched bellows, rubber bellows, Soft-PVC bellows, leather bellows or rubber disc bellows.

KAMERA bellows

History

Bellows for cameras stand out as a specialty of the bellows series. They are still being used in the camera and reproduction industry. However, due to progress in automation and microelectronics, this traditional application has become a mere niche market.

We still supply replacement equipment and produce for new units.



Technical design

KAMERA bellows have three great advantages compared with conventional bellows: the minimum compression close to zero, absolutely light proof and the ability to achieve different pitch by changing the width of the bellows.

As a result of the fact that their shape tapers to one side, their design is very difficult to lay out for production. On the one hand, the extension and the exterior width must stand in a uniform, smoothly tapering relation to each other, while on the other the compression and the weight must remain within specific tolerances. HEMA's solution is to calculate the series of folds with absolute geometric precision, enabling the width and extension of the folds to change.

The ground glass screen is in the wider end of the KAMERA bellows and the lens system in the smaller end. They are attached with wood or metal frames produced to customers' specifications and supplied by the factory.

When we make our KAMERA bellows, we use special three-layer materials guaranteed to be absolutely light proof and dustproof. The inside of the material is dull black, and the connecting corners are additionally reinforced. The corners of the KAMERA bellows can be supplied in standard or tapered shape.

We distinguish between two basic types. The smaller, Type 50, has an extension per fold of 35 millimeters, while in the larger, Type 75, this can reach as much as 50 millimeters. Moreover, various

KAMERA bellows

pitches per fold width are available (sizes 5 to 15) for each fold width. If you select the appropriate relation between pitch and fold width, then the folds will be kept in a straight line.

KAMERA bellows with an extension length of more than 1,200 millimetres are made in several pieces (in two pieces starting at 1,200 millimetres and in three pieces up to 1,600 millimetres, while larger bellows come in segments of 500 millimetres each). Apart from the standard design, we also have many different special designs.

If you are interested, we will be happy to provide you with more detailed information on our KAMERA bellows. Our dedicated employees will come up with a solution tailored to your specific needs within a few days.

Design information on technical layout:

Abbreviations: FB = fold width of bellows
FAZ = extension per fold
Lmax = total extension
Lmin = total compression

Type	FB (mm)	FAZ (mm)
50 G	25	35
50 S5	22,5/27,5	35
50 S10	20/30	35
75 G	37,5	50
75 S5	35/40	50
75 S10	32,5/42,5	50
75 S15	30/45	50