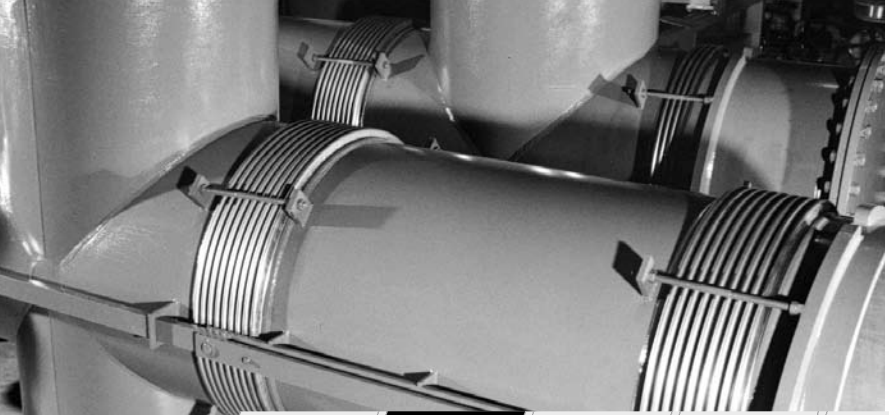


Special Ranges

The standard ranges described in Chapter 6 are supplemented in this chapter by a series of special ranges of expansion joints and related products.

These products are primarily designed either for special applications – engine manufacturing, apparatus engineering, district heating – or for special performance data, e.g. high pressures.

Type series are available for the more frequently demanded dimension ranges; special designs outside these ranges can be supplied on request.

The table overleaf provides an overview of the special ranges.

① ② ③

① **Exhaust expansion joints with special rims**

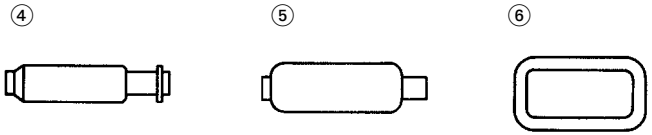
Series:
AOK
AOU
Nominal diameters:
d_i = 20-200
Pressures:
PN1
Page:
394-397

② **Single-ply expansion joints for apparatus engineering**

Series:
AON
Nominal diameters:
DN 100-3000
Pressures:
Dependent on nominal diameter
Page:
398-409

③ **HYDRAFLON Axial expansion with PTFE liner joints**

Series:
ABT
Nominal diameters:
DN 50-500
DN 50-300
Pressures:
PN10
PN25
Page:
410-419



④ **HYDRAMAT Axial expansion joints with automatic release mechanism**

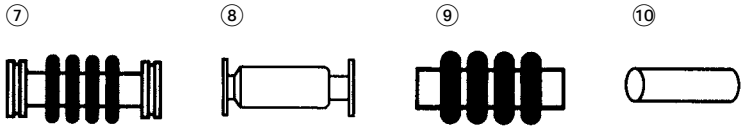
Series:
ARH
Nominal diameters:
DN 40-1000
Pressures:
PN 16 and PN 25
Page:
420-429

⑤ **Pressure balanced axial expansion joints**

Series:
DRD
Nominal diameters:
DN 400-1000
Pressures:
PN 25 and PN 40
Page:
430-433

⑥ **Rectangular expansion joints**

Series:
XOZ etc.
Nominal diameters:
Max. length of side b = 3700
Pressures:
Max. p_o = 2 bar
Page:
434-439



⑦ **Axial expansion joints for vacuum technology**

Series:
AVZ
Nominal diameters:
DN 16-500
Pressures:
PN 1
Page:
440

⑧ **Axial expansion joints for heating and ventilating installations**

Series:
Various
Nominal diameters:
DN 15-100
Pressures:
PN 6-25
Page:
441

⑨ **High pressure bellows and expansion joints**

Series:
Various
Nominal diameters:
DN 10-1000
Pressures:
Max. PN 400
Page:
442-443

⑩ **HYDRAWELD Thin-walled, cylindrical pipes**

Nominal diameters:
d_i = 40-1000
Page:
444-445

Exhaust expansion joints with special rims

Exhaust expansion joints which must be mounted directly at the engine are subjected to abnormal conditions:

- High temperatures ($\vartheta \geq 400$ °C)
- Temperature peaks, according to engine output
- Absorption of thermal expansion and sustained vibrations
- Compact dimensions, since available space usually restricted
- Assembly and dismantling must be rapid if the engine needs to be overhauled or repaired.

We supply special designs based on existing tool series (see table) to meet these requirements; they are tailored to specific applications and have in some cases been developed jointly with the engine manufacturers. Special tools can also be manufactured if necessary. When developing new designs, we are able to make use of our wide-ranging experience and our specially adapted testing facilities, which is an advantage with regard to both development times and costs.

Fig. 7.1 Exhaust expansion joints with special rims

The requirement for simple assembly is met by means of the special installation rims (see. Figs. 7.2 and 7.3).

The moVix connection is a snap-on fixing developed by Witzenmann; it uses a wire-pressed formed ring made of heat-resistant material to seal and secure. This ring is press-fitted together with the conical rim of the bellows by means of a V-band clamp; an unmachined pipe is a suitable mating part (Fig. 7.4).

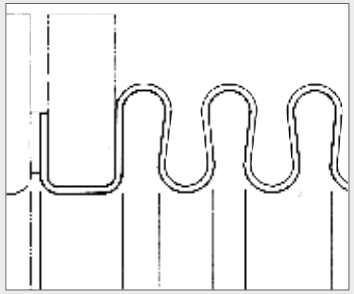


Fig. 7.3 Flange rim for split flanges Type series AOU

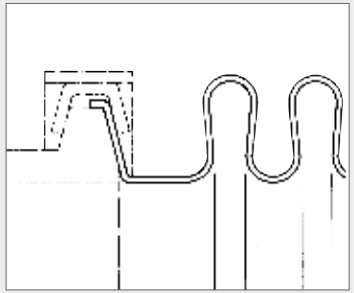


Fig. 7.2 Conical rim for V-band clamp Type series AOK

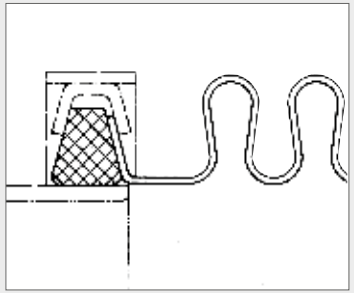
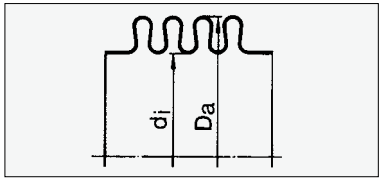


Fig. 7.4 moVix connection



Type AO …

Recommended bellows dimensions

No.	Inside diameter	Outside diameter
–	d_i	D_a
_	mm	mm
1	34	50
2	42*)	60
3	45*)	65
4	51	71
5	56	70-80
6	60	82
7	65*)	80-90
8	71	85-95
9	77	101
10	80	92-106
11	84*)	100-110
12	92	110-120
13	94	110-120
14	96	122

No.	Inside diameter	Outside diameter
–	d_i	D_a
_	mm	mm
15	110*)	130-140
16	116	135-150
17	135*)	145-170
18	143*)	165-180
19	164	185-205
20	170	190-210
21	188	210-230
22	194	215-235
23	214	235-258
24	218	240-262
25	240*)	265-285
26	272	295-320
27	324	345-380

*) Tools available for conical rim

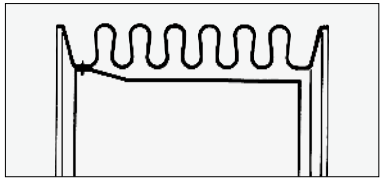


Fig. 7.6 Exhaust expansion joint with one-piece inner sleeve

Materials for sulphur-free exhaust gases (selection)

DIN No.	Designation	Upper temperature limit in °C	Remarks
1.4541	X6CrNiTi 1810	600	Austenite
1.4571	X6CrNiMoTi 17 122	600	Austenite with Mo
1.4828	X15CrNiSi 20 12	1000	Heat-resistant
1.4876	Incoloy 800H	900	(scale-resistant)
2.4856	Inconel 625	650	Temperature and
2.4610	Hastelloy C4	600[1])	corrosion-resistant

Fig. 7.5

[1]) Manufacturer´s specifications

A one-piece inner sleeve can be fitted if necessary, for example to cope with short-time temperature peaks (Fig. 7.6).

Single-ply expansion joints for apparatus engineering
The special range of single-ply expansion joints designed for apparatus engineering and container construction is highly effective in meeting the special demands of these fields:

- Thick, single-ply for welding direct to the container wall
- Good lateral rigidity, which renders axial guides in the container superfluous
- Small corrugations without circumferential seam welds for optimum overall dimensions

The design conforms to the Pressure-Tank Ordinance and has been calculated according to AD Code of Practice B13.

Fig. 7.7 Single-ply expansion joint without connection parts

Design and choice of expansion joints
The values in the table each apply to one corrugation. The required number of corrugations n_W is dependent on the required movement.

No. of corrugation n_W

(7.1) $n_W = 2\delta_{RT} / 2\delta_{WN}$

Movement, cold $2\delta_{RT}$
Movement per corrugation $2\delta_{WN}$
(see table for nominal movement)

The nominal movement, the total length and the adjusting-force rate of the multi-corrugation expansion joint are dependent on the selected number of corrugations (rounded up to integer number):

Nominal movement $2\delta_N$ in mm

(7.2) $2\delta_N = 2\delta_{WN} \cdot n_W$

(Rounded down to integer mm)

Total length L_O in mm

(7.3) $L_O = l_W \cdot n_W + 2l_B$

Length of single corrugation l_W in mm
Length of rim l_B in mm

Adjusting-force rate C_δ in N/mm

(7.4) $C_\delta = C_{\delta W} / n_W$

Adjusting-force rate of single corrugation $C_{\delta W}$ in N/mm

The rim diameter d_B can be adapted to the available connections. The dimension tables specify the permissible diameter range; the desired dimension must be indicated in the order.

It should be noted that the cylindrical section of the rim l_{BZ} must be at least 10mm long.
The transition zone must be between 4mm and $l_W/2$ long on account of the production technology used.

Prequalification, insoection tests, certificates and documentation must be agreed upon when the order is placed, for use in systems requiring inspection.

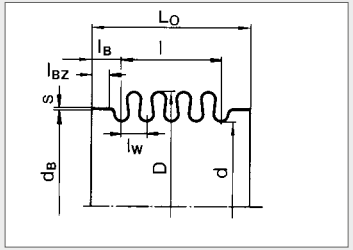


Fig. 7.8 Dimensions/designations