

# Merkel Guide Strip SF

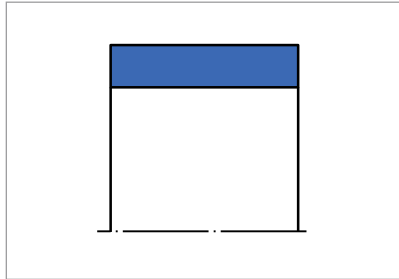


Fig. 1 Merkel Guide Strip SF

## Product description

Non-metallic Merkel Guide Strip SF, available ready to fit cut to size or by the metre.

## Product advantages

As a non-metallic guide element for rods, also for standardised housings according to ISO 10766

- Low friction, free of stick-slip.

## Application

Control and regulation equipment, handling equipment, injection moulding machines.

## Material

| Material             | Code      |
|----------------------|-----------|
| PTFE bronze compound | PTFE B500 |

## Operating conditions

| Material                | PTFE B500               |
|-------------------------|-------------------------|
|                         | Temperature range in °C |
| Hydraulic oils HL, HLP  | -40 ... +200            |
| HFA fluids              | -                       |
| HFB fluids              | -                       |
| HFC fluids              | -                       |
| HFD fluids              | -40 ... +200            |
| Water                   | -                       |
| HETG (rapeseed oil)     | -40 ... +80             |
| HEES (synthetic esters) | -40 ... +100            |
| HEPG (glycol)           | -40 ... +80             |
| Mineral greases         | -40 ... +200            |

## Surface quality

| Surface roughness | R <sub>a</sub>  | R <sub>max</sub> |
|-------------------|-----------------|------------------|
| Sliding surface   | 0,05 ... 0,3 µm | ≤2,5 µm          |
| Groove base       | ≤2 µm           | ≤10,0 µm         |
| Side of groove    | ≤3 µm           | ≤15,0 µm         |

Percentage contact area M<sub>v</sub> >50% to max. 90% at cutting depth c = Rz/2 and reference line C ref = 0%.

## Design notes

Please observe our general design notes in → Technical Manual.

## Calculating straight length L2

| L2             | Production tolerances |
|----------------|-----------------------|
| >20 ... 80     | ... 0,5               |
| >80 ... 250    | ... 1,0               |
| >250 ... 500   | ... 1,5               |
| >500 ... 1000  | ... 2,0               |
| >1000 ... 2000 | ... 3,0               |
| >2000 ... 4000 | ... 4,0               |

### Tolerance recommendation

|                      |
|----------------------|
| <b>D<sub>1</sub></b> |
| H8                   |

The tolerance definition for the dimensions D and d<sub>F</sub> must be viewed in connection with the seal used. The diameter d<sub>1</sub> specified in the table of dimensions is to be viewed exclusively in relation to the guide ring. The corresponding diameter of an adjacent seal housing should be tailored to the sealing component.

### Manufacturing tolerance

|   |
|---|
| <b>Production tolerance profile thickness S</b> |
| -0,05   |

### Surface load

|                                       |
|---------------------------------------|
| p < 15 N/mm <sup>2</sup> up to 20 °C  |
| p < 7,5 N/mm <sup>2</sup> up to 80 °C |
| p < 5 N/mm <sup>2</sup> up to 120 °C  |

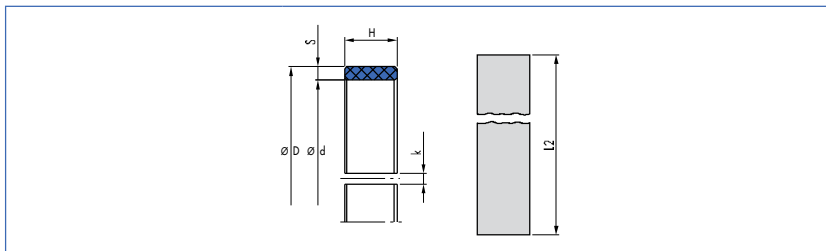
For running speed, see sealing system.

### Cutting rolls to size

The following dimensions are available from stock by the metre. The straight length L2 of blanks is to be determined using the formula. The gap k produced after fitting is necessary due to thermal expansion. We recommend a straight cut on the strips. In the event of butt joints the tips may be damaged and break-off. Our cutter (Article No. 507228) facilitates time-saving and accurate cutting to size.

### Calculation of the straight length L2 for rods:

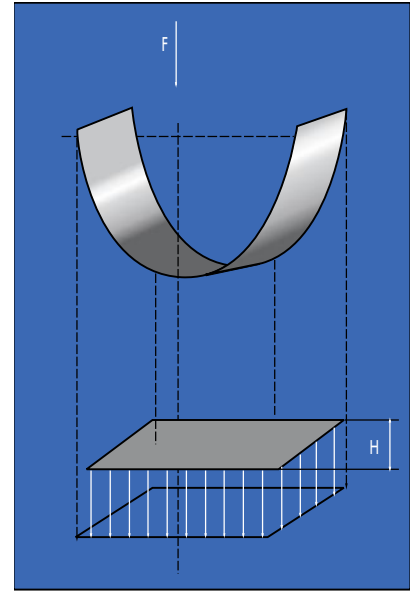
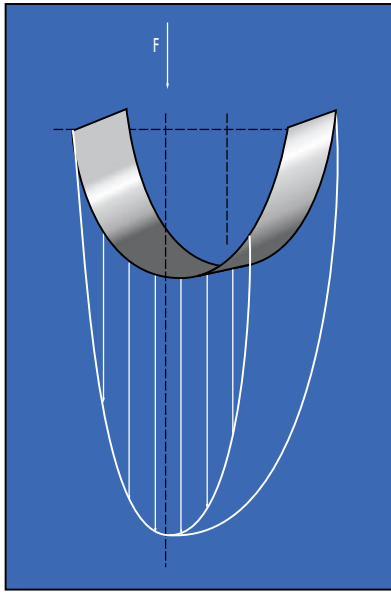
$$L2 = (d + S) \times 3,11 - 0,5$$



| Groove length L | Profile thickness S | Article No. |
|-----------------|---------------------|-------------|
| 8               | 2,5                 | 24226174    |
| 9,7             | 2,5                 | 24102775    |
| 10              | 2,5                 | 24102563    |
| 12              | 2,5                 | 24099191    |
| 15              | 2,5                 | 24102564    |
| 20              | 2,5                 | 24076217    |
| 25              | 2,5                 | 24107955    |
| 15              | 4,0                 | 24160019    |
| 20              | 4,0                 | 24238052    |
| 25              | 4,0                 | 24148093    |

### Surface force

The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The permissible load on the guide strip is calculated by multiplying the projected surface with the permissible specific surface pressure. However, the figure for the permissible specific surface pressure takes into account the possible angular offset of the rods when the recommended guide elements are used.



$$F = P \times A$$

$$H = F / (d \times P)$$

H = guide strip width [mm]

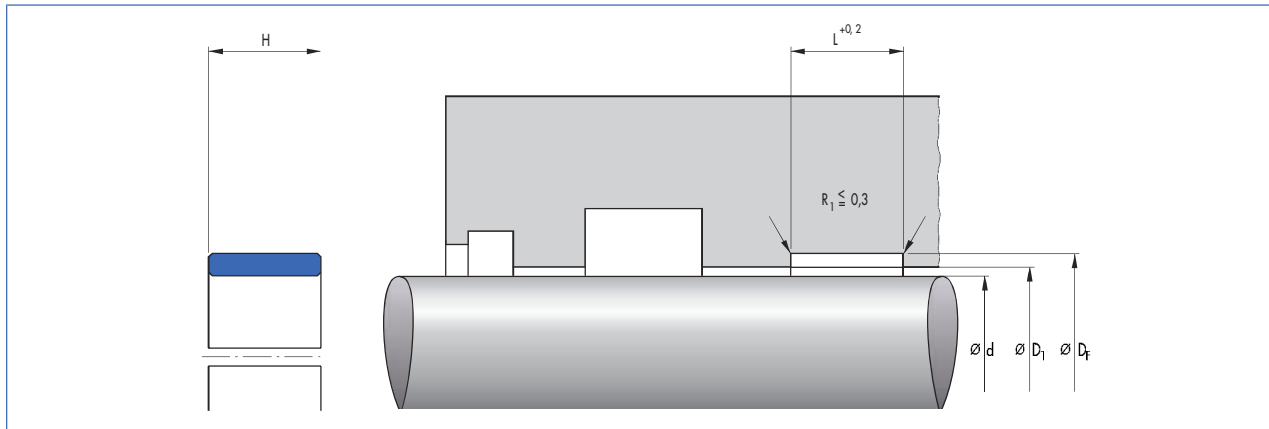
F = radial loading [N]

A = projected area [mm<sup>2</sup>]

P = perm. compression per unit area  
[N/mm<sup>2</sup>]

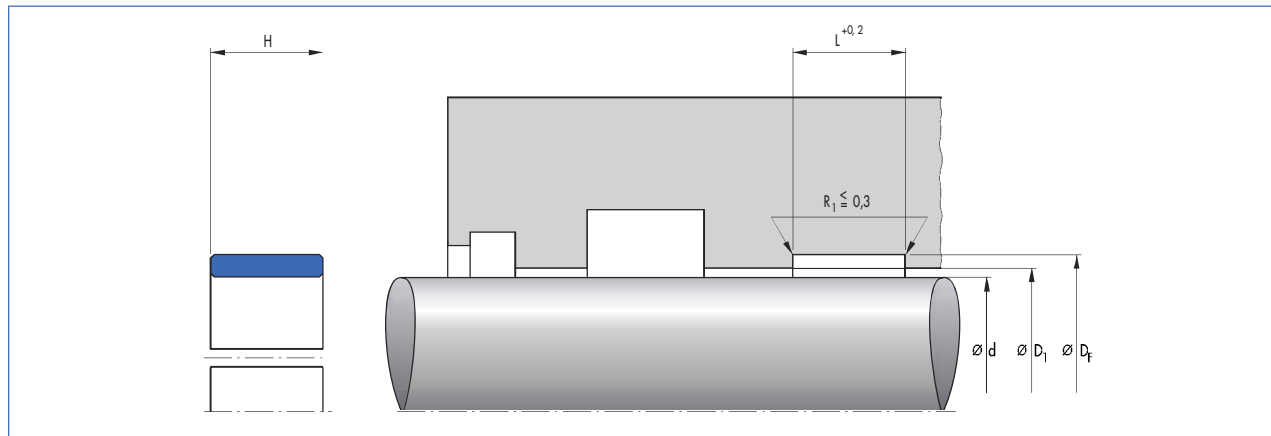
d = rod diameter with rod guidance;  
piston diameter with  
piston guidance [mm].

Article list



| d  | DF | D1   | H    | L   | Profile | Material  | Article No. |   |
|----|----|------|------|-----|---------|-----------|-------------|---|
| 25 | 28 | 25,8 | 5,5  | 5,6 | 1,5     | PTFE B500 | 24300101    | ● |
| 28 | 31 | 28,8 | 5,5  | 5,6 | 1,5     | PTFE B500 | 24300102    | ○ |
| 32 | 37 | 32,8 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24294062    | ○ |
| 35 | 38 | 35,8 | 5,5  | 5,6 | 1,5     | PTFE B500 | 24300105    | ○ |
| 36 | 41 | 36,8 | 5,5  | 5,6 | 2,5     | PTFE B500 | 24165260    | ○ |
| 40 | 45 | 40,8 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24216883    | ○ |
| 42 | 47 | 43,2 | 5,5  | 5,6 | 2,5     | PTFE B500 | 24300109    | ○ |
| 44 | 49 | 45,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24333828    | ○ |
| 45 | 50 | 46,2 | 5,5  | 5,6 | 2,5     | PTFE B500 | 24300110    | ● |
| 45 | 50 | 46,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24266350    | ○ |
| 45 | 50 | 46,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24311361    | ○ |
| 50 | 55 | 51,2 | 5,5  | 5,6 | 2,5     | PTFE B500 | 24110082    | ● |
| 50 | 55 | 51,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24169558    | ● |
| 50 | 55 | 51,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24203345    | ○ |
| 55 | 60 | 56,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24160646    | ● |
| 55 | 60 | 56,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24275190    | ○ |
| 56 | 61 | 57,2 | 5,5  | 5,6 | 2,5     | PTFE B500 | 24300111    | ○ |
| 56 | 61 | 57,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24245671    | ● |
| 56 | 61 | 57,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24316593    | ○ |
| 58 | 63 | 59,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24333829    | ○ |
| 60 | 65 | 61,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24165598    | ● |
| 60 | 65 | 61,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24203612    | ○ |
| 63 | 68 | 64,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300114    | ● |
| 63 | 68 | 64,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24275191    | ○ |
| 65 | 70 | 66,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300116    | ● |
| 68 | 73 | 69,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24332153    | ○ |
| 70 | 75 | 71,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300118    | ● |
| 75 | 80 | 76,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300120    | ● |
| 75 | 80 | 76,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24244742    | ○ |
| 80 | 85 | 81,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300122    | ● |
| 80 | 85 | 81,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24266958    | ○ |
| 80 | 85 | 81,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24265250    | ○ |
| 85 | 90 | 86,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24167352    | ● |
| 85 | 90 | 86,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24244741    | ○ |
| 90 | 95 | 91,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300125    | ● |
| 90 | 95 | 91,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24291194    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

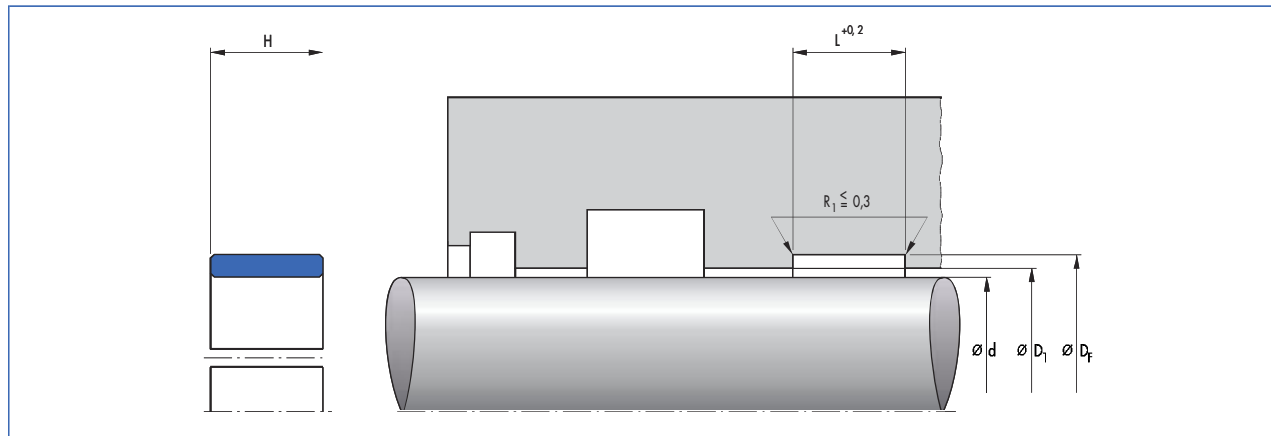


| d   | DF  | D1    | H    | L   | Profile | Material  | Article No. |   |
|-----|-----|-------|------|-----|---------|-----------|-------------|---|
| 95  | 100 | 96,2  | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300127    | ○ |
| 100 | 105 | 101,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300129    | ● |
| 100 | 105 | 101,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24250627    | ● |
| 100 | 105 | 101,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24260605    | ○ |
| 100 | 105 | 101,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24342265    | ○ |
| 100 | 108 | 102,5 | 14,8 | 15  | 4       | PTFE B500 | 24327233    | ○ |
| 105 | 110 | 106,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300131    | ○ |
| 110 | 115 | 111,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300133    | ● |
| 110 | 115 | 111,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24293684    | ○ |
| 110 | 115 | 111,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24166931    | ○ |
| 110 | 115 | 111,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24292915    | ○ |
| 110 | 118 | 112,5 | 14,8 | 15  | 4       | PTFE B500 | 24327234    | ○ |
| 115 | 120 | 116,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300135    | ○ |
| 115 | 120 | 116,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24242172    | ○ |
| 120 | 125 | 121,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300137    | ○ |
| 120 | 125 | 121,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300138    | ○ |
| 125 | 130 | 126,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300140    | ● |
| 125 | 130 | 126,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300141    | ● |
| 125 | 130 | 126,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24230162    | ○ |
| 130 | 135 | 131,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300143    | ○ |
| 130 | 135 | 131,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300144    | ○ |
| 130 | 135 | 131,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24262562    | ○ |
| 135 | 140 | 136,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300146    | ○ |
| 140 | 145 | 141,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300149    | ○ |
| 140 | 145 | 141,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24328413    | ○ |
| 140 | 145 | 141,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24256885    | ○ |
| 140 | 148 | 142,5 | 14,8 | 15  | 4       | PTFE B500 | 24327236    | ○ |
| 145 | 150 | 146,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24248043    | ○ |
| 150 | 155 | 151,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300151    | ● |
| 150 | 155 | 151,6 | 19,5 | 20  | 2,5     | PTFE B500 | 24203276    | ○ |
| 150 | 155 | 151,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24168884    | ○ |
| 160 | 165 | 161,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24204644    | ○ |
| 160 | 165 | 161,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24204055    | ○ |
| 160 | 165 | 161,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24263903    | ○ |
| 170 | 175 | 171,6 | 14,8 | 15  | 2,5     | PTFE B500 | 24300153    | ● |
| 175 | 180 | 176,6 | 24,5 | 25  | 2,5     | PTFE B500 | 24264758    | ○ |
| 180 | 185 | 181,2 | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300154    | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice

| d   | D <sub>F</sub> | D <sub>1</sub> | H    | L   | Profile | Material  | Article No. |   |
|-----|----------------|----------------|------|-----|---------|-----------|-------------|---|
| 180 | 185            | 181,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300155    | ● |
| 185 | 190            | 186,2          | 9,6  | 9,7 | 2,5     | PTFE B500 | 24291724    | ○ |
| 190 | 195            | 191,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300157    | ○ |
| 195 | 200            | 196,2          | 9,6  | 9,7 | 2,5     | PTFE B500 | 24242182    | ○ |
| 200 | 205            | 201,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24154721    | ○ |
| 200 | 205            | 201,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24266925    | ○ |
| 200 | 208            | 202,5          | 24,5 | 25  | 4       | PTFE B500 | 24299021    | ○ |
| 210 | 215            | 211,2          | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300159    | ○ |
| 210 | 215            | 211,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300160    | ● |
| 210 | 215            | 211,6          | 19,5 | 20  | 2,5     | PTFE B500 | 24239042    | ○ |
| 220 | 225            | 221,2          | 9,6  | 9,7 | 2,5     | PTFE B500 | 24300161    | ○ |
| 220 | 225            | 221,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300162    | ○ |
| 220 | 225            | 221,6          | 19,5 | 20  | 2,5     | PTFE B500 | 24157304    | ○ |
| 230 | 235            | 231,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24154716    | ○ |
| 230 | 235            | 231,6          | 19,5 | 20  | 2,5     | PTFE B500 | 24342108    | ○ |
| 240 | 245            | 241,2          | 9,6  | 9,7 | 2,5     | PTFE B500 | 24258216    | ○ |
| 240 | 245            | 241,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24223045    | ○ |
| 240 | 245            | 241,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24314554    | ○ |
| 245 | 250            | 246,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24311377    | ○ |
| 250 | 255            | 251,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300163    | ○ |
| 260 | 265            | 261,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300164    | ○ |
| 270 | 275            | 271,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24262561    | ○ |
| 280 | 285            | 281,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300166    | ○ |
| 290 | 295            | 291,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300167    | ○ |
| 300 | 305            | 301,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300168    | ○ |
| 300 | 305            | 301,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24348072    | ○ |
| 310 | 315            | 311,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300169    | ○ |
| 325 | 330            | 326,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24293821    | ○ |
| 330 | 335            | 331,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300172    | ○ |
| 330 | 335            | 331,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24300173    | ○ |
| 340 | 345            | 341,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300174    | ○ |
| 340 | 345            | 341,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24162997    | ○ |
| 343 | 348            | 344,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24301095    | ○ |
| 350 | 355            | 351,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300175    | ○ |
| 350 | 355            | 351,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24300176    | ○ |
| 350 | 358            | 352,5          | 24,5 | 25  | 4       | PTFE B500 | 24337998    | ○ |
| 360 | 365            | 361,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24300177    | ○ |
| 360 | 368            | 362,5          | 24,5 | 25  | 4       | PTFE B500 | 24342011    | ○ |
| 390 | 395            | 391,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24350238    | ○ |
| 390 | 395            | 391,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24336658    | ○ |
| 390 | 398            | 392,5          | 24,5 | 25  | 4       | PTFE B500 | 24355839    | ○ |
| 400 | 405            | 401,6          | 14,8 | 15  | 2,5     | PTFE B500 | 24274959    | ○ |
| 400 | 408            | 402,5          | 24,5 | 25  | 4       | PTFE B500 | 24269425    | ○ |
| 410 | 415            | 411,6          | 14,8 | 15  | 2,5     | PTFE B500 | 49045103    | ○ |
| 410 | 415            | 411,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24296901    | ○ |
| 420 | 425            | 421,6          | 19,5 | 20  | 2,5     | PTFE B500 | 24230161    | ○ |
| 420 | 425            | 421,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24233817    | ○ |
| 420 | 428            | 422,5          | 24,5 | 25  | 4       | PTFE B500 | 24269684    | ○ |
| 425 | 430            | 426,6          | 24,5 | 25  | 2,5     | PTFE B500 | 24261535    | ○ |
| 430 | 435            | 431,6          | 19,5 | 20  | 2,5     | PTFE B500 | 24203171    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| d     | DF    | D1    | H    | L  | Profile | Material  | Article No. |   |
|-------|-------|-------|------|----|---------|-----------|-------------|---|
| 430   | 435   | 431,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24348071    | ○ |
| 431,8 | 439,8 | 434,3 | 24,5 | 25 | 4       | PTFE B500 | 24362369    | ○ |
| 435   | 440   | 436,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24162988    | ○ |
| 440   | 445   | 441,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24344261    | ○ |
| 450   | 455   | 451,6 | 14,8 | 15 | 2,5     | PTFE B500 | 24265878    | ○ |
| 450   | 455   | 451,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24257338    | ○ |
| 450   | 458   | 452,5 | 24,5 | 25 | 4       | PTFE B500 | 24294991    | ○ |
| 460   | 465   | 461,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24308715    | ○ |
| 460   | 468   | 462,5 | 24,5 | 25 | 4       | PTFE B500 | 24269409    | ○ |
| 463,6 | 471,6 | 466,1 | 24,5 | 25 | 4       | PTFE B500 | 24361808    | ○ |
| 470   | 475   | 471,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24347036    | ○ |
| 470   | 478   | 472,5 | 24,5 | 25 | 4       | PTFE B500 | 24274936    | ○ |
| 475   | 480   | 476,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24261562    | ○ |
| 480   | 485   | 481,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24261536    | ○ |
| 480   | 488   | 482,5 | 24,5 | 25 | 4       | PTFE B500 | 24337938    | ○ |
| 490   | 495   | 491,6 | 14,8 | 15 | 2,5     | PTFE B500 | 24366903    | ○ |
| 500   | 505   | 501,6 | 14,8 | 15 | 2,5     | PTFE B500 | 24264832    | ○ |
| 500   | 505   | 501,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24263467    | ○ |
| 500   | 508   | 502,5 | 19,5 | 20 | 4       | PTFE B500 | 24360925    | ○ |
| 500   | 508   | 502,5 | 24,5 | 25 | 4       | PTFE B500 | 24269420    | ○ |
| 510   | 515   | 511,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24269186    | ○ |
| 520   | 525   | 521,6 | 19,5 | 20 | 2,5     | PTFE B500 | 24242786    | ○ |
| 540   | 545   | 541,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24358194    | ○ |
| 540   | 548   | 542,5 | 24,5 | 25 | 4       | PTFE B500 | 24332687    | ○ |
| 550   | 555   | 551,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24344262    | ○ |
| 560   | 568   | 562,5 | 24,5 | 25 | 4       | PTFE B500 | 24274998    | ○ |
| 570   | 575   | 571,5 | 24,5 | 25 | 2,5     | PTFE B500 | 24263227    | ○ |
| 580   | 588   | 582,5 | 24,5 | 25 | 4       | PTFE B500 | 24307426    | ○ |
| 590   | 595   | 591,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24290939    | ○ |
| 596,9 | 604,9 | 599,4 | 29,5 | 30 | 4       | PTFE B500 | 24236371    | ○ |
| 600   | 605   | 601,6 | 14,8 | 15 | 2,5     | PTFE B500 | 24316132    | ○ |
| 600   | 605   | 601,6 | 19,5 | 20 | 2,5     | PTFE B500 | 24300403    | ○ |
| 600   | 608   | 602,5 | 24,5 | 25 | 4       | PTFE B500 | 24354936    | ○ |
| 620   | 625   | 621,6 | 19,5 | 20 | 2,5     | PTFE B500 | 24291416    | ○ |
| 620   | 625   | 621,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24354129    | ○ |
| 630   | 635   | 631,6 | 19,5 | 20 | 2,5     | PTFE B500 | 24361332    | ○ |
| 630   | 635   | 631,6 | 24,5 | 25 | 2,5     | PTFE B500 | 24263904    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| d       | D <sub>F</sub> | D <sub>1</sub> | H    | L  | Profile | Material  | Article No. |   |
|---------|----------------|----------------|------|----|---------|-----------|-------------|---|
| 640     | 648            | 642,5          | 24,5 | 25 | 4       | PTFE B500 | 24298429    | ○ |
| 650     | 658            | 652,5          | 24,5 | 25 | 4       | PTFE B500 | 24293967    | ○ |
| 670     | 675            | 671,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24162996    | ○ |
| 670     | 678            | 672,5          | 24,5 | 25 | 4       | PTFE B500 | 24361116    | ○ |
| 675     | 680            | 676,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24261537    | ○ |
| 700     | 705            | 701,6          | 14,8 | 15 | 2,5     | PTFE B500 | 24234909    | ○ |
| 700     | 705            | 701,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24223046    | ○ |
| 700     | 708            | 702,5          | 29,5 | 30 | 4       | PTFE B500 | 24262945    | ○ |
| 710     | 718            | 712,5          | 14,8 | 15 | 4       | PTFE B500 | 24216172    | ○ |
| 720     | 728            | 722,5          | 24,5 | 25 | 4       | PTFE B500 | 24359660    | ○ |
| 723,9   | 731,9          | 726,4          | 19,5 | 20 | 4       | PTFE B500 | 24249366    | ○ |
| 730     | 738            | 732,5          | 24,5 | 25 | 4       | PTFE B500 | 24263632    | ○ |
| 735     | 740            | 736,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24163718    | ○ |
| 740     | 748            | 742,5          | 19,5 | 20 | 4       | PTFE B500 | 24344397    | ○ |
| 740     | 748            | 742,5          | 24,5 | 25 | 4       | PTFE B500 | 24243175    | ○ |
| 750     | 755            | 751,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24227972    | ○ |
| 787,4   | 795,4          | 789,9          | 24,5 | 25 | 4       | PTFE B500 | 24331521    | ○ |
| 790     | 798            | 792,5          | 24,5 | 25 | 4       | PTFE B500 | 24351827    | ○ |
| 800     | 805            | 801,6          | 24,5 | 25 | 2,5     | PTFE B500 | 24162994    | ○ |
| 800     | 808            | 802,5          | 24,5 | 25 | 4       | PTFE B500 | 24295216    | ○ |
| 820     | 828            | 822,5          | 19,5 | 20 | 4       | PTFE B500 | 24238051    | ○ |
| 830     | 838            | 832,5          | 24,5 | 25 | 4       | PTFE B500 | 24344381    | ○ |
| 850     | 858            | 852,5          | 24,5 | 25 | 4       | PTFE B500 | 24314615    | ○ |
| 890     | 898            | 892,5          | 14,8 | 15 | 4       | PTFE B500 | 24263607    | ○ |
| 890     | 898            | 892,5          | 24,5 | 25 | 4       | PTFE B500 | 24263885    | ○ |
| 900     | 908            | 902,5          | 24,5 | 25 | 4       | PTFE B500 | 24257241    | ○ |
| 950     | 958            | 952,5          | 24,5 | 25 | 4       | PTFE B500 | 24233242    | ○ |
| 975     | 983            | 977,5          | 24,5 | 25 | 4       | PTFE B500 | 24361413    | ○ |
| 1050,00 | 1058,00        | 1052,50        | 24,5 | 25 | 4       | PTFE B500 | 24296554    | ○ |
| 1150,00 | 1158,00        | 1152,50        | 24,5 | 25 | 4       | PTFE B500 | 24357284    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



# Merkel Guide Ring SB

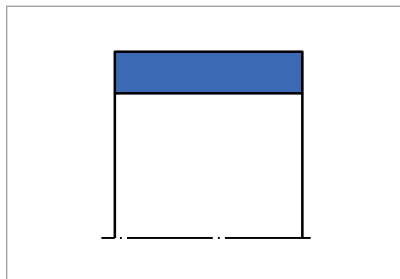


Fig. 1 Merkel Guide Ring SB

## Product description

Non-metallic Merkel Rod Guide Ring SB.

## Product advantages

As a non-metallic guide element for rods, also for standardised housings according to ISO 10766

- Metal/fabric-base laminate materials combination prevents "seizing"
- High load-bearing capacity, elastic (not plastic) behaviour up to break point
- Chamfered profile edges prevent pressing of edge into the corner radii of the housing groove
- Simple snap-in fitting ( $d \leq 300$ ).

## Application

Earth moving equipment, industrial vehicles, agricultural machinery, cranes, injection moulding machines, loading platforms, steel hydraulics engineering, presses, support cylinders.

## Material

Slotted Ring  $\leq 300$

| Material             | Code      |
|----------------------|-----------|
| Fabric-base laminate | HGW HG517 |
| Fabric-base laminate | HGW HG650 |

Ready to fit strip cut to size  $>300$

| Material             | Code      |
|----------------------|-----------|
| Fabric-base laminate | HGW HG600 |

## Operating conditions

| Material                | HGW HG517/HGW HG600     |
|-------------------------|-------------------------|
|                         | Temperature range in °C |
| Hydraulic oils HL, HLP  | -40 ... +120            |
| HFA fluids              | +5 ... +60              |
| HFB fluids              | +5 ... +60              |
| HFC fluids              | -40 ... +60             |
| HFD fluids              | -40 ... +120            |
| Water                   | +5 ... +60              |
| HETG (rapeseed oil)     | -40 ... +80             |
| HEES (synthetic esters) | -40 ... +100            |
| HEPG (glycol)           | -40 ... +80             |
| Mineral greases         | -40 ... +120            |

## Surface quality

| Surface roughness | $R_a$                      | $R_{max}$               |
|-------------------|----------------------------|-------------------------|
| Sliding surface   | 0,05 ... 0,3 $\mu\text{m}$ | $\leq 2,5 \mu\text{m}$  |
| Groove base       | $\leq 2 \mu\text{m}$       | $\leq 10,0 \mu\text{m}$ |
| Groove flanks     | $\leq 3 \mu\text{m}$       | $\leq 15,0 \mu\text{m}$ |

Percentage contact area  $M_v > 50\%$  to max. 90% at cutting depth  $c = R_z/2$  and reference line C ref = 0%.

## Design notes

Please observe our general design notes in → Technical Manual.

## Tolerance recommendation

| $D_F$ |
|-------|
| H8    |

The tolerance definition for the dimensions  $D$  and  $d$  must be viewed in relation to the seal used. The diameter  $D_1$  specified in the table of dimensions is to be viewed exclusively in connection with the guide ring. The corresponding diameter of an adjacent seal housing should be tailored to the sealing component.

**Manufacturing tolerance**

| Profile thickness S |
|---------------------|
| -0,02 ... -0,08     |

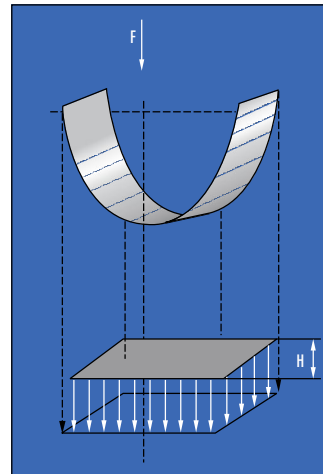
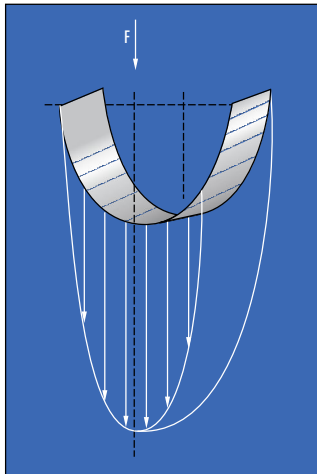
**Surface load**

| Profile thickness S                  |
|--------------------------------------|
| p <50 N/mm <sup>2</sup> up to 60 °C  |
| p <25 N/mm <sup>2</sup> up to 100 °C |

For running speed, see sealing system.

**Surface force**

The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The permissible load on the guide strip is calculated by multiplying the projected area with the permissible specific surface pressure. However, the figure for the permissible specific surface pressure takes into account the possible angular offset of the rods when using the recommended guide elements.

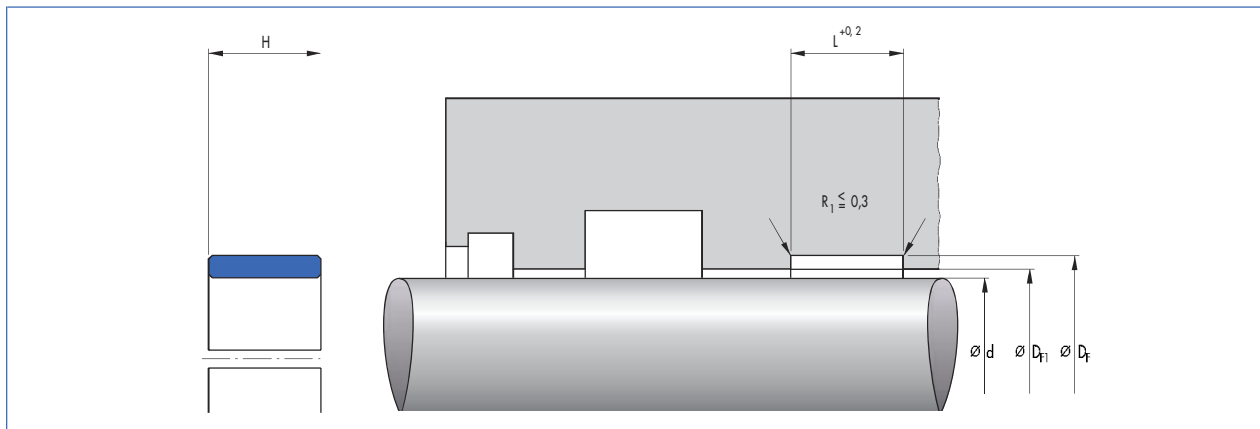


$$F = P \times A$$

$$H = F / (d \times P)$$

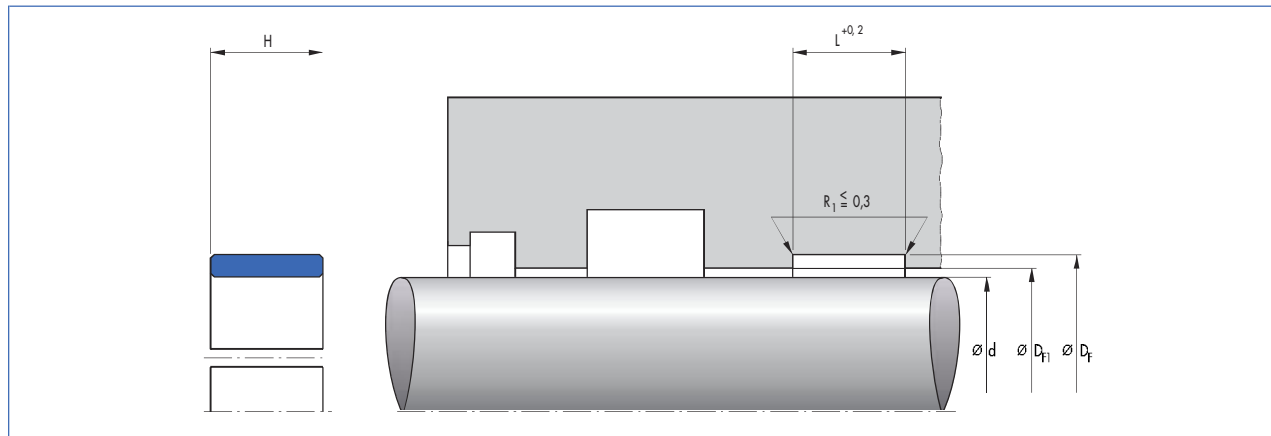
- H = guide strip width [mm]
- F = radial load [N]
- A = projected area [mm<sup>2</sup>]
- P = perm. compression per unit area [N/mm<sup>2</sup>]
- d = rod diameter with rod guidance; piston diameter with piston guidance [mm].

Article list



| d  | D <sub>F</sub> | D <sub>1</sub> | H    | L   | Profile | Material  | Article No. |   |
|----|----------------|----------------|------|-----|---------|-----------|-------------|---|
| 20 | 23             | 21             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24269402    | ○ |
| 22 | 25             | 23             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24288276    | ○ |
| 25 | 28             | 26             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226044    | ● |
| 28 | 31             | 29             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226045    | ○ |
| 30 | 33             | 31             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226046    | ● |
| 32 | 35             | 33             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226047    | ○ |
| 32 | 37             | 33             | 9,6  | 9,7 | 1,5     | HGW HG517 | 24306287    | ○ |
| 35 | 38             | 36             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226048    | ○ |
| 36 | 39             | 37             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226049    | ○ |
| 36 | 41             | 37,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131021    | ● |
| 38 | 41             | 39             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226050    | ○ |
| 40 | 43             | 41             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24226052    | ● |
| 40 | 45             | 41,6           | 9,6  | 9,7 | 1,5     | HGW HG517 | 24131024    | ● |
| 42 | 47             | 43             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24131026    | ○ |
| 45 | 50             | 46,6           | 5,5  | 5,6 | 2,5     | HGW HG517 | 24131029    | ● |
| 45 | 50             | 46,6           | 9,6  | 9,7 | 1,5     | HGW HG517 | 24131030    | ● |
| 50 | 55             | 51,6           | 5,5  | 5,6 | 2,5     | HGW HG517 | 24131032    | ○ |
| 50 | 55             | 51,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131033    | ● |
| 50 | 55             | 51,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24237133    | ○ |
| 55 | 60             | 56,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131036    | ● |
| 55 | 60             | 56,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24275189    | ○ |
| 56 | 61             | 57,6           | 5,5  | 5,6 | 2,5     | HGW HG517 | 24131038    | ○ |
| 56 | 61             | 57,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131039    | ○ |
| 56 | 61             | 57,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24290092    | ○ |
| 60 | 65             | 61,6           | 5,5  | 5,6 | 2,5     | HGW HG517 | 24131041    | ○ |
| 60 | 65             | 61,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131042    | ○ |
| 60 | 65             | 61,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24194850    | ○ |
| 60 | 65             | 61,6           | 19,8 | 20  | 2,5     | HGW HG517 | 24237268    | ○ |
| 63 | 68             | 64,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131045    | ○ |
| 65 | 70             | 66,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131048    | ● |
| 65 | 70             | 66,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24341762    | ○ |
| 70 | 75             | 71,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131051    | ● |
| 70 | 75             | 71,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24180724    | ○ |
| 75 | 80             | 76,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131054    | ● |
| 75 | 80             | 76,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24351115    | ○ |
| 80 | 85             | 81,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131056    | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice

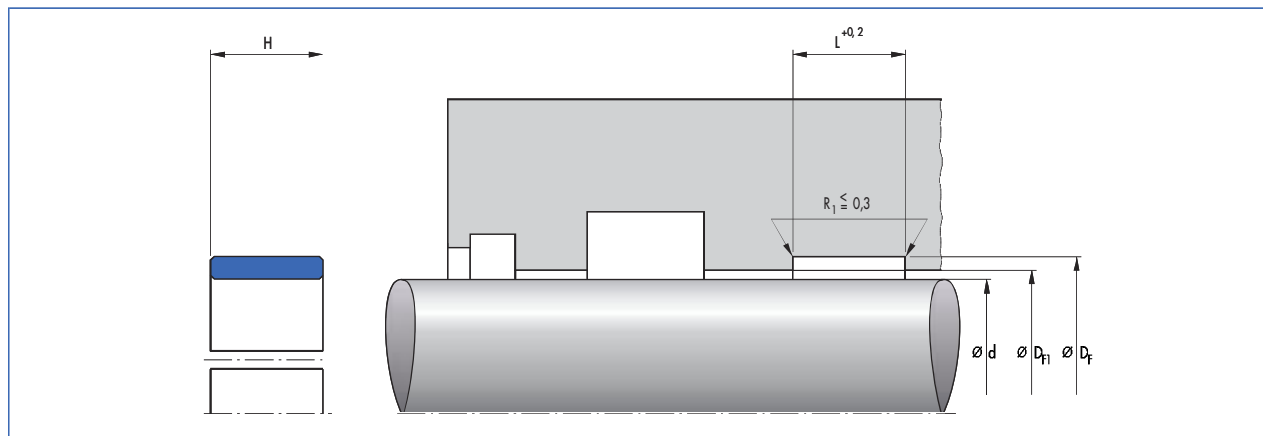


| d     | DF    | D1    | H    | L   | Profile | Material  | Article No. |   |
|-------|-------|-------|------|-----|---------|-----------|-------------|---|
| 80    | 85    | 81,6  | 14,8 | 15  | 2,5     | HGW HG517 | 24138557    | ○ |
| 80    | 85    | 81,6  | 24,5 | 25  | 2,5     | HGW HG517 | 24345442    | ○ |
| 85    | 90    | 86,6  | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131058    | ● |
| 85    | 90    | 86,6  | 14,8 | 15  | 2,5     | HGW HG517 | 24346624    | ● |
| 90    | 95    | 91,6  | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131060    | ● |
| 90    | 95    | 91,6  | 14,8 | 15  | 2,5     | HGW HG517 | 24232557    | ○ |
| 95    | 100   | 96,6  | 9,6  | 9,7 | 2,5     | HGW HG517 | 24148244    | ● |
| 100   | 105   | 101,6 | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131062    | ● |
| 100   | 105   | 101,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24174684    | ● |
| 100   | 105   | 101,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24294287    | ○ |
| 105   | 110   | 106,6 | 9,6  | 9,7 | 2,5     | HGW HG517 | 24197459    | ○ |
| 105   | 110   | 106,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24191184    | ○ |
| 110   | 115   | 111,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24193285    | ○ |
| 110   | 115   | 111,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24306764    | ○ |
| 111,1 | 116,1 | 112,7 | 19,8 | 25  | 2,5     | HGW HG517 | 24375990    | ○ |
| 115   | 120   | 116,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24311951    | ○ |
| 120   | 125   | 121,6 | 9,6  | 9,7 | 2,5     | HGW HG517 | 24136649    | ● |
| 120   | 125   | 121,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24174685    | ● |
| 120   | 125   | 121,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24240122    | ○ |
| 125   | 130   | 126,6 | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131068    | ○ |
| 125   | 130   | 126,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24131069    | ○ |
| 130   | 135   | 131,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24172594    | ○ |
| 130   | 135   | 131,6 | 19,8 | 20  | 2,5     | HGW HG517 | 24375478    | ○ |
| 140   | 145   | 141,6 | 9,6  | 9,7 | 2,5     | HGW HG517 | 24131071    | ○ |
| 140   | 145   | 141,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24131072    | ○ |
| 140   | 145   | 141,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24143420    | ○ |
| 145   | 150   | 146,6 | 19,8 | 20  | 2,5     | HGW HG517 | 24342271    | ○ |
| 145   | 150   | 146,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24349284    | ○ |
| 150   | 155   | 151,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24131075    | ○ |
| 160   | 165   | 161,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24131078    | ○ |
| 165   | 170   | 166,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24183087    | ○ |
| 170   | 175   | 171,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24190517    | ○ |
| 170   | 175   | 171,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24375858    | ○ |
| 180   | 185   | 181,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24131081    | ● |
| 180   | 188   | 182,5 | 24,5 | 25  | 4       | HGW HG517 | 24354370    | ○ |
| 190   | 195   | 191,6 | 14,8 | 15  | 2,5     | HGW HG517 | 24216375    | ○ |
| 190   | 195   | 191,6 | 24,5 | 25  | 2,5     | HGW HG517 | 24262387    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| d     | D <sub>F</sub> | D <sub>1</sub> | H    | L  | Profile | Material  | Article No. |   |
|-------|----------------|----------------|------|----|---------|-----------|-------------|---|
| 200   | 205            | 201,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24131084    | ○ |
| 200   | 208            | 202,5          | 24,5 | 25 | 4       | HGW HG517 | 24227974    | ○ |
| 210   | 215            | 211,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24226067    | ● |
| 210   | 218            | 212,5          | 24,5 | 25 | 4       | HGW HG517 | 24263732    | ○ |
| 220   | 225            | 221,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24209167    | ○ |
| 230   | 235            | 231,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24226069    | ○ |
| 230   | 235            | 231,6          | 19,8 | 20 | 2,5     | HGW HG517 | 24342273    | ○ |
| 240   | 245            | 241,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24197575    | ○ |
| 240   | 245            | 241,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24354796    | ○ |
| 240   | 248            | 242,5          | 24,5 | 25 | 4       | HGW HG517 | 24262692    | ○ |
| 250   | 255            | 251,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24226070    | ○ |
| 260   | 265            | 261,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24226071    | ○ |
| 280   | 285            | 281,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24226073    | ○ |
| 280   | 285            | 281,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24351791    | ○ |
| 280   | 288            | 282,5          | 24,5 | 25 | 4       | HGW HG517 | 24353315    | ○ |
| 300   | 305            | 301,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24191327    | ○ |
| 300   | 305            | 301,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24334866    | ○ |
| 300   | 308            | 302,5          | 24,5 | 25 | 4       | HGW HG600 | 24256760    | ○ |
| 310   | 315            | 311,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226075    | ○ |
| 310   | 315            | 311,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24343892    | ○ |
| 310   | 318            | 312,5          | 24,5 | 25 | 4       | HGW HG600 | 24294293    | ○ |
| 316,2 | 321,2          | 317,8          | 24,5 | 25 | 2,5     | HGW HG600 | 49044808    | ○ |
| 320   | 325            | 321,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226076    | ○ |
| 320   | 325            | 321,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24226077    | ○ |
| 320   | 328            | 322,5          | 24,5 | 25 | 4       | HGW HG600 | 24308092    | ○ |
| 330   | 335            | 331,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226078    | ○ |
| 330   | 335            | 331,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24187413    | ○ |
| 340   | 345            | 341,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226079    | ○ |
| 340   | 345            | 341,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24226080    | ○ |
| 350   | 355            | 351,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226081    | ○ |
| 350   | 355            | 351,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24226082    | ○ |
| 350   | 358            | 352,5          | 24,5 | 25 | 4       | HGW HG600 | 24337997    | ○ |
| 360   | 365            | 361,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24226083    | ○ |
| 360   | 365            | 361,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24226084    | ○ |
| 360   | 368            | 362,5          | 24,5 | 25 | 4       | HGW HG600 | 24342012    | ○ |
| 370   | 375            | 371,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24327519    | ○ |
| 380   | 385            | 381,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24353459    | ○ |
| 380   | 385            | 381,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24250195    | ○ |
| 390   | 395            | 391,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24375951    | ○ |
| 390   | 395            | 391,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24187414    | ○ |
| 390   | 398            | 392,5          | 24,5 | 25 | 4       | HGW HG600 | 24307327    | ○ |
| 400   | 405            | 401,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24345757    | ○ |
| 400   | 405            | 401,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24333824    | ○ |
| 400   | 408            | 402,5          | 24,5 | 25 | 4       | HGW HG600 | 24259182    | ○ |
| 406,4 | 414,4          | 408,9          | 24,5 | 25 | 4       | HGW HG600 | 24361390    | ○ |
| 410   | 415            | 411,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24288046    | ○ |
| 410   | 415            | 411,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24294216    | ○ |
| 420   | 425            | 421,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24356361    | ○ |
| 420   | 425            | 421,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24329919    | ○ |
| 420   | 428            | 422,5          | 24,5 | 25 | 4       | HGW HG600 | 24346468    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| d     | D <sub>F</sub> | D <sub>1</sub> | H    | L   | Profile | Material  | Article No. |   |
|-------|----------------|----------------|------|-----|---------|-----------|-------------|---|
| 440   | 448            | 442,5          | 24,5 | 25  | 4       | HGW HG600 | 24363242    | ○ |
| 450   | 455            | 451,6          | 14,8 | 15  | 2,5     | HGW HG600 | 24265877    | ○ |
| 450   | 455            | 451,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24339926    | ○ |
| 450   | 458            | 452,5          | 24,5 | 25  | 4       | HGW HG600 | 24294987    | ○ |
| 457,2 | 465,2          | 459,7          | 24,5 | 25  | 4       | HGW HG600 | 24367537    | ○ |
| 460   | 465            | 461,6          | 14,8 | 15  | 2,5     | HGW HG600 | 24356363    | ○ |
| 460   | 465            | 461,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24339221    | ○ |
| 460   | 468            | 462,5          | 24,5 | 25  | 4       | HGW HG600 | 24269407    | ○ |
| 463,6 | 471,6          | 466,1          | 24,5 | 25  | 4       | HGW HG600 | 24361809    | ○ |
| 470   | 475            | 471,6          | 14,8 | 15  | 2,5     | HGW HG600 | 24327589    | ○ |
| 470   | 475            | 471,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24359238    | ○ |
| 475   | 483            | 477,5          | 24,5 | 25  | 4       | HGW HG600 | 24334724    | ○ |
| 480   | 485            | 481,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24339373    | ○ |
| 480   | 488            | 482,5          | 24,5 | 25  | 4       | HGW HG600 | 24291803    | ○ |
| 490   | 498            | 492,5          | 24,5 | 25  | 4       | HGW HG600 | 24290172    | ○ |
| 500   | 505            | 501,6          | 14,8 | 15  | 2,5     | HGW HG600 | 24356362    | ○ |
| 500   | 505            | 501,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24269675    | ○ |
| 500   | 508            | 502,5          | 24,5 | 25  | 4       | HGW HG600 | 24269421    | ○ |
| 508   | 516            | 510,5          | 24,5 | 25  | 4       | HGW HG600 | 24346656    | ○ |
| 510   | 518            | 512,5          | 24,5 | 25  | 4       | HGW HG600 | 24299556    | ○ |
| 520   | 525            | 521,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24345682    | ○ |
| 520   | 528            | 522,5          | 24,5 | 25  | 4       | HGW HG600 | 24329460    | ○ |
| 530   | 535            | 531,6          | 14,8 | 15  | 2,5     | HGW HG600 | 24356360    | ○ |
| 530   | 538            | 532,5          | 24,5 | 25  | 4       | HGW HG600 | 24363243    | ○ |
| 535   | 540            | 536,6          | 9,6  | 9,7 | 2,5     | HGW HG600 | 24351386    | ○ |
| 540   | 548            | 542,5          | 24,5 | 25  | 4       | HGW HG600 | 24274965    | ○ |
| 550   | 555            | 551,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24362838    | ○ |
| 558,8 | 566,8          | 561,3          | 24,5 | 25  | 4       | HGW HG600 | 24361615    | ○ |
| 560   | 568            | 562,5          | 24,5 | 25  | 4       | HGW HG600 | 24275169    | ○ |
| 570   | 575            | 571,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24250196    | ○ |
| 570   | 578            | 572,5          | 24,5 | 25  | 4       | HGW HG600 | 24315103    | ○ |
| 580   | 588            | 582,5          | 24,5 | 25  | 4       | HGW HG600 | 24307424    | ○ |
| 590   | 595            | 591,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24316066    | ○ |
| 590   | 598            | 592,5          | 24,5 | 25  | 4       | HGW HG600 | 24288148    | ○ |
| 600   | 605            | 601,6          | 24,5 | 25  | 2,5     | HGW HG600 | 24337098    | ○ |
| 600   | 608            | 602,5          | 24,5 | 25  | 4       | HGW HG600 | 24340044    | ○ |
| 630   | 638            | 632,5          | 24,5 | 25  | 4       | HGW HG600 | 24308091    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| d      | D <sub>F</sub> | D <sub>1</sub> | H    | L  | Profile | Material  | Article No. |   |
|--------|----------------|----------------|------|----|---------|-----------|-------------|---|
| 640    | 648            | 642,5          | 24,5 | 25 | 4       | HGW HG600 | 24298435    | ○ |
| 650    | 655            | 651,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24302588    | ○ |
| 650    | 655            | 651,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24302589    | ○ |
| 650    | 658            | 652,5          | 24,5 | 25 | 4       | HGW HG600 | 24293966    | ○ |
| 660    | 665            | 661,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24336388    | ○ |
| 670    | 675            | 671,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24353636    | ○ |
| 670    | 678            | 672,5          | 24,5 | 25 | 4       | HGW HG600 | 24300401    | ○ |
| 680    | 688            | 682,5          | 24,5 | 25 | 4       | HGW HG600 | 24269484    | ○ |
| 700    | 705            | 701,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24257373    | ○ |
| 710    | 715            | 711,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24359709    | ○ |
| 720    | 728            | 722,5          | 24,5 | 25 | 4       | HGW HG600 | 24295834    | ○ |
| 730    | 735            | 731,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24362406    | ○ |
| 740    | 748            | 742,5          | 24,5 | 25 | 4       | HGW HG600 | 24243177    | ○ |
| 749,5  | 757,5          | 752            | 24,5 | 25 | 4       | HGW HG600 | 24367124    | ○ |
| 750    | 758            | 752,5          | 24,5 | 25 | 4       | HGW HG600 | 24306400    | ○ |
| 787,4  | 795,4          | 789,9          | 24,5 | 25 | 4       | HGW HG600 | 24331518    | ○ |
| 790    | 798            | 792,5          | 24,5 | 25 | 4       | HGW HG600 | 24351818    | ○ |
| 800    | 808            | 802,5          | 24,5 | 25 | 4       | HGW HG600 | 24295217    | ○ |
| 820    | 828            | 822,5          | 24,5 | 25 | 4       | HGW HG600 | 24335809    | ○ |
| 830    | 838            | 832,5          | 24,5 | 25 | 4       | HGW HG600 | 24339267    | ○ |
| 850    | 858            | 852,5          | 24,5 | 25 | 4       | HGW HG600 | 24269891    | ○ |
| 860    | 868            | 862,5          | 24,5 | 25 | 4       | HGW HG600 | 24294618    | ○ |
| 880    | 888            | 882,5          | 24,5 | 25 | 4       | HGW HG600 | 24336302    | ○ |
| 890    | 898            | 892,5          | 14,8 | 15 | 4       | HGW HG600 | 24297567    | ○ |
| 890    | 898            | 892,5          | 24,5 | 25 | 4       | HGW HG600 | 24338494    | ○ |
| 900    | 908            | 902,5          | 24,5 | 25 | 4       | HGW HG600 | 24257240    | ○ |
| 950    | 958            | 952,5          | 24,5 | 25 | 4       | HGW HG600 | 24294142    | ○ |
| 970    | 978            | 972,5          | 24,5 | 25 | 4       | HGW HG600 | 24359657    | ○ |
| 975    | 983            | 977,5          | 24,5 | 25 | 4       | HGW HG600 | 24293718    | ○ |
| 1000   | 1005           | 1001,6         | 24,5 | 25 | 2,5     | HGW HG600 | 24352886    | ○ |
| 1050   | 1058           | 1052,5         | 24,5 | 25 | 4       | HGW HG600 | 24296553    | ○ |
| 1150   | 1158           | 1152,5         | 24,5 | 25 | 4       | HGW HG600 | 24357301    | ○ |
| 1295,4 | 1303,4         | 1297,9         | 24,5 | 25 | 4       | HGW HG600 | 24363063    | ○ |
| 1650   | 1658           | 1652,5         | 24,5 | 25 | 4       | HGW HG600 | 24335492    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring Guivex SBK

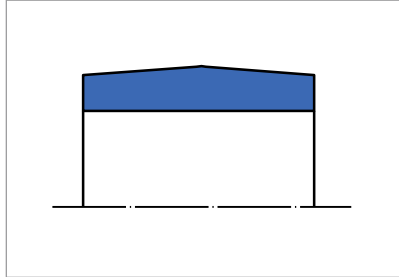


Fig. 1 Merkel Guide Ring Guivex SBK

## Product description

Profiled Merkel Guide Ring Guivex SBK made from fabric-base laminate. Patented product design (patent-no.: PCT/EP95/03874).

## Product advantages

Merkel SBK guide rings offer clear advantages over conventional guide strips/rings, designed for standardised housings according to ISO 10766 amongst others

- Interchangeable to existing operating environments of the types SB and SF
- High radial load
- Very good utilisation of the guide length through even distribution of stress
- Improved drawing-in of lubricating medium through optimised distribution of stress in the contact zone between guide ring and counter-acting surface
- Reduced stick-slip tendency
- Outstanding running behaviour with short guide distances (no clamping).

## Application

Long stroke cylinders (piston rod bowing under load), short guide distances (lateral buckling of the piston rod), short stroke (inadequate lubrication) friction-optimised sealing systems, additional item for metal guides, mobile hydraulics, heavy-duty hydraulics.

## Material

Ø range ≤300

| Material             | Code      | Colour    |
|----------------------|-----------|-----------|
| Fabric-base laminate | HGW HG517 | Dark grey |
| Fabric-base laminate | HGW HG650 | Red       |

Ø range >300

| Material             | Code      | Colour |
|----------------------|-----------|--------|
| Fabric-base laminate | HGW HG650 | Red    |

## Operating conditions

| Material               | HGW HG517/HGW HG650     |
|------------------------|-------------------------|
|                        | Temperature range in °C |
| Hydraulic oils HL, HLP | -40 ... +120            |
| HFA fluids             | +5 ... +60              |
| HFB fluids             | +5 ... +60              |
| HFC fluids             | -40 ... +60             |
| HFD fluids             | -40 ... +120            |
| Water                  | +5 ... +60              |
| HETG (rapeseed oil)    | -40 ... +80             |
| HEES (synthetic ester) | -40 ... +100            |
| HEPG (glycol)          | -40 ... +80             |
| Mineral greases        | -40 ... +120            |

## Surface quality

| Surface roughness | R <sub>a</sub>  | R <sub>max</sub> |
|-------------------|-----------------|------------------|
| Sliding surface   | 0,05 ... 0,3 µm | ≤2,5 µm          |
| Groove base       | ≤1,6 µm         | ≤6,3 µm          |
| Groove flanks     | ≤3,0 µm         | ≤15,0 µm         |

Percentage contact area M<sub>v</sub> >50% to max. 90% at cutting depth c = Rz/2 and reference line C ref = 0%.

The long-term behaviour of the sealing component as well as the security against early failures are primarily determined by the quality of the counter-acting surface. This means that the surface must be precisely described and evaluated. Based on current knowledge we recommend supplementing the above definition of the surface quality of the

sliding surface with the quantities in the following table. The previous general description of the material component is significantly improved with the new quantities from the material component, particularly with reference to the abrasiveness of the surface.  
→ Technical Manual.



**Design notes**

The diameter D1 given in the table of dimensions is to be considered exclusively in relation to the guide bush. The corresponding diameter for the adjacent seal housing is to be matched to the sealing component.

**Sliding surfaces**

| Characteristic value | Limit position       |
|----------------------|----------------------|
| $R_a$                | >0,05 mm ... 0,30 mm |
| $R_{max}$            | <2,50 mm             |
| $R_{plx}$            | <0,50 mm             |
| $R_{pk}$             | <0,50 mm             |
| $R_k$                | >0,25 mm ... 0,70 mm |
| $R_{vk}$             | >0,20 mm ... 0,65 mm |
| $R_{vlx}$            | >0,20 mm ... 2,00 mm |

The limit values listed in the table are not currently applicable for ceramic or partial ceramic counter-surfaces.

**Tolerance**

| Production tolerance profile thickness S |
|--|
| -0,01 ... -0,06                          |

**Surface load**

The value for the specific compression per unit area is dependent on the operating temperature and the size of the elastic deformation (deflection) of the guide element. The maximum possible deflection is limited in a sealing system by the smallest gap dimension behind the primary seal. → Technical Manual.

**Deflection**

- e1 = 0,10 for s = 2,5
- e1 = 0,15 for s = 4,0
- e2 = 0,15 for s = 2,5
- e2 = 0,20 for s = 4,0

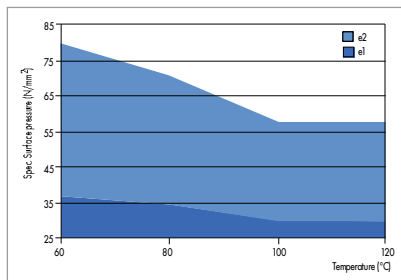
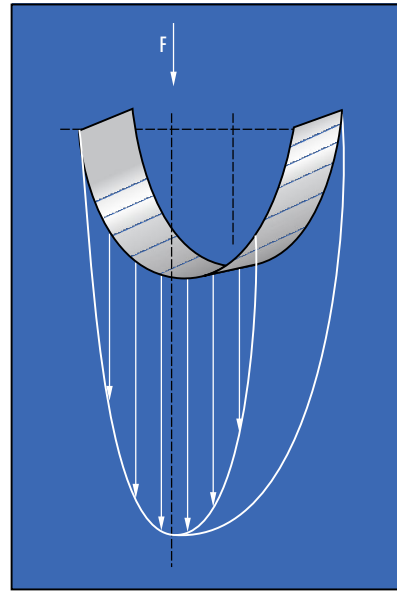


Fig. 2 Special surface pressure for parallel load

**Radial load**

The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The required guide width can be calculated

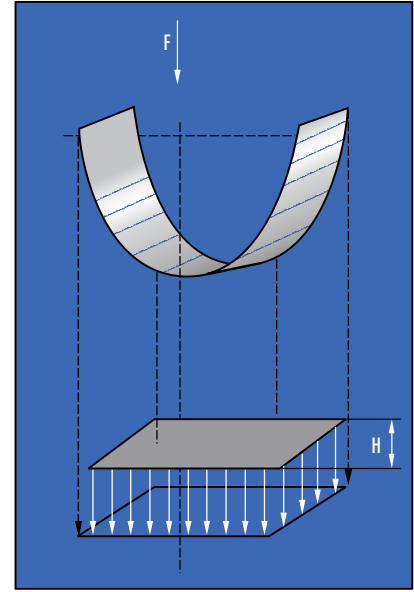


$$F = P \times A$$

$$H = F / (d \times P)$$

$H$  = guide strip width [mm]  
 $F$  = radial load [N]  
 $A$  = projected area [mm<sup>2</sup>]

using the following formulas. Taking the increased service life into consideration, a reduction of the load by selection of a wide guide can make sense in individual cases.



$P$  = perm. compression per unit area [N/mm<sup>2</sup>]  
 $d$  = rod diameter with rod guidance; piston diameter with piston guidance [mm].

**Mode of operation**

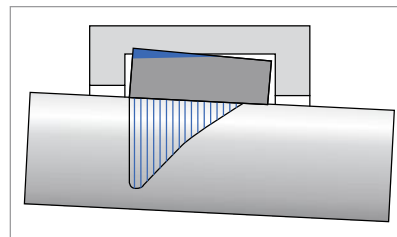


Fig. 3 Rectangular guide ring: stress peaks in the edge area

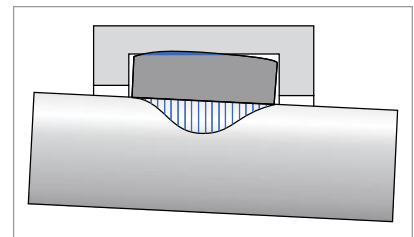
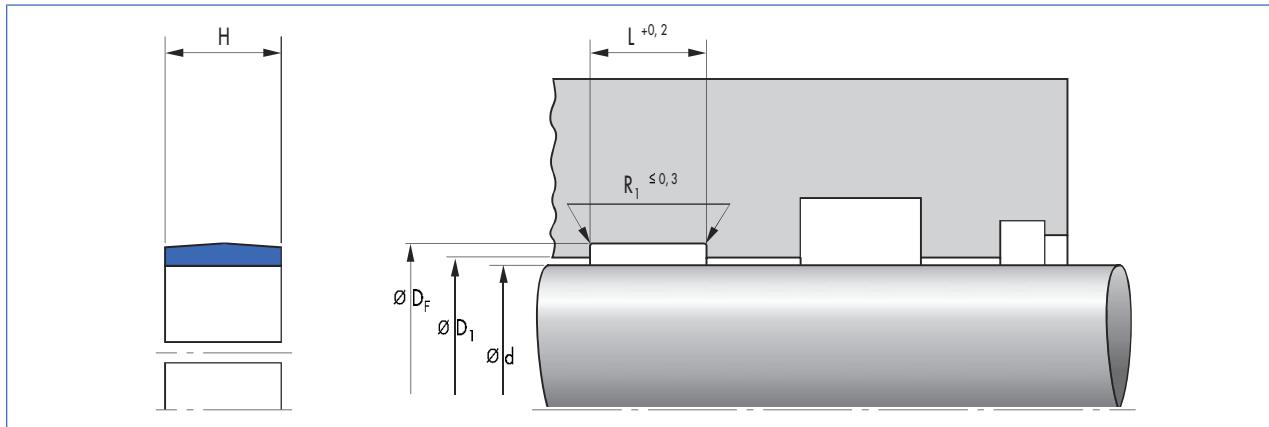


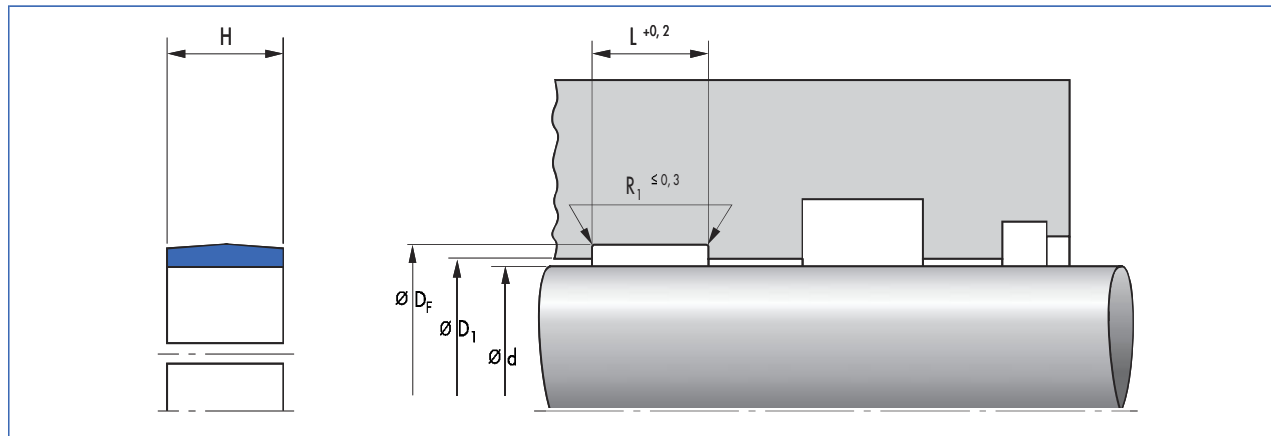
Fig. 4 Merkel Guide Ring Guivex SBK: even distribution of stress

Article list



| d   | D <sub>F</sub> | D <sub>1</sub> | H    | L   | Profile | Material  | Article No. |   |
|-----|----------------|----------------|------|-----|---------|-----------|-------------|---|
| 25  | 30             | 30             | 9,5  | 9,7 | 2,5     | HGW HG517 | 533551      | ○ |
| 28  | 31             | 29             | 5,5  | 5,6 | 1,5     | HGW HG517 | 24375389    | ○ |
| 40  | 45             | 41,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24370469    | ● |
| 45  | 50             | 46,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24375662    | ● |
| 45  | 50             | 46,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24380507    | ○ |
| 50  | 55             | 51,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24367539    | ● |
| 55  | 60             | 56,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 524832      | ● |
| 55  | 60             | 56,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24380889    | ○ |
| 60  | 65             | 61,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24375946    | ● |
| 63  | 68             | 68             | 9,5  | 9,7 | 2,5     | HGW HG517 | 49000672    | ○ |
| 65  | 70             | 66,6           | 9,5  | 9,7 | 2,5     | HGW HG517 | 24367540    | ○ |
| 65  | 70             | 66,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24380160    | ○ |
| 70  | 75             | 71,6           | 9,6  | 9,7 | 2,5     | HGW HG517 | 24367541    | ● |
| 75  | 80             | 76,6           | 9,5  | 9,7 | 2,5     | HGW HG517 | 528479      | ○ |
| 75  | 80             | 76,6           | 14,8 | 15  | 2,5     | HGW HG517 | 529802      | ○ |
| 75  | 83             | 83             | 14,8 | 15  | 4       | HGW HG517 | 49004925    | ○ |
| 78  | 83             | 83             | 19,8 | 20  | 2,5     | HGW HG517 | 49002107    | ○ |
| 80  | 85             | 81,6           | 9,5  | 9,7 | 2,5     | HGW HG517 | 24380101    | ● |
| 80  | 85             | 81,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24370470    | ● |
| 80  | 85             | 81,6           | 24,5 | 25  | 2,5     | HGW HG517 | 24373284    | ● |
| 80  | 88             | 88             | 14,8 | 15  | 4       | HGW HG517 | 49004810    | ○ |
| 85  | 90             | 86,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24380161    | ○ |
| 90  | 95             | 91,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24379371    | ● |
| 90  | 95             | 91,6           | 24,5 | 25  | 2,5     | HGW HG517 | 528119      | ○ |
| 90  | 95             | 91,6           | 34,5 | 35  | 2,5     | HGW HG517 | 24380556    | ○ |
| 90  | 98             | 92,5           | 19,8 | 20  | 4       | HGW HG517 | 24359046    | ○ |
| 93  | 98             | 98             | 19,8 | 20  | 2,5     | HGW HG517 | 49002108    | ○ |
| 95  | 100            | 96,6           | 14,8 | 15  | 2,5     | HGW HG517 | 24379355    | ○ |
| 100 | 105            | 101,6          | 14,8 | 15  | 2,5     | HGW HG517 | 24380162    | ● |
| 100 | 105            | 101,6          | 19,8 | 20  | 2,5     | HGW HG517 | 24379370    | ● |
| 100 | 108            | 108            | 24,5 | 25  | 4       | HGW HG517 | 49005018    | ○ |
| 110 | 113,2          | 111,6          | 14,5 | 15  | 1,6     | HGW HG517 | 24358241    | ● |
| 110 | 115            | 111,6          | 19,8 | 20  | 2,5     | HGW HG517 | 24379369    | ○ |
| 110 | 115            | 111,6          | 24,5 | 25  | 2,5     | HGW HG517 | 24377187    | ● |
| 110 | 118            | 112,5          | 14,8 | 15  | 4       | HGW HG517 | 24358242    | ○ |
| 112 | 117            | 117            | 19,8 | 20  | 2,5     | HGW HG517 | 49000534    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

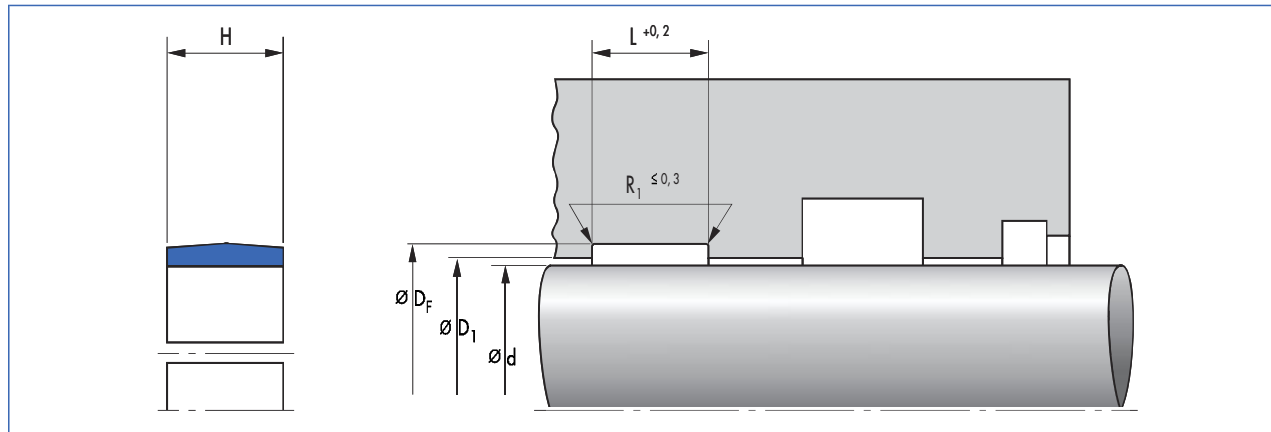


| d   | D <sub>F</sub> | D <sub>1</sub> | H    | L  | Profile | Material  | Article No. |   |
|-----|----------------|----------------|------|----|---------|-----------|-------------|---|
| 120 | 125            | 121,6          | 14,8 | 15 | 2,5     | HGW HG517 | 525470      | ○ |
| 120 | 125            | 121,6          | 19,8 | 20 | 2,5     | HGW HG517 | 529483      | ○ |
| 120 | 125            | 121,6          | 34,5 | 35 | 2,5     | HGW HG517 | 24380557    | ○ |
| 125 | 130            | 126,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380163    | ○ |
| 125 | 130            | 126,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379074    | ○ |
| 140 | 145            | 141,6          | 24,5 | 25 | 2,5     | HGW HG517 | 528820      | ● |
| 140 | 148            | 142,5          | 39,5 | 40 | 4       | HGW HG517 | 528995      | ○ |
| 145 | 150            | 146,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380690    | ● |
| 155 | 160            | 156,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380691    | ● |
| 160 | 165            | 161,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380782    | ○ |
| 160 | 165            | 161,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24375641    | ● |
| 160 | 168            | 162,5          | 39,5 | 40 | 4       | HGW HG517 | 24370365    | ● |
| 170 | 175            | 171,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380692    | ● |
| 170 | 175            | 171,6          | 24,5 | 25 | 2,5     | HGW HG517 | 524993      | ○ |
| 170 | 178            | 172,5          | 24,5 | 25 | 4       | HGW HG517 | 530870      | ○ |
| 170 | 178            | 172,5          | 39,5 | 40 | 4       | HGW HG517 | 24378034    | ○ |
| 180 | 185            | 181,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380693    | ● |
| 180 | 185            | 181,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379035    | ○ |
| 180 | 185            | 181,6          | 29,5 | 30 | 2,5     | HGW HG517 | 526594      | ○ |
| 180 | 185            | 181,6          | 39,5 | 40 | 2,5     | HGW HG517 | 530602      | ○ |
| 180 | 188            | 182,5          | 39,5 | 40 | 4       | HGW HG517 | 24378035    | ○ |
| 190 | 195            | 191,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380270    | ○ |
| 190 | 198            | 198            | 34,5 | 35 | 4       | HGW HG517 | 49002019    | ○ |
| 200 | 205            | 201,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380775    | ○ |
| 200 | 205            | 201,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379075    | ○ |
| 200 | 205            | 201,6          | 34,5 | 35 | 2,5     | HGW HG517 | 24378003    | ○ |
| 200 | 208            | 202,5          | 39,5 | 40 | 4       | HGW HG517 | 24378036    | ○ |
| 210 | 215            | 211,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380694    | ● |
| 210 | 218            | 212,5          | 24,5 | 25 | 4       | HGW HG517 | 530265      | ○ |
| 220 | 225            | 221,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24372435    | ○ |
| 220 | 225            | 221,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379036    | ○ |
| 220 | 228            | 222,5          | 39,5 | 40 | 4       | HGW HG517 | 24378037    | ○ |
| 230 | 235            | 231,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380269    | ○ |
| 230 | 235            | 231,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379253    | ○ |
| 240 | 245            | 241,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380255    | ○ |
| 240 | 245            | 241,6          | 24,5 | 25 | 2,5     | HGW HG517 | 530267      | ○ |
| 240 | 248            | 242,5          | 39,5 | 40 | 4       | HGW HG517 | 24378038    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| d   | D <sub>F</sub> | D <sub>1</sub> | H    | L  | Profile | Material  | Article No. |   |
|-----|----------------|----------------|------|----|---------|-----------|-------------|---|
| 250 | 255            | 251,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380273    | ○ |
| 250 | 255            | 251,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379037    | ○ |
| 250 | 256            | 251,6          | 24,5 | 25 | 3       | HGW HG517 | 49002878    | ○ |
| 255 | 260            | 260            | 24,5 | 25 | 2,5     | HGW HG517 | 49002907    | ○ |
| 260 | 268            | 262,5          | 39,5 | 40 | 4       | HGW HG517 | 24378039    | ○ |
| 260 | 268            | 268            | 24,5 | 25 | 4       | HGW HG517 | 49003297    | ○ |
| 270 | 275            | 271,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24380271    | ● |
| 280 | 285            | 281,6          | 14,8 | 15 | 2,5     | HGW HG517 | 24380777    | ○ |
| 280 | 285            | 281,6          | 24,5 | 25 | 2,5     | HGW HG517 | 24379038    | ● |
| 280 | 288            | 282,5          | 34,5 | 35 | 4       | HGW HG517 | 24379347    | ○ |
| 280 | 288            | 282,5          | 39,5 | 40 | 4       | HGW HG517 | 24378040    | ○ |
| 280 | 288            | 288            | 14,8 | 15 | 4       | HGW HG517 | 24379158    | ○ |
| 290 | 298            | 292,5          | 24,5 | 25 | 4       | HGW HG517 | 24379491    | ○ |
| 292 | 297            | 293,6          | 24,5 | 25 | 2,5     | HGW HG517 | 528857      | ○ |
| 300 | 308            | 302,5          | 24,5 | 25 | 4       | HGW HG600 | 24380482    | ● |
| 300 | 308            | 302,5          | 39,5 | 40 | 4       | HGW HG600 | 24379155    | ● |
| 320 | 325            | 321,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24380778    | ○ |
| 320 | 325            | 321,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24380272    | ● |
| 320 | 328            | 322,5          | 24,5 | 25 | 4       | HGW HG600 | 24379076    | ○ |
| 320 | 328            | 322,5          | 29,5 | 30 | 4       | HGW HG600 | 528486      | ○ |
| 320 | 328            | 328            | 39,5 | 40 | 4       | HGW HG600 | 532132      | ○ |
| 330 | 338            | 332,5          | 24,5 | 25 | 4       | HGW HG600 | 24379040    | ○ |
| 350 | 355            | 351,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24380779    | ○ |
| 350 | 358            | 352,5          | 24,5 | 25 | 4       | HGW HG600 | 24379041    | ○ |
| 360 | 365            | 361,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24380275    | ○ |
| 360 | 368            | 362,5          | 24,5 | 25 | 4       | HGW HG600 | 24375318    | ● |
| 360 | 368            | 368            | 39,5 | 40 | 4       | HGW HG600 | 531873      | ○ |
| 370 | 378            | 372,5          | 24,5 | 25 | 4       | HGW HG600 | 24379042    | ○ |
| 370 | 378            | 378            | 34,5 | 35 | 4       | HGW HG600 | 49000975    | ○ |
| 380 | 385            | 385            | 24,5 | 25 | 2,5     | HGW HG600 | 531516      | ○ |
| 380 | 388            | 382,5          | 24,5 | 25 | 4       | HGW HG600 | 24379138    | ○ |
| 380 | 388            | 382,5          | 39,5 | 40 | 4       | HGW HG600 | 24379245    | ● |
| 390 | 395            | 391,6          | 24,5 | 25 | 2,5     | HGW HG600 | 24380276    | ○ |
| 400 | 405            | 401,6          | 14,8 | 15 | 2,5     | HGW HG600 | 24380781    | ○ |
| 400 | 405            | 405            | 24,5 | 25 | 2,5     | HGW HG600 | 49012525    | ○ |
| 400 | 408            | 402,5          | 24,5 | 25 | 4       | HGW HG600 | 24375319    | ● |
| 400 | 408            | 402,5          | 39,5 | 40 | 4       | HGW HG600 | 526027      | ○ |
| 420 | 425            | 421,5          | 24,5 | 25 | 2,5     | HGW HG600 | 527921      | ● |
| 420 | 428            | 422,5          | 39,5 | 40 | 4       | HGW HG600 | 24379322    | ○ |
| 440 | 448            | 442,5          | 19,8 | 20 | 4       | HGW HG600 | 24378391    | ○ |
| 440 | 448            | 442,5          | 24,5 | 25 | 4       | HGW HG600 | 24375320    | ● |
| 440 | 448            | 442,5          | 39,5 | 40 | 4       | HGW HG600 | 526028      | ● |
| 445 | 453            | 453            | 39,5 | 40 | 4       | HGW HG600 | 49004008    | ○ |
| 450 | 458            | 452,5          | 24,5 | 25 | 4       | HGW HG600 | 24380453    | ○ |
| 460 | 465            | 465            | 24,5 | 25 | 2,5     | HGW HG600 | 49001818    | ○ |
| 460 | 468            | 462,5          | 24,5 | 25 | 4       | HGW HG600 | 24375321    | ● |
| 500 | 508            | 502,5          | 19,8 | 20 | 4       | HGW HG600 | 24378392    | ○ |
| 500 | 508            | 502,5          | 24,5 | 25 | 4       | HGW HG600 | 24375322    | ● |
| 500 | 508            | 502,5          | 39,5 | 40 | 4       | HGW HG600 | 24379324    | ○ |
| 510 | 518            | 512,5          | 24,5 | 25 | 4       | HGW HG600 | 530266      | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| d      | DF     | D1     | H    | L  | Profile | Material  | Article No. |   |
|--------|--------|--------|------|----|---------|-----------|-------------|---|
| 530    | 538    | 532,5  | 24,5 | 25 | 4       | HGW HG600 | 24375323    | ● |
| 530    | 538    | 538    | 39,5 | 40 | 4       | HGW HG600 | 49004922    | ○ |
| 540    | 548    | 548    | 39,5 | 40 | 4       | HGW HG600 | 49018518    | ○ |
| 550    | 558    | 558    | 24,5 | 25 | 4       | HGW HG600 | 49016779    | ○ |
| 550    | 558    | 558    | 39,5 | 40 | 4       | HGW HG600 | 49005155    | ○ |
| 560    | 568    | 562,5  | 24,5 | 25 | 4       | HGW HG600 | 24375324    | ● |
| 600    | 605    | 601,5  | 24,5 | 25 | 2,5     | HGW HG600 | 528326      | ● |
| 600    | 608    | 602,5  | 24,5 | 25 | 4       | HGW HG600 | 24375325    | ● |
| 600    | 608    | 608    | 39,5 | 40 | 4       | HGW HG600 | 49003964    | ○ |
| 630    | 638    | 632,5  | 24,5 | 15 | 4       | HGW HG600 | 524927      | ● |
| 650    | 658    | 652,5  | 34,5 | 35 | 4       | HGW HG600 | 24378494    | ○ |
| 700    | 708    | 702,5  | 39,5 | 40 | 4       | HGW HG600 | 529519      | ● |
| 710    | 718    | 718    | 24,5 | 25 | 4       | HGW HG600 | 49017422    | ○ |
| 710    | 718    | 718    | 39,5 | 40 | 4       | HGW HG600 | 49012632    | ○ |
| 730    | 738    | 738    | 39,5 | 40 | 4       | HGW HG600 | 49015646    | ○ |
| 740    | 748    | 748    | 24,5 | 25 | 4       | HGW HG600 | 49000239    | ○ |
| 760    | 768    | 762,5  | 24,5 | 25 | 4       | HGW HG600 | 24380545    | ○ |
| 790    | 798    | 798    | 19,8 | 20 | 4       | HGW HG600 | 531677      | ○ |
| 790    | 798    | 798    | 34,5 | 35 | 4       | HGW HG600 | 49003032    | ○ |
| 790    | 798    | 798    | 39,5 | 40 | 4       | HGW HG600 | 49015647    | ○ |
| 800    | 808    | 802,5  | 24,5 | 25 | 4       | HGW HG600 | 526190      | ● |
| 820    | 828    | 822,5  | 24,5 | 25 | 4       | HGW HG600 | 528715      | ● |
| 820    | 828    | 822,5  | 39,5 | 40 | 4       | HGW HG600 | 528716      | ● |
| 890    | 898    | 898    | 19,8 | 20 | 4       | HGW HG600 | 49003043    | ○ |
| 890    | 898    | 898    | 34,5 | 35 | 4       | HGW HG600 | 49020525    | ○ |
| 970    | 978    | 972,5  | 24,5 | 25 | 4       | HGW HG600 | 24376186    | ○ |
| 990    | 996,3  | 991,6  | 29,5 | 30 | 3,15    | HGW HG600 | 49004975    | ○ |
| 1000   | 1008   | 1008   | 24,5 | 25 | 4       | HGW HG600 | 49017423    | ○ |
| 1100   | 1108   | 1108   | 24,5 | 25 | 4       | HGW HG600 | 49017424    | ○ |
| 1100   | 1108   | 1108   | 34,5 | 35 | 4       | HGW HG600 | 533289      | ○ |
| 1130   | 1138   | 1132,5 | 24,5 | 25 | 4       | HGW HG600 | 530019      | ● |
| 1145   | 1153   | 1153   | 39,5 | 40 | 4       | HGW HG600 | 49002141    | ○ |
| 1340   | 1348   | 1342,5 | 39,5 | 40 | 4       | HGW HG600 | 531144      | ○ |
| 1350   | 1358   | 1358   | 39,5 | 40 | 4       | HGW HG600 | 531904      | ○ |
| 1625,6 | 1633,6 | 1628,1 | 39,5 | 40 | 4       | HGW HG600 | 528780      | ○ |
| 1626   | 1634   | 1628,5 | 39,5 | 40 | 4       | HGW HG600 | 527116      | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring FRI

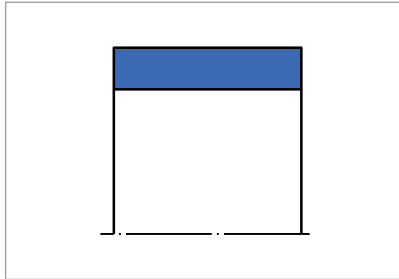


Fig. 1 Merkel Guide Ring FRI

## Product description

Slit, non-metallic Merkel Guide Ring FRI.

## Product advantages

Non-metallic guide element for rods; for standardised housings amongst others, according to ISO 10766

- No seizure due to metal/plastic materials combination
- Medium load-bearing capacity
- Chamfered profile edges prevent pressing of edge into the corner radii of the housing groove
- Simple snap-in fitting.

## Application

Earth moving equipment, industrial vehicles, agricultural machinery, cranes.

## Material

| Material         | Code    |
|------------------|---------|
| Filled polyamide | PA 4112 |

## Operating conditions

| Material                                    | PA 4112 (filled polyamide)                |
|---|---|
|   | Temperature range in °C                   |
| Hydraulic oils HL, HLP                      | -30 ... +100                              |
| HFA fluids                                  | +5 ... +50                                |
| HFB fluids                                  | +5 ... +50                                |
| HFC fluids                                  | -30 ... +50                               |
| HFD fluids                                  | -   |
| Water                                       | +5 ... +50                                |
| HETG (rapeseed oil)                         | -30 ... +60                               |
| HEES (synthetic ester)                      | -30 ... +80                               |
| HEPG (glycol)                               | -30 ... +50                               |
| Mineral greases                             | -30 ... +100                              |
| Running speed in m/s                        | 1   |
| Load (permitted specific surface pressure*) | ≤40 N/mm² at 20 °C<br>≤30 N/mm² at 100 °C |

\* For the simple determination of the load, a constant surface pressure is calculated using the projected area (d x H). The actual surface pressure is clearly greater in the centre of the surface than the calculated surface pressure. This is taken into account in the value for the permissible specific surface pressure.

## Surface quality

| Surface roughness | R <sub>a</sub>  | R <sub>max</sub> |
|-------------------|-----------------|------------------|
| Sliding surface   | 0,05 ... 0,3 µm | ≤2,5 µm          |
| Groove base       | ≤2 µm           | ≤10,0 µm         |
| Groove flanks     | ≤3 µm           | ≤15,0 µm         |

Percentage contact area M, >50% to max. 90% at cutting depth c = Rz/2 and reference line C ref = 0%.

## Design notes

Please observe our general design notes in → Technical Manual.

### Tolerance recommendation

| d  | D <sub>F</sub> | D <sub>F1</sub> |
|----|----------------|-----------------|
| f8 | H8             | H9              |

The tolerances given are recommended values. The usage of the guide and tolerance definition are to be considered in connection with the seal employed. The diameter D<sub>F1</sub> given in the table of dimensions is to be considered exclusively in relation to the guide ring. The corresponding diameter for the adjacent seal housing is to be matched to the sealing component.

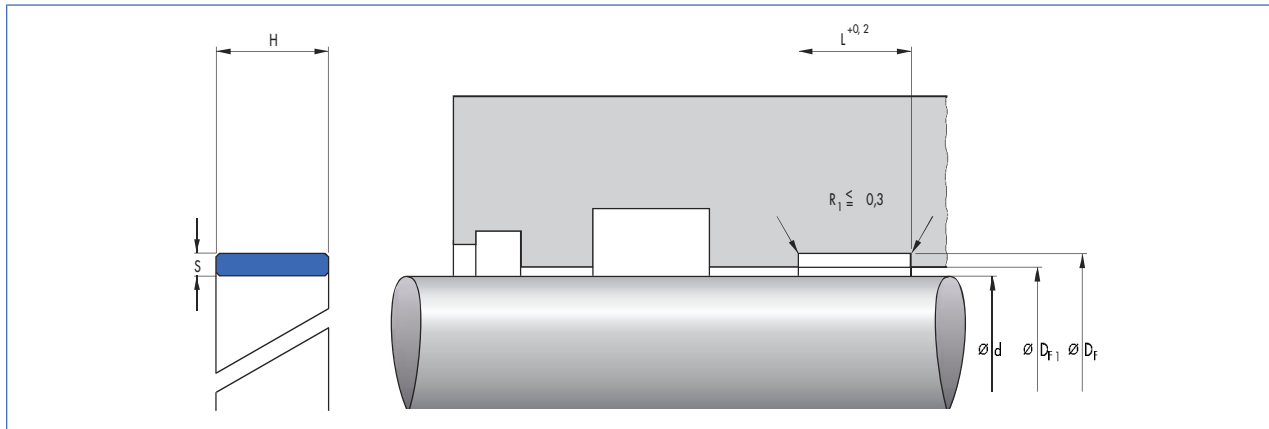
### Manufacturing tolerance

| Production tolerance profile thickness S |
|--|
| -0,1                                     |

## Fitting & installation

Merkel Guide Ring FRI can be easily snapped into the housing groove. Careful fitting is a prerequisite for correct function. → Technical Manual.

Article list



| d   | D <sub>F</sub> | L   | H   | D <sub>F1</sub> | Profile | Material    | Article No. |   |
|-----|----------------|-----|-----|-----------------|---------|-------------|-------------|---|
| 20  | 23,1           | 4   | 3,9 | 20,4            | 1,55    | PAGF Q04112 | 434219      | ● |
| 25  | 28,1           | 4   | 3,9 | 25,4            | 1,55    | PAGF Q04112 | 434220      | ● |
| 30  | 33,1           | 4   | 3,9 | 30,4            | 1,55    | PAGF Q04112 | 434221      | ● |
| 32  | 35,1           | 4   | 3,9 | 32,4            | 1,55    | PAGF Q04112 | 434222      | ● |
| 36  | 41             | 5,6 | 5,4 | 36,4            | 2,5     | PAGF Q04112 | 426463      | ● |
| 40  | 45             | 5,6 | 5,4 | 40,4            | 2,5     | PAGF Q04112 | 426464      | ● |
| 45  | 50             | 5,6 | 5,4 | 45,4            | 2,5     | PAGF Q04112 | 426465      | ● |
| 50  | 55             | 9,7 | 9,5 | 50,4            | 2,5     | PAGF Q04112 | 428805      | ● |
| 56  | 61             | 9,7 | 9,5 | 56,4            | 2,5     | PAGF Q04112 | 429273      | ● |
| 60  | 65             | 9,7 | 9,5 | 60,5            | 2,5     | PAGF Q04112 | 429318      | ● |
| 63  | 68             | 9,7 | 9,5 | 63,5            | 2,5     | PAGF Q04112 | 432260      | ● |
| 65  | 70             | 9,7 | 9,5 | 65,5            | 2,5     | PAGF Q04112 | 432261      | ○ |
| 70  | 75             | 9,7 | 9,5 | 70,5            | 2,5     | PAGF Q04112 | 432262      | ● |
| 80  | 85             | 9,7 | 9,5 | 80,5            | 2,5     | PAGF Q04112 | 432264      | ● |
| 90  | 95             | 9,7 | 9,5 | 90,6            | 2,5     | PAGF Q04112 | 432266      | ● |
| 100 | 105            | 9,7 | 9,5 | 100,6           | 2,5     | PAGF Q04112 | 432267      | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice



# Merkel Guide Strip KF

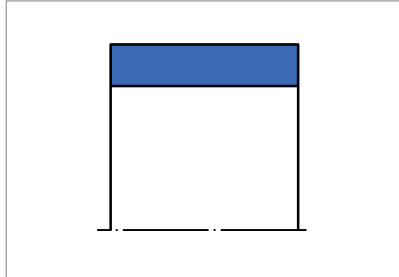


Fig. 1 Merkel Guide Strip KF

## Product description

Non-metallic Merkel Guide Strip KF, available ready to fit cut to size or by the metre.

## Product advantages

Non-metallic guide element for pistons, also for standardised housings as per ISO 10766

- Low friction, free of stick-slip.

## Application

Injection moulding machines, control and regulation equipment, handling equipment.

## Material

| Material             | Code      |
|----------------------|-----------|
| PTFE bronze compound | PTFE B500 |

## Operating conditions

| Material                | PTFE B500               |
|-------------------------|-------------------------|
|                         | Temperature range in °C |
| Hydraulic oils HL, HLP  | -40 ... +200            |
| HFA fluids              | -                       |
| HFB fluids              | -                       |
| HFC fluids              | -                       |
| HFD fluids              | -40 ... +200            |
| Water                   | -                       |
| HETG (rapeseed oil)     | -40 ... +80             |
| HEES (synthetic esters) | -40 ... +100            |
| HEPG (glycol)           | -40 ... +80             |
| Mineral greases         | -40 ... +200            |

## Surface quality

| Surface roughness | $R_a$                      | $R_{max}$               |
|-------------------|----------------------------|-------------------------|
| Sliding surface   | 0,05 ... 0,3 $\mu\text{m}$ | $\leq 2,5 \mu\text{m}$  |
| Groove base       | $\leq 2 \mu\text{m}$       | $\leq 10,0 \mu\text{m}$ |
| Groove flanks     | $\leq 3 \mu\text{m}$       | $\leq 15,0 \mu\text{m}$ |

Percentage contact area  $M_v > 50\%$  to max. 90% at cutting depth  $c = R_z/2$  and reference line  $C_{ref} = 0\%$ .

## Design notes

Please observe our general design notes in → Technical Manual.

## Calculating straight length L2

| L2             | Production tolerances |
|----------------|-----------------------|
| >20 ... 80     | ... 0,5               |
| >80 ... 250    | ... 1,0               |
| >250 ... 500   | ... 1,5               |
| >500 ... 1000  | ... 2,0               |
| >1000 ... 2000 | ... 3,0               |
| >2000 ... 4000 | ... 4,0               |

**Tolerance recommendation**

|       |
|-------|
| $d_1$ |
| h8    |

The tolerance definition for the dimensions D and  $d_F$  must be viewed in connection with the seal used. The diameter  $D_1$  specified in the table of dimensions is to be viewed exclusively in relation to the guide ring. The corresponding diameter of an adjoining seal housing should be tailored to the sealing component.

**Manufacturing tolerance**

|   |
|---|
| <b>Production tolerance profile thickness S</b> |
| -0,05   |

**Surface load**

|                                      |
|--------------------------------------|
| $p < 15 \text{ N/mm}^2$ up to 20 °C  |
| $p < 7,5 \text{ N/mm}^2$ up to 80 °C |
| $p < 5 \text{ N/mm}^2$ up to 120 °C  |

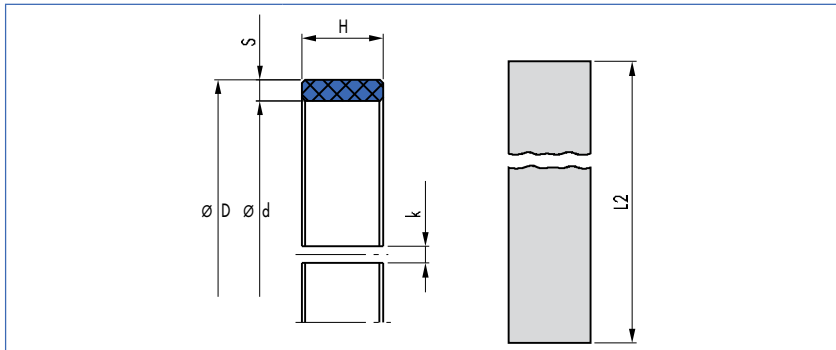
For running speed, see sealing system.

**Cutting rolls to size**

The following dimensions are available from stock by the metre. The straight length L2 of blanks is to be determined using the formula. The gap k produced after fitting is necessary due to thermal expansion. We recommend a straight cut on the strips. On impact at an angle the tips may be damaged and break-off. Our cutter (Article No. 507228) facilitates time-saving and accurate cutting to size.

**Calculating stretched length L2 for rods:**

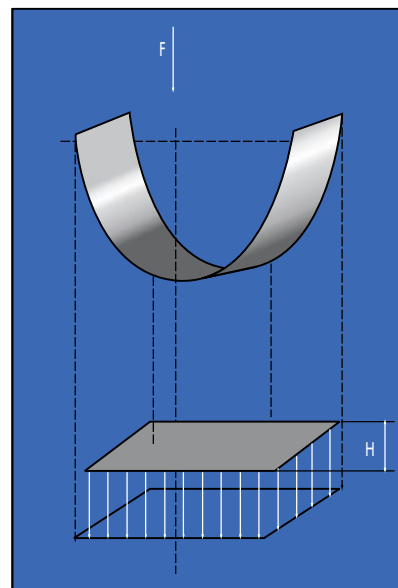
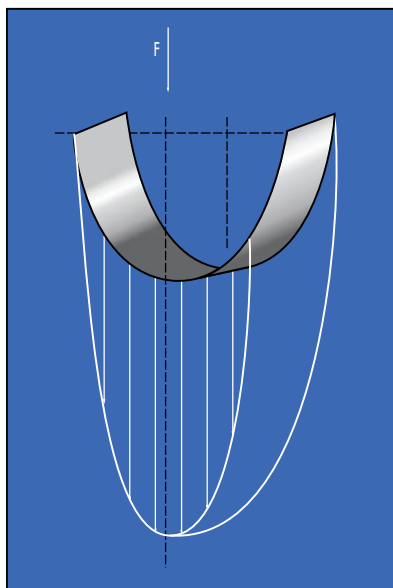
$$L2 = (D - S) \times 3,11 - 0,5$$



| Groove length L | Profile thickness S | Article No. |
|-----------------|---------------------|-------------|
| 8               | 2,5                 | 24226174    |
| 9,7             | 2,5                 | 24102775    |
| 10              | 2,5                 | 24102563    |
| 12              | 2,5                 | 24099191    |
| 15              | 2,5                 | 24102564    |
| 20              | 2,5                 | 24076217    |
| 25              | 2,5                 | 24107955    |
| 15              | 4,0                 | 24160019    |
| 20              | 4,0                 | 24238052    |
| 25              | 4,0                 | 24148093    |

### Surface force

The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The permissible load on the guide strip is calculated by multiplying the projected area with the permissible specific surface pressure. However, the figure for the permissible specific surface pressure takes into account the possible angular offset of the piston when the recommended guide elements are used.



$$F = P \times A$$

$$H = F / (d \times P)$$

H = guide strip width [mm]

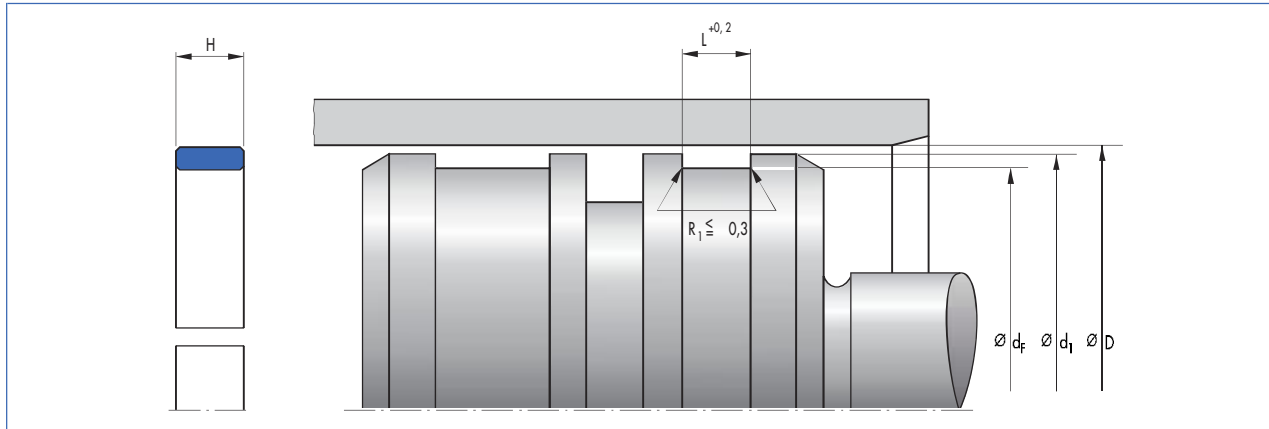
F = radial loading [N]

A = projected area [mm<sup>2</sup>]

P = perm. compression per unit area  
[N/mm<sup>2</sup>]

d = rod diameter with rod guidance;  
piston diameter with  
piston guidance [mm].

Article list

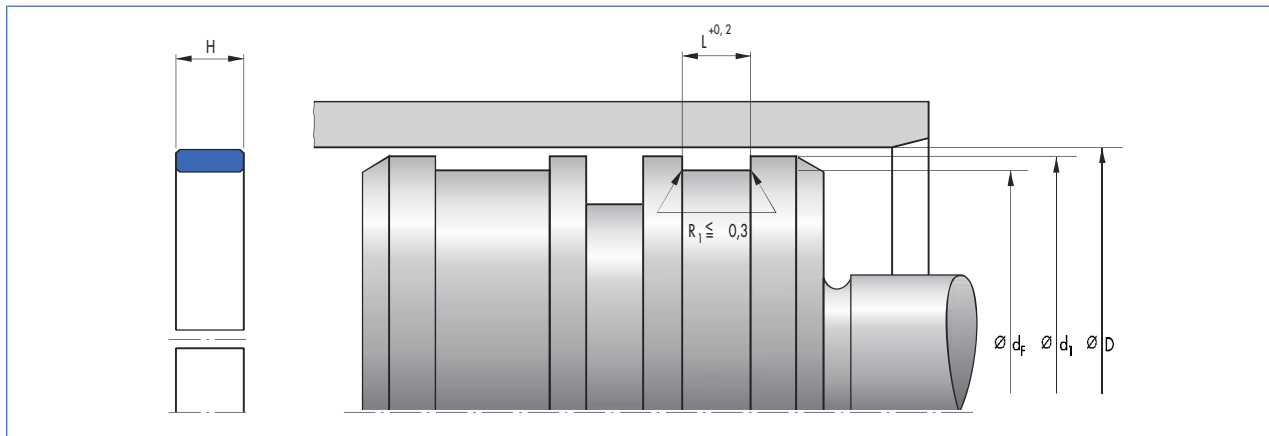


| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 20  | 17             | 19,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300179    | ○ |
| 22  | 19             | 21,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300180    | ○ |
| 25  | 22             | 24,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300182    | ○ |
| 28  | 25             | 27,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300183    | ○ |
| 30  | 27             | 29,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300184    | ○ |
| 32  | 29             | 31,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300185    | ○ |
| 35  | 32             | 34,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300186    | ○ |
| 36  | 33             | 35,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300187    | ○ |
| 40  | 35             | 38,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24168850    | ○ |
| 40  | 37             | 39,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24300188    | ○ |
| 42  | 37             | 40,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24300189    | ○ |
| 45  | 40             | 43,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24108647    | ● |
| 45  | 42             | 44,2           | 5,6 | 5,5  | 1,5     | PTFE B500 | 24312965    | ○ |
| 50  | 45             | 48,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24162171    | ● |
| 50  | 45             | 48,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24340072    | ○ |
| 55  | 50             | 53,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24300190    | ● |
| 56  | 51             | 54,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24260615    | ○ |
| 60  | 55             | 58,8           | 5,6 | 5,5  | 2,5     | PTFE B500 | 24210205    | ○ |
| 60  | 55             | 58,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24163238    | ○ |
| 63  | 58             | 61,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24169847    | ● |
| 65  | 60             | 63,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300192    | ○ |
| 70  | 65             | 68,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24165146    | ○ |
| 70  | 65             | 68,8           | 15  | 14,8 | 2,5     | PTFE B500 | 24338058    | ○ |
| 75  | 70             | 73,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300193    | ○ |
| 76  | 71             | 74,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24264453    | ○ |
| 80  | 75             | 78,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24217207    | ● |
| 85  | 80             | 83,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24169641    | ○ |
| 85  | 80             | 83,8           | 15  | 14,8 | 2,5     | PTFE B500 | 24258738    | ○ |
| 90  | 85             | 88,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24165145    | ● |
| 90  | 85             | 88,8           | 15  | 14,8 | 2,5     | PTFE B500 | 24164295    | ○ |
| 90  | 85             | 88,8           | 20  | 19,5 | 2,5     | PTFE B500 | 24229424    | ○ |
| 95  | 90             | 93,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300197    | ○ |
| 95  | 90             | 93,8           | 15  | 14,8 | 2,5     | PTFE B500 | 24343224    | ○ |
| 100 | 95             | 98,8           | 9,7 | 9,6  | 2,5     | PTFE B500 | 24153611    | ● |
| 100 | 95             | 98,8           | 15  | 14,8 | 2,5     | PTFE B500 | 24165294    | ○ |
| 100 | 95             | 98,8           | 25  | 24,5 | 2,5     | PTFE B500 | 24311931    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 105 | 100            | 103,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24216699    | ● |
| 105 | 100            | 103,8          | 25  | 24,5 | 2,5     | PTFE B500 | 24333282    | ○ |
| 110 | 105            | 108,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24165147    | ○ |
| 110 | 105            | 108,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24291125    | ○ |
| 110 | 105            | 108,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24243431    | ○ |
| 115 | 110            | 113,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24153613    | ○ |
| 120 | 115            | 118,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300203    | ○ |
| 120 | 115            | 118,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24166736    | ● |
| 125 | 120            | 123,4          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24204056    | ● |
| 125 | 120            | 123,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24165043    | ○ |
| 130 | 125            | 128,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300206    | ○ |
| 130 | 125            | 128,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24153612    | ● |
| 130 | 125            | 128,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24166634    | ○ |
| 135 | 130            | 133,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24203611    | ○ |
| 135 | 130            | 133,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24340099    | ○ |
| 140 | 135            | 138,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24102436    | ● |
| 140 | 135            | 138,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24236467    | ○ |
| 140 | 135            | 138,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24339882    | ○ |
| 140 | 135            | 138,8          | 25  | 24,5 | 2,5     | PTFE B500 | 24338745    | ○ |
| 150 | 145            | 148,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300208    | ● |
| 150 | 145            | 148,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24169689    | ○ |
| 150 | 145            | 148,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24336312    | ○ |
| 150 | 145            | 148,8          | 25  | 24,5 | 2,5     | PTFE B500 | 24243485    | ○ |
| 155 | 150            | 153,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24169405    | ○ |
| 160 | 155            | 158,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24168887    | ● |
| 160 | 155            | 158,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24300209    | ● |
| 160 | 155            | 158,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24217554    | ○ |
| 170 | 165            | 168,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300211    | ○ |
| 170 | 165            | 168,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300210    | ○ |
| 170 | 165            | 168,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24336310    | ○ |
| 180 | 175            | 178,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24219351    | ● |
| 180 | 175            | 178,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24203474    | ● |
| 180 | 175            | 178,8          | 25  | 24,5 | 2,5     | PTFE B500 | 24258396    | ○ |
| 190 | 185            | 188,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300213    | ● |
| 190 | 185            | 188,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300212    | ○ |
| 200 | 195            | 198,4          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300214    | ○ |
| 200 | 195            | 198,8          | 15  | 14,8 | 2,5     | PTFE B500 | 24300215    | ● |
| 200 | 195            | 198,8          | 20  | 19,5 | 2,5     | PTFE B500 | 24227497    | ○ |
| 200 | 195            | 198,8          | 25  | 24,5 | 2,5     | PTFE B500 | 24306765    | ○ |
| 210 | 205            | 208,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24236228    | ○ |
| 210 | 205            | 208,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24301068    | ○ |
| 220 | 215            | 218,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24203911    | ● |
| 220 | 215            | 218,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24340941    | ○ |
| 220 | 215            | 218,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24290417    | ○ |
| 220 | 215            | 218,8          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24300216    | ○ |
| 225 | 220            | 223,4          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24259939    | ○ |
| 225 | 220            | 223,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24169846    | ○ |
| 225 | 220            | 223,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24260604    | ○ |
| 225 | 220            | 223,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24298509    | ○ |
| 230 | 225            | 228,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24338432    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

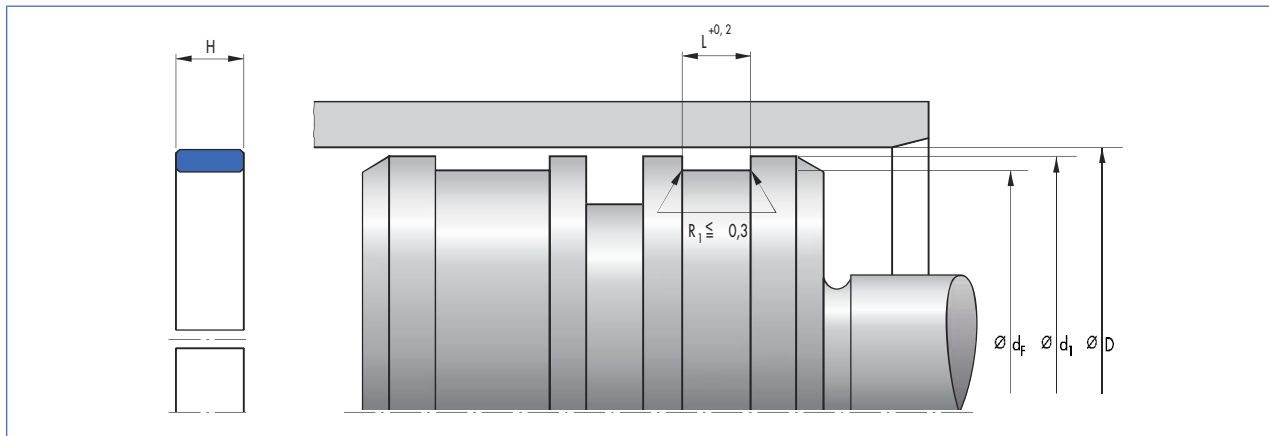


| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 230 | 225            | 228,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24233567    | ○ |
| 240 | 235            | 238,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24167876    | ○ |
| 250 | 245            | 248,4          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24344263    | ○ |
| 250 | 245            | 248,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300217    | ● |
| 250 | 245            | 248,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24338719    | ○ |
| 260 | 255            | 258,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300218    | ○ |
| 260 | 255            | 258,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24293567    | ○ |
| 270 | 265            | 268,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24238840    | ○ |
| 270 | 265            | 268,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24332002    | ○ |
| 280 | 275            | 278,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300219    | ● |
| 280 | 275            | 278,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24153362    | ○ |
| 280 | 275            | 278,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24203990    | ○ |
| 300 | 295            | 298,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24137238    | ○ |
| 300 | 295            | 298,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24134951    | ○ |
| 305 | 300            | 303,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24350592    | ○ |
| 310 | 305            | 308,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24237194    | ○ |
| 320 | 312            | 317,5          | 20  | 19,5 | 4       | PTFE B500 | 24245663    | ○ |
| 320 | 315            | 318,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300220    | ○ |
| 320 | 315            | 318,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24231223    | ○ |
| 320 | 315            | 318,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24300221    | ○ |
| 330 | 325            | 328,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24296714    | ○ |
| 330 | 325            | 328,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24314011    | ○ |
| 340 | 335            | 338,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300222    | ○ |
| 340 | 335            | 338,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24300223    | ○ |
| 350 | 345            | 348,4          | 9,7 | 9,6  | 2,5     | PTFE B500 | 24316713    | ○ |
| 350 | 345            | 348,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24234725    | ○ |
| 355 | 350            | 353,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24336608    | ○ |
| 360 | 352            | 357,5          | 15  | 14,8 | 4       | PTFE B500 | 24266168    | ○ |
| 360 | 352            | 357,5          | 25  | 24,5 | 4       | PTFE B500 | 24298511    | ○ |
| 360 | 355            | 358,4          | 15  | 14,8 | 2,5     | PTFE B500 | 24300224    | ○ |
| 360 | 355            | 358,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24164558    | ○ |
| 380 | 375            | 378,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24257157    | ○ |
| 380 | 375            | 378,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24299555    | ○ |
| 390 | 382            | 387,5          | 25  | 24,5 | 4       | PTFE B500 | 24344184    | ○ |
| 390 | 385            | 388,4          | 20  | 19,5 | 2,5     | PTFE B500 | 24248042    | ○ |
| 390 | 385            | 388,4          | 25  | 24,5 | 2,5     | PTFE B500 | 24215936    | ○ |
| 400 | 392            | 397,5          | 25  | 24,5 | 4       | PTFE B500 | 24353170    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| D     | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |   |
|-------|----------------|----------------|----|------|---------|-----------|-------------|---|
| 400   | 395            | 398,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24300225    | ○ |
| 400   | 395            | 398,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24241924    | ○ |
| 400   | 395            | 398,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24237477    | ○ |
| 410   | 405            | 408,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24292267    | ○ |
| 420   | 415            | 418,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24246829    | ○ |
| 420   | 415            | 418,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24298563    | ○ |
| 430   | 425            | 428,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24274579    | ○ |
| 430   | 425            | 428,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24356343    | ○ |
| 440   | 435            | 438,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24362293    | ○ |
| 440   | 435            | 438,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24238056    | ○ |
| 445   | 440            | 443,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24169312    | ○ |
| 450   | 442            | 447,5          | 25 | 24,5 | 4       | PTFE B500 | 24336064    | ○ |
| 450   | 445            | 448,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24295904    | ○ |
| 450   | 445            | 448,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24218386    | ○ |
| 450   | 445            | 448,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24339916    | ○ |
| 457,2 | 449,2          | 454,7          | 25 | 24,5 | 4       | PTFE B500 | 24361018    | ○ |
| 460   | 455            | 458,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24237495    | ○ |
| 460   | 455            | 458,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24216297    | ○ |
| 460   | 455            | 458,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24258000    | ○ |
| 480   | 472            | 477,5          | 25 | 24,5 | 4       | PTFE B500 | 24298510    | ○ |
| 480   | 475            | 478,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24250182    | ○ |
| 500   | 492            | 497,5          | 15 | 14,8 | 4       | PTFE B500 | 24344266    | ○ |
| 500   | 492            | 497,5          | 25 | 24,5 | 4       | PTFE B500 | 24261230    | ○ |
| 500   | 495            | 498,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24274580    | ○ |
| 500   | 495            | 498,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24263977    | ○ |
| 510   | 505            | 508,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24291161    | ○ |
| 510   | 505            | 508,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24360396    | ○ |
| 510,2 | 502,2          | 507,7          | 25 | 24,5 | 4       | PTFE B500 | 24355928    | ○ |
| 520   | 515            | 518,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24230163    | ○ |
| 520,7 | 515,7          | 519,1          | 15 | 14,8 | 2,5     | PTFE B500 | 24224011    | ○ |
| 530   | 525            | 528,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24258834    | ○ |
| 540   | 535            | 538,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24339008    | ○ |
| 545   | 540            | 543,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24250579    | ○ |
| 550   | 545            | 548,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24257339    | ○ |
| 560   | 552            | 557,5          | 25 | 24,5 | 4       | PTFE B500 | 24359710    | ○ |
| 560   | 555            | 558,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24351466    | ○ |
| 560   | 555            | 558,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24269185    | ○ |
| 570   | 562            | 567,5          | 15 | 14,8 | 4       | PTFE B500 | 24352095    | ○ |
| 570   | 562            | 567,5          | 25 | 24,5 | 4       | PTFE B500 | 24351060    | ○ |
| 580   | 572            | 577,5          | 15 | 14,8 | 4       | PTFE B500 | 24344267    | ○ |
| 580   | 575            | 578,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24339500    | ○ |
| 584,2 | 576,2          | 581,7          | 25 | 24,5 | 4       | PTFE B500 | 24362368    | ○ |
| 600   | 592            | 597,5          | 25 | 24,5 | 4       | PTFE B500 | 24275000    | ○ |
| 600   | 595            | 598,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24234910    | ○ |
| 600   | 595            | 598,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24329803    | ○ |
| 600   | 595            | 598,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24234912    | ○ |
| 625   | 620            | 623,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24352637    | ○ |
| 630   | 625            | 628,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24161640    | ○ |
| 630   | 625            | 628,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24263466    | ○ |
| 640   | 632            | 637,5          | 25 | 24,5 | 4       | PTFE B500 | 24275167    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| D     | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |   |
|-------|----------------|----------------|----|------|---------|-----------|-------------|---|
| 650   | 642            | 647,5          | 25 | 24,5 | 4       | PTFE B500 | 24358984    | ○ |
| 650   | 645            | 648,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24239182    | ○ |
| 655   | 650            | 653,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24231930    | ○ |
| 660,4 | 652,4          | 657,9          | 25 | 24,5 | 4       | PTFE B500 | 24361508    | ○ |
| 665   | 660            | 663,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24336379    | ○ |
| 680   | 672            | 677,5          | 15 | 14,8 | 4       | PTFE B500 | 24344269    | ○ |
| 680   | 672            | 677,5          | 25 | 24,5 | 4       | PTFE B500 | 24298430    | ○ |
| 680   | 675            | 678,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24357190    | ○ |
| 690   | 682            | 687,5          | 25 | 24,5 | 4       | PTFE B500 | 24361405    | ○ |
| 700   | 692            | 697,5          | 25 | 24,5 | 4       | PTFE B500 | 24349705    | ○ |
| 700   | 695            | 698,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24275183    | ○ |
| 700   | 695            | 698,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24338859    | ○ |
| 710   | 705            | 708,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24162128    | ○ |
| 720   | 712            | 717,5          | 20 | 19,5 | 4       | PTFE B500 | 24226253    | ○ |
| 720   | 712            | 717,5          | 25 | 24,5 | 4       | PTFE B500 | 24355876    | ○ |
| 720   | 715            | 718,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24348252    | ○ |
| 720   | 715            | 718,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24291417    | ○ |
| 720   | 715            | 718,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24240256    | ○ |
| 725   | 720            | 723,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24340198    | ○ |
| 750   | 742            | 747,5          | 25 | 24,5 | 4       | PTFE B500 | 24293964    | ○ |
| 760   | 752            | 757,5          | 15 | 14,8 | 4       | PTFE B500 | 24216171    | ○ |
| 760   | 752            | 757,5          | 20 | 19,5 | 4       | PTFE B500 | 24216170    | ○ |
| 760   | 755            | 758,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24162992    | ○ |
| 770   | 762            | 767,5          | 15 | 14,8 | 4       | PTFE B500 | 24344270    | ○ |
| 775   | 770            | 773,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24245794    | ○ |
| 780   | 775            | 778,4          | 15 | 14,8 | 2,5     | PTFE B500 | 24358668    | ○ |
| 800   | 792            | 797,5          | 15 | 14,8 | 4       | PTFE B500 | 24348279    | ○ |
| 800   | 792            | 797,5          | 25 | 24,5 | 4       | PTFE B500 | 24243176    | ○ |
| 812,8 | 804,8          | 810,3          | 25 | 24,5 | 4       | PTFE B500 | 24249318    | ○ |
| 820   | 812            | 817,5          | 25 | 24,5 | 4       | PTFE B500 | 24341042    | ○ |
| 830   | 822            | 827,5          | 25 | 24,5 | 4       | PTFE B500 | 24354856    | ○ |
| 830   | 825            | 828,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24353637    | ○ |
| 850   | 842            | 847,5          | 25 | 24,5 | 4       | PTFE B500 | 24300402    | ○ |
| 850   | 845            | 848,4          | 20 | 19,5 | 2,5     | PTFE B500 | 24265124    | ○ |
| 850   | 845            | 848,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24163721    | ○ |
| 900   | 892            | 897,5          | 20 | 19,5 | 4       | PTFE B500 | 24238053    | ○ |
| 900   | 892            | 897,5          | 25 | 24,5 | 4       | PTFE B500 | 24344380    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| D     | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |                       |
|-------|----------------|----------------|----|------|---------|-----------|-------------|-----------------------|
| 900   | 895            | 898,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24162990    | <input type="radio"/> |
| 914,5 | 906,5          | 912            | 25 | 24,5 | 4       | PTFE B500 | 24354414    | <input type="radio"/> |
| 920   | 915            | 918,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24258318    | <input type="radio"/> |
| 940   | 932            | 937,5          | 25 | 24,5 | 4       | PTFE B500 | 24352164    | <input type="radio"/> |
| 940   | 935            | 938,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24163720    | <input type="radio"/> |
| 965   | 957            | 962,5          | 15 | 14,8 | 4       | PTFE B500 | 24263608    | <input type="radio"/> |
| 965   | 957            | 962,5          | 25 | 24,5 | 4       | PTFE B500 | 24295215    | <input type="radio"/> |
| 965,2 | 957,2          | 962,7          | 25 | 24,5 | 4       | PTFE B500 | 24331520    | <input type="radio"/> |
| 1000  | 995            | 998,4          | 25 | 24,5 | 2,5     | PTFE B500 | 24162989    | <input type="radio"/> |
| 1050  | 1042           | 1047,5         | 25 | 24,5 | 4       | PTFE B500 | 24257242    | <input type="radio"/> |
| 1050  | 1045           | 1048,4         | 25 | 24,5 | 2,5     | PTFE B500 | 24227975    | <input type="radio"/> |
| 1100  | 1092           | 1097,5         | 25 | 24,5 | 4       | PTFE B500 | 24269869    | <input type="radio"/> |
| 1140  | 1132           | 1137,5         | 20 | 19,5 | 4       | PTFE B500 | 24167297    | <input type="radio"/> |
| 1180  | 1172           | 1177,5         | 25 | 24,5 | 4       | PTFE B500 | 24361406    | <input type="radio"/> |
| 1200  | 1192           | 1197,5         | 15 | 14,8 | 4       | PTFE B500 | 24359446    | <input type="radio"/> |
| 1300  | 1292           | 1297,5         | 25 | 24,5 | 4       | PTFE B500 | 24357283    | <input type="radio"/> |

● Available from stock    ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring Guivex KBK

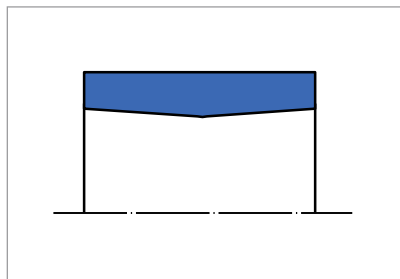


Fig. 1 Merkel Guide Ring Guivex KBK

## Product description

Profiled Merkel Guide Ring Guivex KBK made from fabric-base laminate. Patented product design (patent-no.: PCT/EP95/03874).

## Product advantages

Merkel KBK guide rings offer clear advantages over conventional guide strips/rings, designed for standardised housings according to ISO 10766 amongst others

- Interchangeable to existing operating environments of the types SB and SF
- High radial load
- Very good utilisation of the guide length through even distribution of stress
- Improved drawing-in of lubricating medium through optimised distribution of stress in the contact zone between guide bush and counter-acting surface
- Reduced stick-slip tendency
- Outstanding running behaviour with short guide distances (no clamping).

## Application

Long stroke cylinders (piston rod bowing under load), short guide distances (lateral buckling of the piston rod), short stroke (inadequate lubrication) friction-optimised sealing systems, additional item for metal guides, mobile hydraulics, heavy-duty hydraulics.

## Material

Ø range ≤300

| Material             | Code      | Colour    |
|----------------------|-----------|-----------|
| Fabric-base laminate | HGW HG517 | Dark grey |
| Fabric-base laminate | HGW HG650 | Red       |

Ø range >300

| Material             | Code      | Colour |
|----------------------|-----------|--------|
| Fabric-base laminate | HGW HG650 | Red    |

## Operating conditions

| Material                | HGW HG517/HGW HG650 |
|-------------------------|---------------------|
| Temperature range in °C |                     |
| Hydraulic oils HL, HLP  | -40 ... +120        |
| HFA fluids              | +5 ... +60          |
| HFB fluids              | +5 ... +60          |
| HFC fluids              | -40 ... +60         |
| HFD fluids              | -40 ... +120        |
| Water                   | +5 ... +60          |
| HETG (rapeseed oil)     | -40 ... +80         |
| HEES (synthetic esters) | -40 ... +100        |
| HEPG (glycol)           | -40 ... +80         |
| Mineral greases         | -40 ... +120        |

## Surface quality

| Surface roughness | R <sub>a</sub>  | R <sub>max</sub> |
|-------------------|-----------------|------------------|
| Sliding surface   | 0,05 ... 0,3 µm | ≤2,5 µm          |
| Groove base       | ≤1,6 µm         | ≤6,3 µm          |
| Groove flanks     | ≤3,0 µm         | ≤15,0 µm         |

Percentage contact area M<sub>r</sub> >50% to max. 90% at cutting depth c = Rz/2 and reference line C ref = 0%.

The long-term behaviour of the sealing component as well as the security against early failures are primarily determined by the quality of the counter-acting surface. This means that the surface must be precisely described and evaluated. Based on current knowledge we recommend supplementing the above definition of the surface quality of the

sliding surface with the quantities in the following table. The previous general description of the material component is significantly improved with the new quantities from the material component, particularly with reference to the abrasiveness of the surface.

→ Technical Manual.

**Design notes**

The diameter  $D_1$  given in the table of dimensions is to be considered exclusively in relation to the guide ring. The corresponding diameter for the adjacent seal housing is to be matched to the sealing component.

**Sliding surfaces**

| Characteristic value | Limit position       |
|----------------------|----------------------|
| $R_a$                | >0,05 mm ... 0,30 mm |
| $R_{max}$            | <2,50 mm             |
| $R_{plx}$            | <0,50 mm             |
| $R_{pk}$             | <0,50 mm             |
| $R_k$                | >0,25 mm ... 0,70 mm |
| $R_{vk}$             | >0,20 mm ... 0,65 mm |
| $R_{vlx}$            | >0,20 mm ... 2,00 mm |

The limit values listed in the table are not currently applicable for ceramic or partial ceramic counter-surfaces.

**Tolerance**

| Production tolerance profile thickness S |
|--|
| -0,01 ... -0,06                          |

**Surface load**

The value for the specific compression per unit area is dependent on the operating temperature and the size of the elastic deformation (deflection) of the guide element. The maximum possible deflection is limited in a sealing system by the smallest gap dimension behind the primary seal. → Technical Manual.

**Deflection**

- $e1 = 0,10$  for  $s = 2,5$
- $e1 = 0,15$  for  $s = 4,0$
- $e2 = 0,15$  for  $s = 2,5$
- $e2 = 0,20$  for  $s = 4,0$

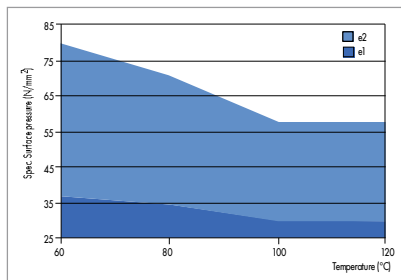
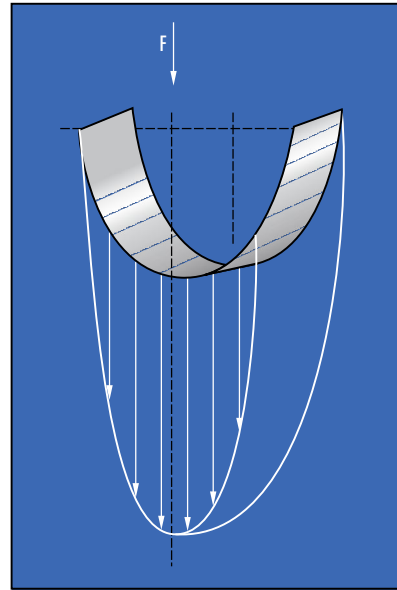


Fig. 2 Special surface pressure for parallel load

**Radial load**

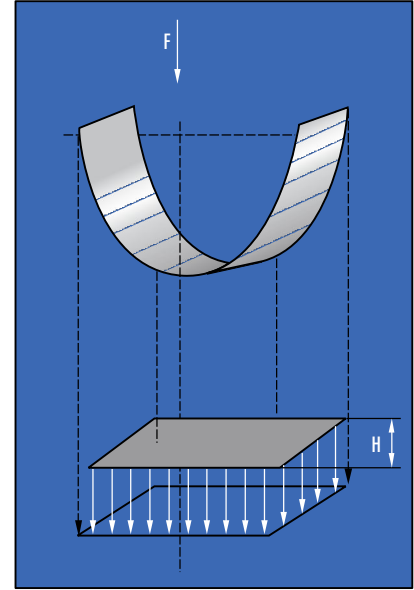
The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The required guide width can be calculated

using the following formulas. Taking the increased service life into consideration, a reduction of the load by selection of a wide guide can make sense in individual cases.



$F = P \times A$   
 $H = F / (d \times P)$

- $H$  = guide strip width [mm]
- $F$  = radial load [N]
- $A$  = projected area [mm<sup>2</sup>]



- $P$  = perm. compression per unit area [N/mm<sup>2</sup>]
- $d$  = rod diameter with rod guidance; piston diameter with piston guidance [mm].

**Mode of operation**

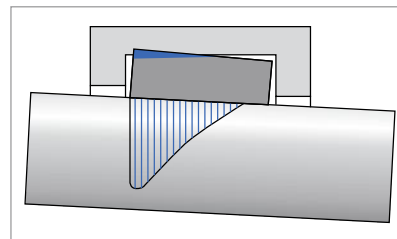


Fig. 3 Rectangular guide ring: stress peaks in the edge area

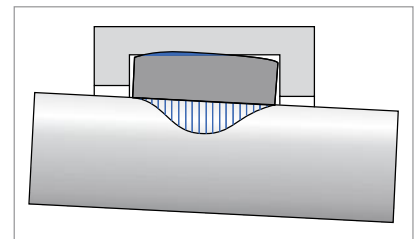
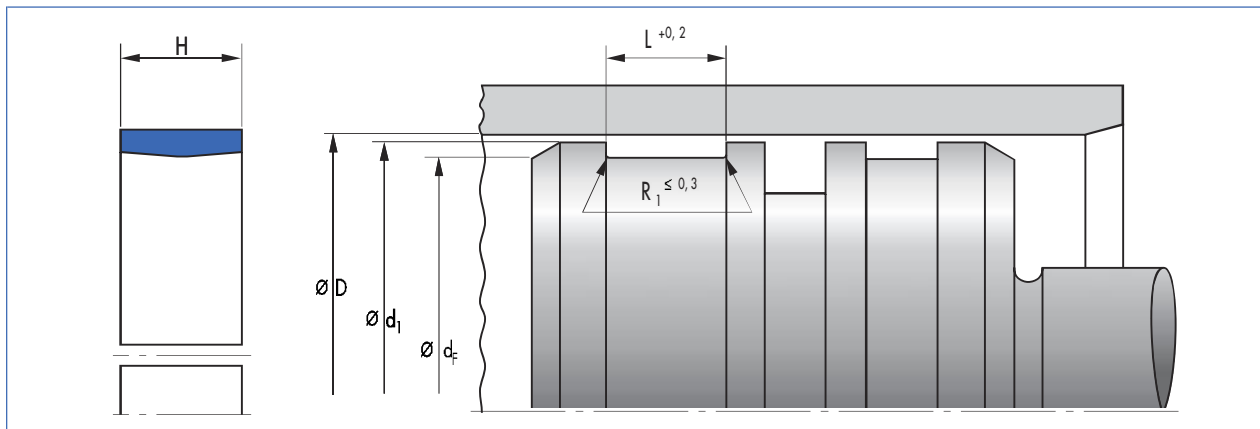


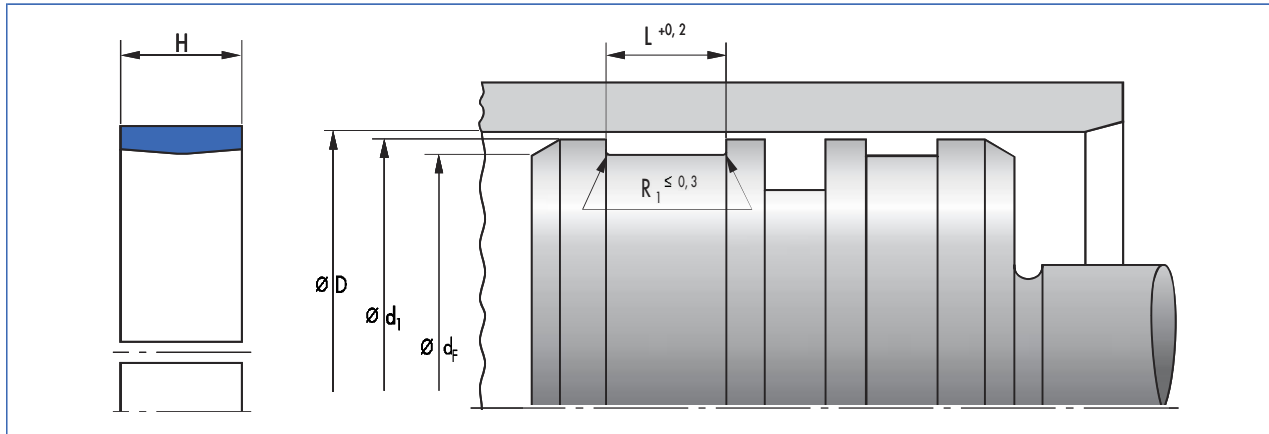
Fig. 4 Merkel Guide Ring Guivex KBK: even distribution of stress

Article list



| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 40  | 35             | 38,4           | 25  | 14,8 | 2,5     | HGW HG517 | 24373629    | ○ |
| 50  | 45             | 48,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24376320    | ● |
| 60  | 55             | 58,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24381008    | ○ |
| 63  | 58             | 61,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24377609    | ● |
| 65  | 60             | 63,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24379281    | ○ |
| 70  | 65             | 68,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24378390    | ○ |
| 75  | 67             | 72,5           | 15  | 14,8 | 4       | HGW HG517 | 49005284    | ○ |
| 75  | 70             | 73,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24379280    | ○ |
| 80  | 75             | 78,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24378388    | ● |
| 85  | 80             | 83,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24380508    | ○ |
| 90  | 85             | 88,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 49000753    | ○ |
| 95  | 90             | 93,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 24378389    | ○ |
| 95  | 90             | 93,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24380164    | ○ |
| 98  | 93             | 96,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 528477      | ○ |
| 100 | 92             | 97,5           | 20  | 19,8 | 4       | HGW HG517 | 49005017    | ○ |
| 100 | 95             | 98,4           | 9,7 | 9,5  | 2,5     | HGW HG517 | 49002078    | ○ |
| 100 | 95             | 98,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24375947    | ● |
| 100 | 95             | 98,4           | 20  | 19,8 | 2,5     | HGW HG517 | 24373283    | ○ |
| 105 | 100            | 103,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 24367544    | ○ |
| 110 | 102            | 107,5          | 20  | 19,8 | 4       | HGW HG517 | 24359047    | ○ |
| 110 | 102            | 107,5          | 25  | 24,5 | 4       | HGW HG517 | 49004871    | ○ |
| 110 | 105            | 108,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24380278    | ○ |
| 115 | 110            | 113,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24378948    | ○ |
| 120 | 112            | 117,5          | 25  | 24,5 | 4       | HGW HG517 | 49004872    | ○ |
| 120 | 115            | 118,4          | 15  | 14,8 | 2,5     | HGW HG517 | 49000752    | ○ |
| 120 | 115            | 118,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24380279    | ○ |
| 125 | 120            | 123,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 49000675    | ○ |
| 125 | 120            | 123,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24375948    | ● |
| 130 | 122            | 127,5          | 25  | 24,5 | 4       | HGW HG517 | 24358243    | ○ |
| 130 | 124            | 128            | 20  | 19,8 | 3       | HGW HG517 | 49002431    | ○ |
| 130 | 125            | 128,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 49002077    | ○ |
| 130 | 125            | 128,4          | 20  | 19,8 | 2,5     | HGW HG517 | 531549      | ○ |
| 130 | 125            | 128,4          | 25  | 24,5 | 2,5     | HGW HG517 | 528114      | ○ |
| 140 | 135            | 138,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24380185    | ● |
| 140 | 135            | 138,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24380281    | ○ |
| 140 | 135            | 138,4          | 25  | 24,5 | 2,5     | HGW HG517 | 528117      | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

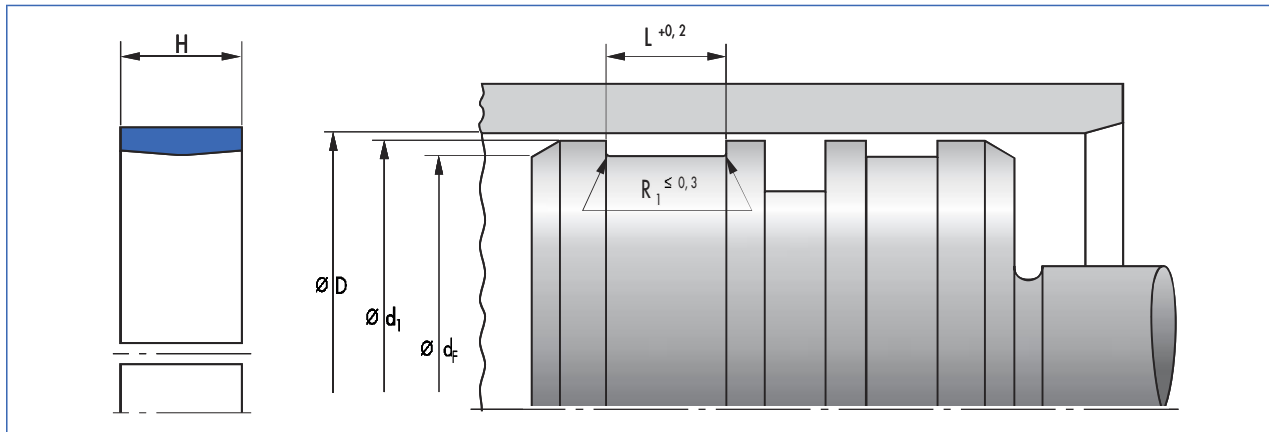


| D     | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-------|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 149   | 144            | 147,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24380165    | ○ |
| 150   | 145            | 148,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 49001347    | ○ |
| 150   | 145            | 148,4          | 25  | 24,5 | 2,5     | HGW HG517 | 529384      | ○ |
| 160   | 155            | 158,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24378946    | ● |
| 160   | 155            | 158,4          | 20  | 19,8 | 2,5     | HGW HG517 | 526097      | ○ |
| 160   | 155            | 158,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24380280    | ○ |
| 160   | 155            | 158,4          | 35  | 34,5 | 2,5     | HGW HG517 | 24379367    | ○ |
| 170   | 162            | 167,5          | 25  | 24,5 | 4       | HGW HG517 | 49003985    | ○ |
| 170   | 165            | 168,4          | 25  | 24,5 | 2,5     | HGW HG517 | 526071      | ○ |
| 180   | 172            | 177,5          | 25  | 24,5 | 4       | HGW HG517 | 24380555    | ○ |
| 180   | 175            | 178,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 49001427    | ○ |
| 180   | 175            | 178,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24378947    | ● |
| 180   | 175            | 178,4          | 35  | 34,5 | 2,5     | HGW HG517 | 24377817    | ○ |
| 190   | 185            | 188,4          | 15  | 14,8 | 2,5     | HGW HG517 | 49003727    | ○ |
| 190   | 185            | 188,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24379077    | ○ |
| 200   | 192            | 197,5          | 35  | 34,5 | 4       | HGW HG517 | 24380583    | ○ |
| 200   | 195            | 198,4          | 15  | 14,8 | 2,5     | HGW HG517 | 49003728    | ○ |
| 200   | 195            | 198,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24380282    | ○ |
| 200   | 195            | 198,4          | 30  | 29,5 | 2,5     | HGW HG517 | 24380416    | ○ |
| 200   | 195            | 198,4          | 35  | 34,5 | 2,5     | HGW HG517 | 24380417    | ○ |
| 210   | 205            | 208,4          | 15  | 14,8 | 2,5     | HGW HG517 | 49002879    | ○ |
| 210   | 205            | 208,4          | 35  | 34,5 | 2,5     | HGW HG517 | 49001642    | ○ |
| 215   | 210            | 213,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24380699    | ● |
| 220   | 215            | 218,4          | 15  | 14,8 | 2,5     | HGW HG517 | 49018312    | ○ |
| 220   | 215            | 218,4          | 25  | 24,5 | 2,5     | HGW HG517 | 49001458    | ○ |
| 220   | 215            | 218,4          | 25  | 34,5 | 2,5     | HGW HG517 | 24379368    | ○ |
| 223,5 | 215,5          | 220,5          | 40  | 39,5 | 4       | HGW HG517 | 49046270    | ○ |
| 225   | 217            | 222,5          | 40  | 39,5 | 4       | HGW HG517 | 530604      | ○ |
| 225   | 220            | 223,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24380539    | ○ |
| 230   | 225            | 228,4          | 9,7 | 9,5  | 2,5     | HGW HG517 | 24380706    | ○ |
| 230   | 225            | 228,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24372436    | ● |
| 230   | 225            | 228,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24378298    | ○ |
| 230   | 225            | 228,4          | 35  | 34,5 | 2,5     | HGW HG517 | 24378002    | ○ |
| 240   | 235            | 238,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24380340    | ○ |
| 240   | 235            | 238,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24379078    | ○ |
| 250   | 242            | 247,5          | 40  | 39,5 | 4       | HGW HG517 | 24378050    | ○ |
| 250   | 245            | 248,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24378945    | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice

| D   | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|----|------|---------|-----------|-------------|---|
| 250 | 245            | 248,4          | 25 | 24,5 | 2,5     | HGW HG517 | 49002401    | ○ |
| 260 | 252            | 257,5          | 40 | 39,5 | 4       | HGW HG517 | 24378051    | ○ |
| 260 | 255            | 258,4          | 25 | 24,5 | 2,5     | HGW HG517 | 49002880    | ○ |
| 260 | 255            | 258,4          | 35 | 34,5 | 2,5     | HGW HG517 | 529482      | ○ |
| 268 | 263            | 266,4          | 15 | 14,8 | 2,5     | HGW HG517 | 24380700    | ● |
| 270 | 265            | 268,4          | 25 | 24,5 | 2,5     | HGW HG517 | 24379079    | ○ |
| 270 | 265            | 268,4          | 35 | 34,5 | 2,5     | HGW HG517 | 49000025    | ○ |
| 280 | 272            | 277,5          | 40 | 39,5 | 4       | HGW HG517 | 24378052    | ○ |
| 280 | 275            | 278,4          | 25 | 24,5 | 2,5     | HGW HG517 | 527111      | ○ |
| 290 | 282            | 287,5          | 40 | 39,5 | 4       | HGW HG517 | 528969      | ○ |
| 300 | 295            | 298,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24378787    | ● |
| 300 | 295            | 298,4          | 35 | 34,5 | 2,5     | HGW HG517 | 529484      | ○ |
| 310 | 302            | 307,5          | 40 | 39,6 | 4       | HGW HG600 | 24378053    | ○ |
| 310 | 305            | 308,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24380701    | ● |
| 320 | 312            | 317,5          | 25 | 24,5 | 4       | HGW HG600 | 24379044    | ● |
| 320 | 312            | 317,5          | 40 | 39,6 | 4       | HGW HG600 | 24378054    | ○ |
| 330 | 322            | 327,5          | 30 | 29,5 | 4       | HGW HG600 | 49004578    | ○ |
| 330 | 325            | 328,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24379256    | ● |
| 340 | 332            | 337,5          | 25 | 24,5 | 4       | HGW HG600 | 24379045    | ○ |
| 340 | 332            | 337,5          | 30 | 29,5 | 4       | HGW HG600 | 528485      | ○ |
| 350 | 342            | 347,5          | 25 | 24,5 | 4       | HGW HG600 | 530277      | ○ |
| 350 | 342            | 347,5          | 40 | 39,5 | 4       | HGW HG600 | 533359      | ○ |
| 360 | 352            | 357,5          | 25 | 24,5 | 4       | HGW HG600 | 531639      | ○ |
| 360 | 352            | 357,5          | 30 | 29,5 | 4       | HGW HG600 | 24379154    | ● |
| 360 | 352            | 357,5          | 40 | 39,5 | 4       | HGW HG600 | 24378056    | ● |
| 375 | 367            | 372,5          | 25 | 24,5 | 4       | HGW HG600 | 24379080    | ○ |
| 375 | 370            | 373,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24378788    | ● |
| 380 | 372            | 377,5          | 40 | 39,5 | 4       | HGW HG600 | 24378057    | ○ |
| 400 | 392            | 397,5          | 40 | 39,5 | 4       | HGW HG600 | 24378058    | ○ |
| 410 | 402            | 407,5          | 40 | 39,5 | 4       | HGW HG600 | 531871      | ○ |
| 420 | 412            | 417,5          | 25 | 24,5 | 4       | HGW HG600 | 24379046    | ○ |
| 420 | 412            | 417,5          | 40 | 39,5 | 4       | HGW HG600 | 24378059    | ○ |
| 430 | 422            | 427,5          | 40 | 39,5 | 4       | HGW HG600 | 49003308    | ○ |
| 440 | 432            | 437,5          | 25 | 24,5 | 4       | HGW HG600 | 49002762    | ○ |
| 441 | 433            | 438,5          | 40 | 39,5 | 4       | HGW HG600 | 532899      | ○ |
| 460 | 452            | 457,5          | 25 | 24,5 | 4       | HGW HG600 | 24379348    | ● |
| 460 | 452            | 457,5          | 40 | 39,5 | 4       | HGW HG600 | 24379244    | ● |
| 480 | 472            | 477,5          | 25 | 24,5 | 4       | HGW HG600 | 24379081    | ○ |
| 480 | 472            | 477,5          | 40 | 39,5 | 4       | HGW HG600 | 24378060    | ○ |
| 480 | 475            | 478,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24378805    | ● |
| 500 | 492            | 497,5          | 25 | 24,5 | 4       | HGW HG600 | 49002908    | ○ |
| 500 | 492            | 497,5          | 40 | 39,5 | 4       | HGW HG600 | 531874      | ○ |
| 530 | 522            | 527,5          | 25 | 24,5 | 4       | HGW HG600 | 530276      | ○ |
| 540 | 532            | 537,5          | 25 | 24,5 | 4       | HGW HG600 | 24379047    | ○ |
| 540 | 535            | 538,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24378806    | ○ |
| 560 | 552            | 557,5          | 25 | 24,5 | 4       | HGW HG600 | 24377622    | ○ |
| 580 | 572            | 577,5          | 25 | 24,5 | 4       | HGW HG600 | 24379048    | ○ |
| 600 | 592            | 597,5          | 25 | 24,5 | 4       | HGW HG600 | 24377999    | ○ |
| 600 | 592            | 597,5          | 40 | 39,5 | 4       | HGW HG600 | 24379323    | ○ |
| 600 | 595            | 598,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24378808    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| D    | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |   |
|------|----------------|----------------|----|------|---------|-----------|-------------|---|
| 620  | 612            | 617,5          | 25 | 24,5 | 4       | HGW HG600 | 49004662    | ○ |
| 630  | 622            | 627,5          | 25 | 24,5 | 4       | HGW HG600 | 24379049    | ○ |
| 630  | 622            | 627,5          | 40 | 39,5 | 4       | HGW HG600 | 49002675    | ○ |
| 640  | 632            | 637,5          | 25 | 24,5 | 4       | HGW HG600 | 531869      | ○ |
| 680  | 672            | 677,5          | 25 | 24,5 | 4       | HGW HG600 | 527133      | ○ |
| 680  | 672            | 677,5          | 40 | 39,5 | 4       | HGW HG600 | 49004923    | ○ |
| 680  | 675            | 678,4          | 25 | 24,5 | 2,5     | HGW HG600 | 526191      | ● |
| 700  | 692            | 697,5          | 25 | 24,5 | 4       | HGW HG600 | 24376187    | ○ |
| 700  | 692            | 697,5          | 35 | 34,5 | 4       | HGW HG600 | 49003965    | ○ |
| 710  | 702            | 707,5          | 40 | 39,5 | 4       | HGW HG600 | 49002676    | ○ |
| 740  | 732            | 737,5          | 35 | 34,5 | 4       | HGW HG600 | 24378498    | ○ |
| 760  | 752            | 757,5          | 40 | 39,5 | 4       | HGW HG600 | 24379321    | ○ |
| 800  | 792            | 797,5          | 20 | 19,8 | 4       | HGW HG600 | 49000238    | ○ |
| 800  | 792            | 797,5          | 25 | 24,5 | 4       | HGW HG600 | 24378000    | ○ |
| 850  | 842            | 847,5          | 25 | 24,5 | 4       | HGW HG600 | 531637      | ○ |
| 865  | 857            | 862,5          | 20 | 19,8 | 4       | HGW HG600 | 531678      | ○ |
| 865  | 857            | 862,5          | 40 | 39,5 | 4       | HGW HG600 | 49003031    | ○ |
| 950  | 942            | 947,5          | 25 | 24,5 | 4       | HGW HG600 | 24379050    | ● |
| 952  | 942            | 948,5          | 25 | 24,5 | 5       | HGW HG600 | 532858      | ○ |
| 965  | 957            | 962,5          | 25 | 24,5 | 4       | HGW HG600 | 49003044    | ○ |
| 1050 | 1042           | 1047,5         | 25 | 24,5 | 4       | HGW HG600 | 24376188    | ○ |
| 1160 | 1152           | 1157,5         | 40 | 39,5 | 4       | HGW HG600 | 49002142    | ○ |
| 1200 | 1192           | 1197,5         | 25 | 24,5 | 4       | HGW HG600 | 533290      | ○ |
| 1250 | 1242           | 1247,5         | 25 | 24,5 | 4       | HGW HG600 | 530020      | ● |
| 1450 | 1442           | 1447,5         | 40 | 39,5 | 4       | HGW HG600 | 531903      | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring KB

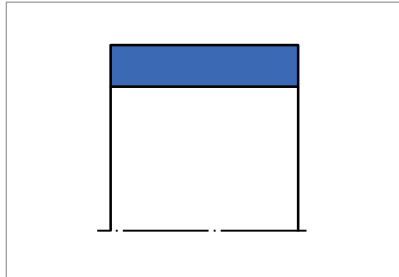


Fig. 1 Merkel Guide Ring KB

## Product description

Non-metallic Merkel Guide Ring KB.

## Product advantages

Non-metallic guide element for pistons, also for standardised housings according to ISO 10766

- Metal/fabric-base laminate materials combination prevents “seizing”
- High load-bearing capacity, elastic (not plastic) behaviour up to break point
- Chamfered profile edges prevent pressing of edge into the corner radii of the housing groove
- Simple snap-in fitting ( $d \leq 300$ ).

## Application

Earth moving equipment, agricultural machinery, injection moulding machines, loading platforms, support cylinders, industrial vehicles, cranes, presses, steel hydraulics engineering.

## Material

Slotted Ring  $\leq 300$

| Material             | Code      |
|----------------------|-----------|
| Fabric-base laminate | HGW HG517 |

Ready to fit strip cut to size  $>300$

| Material             | Code      |
|----------------------|-----------|
| Fabric-base laminate | HGW HG600 |

## Operating conditions

| Material               | HGW HG517/HGW HG600     |
|------------------------|-------------------------|
|                        | Temperature range in °C |
| Hydraulic oils HL, HLP | -40 ... +120            |
| HFA fluids             | +5 ... +60              |
| HFB fluids             | +5 ... +60              |
| HFC fluids             | -40 ... +60             |
| HFD fluids             | -40 ... +120            |
| Water                  | +5 ... +60              |
| HETG (rapeseed oil)    | -40 ... +80             |
| HEES (synthetic ester) | -40 ... +100            |
| HEPG (glycol)          | -40 ... +80             |
| Mineral greases        | -40 ... +120            |

## Surface quality

| Surface roughness | $R_a$                      | $R_{max}$               |
|-------------------|----------------------------|-------------------------|
| Sliding surface   | 0,05 ... 0,3 $\mu\text{m}$ | $\leq 2,5 \mu\text{m}$  |
| Groove base       | $\leq 2 \mu\text{m}$       | $\leq 10,0 \mu\text{m}$ |
| Groove flanks     | $\leq 3 \mu\text{m}$       | $\leq 15,0 \mu\text{m}$ |

Percentage contact area  $M_v >50\%$  up to max. 90% at cutting depth  $c = R_z/2$  and reference line  $C_{ref} = 0\%$ .

## Design notes

Please observe our general design notes in → Technical Manual.

## Tolerance recommendation

| $d_1$ |
|-------|
| H8    |

The tolerance definition for the dimensions D and  $d_1$  must be viewed in relation to the seal used. The diameter  $D_1$  specified in the table of dimensions is to be viewed exclusively in connection with the guide ring. The corresponding diameter of an adjacent seal housing should match the sealing component.



**Manufacturing tolerance**

| Profile thickness S |
|---------------------|
| -0,02 ... -0,08     |

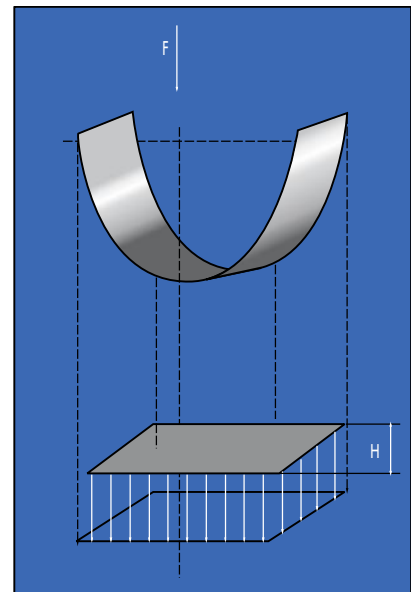
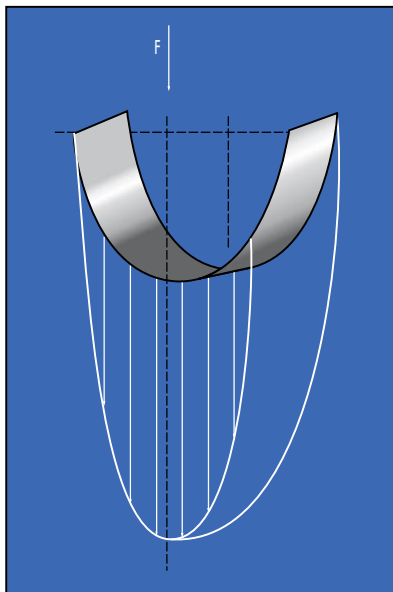
**Surface load**

| Profile thickness S                  |
|--------------------------------------|
| p <50 N/mm <sup>2</sup> up to 60 °C  |
| p <25 N/mm <sup>2</sup> up to 100 °C |

For running speed, see sealing system.

**Surface force**

The pressure distribution on the guide rings is non-linear. The non-linear pressure curve over the contact range was taken into account when calculating the permissible specific surface pressure. The permissible load on the guide strip is calculated by multiplying the projected area with the permissible specific surface pressure. However, the figure for the permissible specific surface pressure takes into account the possible angular offset of the piston when using the recommended guide elements.



$$F = P \times A$$

$$H = F / (d \times P)$$

H = guide strip width [mm]

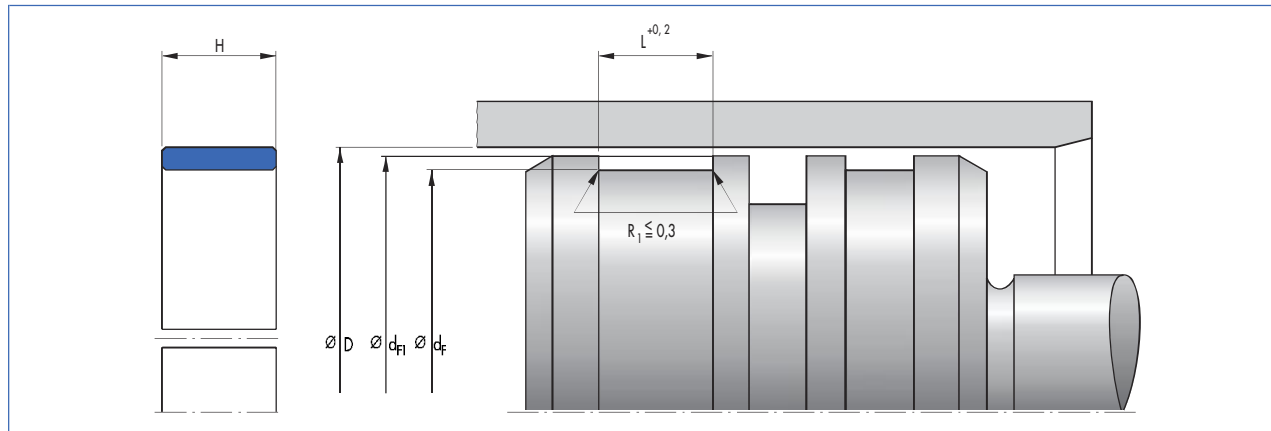
F = radial load [N]

A = projected area [mm<sup>2</sup>]

P = perm. compression per unit area [N/mm<sup>2</sup>]

d = rod diameter  
with rod guidance;  
piston diameter with  
piston guidance [mm].

Article list

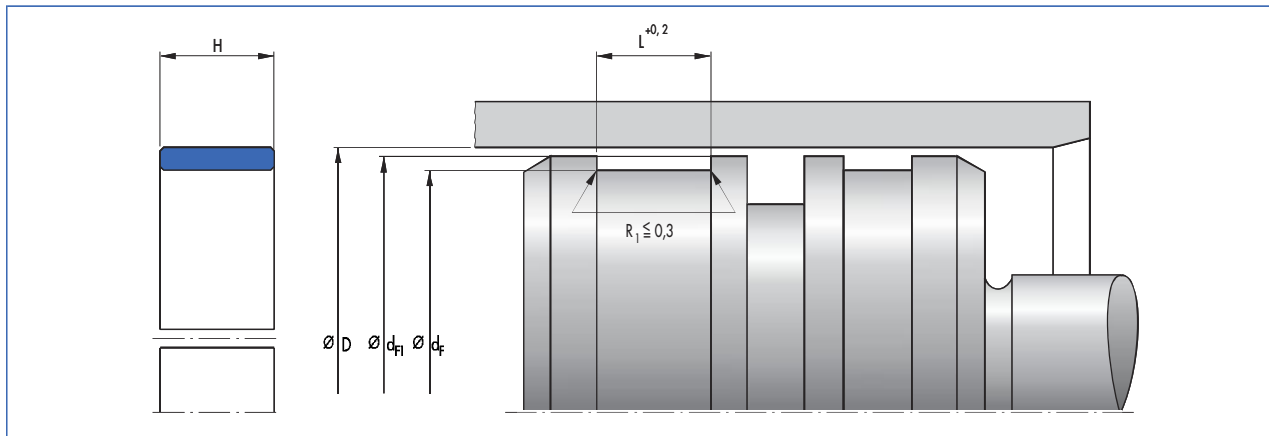


| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 30  | 27             | 29             | 5,6 | 5,5  | 1,5     | HGW HG517 | 24300231    | ● |
| 32  | 29             | 31             | 5,6 | 5,5  | 1,5     | HGW HG517 | 24300232    | ○ |
| 36  | 33             | 35             | 5,6 | 5,5  | 1,5     | HGW HG517 | 24300234    | ○ |
| 40  | 35             | 38,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130923    | ○ |
| 40  | 37             | 39             | 5,6 | 5,5  | 1,5     | HGW HG517 | 24300235    | ○ |
| 42  | 37             | 40,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130926    | ○ |
| 45  | 40             | 43,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130929    | ○ |
| 50  | 45             | 48,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130932    | ○ |
| 50  | 45             | 48,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130933    | ● |
| 55  | 50             | 53,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130935    | ● |
| 56  | 51             | 54,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130938    | ○ |
| 60  | 55             | 58,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130941    | ○ |
| 60  | 55             | 58,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130942    | ○ |
| 60  | 55             | 58,4           | 10  | 9,9  | 2,5     | HGW HG517 | 24375278    | ● |
| 63  | 58             | 61,4           | 5,6 | 5,5  | 2,5     | HGW HG517 | 24130944    | ● |
| 63  | 58             | 61,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130945    | ○ |
| 65  | 60             | 63,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24133632    | ● |
| 70  | 62             | 67,5           | 25  | 24,5 | 4       | HGW HG517 | 24298678    | ○ |
| 70  | 65             | 68,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130948    | ○ |
| 70  | 65             | 68,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24345783    | ○ |
| 75  | 70             | 73,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24220353    | ● |
| 80  | 75             | 78,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130950    | ● |
| 80  | 75             | 78,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24128202    | ● |
| 85  | 80             | 83,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24135787    | ● |
| 85  | 80             | 83,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24351574    | ○ |
| 90  | 85             | 88,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130952    | ● |
| 90  | 85             | 88,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24269687    | ○ |
| 95  | 90             | 93,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24300241    | ● |
| 95  | 90             | 93,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24337625    | ○ |
| 100 | 95             | 98,4           | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130954    | ● |
| 100 | 95             | 98,4           | 15  | 14,8 | 2,5     | HGW HG517 | 24132237    | ● |
| 105 | 100            | 103,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24209853    | ○ |
| 110 | 102            | 107,5          | 25  | 24,5 | 4       | HGW HG517 | 24146909    | ○ |
| 110 | 105            | 108,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130956    | ● |
| 110 | 105            | 108,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24245043    | ● |
| 115 | 110            | 113,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24245178    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| D     | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-------|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 120   | 112            | 117,5          | 25  | 24,5 | 4       | HGW HG517 | 24302126    | ○ |
| 120   | 115            | 118,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24300246    | ○ |
| 120   | 115            | 118,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24144161    | ○ |
| 125   | 117            | 122,5          | 25  | 24,5 | 4       | HGW HG517 | 24137311    | ○ |
| 125   | 120            | 123,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130960    | ○ |
| 125   | 120            | 123,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130961    | ○ |
| 125   | 120            | 123,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24174689    | ○ |
| 133,4 | 128,4          | 131,8          | 10  | 9,9  | 2,5     | HGW HG517 | 24375988    | ○ |
| 140   | 132            | 137,5          | 20  | 19,8 | 4       | HGW HG517 | 24335709    | ○ |
| 140   | 132            | 137,5          | 25  | 24,5 | 4       | HGW HG517 | 24137312    | ● |
| 140   | 135            | 138,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130963    | ○ |
| 140   | 135            | 138,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130964    | ● |
| 140   | 135            | 138,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24349281    | ○ |
| 150   | 142            | 147,5          | 20  | 19,8 | 4       | HGW HG517 | 24335710    | ○ |
| 150   | 142            | 147,5          | 25  | 24,5 | 4       | HGW HG517 | 24146908    | ○ |
| 150   | 145            | 148,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130966    | ○ |
| 150   | 145            | 148,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130967    | ○ |
| 150   | 145            | 148,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24342275    | ● |
| 150   | 145            | 148,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24245817    | ○ |
| 160   | 152            | 157,5          | 25  | 24,5 | 4       | HGW HG517 | 24176821    | ○ |
| 160   | 155            | 158,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130969    | ○ |
| 160   | 155            | 158,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130970    | ● |
| 160   | 155            | 158,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24351443    | ○ |
| 160   | 155            | 158,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24263520    | ○ |
| 170   | 165            | 168,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130973    | ○ |
| 180   | 172            | 177,5          | 20  | 19,8 | 4       | HGW HG517 | 24140088    | ○ |
| 180   | 172            | 177,5          | 25  | 24,5 | 4       | HGW HG517 | 24290191    | ○ |
| 180   | 175            | 178,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130975    | ○ |
| 180   | 175            | 178,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130976    | ● |
| 200   | 192            | 197,5          | 25  | 24,5 | 4       | HGW HG517 | 24290195    | ○ |
| 200   | 195            | 198,4          | 9,7 | 9,6  | 2,5     | HGW HG517 | 24130981    | ● |
| 200   | 195            | 198,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130982    | ● |
| 200   | 195            | 198,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24350641    | ● |
| 200   | 195            | 198,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24344891    | ○ |
| 210   | 205            | 208,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24334874    | ○ |
| 220   | 215            | 218,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24300249    | ● |
| 220   | 215            | 218,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24143328    | ○ |
| 225   | 217            | 222,5          | 15  | 14,8 | 4       | HGW HG517 | 24339297    | ○ |
| 225   | 217            | 222,5          | 25  | 24,5 | 4       | HGW HG517 | 24330488    | ○ |
| 225   | 220            | 223,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24212963    | ○ |
| 225   | 220            | 223,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24142350    | ○ |
| 230   | 222            | 227,5          | 15  | 14,8 | 4       | HGW HG517 | 24349607    | ○ |
| 230   | 225            | 228,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24334044    | ○ |
| 240   | 235            | 238,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24147696    | ○ |
| 240   | 235            | 238,4          | 20  | 19,8 | 2,5     | HGW HG517 | 24342277    | ○ |
| 240   | 235            | 238,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24349511    | ○ |
| 250   | 242            | 247,5          | 25  | 24,5 | 4       | HGW HG517 | 24299851    | ○ |
| 250   | 245            | 248,4          | 15  | 14,8 | 2,5     | HGW HG517 | 24130988    | ○ |
| 250   | 245            | 248,4          | 25  | 24,5 | 2,5     | HGW HG517 | 24144514    | ○ |
| 260   | 252            | 257,5          | 25  | 24,5 | 4       | HGW HG517 | 24299314    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

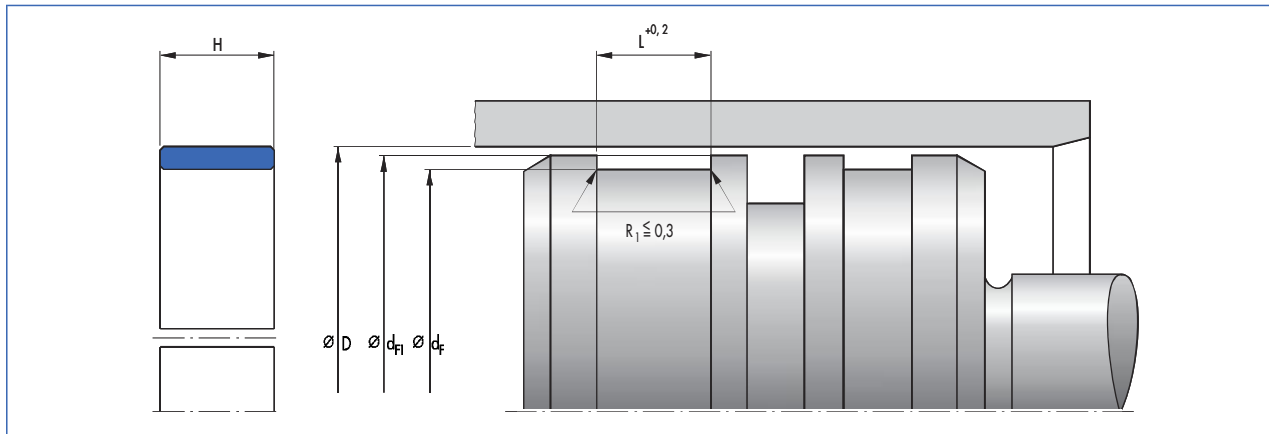


| D   | d <sub>F</sub> | d <sub>1</sub> | L  | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|----|------|---------|-----------|-------------|---|
| 260 | 255            | 258,4          | 15 | 14,8 | 2,5     | HGW HG517 | 24131488    | ○ |
| 280 | 275            | 278,4          | 15 | 14,8 | 2,5     | HGW HG517 | 24130991    | ● |
| 280 | 275            | 278,4          | 25 | 24,5 | 2,5     | HGW HG517 | 24350273    | ○ |
| 300 | 295            | 298,4          | 15 | 14,8 | 2,5     | HGW HG517 | 24137782    | ● |
| 305 | 300            | 303,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24142162    | ○ |
| 310 | 305            | 308,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24353021    | ○ |
| 315 | 310            | 313,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24351270    | ○ |
| 320 | 315            | 318,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24130993    | ○ |
| 320 | 315            | 318,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24130994    | ○ |
| 330 | 325            | 328,4          | 15 | 14,5 | 2,5     | HGW HG600 | 24311172    | ○ |
| 330 | 325            | 328,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24260227    | ○ |
| 340 | 335            | 338,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24300250    | ○ |
| 340 | 335            | 338,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24300251    | ○ |
| 350 | 342            | 347,5          | 25 | 24,5 | 4       | HGW HG600 | 24300936    | ○ |
| 350 | 345            | 348,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24338667    | ○ |
| 350 | 345            | 348,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24330500    | ○ |
| 355 | 350            | 353,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24215447    | ○ |
| 360 | 352            | 357,5          | 25 | 24,5 | 4       | HGW HG600 | 24331493    | ○ |
| 360 | 355            | 358,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24130996    | ○ |
| 360 | 355            | 358,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24130997    | ○ |
| 380 | 372            | 377,5          | 25 | 24,5 | 4       | HGW HG600 | 24294294    | ○ |
| 380 | 375            | 378,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24333136    | ○ |
| 380 | 375            | 378,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24352259    | ○ |
| 390 | 382            | 387,5          | 25 | 24,5 | 4       | HGW HG600 | 24344183    | ○ |
| 390 | 385            | 388,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24338260    | ○ |
| 390 | 385            | 388,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24256744    | ○ |
| 400 | 392            | 397,5          | 25 | 24,5 | 4       | HGW HG600 | 24307328    | ○ |
| 400 | 395            | 398,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24300252    | ○ |
| 400 | 395            | 398,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24300253    | ○ |
| 410 | 402            | 407,5          | 25 | 24,5 | 4       | HGW HG600 | 24263733    | ○ |
| 410 | 405            | 408,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24375939    | ○ |
| 420 | 415            | 418,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24259239    | ○ |
| 420 | 415            | 418,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24261300    | ○ |
| 430 | 425            | 428,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24296973    | ○ |
| 430 | 425            | 428,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24339689    | ○ |
| 440 | 432            | 437,5          | 25 | 24,5 | 4       | HGW HG600 | 24289887    | ○ |
| 440 | 435            | 438,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24338261    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice

| D   | d <sub>F</sub> | d <sub>1</sub> | L   | H    | Profile | Material  | Article No. |   |
|-----|----------------|----------------|-----|------|---------|-----------|-------------|---|
| 440 | 435            | 438,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24368282    | ○ |
| 450 | 442            | 447,5          | 25  | 24,5 | 4       | HGW HG600 | 24259181    | ○ |
| 450 | 445            | 448,4          | 15  | 14,5 | 2,5     | HGW HG600 | 24345674    | ○ |
| 450 | 445            | 448,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24250199    | ○ |
| 460 | 455            | 458,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24341856    | ○ |
| 460 | 455            | 458,4          | 20  | 19,5 | 2,5     | HGW HG600 | 24341855    | ○ |
| 460 | 455            | 458,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24339270    | ○ |
| 470 | 465            | 468,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24294215    | ○ |
| 480 | 472            | 477,5          | 25  | 24,5 | 4       | HGW HG600 | 24331494    | ○ |
| 480 | 475            | 478,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24250198    | ○ |
| 490 | 482            | 487,5          | 25  | 24,5 | 4       | HGW HG600 | 24262693    | ○ |
| 500 | 492            | 497,5          | 25  | 24,5 | 4       | HGW HG600 | 24294986    | ○ |
| 500 | 495            | 498,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24302073    | ○ |
| 508 | 500            | 505,5          | 25  | 24,5 | 4       | HGW HG600 | 24360120    | ○ |
| 510 | 505            | 508,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24359433    | ○ |
| 520 | 515            | 518,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24274934    | ○ |
| 530 | 522            | 527,5          | 25  | 24,5 | 4       | HGW HG600 | 24290173    | ○ |
| 530 | 525            | 528,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24294259    | ○ |
| 540 | 532            | 537,5          | 25  | 24,5 | 4       | HGW HG600 | 24299558    | ○ |
| 540 | 535            | 538,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24359735    | ○ |
| 540 | 535            | 538,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24359576    | ○ |
| 550 | 545            | 548,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24302134    | ○ |
| 560 | 552            | 557,5          | 25  | 24,5 | 4       | HGW HG600 | 24332680    | ○ |
| 560 | 555            | 558,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24185838    | ○ |
| 560 | 555            | 558,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24336491    | ○ |
| 570 | 565            | 568,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24351059    | ○ |
| 575 | 570            | 573,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24289831    | ○ |
| 580 | 572            | 577,5          | 25  | 24,5 | 4       | HGW HG600 | 24298400    | ○ |
| 580 | 575            | 578,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24345487    | ○ |
| 600 | 592            | 597,5          | 25  | 24,5 | 4       | HGW HG600 | 24275141    | ○ |
| 600 | 595            | 598,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24274937    | ○ |
| 600 | 595            | 598,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24362837    | ○ |
| 610 | 602            | 607,5          | 25  | 24,5 | 4       | HGW HG600 | 24344890    | ○ |
| 620 | 612            | 617,5          | 25  | 24,5 | 4       | HGW HG600 | 24291804    | ○ |
| 620 | 615            | 618,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24309946    | ○ |
| 625 | 620            | 623,4          | 9,7 | 9,6  | 2,5     | HGW HG600 | 24351384    | ○ |
| 630 | 622            | 627,5          | 25  | 24,5 | 4       | HGW HG600 | 24340041    | ○ |
| 640 | 632            | 637,5          | 25  | 24,5 | 4       | HGW HG600 | 24275165    | ○ |
| 650 | 642            | 647,5          | 25  | 24,5 | 4       | HGW HG600 | 24358966    | ○ |
| 660 | 652            | 657,5          | 25  | 24,5 | 4       | HGW HG600 | 24315102    | ○ |
| 680 | 672            | 677,5          | 25  | 24,5 | 4       | HGW HG600 | 24298436    | ○ |
| 680 | 675            | 678,5          | 25  | 24,5 | 2,5     | HGW HG600 | 24344258    | ○ |
| 700 | 692            | 697,5          | 25  | 24,5 | 4       | HGW HG600 | 24314495    | ○ |
| 700 | 695            | 698,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24275184    | ○ |
| 710 | 702            | 707,5          | 25  | 24,5 | 4       | HGW HG600 | 24340042    | ○ |
| 710 | 705            | 708,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24287808    | ○ |
| 720 | 715            | 718,4          | 15  | 14,8 | 2,5     | HGW HG600 | 24302590    | ○ |
| 720 | 715            | 718,4          | 25  | 24,5 | 2,5     | HGW HG600 | 24250197    | ○ |
| 730 | 722            | 727,5          | 25  | 24,5 | 4       | HGW HG600 | 24269481    | ○ |
| 740 | 732            | 737,5          | 25  | 24,5 | 4       | HGW HG600 | 24263271    | ○ |

● Available from stock ○ On request: Tool is available, delivery at short notice



| D     | d <sub>F</sub> | d <sub>H</sub> | L  | H    | Profile | Material  | Article No. |   |
|-------|----------------|----------------|----|------|---------|-----------|-------------|---|
| 750   | 742            | 747,5          | 25 | 24,5 | 4       | HGW HG600 | 24293965    | ○ |
| 770   | 765            | 768,4          | 25 | 24,5 | 2,5     | HGW HG600 | 24344259    | ○ |
| 780   | 775            | 778,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24358669    | ○ |
| 800   | 792            | 797,5          | 25 | 24,5 | 4       | HGW HG600 | 24243178    | ○ |
| 800   | 795            | 798,4          | 15 | 14,8 | 2,5     | HGW HG600 | 24257374    | ○ |
| 813,3 | 805,3          | 810,8          | 25 | 24,5 | 4       | HGW HG600 | 24346654    | ○ |
| 820   | 812            | 817,5          | 25 | 24,5 | 4       | HGW HG600 | 24341040    | ○ |
| 830   | 822            | 827,5          | 25 | 24,5 | 4       | HGW HG600 | 24295835    | ○ |
| 850   | 842            | 847,5          | 25 | 24,5 | 4       | HGW HG600 | 24293544    | ○ |
| 870   | 862            | 867,5          | 25 | 24,5 | 4       | HGW HG600 | 24359019    | ○ |
| 878   | 870            | 875,5          | 25 | 24,5 | 4       | HGW HG600 | 24358857    | ○ |
| 880   | 872            | 877,5          | 25 | 24,5 | 4       | HGW HG600 | 24339269    | ○ |
| 900   | 892            | 897,5          | 25 | 24,5 | 4       | HGW HG600 | 24344382    | ○ |
| 914,4 | 906,4          | 911,9          | 25 | 24,5 | 4       | HGW HG600 | 24358613    | ○ |
| 965   | 957            | 962,5          | 25 | 24,5 | 4       | HGW HG600 | 24263886    | ○ |
| 965,2 | 957,2          | 962,7          | 25 | 24,5 | 4       | HGW HG600 | 24331519    | ○ |
| 1050  | 1042           | 1047,5         | 25 | 24,4 | 4       | HGW HG600 | 24257239    | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring FRA

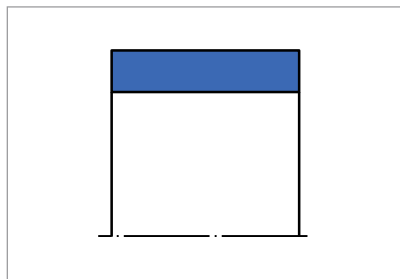


Fig. 1 Merkel Guide Ring FRA

## Product description

Slit, non-metallic Merkel Guide Ring FRA.

## Product advantages

As a non-metallic guide element for pistons, for standardised housings, amongst others, according to ISO 10766

- No seizure due to metal/plastic materials combination
- Medium load-bearing capacity
- Chamfered profile edges prevent pressing of edge into the corner radii of the housing groove
- Simple snap-in fitting.

## Application

Earth moving equipment, industrial vehicles, agricultural machinery, cranes.

## Material

| Material         | Code    |
|------------------|---------|
| Filled polyamide | PA 4112 |

## Operating conditions

| Material                                    | PA 4112 (filled polyamide)  |
|---|---|
|   | Temperature range in °C   |
| Hydraulic oils HL, HLP                      | -30 ... +100  |
| HFA fluids                                  | +5 ... +50  |
| HFB fluids                                  | +5 ... +50  |
| HFC fluids                                  | -30 ... +50   |
| HFD fluids                                  | -   |
| Water                                       | +5 ... +50  |
| HETG (rapeseed oil)                         | -30 ... +60   |
| HEES (synthetic esters)                     | -30 ... +80   |
| HEPG (glycol)                               | -30 ... +50   |
| Mineral greases                             | -30 ... +100  |
| Running speed in m/s                        | 1   |
| Load (permitted specific surface pressure*) | ≤40 N/mm <sup>2</sup> at 20 °C<br>≤30 N/mm <sup>2</sup> at 100 °C |

\* For the simple determination of the load, a constant surface pressure is calculated using the projected area (D x H). The actual surface pressure is clearly greater in the centre of the surface than the calculated surface pressure. This is taken into account in the value for the permissible specific surface pressure.

## Surface quality

| Surface roughness | R <sub>a</sub>  | R <sub>max</sub> |
|-------------------|-----------------|------------------|
| Sliding surface   | 0,05 ... 0,3 µm | ≤2,5 µm          |
| Groove base       | ≤2 µm           | ≤10,0 µm         |
| Groove flanks     | ≤3 µm           | ≤15,0 µm         |

Percentage contact area M, >50% to max. 90% at cutting depth c = Rz/2 and reference line C ref = 0%.

## Design notes

Please observe our general design notes in → Technical Manual.

### Tolerance recommendation

| D  | $d_F$ | $d_{F1}$ |
|----|-------|----------|
| H8 | h8    | h9       |

The tolerances given are recommended values. The usage of the guide and tolerance definition are to be considered in relation to the seal employed. The diameter  $d_{F1}$  given in the table of dimensions is to be considered exclusively in connection with the guide ring. The corresponding diameter for the adjacent seal housing is to be matched to the sealing component.

### Manufacturing tolerance

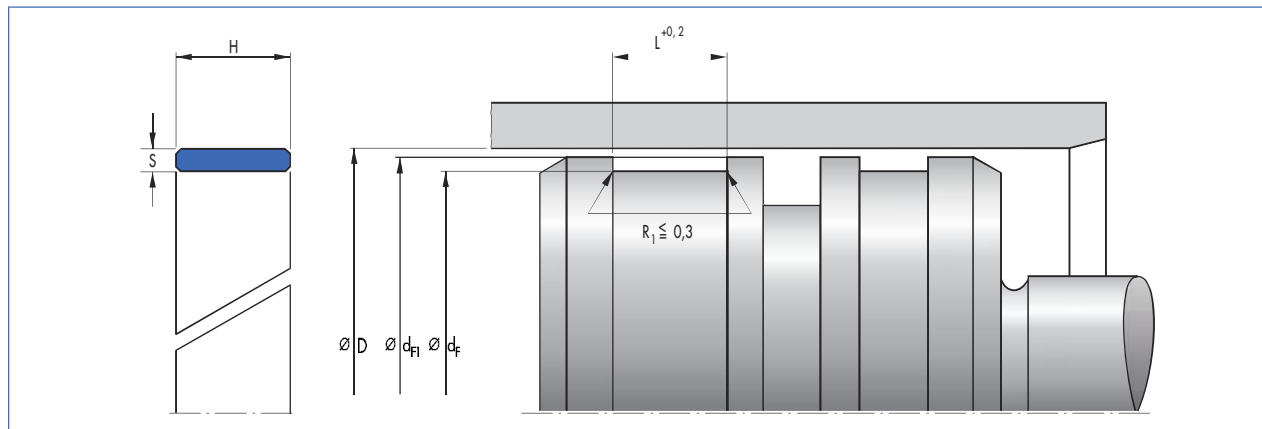
| D    | Production tolerance profile thickness S |
|------|--|
| ≤120 | -0,1                                     |
| >120 | -0,15                                    |

## Fitting & installation

Merkel Guide Ring FRA can be easily snapped into the housing groove. Careful fitting is a prerequisite for correct function. → Technical Manual.



Article list



| D   | d <sub>F</sub> | L   | H    | d <sub>F1</sub> | Material    | Article No. |   |
|-----|----------------|-----|------|-----------------|-------------|-------------|---|
| 20  | 16,9           | 4   | 3,9  | 19,4            | PAGF Q04112 | 434212      | ● |
| 25  | 21,9           | 4   | 3,9  | 24,4            | PAGF Q04112 | 434213      | ● |
| 30  | 26,9           | 4   | 3,9  | 29,4            | PAGF Q04112 | 434214      | ○ |
| 32  | 28,9           | 4   | 3,9  | 31,4            | PAGF Q04112 | 434215      | ● |
| 35  | 31,9           | 4   | 3,9  | 34,4            | PAGF Q04112 | 434217      | ● |
| 40  | 35             | 5,6 | 5,4  | 39,4            | PAGF Q04112 | 424740      | ● |
| 45  | 40             | 5,6 | 5,4  | 44,4            | PAGF Q04112 | 428783      | ● |
| 50  | 45             | 5,6 | 5,4  | 49,4            | PAGF Q04112 | 423806      | ● |
| 55  | 50             | 9,7 | 9,5  | 54,4            | PAGF Q04112 | 428789      | ● |
| 60  | 55             | 9,7 | 9,5  | 59,4            | PAGF Q04112 | 428800      | ● |
| 63  | 58             | 9,7 | 9,5  | 62,4            | PAGF Q04112 | 424703      | ● |
| 65  | 60             | 9,7 | 9,5  | 64,4            | PAGF Q04112 | 428802      | ● |
| 70  | 65             | 9,7 | 9,5  | 69,4            | PAGF Q04112 | 434199      | ● |
| 75  | 70             | 9,7 | 9,5  | 74,4            | PAGF Q04112 | 428814      | ● |
| 80  | 75             | 9,7 | 9,5  | 79,4            | PAGF Q04112 | 424702      | ● |
| 90  | 85             | 9,7 | 9,5  | 89,4            | PAGF Q04112 | 428815      | ● |
| 100 | 95             | 9,7 | 9,5  | 99,4            | PAGF Q04112 | 426223      | ● |
| 110 | 105            | 9,7 | 9,5  | 109,4           | PAGF Q04112 | 428819      | ● |
| 120 | 115            | 9,7 | 9,5  | 119,4           | PAGF Q04112 | 428820      | ● |
| 125 | 120            | 9,7 | 9,5  | 124,4           | PAGF Q04112 | 426238      | ● |
| 140 | 135            | 15  | 14,8 | 139,4           | PAGF Q04112 | 428858      | ● |
| 160 | 155            | 15  | 14,8 | 159,4           | PAGF Q04112 | 428860      | ● |
| 180 | 175            | 15  | 14,8 | 179,4           | PAGF Q04112 | 428863      | ● |
| 200 | 195            | 15  | 14,8 | 199,4           | PAGF Q04112 | 428866      | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice

# Merkel Guide Ring EKF

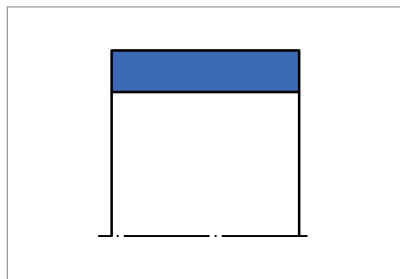


Fig. 1 Merkel Guide Ring EKF

## Product description

Slit, non-metallic Merkel Guide Ring EKF.

## Product advantages

Non-metallic guide element for pistons.

## Application

Standard cylinders, mobile hydraulics, injection moulding machines.

## Material

| Material  | Code    |
|-----------|---------|
| Polyamide | PA 4201 |

## Operating conditions

| Material  | PA 4201   |
|---|---|
|   | Temperature range in °C   |
| Hydraulic oils HL, HLP                            | -30 ... +100  |
| HFA fluids  | +5 ... +50  |
| HFB fluids  | +5 ... +50  |
| HFC fluids  | -30 ... +50   |
| HFD fluids  | -   |
| Water   | +5 ... +50  |
| HETG (rapeseed oil)                               | -30 ... +60   |
| HEES (synthetic ester)                            | -30 ... +80   |
| HEPG (glycol)                                     | -30 ... +50   |
| Mineral greases                                   | -30 ... +100  |
| Running speed $v$ in m/s                          | 1   |
| Loading<br>(permitted specific surface pressure*) | $\leq 25 \text{ N/mm}^2$ at $20 \text{ }^\circ\text{C}$<br>$\leq 15 \text{ N/mm}^2$ at $100 \text{ }^\circ\text{C}$ |

\* For the simple determination of the loading, a constant surface pressure is calculated using the projected area ( $D \times H$ ). The actual surface pressure is clearly greater in the centre of the surface than the calculated surface pressure. This is taken into account in the value for the permissible specific surface pressure.

## Surface quality

| Surface roughness | $R_a$                      | $R_{max}$               |
|-------------------|----------------------------|-------------------------|
| Sliding surface   | 0,05 ... 0,3 $\mu\text{m}$ | $\leq 2,5 \mu\text{m}$  |
| Groove base       | $\leq 2 \mu\text{m}$       | $\leq 10,0 \mu\text{m}$ |
| Groove flanks     | $\leq 3 \mu\text{m}$       | $\leq 15,0 \mu\text{m}$ |

Percentage contact area  $M_v > 50\%$  to max. 90% at cutting depth  $c = Rz/2$  and reference line  $C_{ref} = 0\%$ .

## Design notes

Please observe our general design notes in → Technical Manual.

### Tolerance recommendation

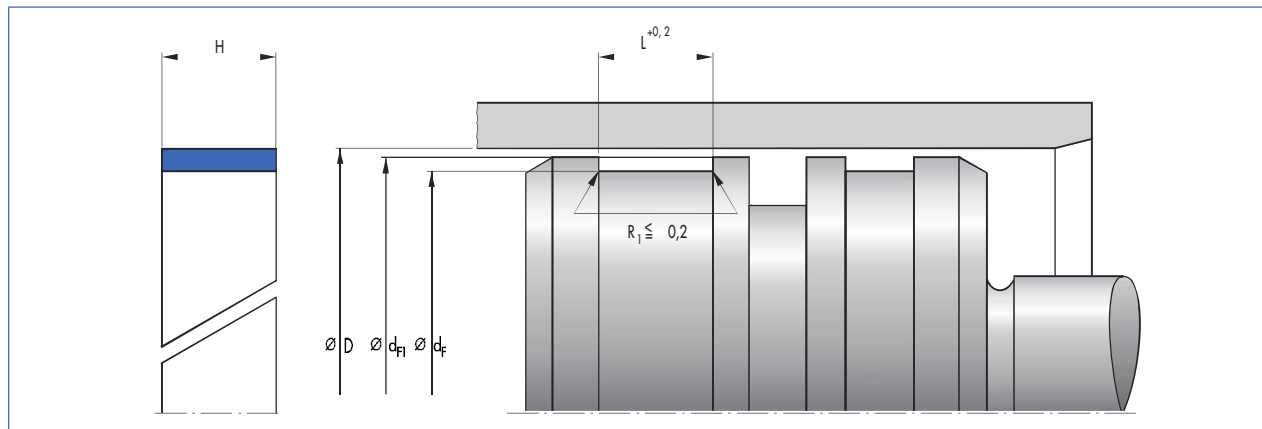
| $D_1$ | $d_F$ | $d_{F1}$ |
|-------|-------|----------|
| H8    | h8    | h9       |

The tolerances given are recommended values. The usage of the guide and tolerance definition are to be considered in connection with the seal employed. The diameter  $d_{F1}$  given in the table of dimensions is to be considered exclusively in relation to the guide ring. The corresponding diameter for the adjacent seal housing is to be matched to the sealing component. → Technical Manual.

## Fitting & installation

Merkel Guide Ring EKF can be easily snapped into the housing groove. Careful fitting is a prerequisite for correct function. → Technical Manual.

Article list



| D   | d <sub>F</sub> | L    | H  | d <sub>F1</sub> | Material | Article No. |   |
|-----|----------------|------|----|-----------------|----------|-------------|---|
| 20  | 16             | 8,2  | 8  | 19,4            | PA 4201  | 94215       | ● |
| 25  | 21             | 8,2  | 8  | 24,4            | PA 4201  | 99664       | ● |
| 30  | 26             | 8,2  | 8  | 29,4            | PA 4201  | 99665       | ● |
| 32  | 28             | 8,2  | 8  | 31,4            | PA 4201  | 94044       | ● |
| 35  | 31             | 8,2  | 8  | 34,4            | PA 4201  | 1264        | ● |
| 40  | 36             | 8,2  | 8  | 39,4            | PA 4201  | 99422       | ● |
| 45  | 41             | 10,2 | 10 | 44,4            | PA 4201  | 94191       | ● |
| 50  | 46             | 10,2 | 10 | 49,4            | PA 4201  | 99423       | ● |
| 55  | 51             | 10,2 | 10 | 54,4            | PA 4201  | 99424       | ● |
| 58  | 54             | 10,2 | 10 | 57,4            | PA 4201  | 95290       | ○ |
| 60  | 56             | 10,2 | 10 | 59,4            | PA 4201  | 99375       | ● |
| 63  | 59             | 10,2 | 10 | 62,4            | PA 4201  | 99861       | ● |
| 65  | 61             | 10,2 | 10 | 64,4            | PA 4201  | 99368       | ● |
| 70  | 66             | 10,2 | 10 | 69,4            | PA 4201  | 99739       | ● |
| 75  | 71             | 15,2 | 15 | 74,4            | PA 4201  | 94192       | ● |
| 80  | 76             | 15,2 | 15 | 79,4            | PA 4201  | 34024       | ● |
| 85  | 81             | 15,2 | 15 | 84,4            | PA 4201  | 99331       | ○ |
| 90  | 86             | 15,2 | 15 | 89,4            | PA 4201  | 99426       | ● |
| 95  | 91             | 15,2 | 15 | 94,4            | PA 4201  | 94193       | ○ |
| 100 | 96             | 15,2 | 15 | 99,4            | PA 4201  | 99376       | ● |
| 105 | 101            | 20,3 | 20 | 104,4           | PA 4201  | 27257       | ○ |
| 110 | 106            | 20,3 | 20 | 109,4           | PA 4201  | 99864       | ● |
| 115 | 111            | 20,3 | 20 | 114,4           | PA 4201  | 94194       | ○ |
| 120 | 116            | 20,3 | 20 | 119,4           | PA 4201  | 99740       | ● |
| 125 | 121            | 20,3 | 20 | 124,4           | PA 4201  | 99172       | ● |
| 130 | 126            | 20,3 | 20 | 129,4           | PA 4201  | 99863       | ● |
| 135 | 131            | 20,3 | 20 | 134,4           | PA 4201  | 34301       | ○ |
| 140 | 136            | 20,3 | 20 | 139,4           | PA 4201  | 99425       | ● |
| 150 | 146            | 25,4 | 25 | 149,4           | PA 4201  | 94201       | ● |
| 160 | 156            | 25,4 | 25 | 159,4           | PA 4201  | 99862       | ● |
| 180 | 176            | 25,4 | 25 | 179,4           | PA 4201  | 94204       | ● |
| 200 | 196            | 25,4 | 25 | 199,4           | PA 4201  | 99963       | ● |
| 220 | 216            | 30,5 | 30 | 219,4           | PA 4201  | 95594       | ○ |
| 250 | 246            | 30,5 | 30 | 249,4           | PA 4201  | 94323       | ● |

● Available from stock ○ On request: Tool is available, delivery at short notice