



Merkel Seals and Sealing Systems for Mining Technology

Merkel Freudenberg
Fluidtechnic GmbH



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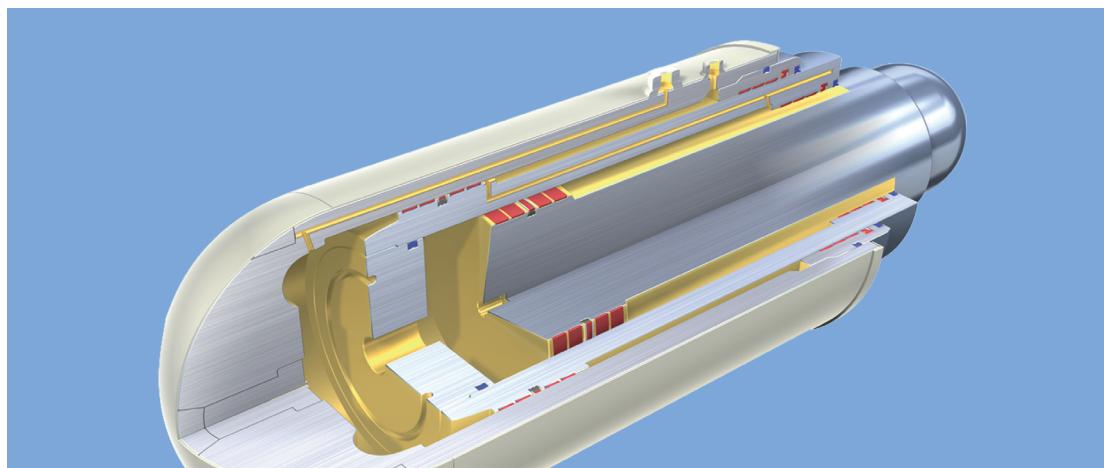
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Industry-specific solutions

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Merkel – leading sealing competency for your demanding applications in the mining industry



The special operating conditions and safety requirements in the mining industry place the highest requirements on the sealing system used. With the comprehensive Merkel product program, we offer you outstanding solutions for your fluid technology application.

Merkel's performance promise focuses on your specific market requirements. It creates the highest operational safety and functionality for the sealing of particularly large dimensions for example with stamping, pushers or hydraulic reverse systems and hydraulic cylinders in mining.



Through our founded application competency, in conjunction with our unique materials know how, we are positioned to supply you with ever more precisely matched solutions to your requirements. Reliability and efficiency are significant factors that you can count on from every Merkel sealing solution. You can also count on the rapid and high availability of our products. The Merkel product program, provides you with a complete standard offering of seals and sealing systems. We bring customer-specific, application-ready solutions to you quickly and competently.

Quality and Service

Diverse operating conditions and the associated high requirements of sealing systems like:

- low frictional forces and good controllability
- high reliability
- long service life
- optimal leakage behaviour

often require customer-specific solutions. Merkel has specialised in this area and is one of the globally leading suppliers of seals and sealing systems particularly for large dimensions.

Our international presence and large experience potential, offers a wide product program particularly in mining technology, e.g. in the face support (face and edge protection), return and transfer systems, heading and lowering systems, continuous mining road heading machines or also plunger pumps: Piston and rod seals, guides, wipers as well as shaft seals and rotary joints for large bearings and ensures you a cost-reducing complete program.

We offer well-engineered and well-performing, high quality sealing systems for linear stroke movements e.g. with:

- stamping and pushers
- hydraulic return systems
- hydraulic cylinders in diverse applications

Development and Production

The development work is rounded out through the concerted, close cooperation with leading producers of fluid components. This ensures an extremely close to the market, application and practically suitable implementation.

An important part of our "all around supply" is the dual manufacturing concept. We offer conventional manufacturing methods, which ensures a high availability of stock, in combination with modern machined products to be able to quickly react to an immediate repair need. This reduces downtimes significantly and keeps replacement stock to a minimum. Even small series can be manufactured economically.



Merkel rod seal TM 23
for pressure 0 MPa



Merkel rod seal TM 23
for pressure 10 MPa



Exemplary concepts of proven sealing systems

Merkel sealing system
with rod seal TM 23,
Guivex guide rings,
wiper PU 5

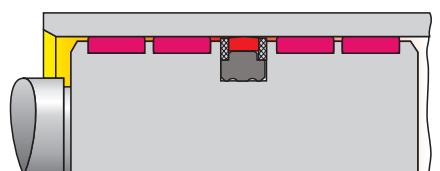


Operating conditions	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	50
Sliding speed v in m/s	0.1

Rod sealing system in stamping, pushers or ancillary cylinders

Very reliable universal sealing solution in underground areas. The rod sealing system offers outstanding security against dirt intake by Merkel wiper means of a static sealing edge and a rod seal with an additional supporting and sealing edge.

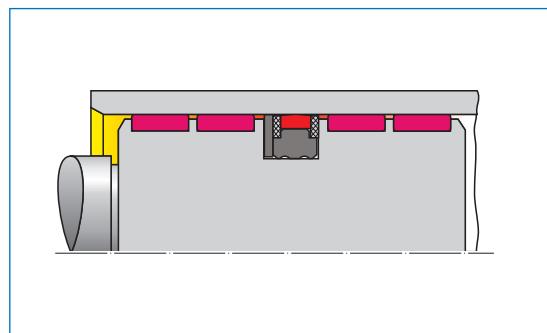
Merkel sealing
system with piston
seal T 42 and
Guivex guide rings



Operating conditions	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	50
Sliding speed v in m/s	0.1

Piston sealing system for sealing dual-sided pressure supplied pistons in stampers, pushers and ancillary cylinders in face support

Excellent sealing thanks to Merkel T 42 piston seal with plastic back rings, ensuring functional reliability even under high pressure, pipe widening and larger sealing gaps.

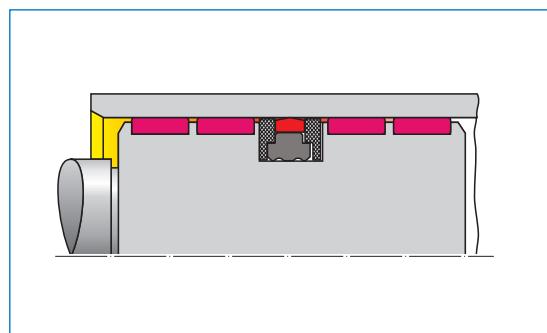


Merkel sealing system with piston seal T 42 and Guivex guide rings

Operating conditions	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	150
Sliding speed v in m/s	0.1

Piston sealing system in stamping, pushers or ancillary cylinders for pistons with single-sided high pressure

Piston seal T 42 with synthetic back-up ring and a back-up ring on the side facing away from the high-pressure, application even up to 150 MPa is thus also possible.



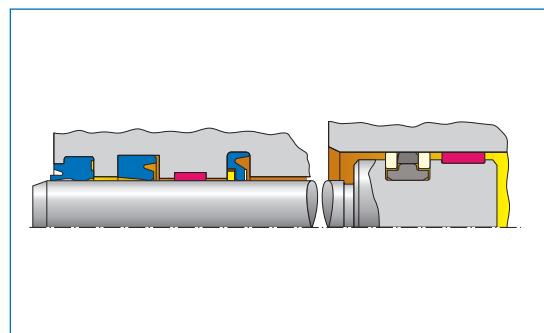
Merkel sealing system with piston seal T 44 and Guivex guide rings

Operating conditions	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	150
Sliding speed v in m/s	0.1

Piston sealing system in stamping, pushers or ancillary cylinders

Piston seal T 44 with semi-active angle back-up rings, very good resistance to extrusion even with pressure peaks.

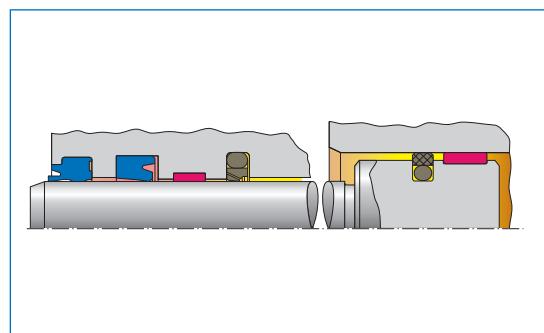
Wide range of dimensions and types also for special applications



Operating conditions	
HL/HLP fluids t in °C	-30 ... +100
Pressure p in MPa	40
Sliding speed v in m/s	0.8

Merkel rod sealing system with Syprim SM primary seal and U-ring T 20 as secondary seal, Guivex guide ring and wiper PU 5, Merkel piston sealing system with compact seal L 27 and Guivex guide rings

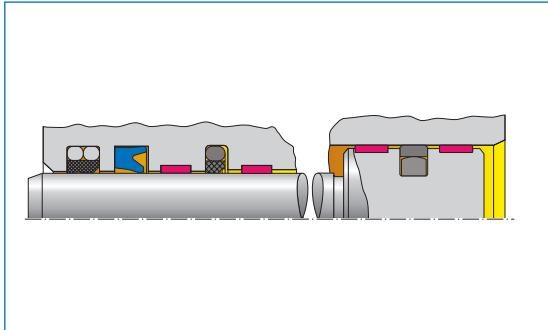
Sealing system with very high functional safety and longevity suitable for use even under the most extreme conditions like shock pressures, high lateral forces or extreme temperatures.



Operating conditions	
HL/HLP fluids t in °C	-30 ... +100
Pressure p in MPa	40
Sliding speed v in m/s	1.5

Merkel rod sealing system with Omegat primary seal OMS-MR PR and as secondary seal U-ring T 20, Guivex guide ring and Merkel wiper PU 5, piston sealing system with Omegat OMK-MR and Guivex guide ring

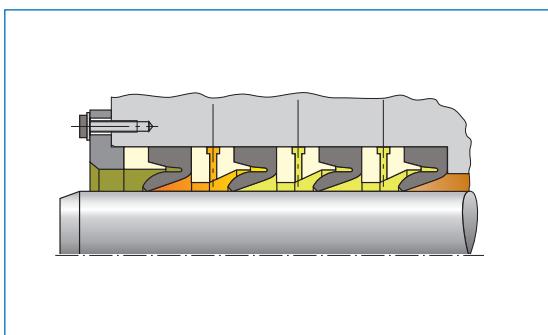
Universal sealing system with good static and dynamic sealing tightness.



Operating conditions	
HL/HLP fluids t in °C	-30 ... +100
Pressure p in MPa	40
Sliding speed v in m/s	0.8

Merkel rod sealing system with Omegat primary seal OMS-MR PR and as secondary seal U-ring T 20, Guivex guide rings and double wiper PT 1, piston sealing system with Omegat OMK-S Guivex guide rings

Heavy-duty-sealing system with very high functional safety and lifespan can be used even under the most extreme temperatures and conditions.



Operating conditions	
Mineral oils t in °C	-30 ... +100
Pressure p in MPa	0.5
Sliding speed v in m/s	2.0
Total eccentricity in mm	±2.0

In-line sealing system with Merkel Radial shaft seal TBM 27

Rotary sealing system with very high service life and functional safety even under the most extreme conditions e.g. in tunnel boring machines.

Merkel U-Ring TM 23

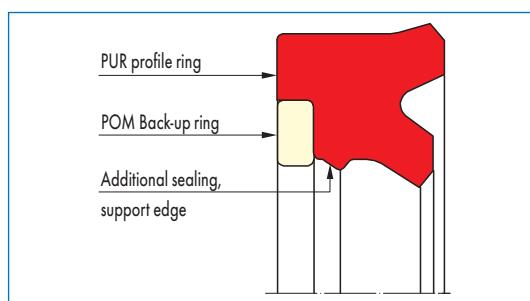


Fig. 1 Merkel U-Ring TM 23

Product description

The Merkel U-Ring TM 23 is specially designed for sealing the piston rods of plungers, pushers and subsidiary cylinders in self-advancing support systems.

Product advantages

To meet the requirements of a higher radial deflection and larger gap bridging, the Merkel U-Ring TM 23 has been fitted with an increased preload and active back-up ring. The second sealing edge provides extra protection against the ingress of dirt particles.

- Good media resistance
- Very good static and dynamic tightness
- Large range of dimensions
- Bridges large gaps
- Highly wear-resistant.

Material

Profile ring

Material	Code	Hardness
Polyurethane	95 AU V157 93 AU V167	95 Shore A 93 Shore A

Back-up ring

Material	Code
Polyacetal	POM PO 202

Operating conditions

Material 95 AU V157/93 AU V167	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	50
Running speed v in m/s	<0.1



Surface quality

Surface roughness	R_a	R_{max}
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_c >50% up to max. 90% at cutting depth $c = Rz/2$ and reference line C ref = 0%.

Recommended profile

d	s	L
<60	6.0	9.6
60 ... 120	7.5	12.5
120 ... 200	10.0	16.0
200 ... 300	12.5	20.0
>300	15.0	22.0

Design notes

Please observe our general design notes in → Technical Manual.

Gap dimension

The decisive factor for the function of the seal is the largest gap dimension occurring during operation on the non-pressurised side of the seal → Technical Manual.

Profile		Max. permissible gap dimension			
L	Profile	16 MPa	26 MPa	32 MPa	50 MPa
12.5	7.5	0.8	0.7	0.50	0.4
>12.5 ... 16.0	>7.5 ... 10.0	1.2	1.0	0.65	0.5
>16.0	>10.0	1.8	1.4	0.90	0.7

Tolerance recommendation and dimension d2

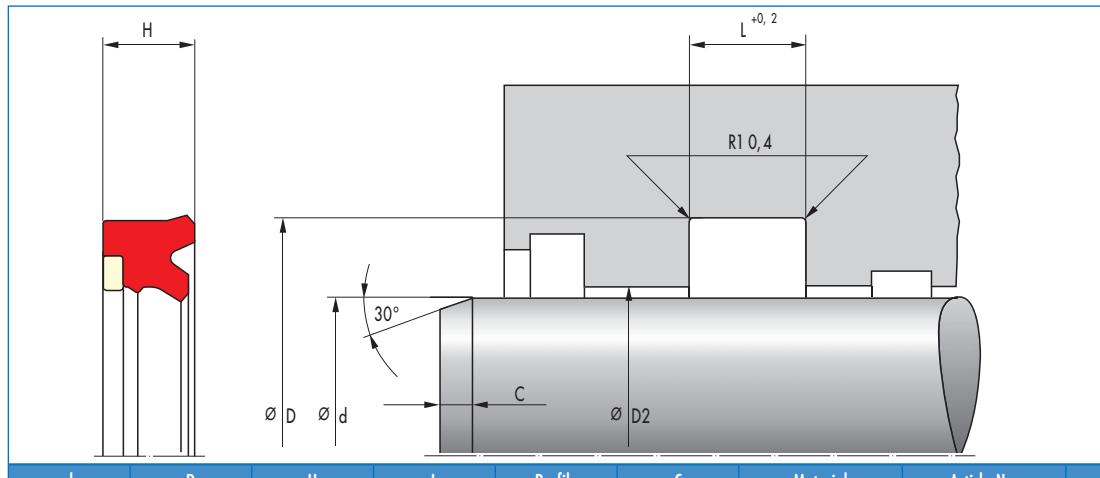
The admissible gap width, tolerances, guide play and deflection of the guide under load are to be taken into account when designing d2. → Technical Manual.

Nominal Ø d	d	D
≤350	f7	H10

Fitting & installation

The U-rings can be fitted into plunge-cut grooves by hand or with a fitting tool. We will be pleased to send you a design drawing for this on enquiry.

Merkel U-Ring TM 23



d	D	H	L	Profile	C	Material	Article No.	
60	72	11.4	13	6	6	95 AU V157	24301853	○
70	85	11.4	13	7.5	7	95 AU V157	24296870	○
80	92	10.9	12	6	6	95 AU V157	24301858	○
80	95	14.6	16	7.5	7	95 AU V157	24309920	○
85	100	11.4	13	7.5	7	93 AU V167	24359397	○
90	110	14.6	16	10	8.5	95 AU V157	24296871	○
95	110	11.4	13	7.5	7	95 AU V157	24328307	○
100	115	10.5	12	7.5	7	95 AU V157	24315670	○
100	115	14.6	16	7.5	7	95 AU V157	24268764	○
110	125	14.6	16	7.5	7	95 AU V157	24313031	○
110	130	14.6	16	10	8.5	95 AU V157	24296872	○
120	135	11.4	13	7.5	7	95 AU V157	24296681	○
120	135	14.6	16	7.5	7	95 AU V157	24313025	○
125	140	11.4	13	7.5	7	95 AU V157	24294247	○
135	155	14.6	16	10	8.5	93 AU V167	24369133	○
140	160	14.6	16	10	8.5	95 AU V157	24265472	○
145	162	14.6	16	8.5	8	95 AU V157	24372351	○
145	165	16	17.5	7.5	8.5	93 AU V167	24354392	○
149	165	18.2	20	8	7	95 AU V157	24299881	○
150	165	14.6	16	7.5	7	95 AU V157	24313029	○
150	168	19.1	21	9	8	95 AU V157	24328308	○
155	170	14.6	16	7.5	7	95 AU V157	24313030	○
155	175	14.6	16	10	8.5	95 AU V157	24268763	○
160	175	14.6	16	7.5	7	95 AU V157	24308961	○
165	180	11.4	13	7.5	7	95 AU V157	24309919	○
165	182	11.4	13	8.5	8	95 AU V157	24315950	○
165	182	14.6	16	8.5	8	93 AU V167	24366938	○
170	185	14.6	16	7.5	7	95 AU V157	24292396	○
170	190	14.6	16	10	8.5	95 AU V157	24338291	○
180	195	11.4	16	7.5	7	95 AU V157	24296682	○
180	195	14.6	16	7.5	7	95 AU V157	24299882	○
180	200	14.6	16	10	8.5	93 AU V167	24374346	○

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



d	D	H	L	Profile	C	Material	Article No.	
180	200	19.1	21	10	8.5	95 AU V157	24293702	○
185	200	20.6	23	7.5	7	93 AU V167	24374555	○
185	210	18.2	20	12.5	7	95 AU V157	24314005	○
185	214	18.2	20	14.5	11	95 AU V157	24299628	○
190	210	14.6	16	10	8.5	95 AU V157	24265473	○
195	210	14.6	16	7.5	7	93 AU V167	24356464	○
195	215	14.6	16	10	8.5	93 AU V167	24366936	○
205	220	14.6	16	7.5	7	95 AU V157	24313032	○
205	225	14.6	16	10	8.5	95 AU V157	24327442	○
210	230	14.6	16	10	8.5	93 AU V167	24358106	○
210	235	18.2	20	12.5	9.5	95 AU V157	24263447	○
220	235	14.6	16	7.5	7	95 AU V157	24262955	○
222	237	20.2	23	7.5	7	95 AU V157	24337054	○
225	250	18.2	20	12.5	9.5	93 AU V167	24366939	○
230	255	22.8	25	12.5	9.5	95 AU V157	24293703	○
235	255	14.6	16	10	8.5	95 AU V157	24299884	○
245	270	18.2	20	12.5	9.5	95 AU V157	24314006	○
260	280	16.6	18	10	8.5	93 AU V167	24374345	○
265	294	20	22	14.5	11	95 AU V157	24299629	○
275	300	18.2	20	12.5	9.5	95 AU V157	24265474	○
285	310	18.2	20	12.5	9.5	95 AU V157	24380148	○
290	315	18.2	20	12.5	9.5	95 AU V157	24316205	○
305	330	18.2	20	12.5	9.5	93 AU V167	24263445	○
325	355	20	22	15	8	93 AU V167	24359407	○

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

Merkel Compact Seal Profile 0155

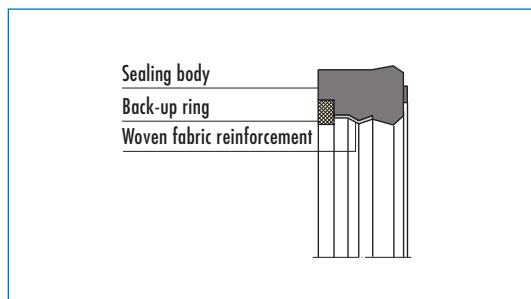


Fig. 1 Merkel Compact seal Profile 0155

Product description

Compact single-acting seal for piston rods for extreme application conditions.

Product advantages

The two-piece Merkel seal with up to three dynamic sealing edges and an integrated back-up ring. The first sealing edge can be designed as elastomer or fabric sealing edge, the additional sealing edges are equipped with woven fabric reinforcement.

Material

Material	Designation
Elastomer ring	80 NBR B246
Woven fabric reinforcement	Bi-NBR/B3B285
Back-up ring	POM PO 202

Operating conditions

Material 80 NBR B246/Bi-NBR B3B285/POM PO 202	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	25
Sliding speed v in m/s	0.5



Surface quality

Surface roughness	R_a	R_{max}
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 $M_c > 50\%$ to max. 90% for cut depth $c = Rz/2$ and reference line C ref = 0%. Abrasive surfaces, scoring, scratches and sinkholes are to be avoided.

Other materials upon request.

Design notes

Please observe our general design notes in → Technical Manual.

Gap dimension

The largest occurring gap dimension in operation on the side of the seal facing away from the pressure is crucial for the seal function → Technical Manual.

Profile dimension	Max. permissible gap dimension
3.5 – 4	0.2
5 – 6	0.3
7.5 – 10	0.4
12.5 – 15	0.5

Tolerance recommendation and dimension D2

For the design of D2, permissible gap dimension, tolerances, guide clearance and deflection of the guide under load are to be observed → Technical Manual.

Nominal diameter d	d	D
up to 350	f8	H10

Lead-in chamfers

Profile	C
3.5 – 4	2.5
5 – 6	3
7.5 – 10	5
12.5 – 15	7.5

Merkel Compact Seal Profile 0155

All non-dimensioned edges rounded and burr-free

$L \pm 0,2$

H

$\emptyset D$

$\emptyset d$

30°

C

$\emptyset D2$

d	D	Profile	L	H	C	Material	Article No.	
50	65	7.5	16.0	15.0	5	80 NBR B246	24187539	○
50	65	7.5	13.0	11.5	5	80 NBR B246	24237129	○
55	65	5.0	18.5	17.5	3	80 NBR B246	24090425	
55	70	7.5	22.5	21.0	5	80 NBR B246	24093055	○
55	65	5.0	18.5	17.5	3	80 NBR B246	24231772	○
56	71	7.5	11.5	10.0	5	80 NBR B246	24192612	○
56	71	7.5	22.5	21.0	5	80 NBR B246	24093056	○
60	75	7.5	13.5	12.5	5	80 NBR B246	24144126	○
60	75	7.5	16.0	15.0	5	80 NBR B246	24141816	○
60	70	5.0	18.5	17.5	3	80 NBR B246	24090230	○
60	75	7.5	22.5	21.0	5	80 NBR B246	24093057	●
60	75	7.5	13.0	12.0	5	80 NBR B246	24134853	○
63	78	7.5	22.5	21.0	5	80 NBR B246	24093058	○
63	78	7.5	11.5	10.0	5	80 NBR B246	24237135	○
65	73	4.0	14.0	13.0	2.5	80 NBR B246	24119003	○
65	80	7.5	22.5	21.0	5	80 NBR B246	24093059	○
65	80	7.5	18.5	17.5	5	80 NBR B246	24074171	○
65	80	7.5	11.5	10.5	5	80 NBR B246	24174724	○
70	90	10.0	32.0	30.0	5	80 NBR B246	24105181	○
70	85	7.5	13.0	12.0	5	80 NBR B246	24109910	○
70	82	6.0	17.0	15.5	3	80 NBR B246	24224802	○
70	85	7.5	13.0	12.0	5	80 NBR B246	24214640	○
70	85	7.5	22.5	21.0	5	80 NBR B246	24191805	○
75	90	7.5	13.0	11.5	5	80 NBR B246	24146083	○
78	93	7.5	18.5	17.5	5	80 NBR B246	24086453	○
80	95	7.5	22.5	21.0	5	80 NBR B246	24089334	●
80	100	10.0	14.5	13.5	5	80 NBR B246	24192981	○
80	100	10.0	25.0	23.5	5	80 NBR B246	24137313	○
85	100	7.5	22.5	21.0	5	80 NBR B246	24090120	○

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



d	D	Profile	L	H	C	Material	Article No.	
85	100	7.5	16.0	15.0	5	80 NBR B246	24141813	○
90	110	10.0	13.0	11.5	5	80 NBR B246	24143578	○
90	105	7.5	22.5	21.0	5	80 NBR B246	24089297	○
90	105	7.5	12.5	11.0	5	80 NBR B246	24115787	○
90	110	10.0	25.0	23.5	5	80 NBR B246	24134386	○
90	105	7.5	15.0	14.0	5	80 NBR B246	24212879	○
95	110	7.5	13.0	11.5	5	80 NBR B246	24173083	○
95	110	7.5	22.5	21.0	5	80 NBR B246	24196923	○
97	112	7.5	18.5	17.5	5	80 NBR B246	24080766	○
100	120	10.0	22.5	21.0	5	80 NBR B246	24089231	○
100	110	5.0	18.5	17.5	3	80 NBR B246	24123590	○
100	115	7.5	22.5	21.0	5	80 NBR B246	24191160	○
100	115	7.5	30.0	28.5	5	80 NBR B246	24127777	○
104	116	6.0	15.0	14.0	3	80 NBR B246	24188796	○
105	120	7.5	22.5	21.0	5	80 NBR B246	24191668	○
105	120	7.5	16.0	15.0	5	80 NBR B246	24073485	●
110	125	7.5	30.0	28.5	5	80 NBR B246	24110046	○
115	130	7.5	30.0	28.5	5	80 NBR B246	24093061	○
115	127	6.0	15.0	14.0	3	80 NBR B246	24196030	○
115	130	7.5	16.0	15.0	5	80 NBR B246	24087594	○
115	130	7.5	13.0	12.0	5	80 NBR B246	24099743	○
120	130	5.0	18.5	17.5	3	80 NBR B246	24119007	●
120	132	6.0	15.0	14.0	3	80 NBR B246	24181106	○
125	140	7.5	20.0	19.0	5	80 NBR B246	24085788	○
125	145	10.0	16.0	15.0	5	80 NBR B246	24112715	○
133.5	155	10.8	20.0	18.5	5	80 NBR B246	24134177	●
139	155	8.0	20.0	18.5	3	80 NBR B246	24182484	○
140	150	5.0	18.5	17.5	3	80 NBR B246	24119010	○
140	155	7.5	34.0	32.5	5	80 NBR B246	24093063	○
140	165	12.5	19.5	18.0	7.5	80 NBR B246	24135818	○
160	175	7.5	16.0	15.0	5	80 NBR B246	24247195	○
160	180	10.0	22.5	21.0	5	80 NBR B246	24236193	○
160	180	10.0	40.0	38.5	5	80 NBR B246	24093064	○
180	195	7.5	22.5	21.0	5	80 NBR B246	24146240	○
180	195	7.5	16.0	15.0	5	80 NBR B246	24193173	○
190	205	7.5	22.5	21.0	5	80 NBR B246	24194587	○
200	220	10.0	40.0	38.5	5	80 NBR B246	24093128	○
210	224	7.0	18.0	17.0	3	80 NBR B246	24146400	○
260	280	10.0	22.5	21.0	5	80 NBR B246	24134379	○
315	345	15.0	24.0	22.5	7.5	80 NBR B246	24237612	○

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

Merkel Compact Seal T 42

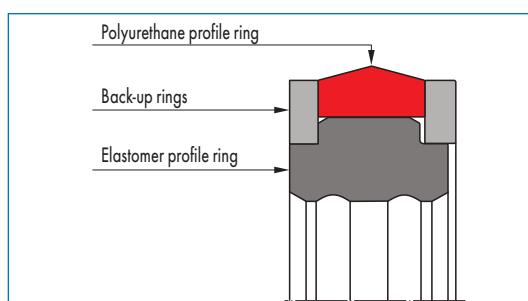


Fig. 1 Merkel Compact Seal T 42

Product description

Double-acting Merkel Compact Seal T 42 with back-up rings.

Product advantages

Merkel Compact Seal T 42 for sealing pistons which can be pressurised on both sides in plungers, pushers and subsidiary cylinders in self-advancing support systems

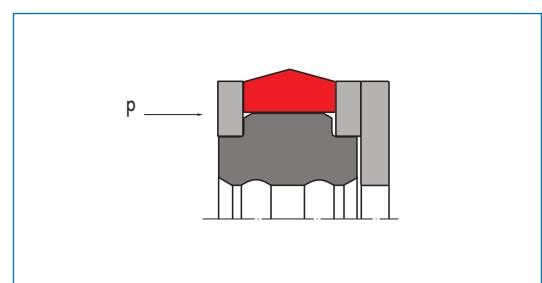
- Very good protection against extrusion even with pressure peaks
- High resistance to abrasion
- High contact pressure due to rubber profile ring
- Good media resistance, particularly with regard to aqueous solutions.

Material

Polyurethane profile ring	Back-up rings	Elastomer profile ring
93 AU V167	POM PO202	85 NBR B203 80 NBR B246

Operating conditions

Material 93 AU V167/NBR/POM PO202	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa *	50
Running speed v in m/s	0.1



* If a full-surface back-up ring is used on the side not subjected to high pressure, the use of up to 150 MPa is possible. The height of the backup ring should be 5 mm.



Surface quality

Surface roughness	R_a	R_{max}
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 $M_c > 50\%$ 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

$\emptyset d$		16 MPa					26 MPa				
	Profile	D	d	D2	DF	X2	D	d	D2	DF	X2
... 230	>7.5 ... 10.0 (BR 5.0)	H8	h9	h9	h8	1.1	H8	h9	h9	h8	0.8
... 300	>10.0 ... 12.5 (BR 6.0)	H8	h9	h9	h8	1.6	H8	h9	h9	h8	1.2
... 380	>12.5 (BR 7.5 x 5.0)	H8	h9	h9	h8	1.6	H8	h9	h9	h8	1.2
... 140	≤7.5 (BR 4.0 x 3.0)	H8	h9	h9	h8	0.8	H8	h9	h9	h8	0.6
... 160	>7.5 ... 8.5 (BR 4.5)	H8	h9	h9	h8	0.8	H8	h9	h9	h8	0.6

$\emptyset d$		32 MPa					40 MPa				
	Profile	D	d	D2	DF	X2	D	d	D2	DF	X2
... 230	>7.5 ... 10.0 (BR 5.0)	H8	h9	h9	h8	0.6	H8	h9	h9	h8	0.5
... 300	>10.0 ... 12.5 (BR 6.0)	H8	h9	h9	h8	0.9	H8	h9	h9	h8	0.7
... 380	>12.5 (BR 7.5 x 5.0)	H8	h9	h9	h8	0.9	H8	h9	h9	h8	0.7
... 140	≤7.5 (BR 4.0 x 3.0)	H8	h9	h9	h8	0.5	H8	h9	h9	h8	0.4
... 160	>7.5 ... 8.5 (BR 4.5)	H8	h9	h9	h8	0.5	H8	h9	h9	h8	0.4

$\emptyset d$		70 MPa					
	Profile	D	d	d2	df	X2	
... 230	>7.5 ... 10.0 (BR 5.0 x 3.5)	H8	h9	h7	h7	0.4	
... 300	>10.0 ... 12.5 (BR 6.5 x 3.5)	H8	h9	h7	h7	0.5	
... 400	>12.5 (BR 7.5 x 5.0)	H8	h9	h7	h7	0.6	

Gap dimension X2

The largest gap dimension occurring on the non-pressurised side of the seal in operation is of vital importance for the function of the seal → Technical Manual.

Merkel Compact Seal T 42

Tolerance recommendation and dimension d2

When designing d_2 the admissible gap width, tolerances, guide play and deflection of the guide under load are to be taken into account → Technical Manual.

Profile recommendation

D	S	L
<150	7.5	16.0
150 ... 200	10.0	20.0
>200 ... 400	12.5	20.0
>400	15.0	25.0

Fitting & installation

Careful fitting is a prerequisite for the correct function of the seal → Technical Manual.



D	d	H	L	Profile	C	Material	Article No.	
60	44	19	20.5	8	4	93 AU V167	24367984	○
105	91	15.2	16.5	7	4	93 AU V167	24367987	○
110	95	14.7	16	7.5	4	93 AU V167	24367988	○
115	97	21	22.5	9	5	93 AU V167	24367989	○
115	100	14.7	16	7.5	4	93 AU V167	24367990	○
120	105	14.7	16	7.5	4	93 AU V167	24367991	○
125	110	14.7	16	7.5	4	93 AU V167	24367993	○
130	115	14.7	16	7.5	4	93 AU V167	24373713	○
135	120	14.7	16	7.5	4	93 AU V167	24367994	○
140	125	14.7	16	7.5	4	93 AU V167	24374443	○
150	133	18.5	20	8.5	5	93 AU V167	24373891	○
160	143	18.5	20	8.5	5	93 AU V167	24367996	○
165	145	18.5	20	10	5	93 AU V167	24361344	○
170	150	18.5	20	10	5	93 AU V167	24367998	○
175	155	18.5	20	10	5	93 AU V167	24366948	○
185	165	14.2	15.5	10	5	93 AU V167	24375902	○
185	165	18.5	20	10	5	93 AU V167	24361930	○
210	190	18.5	20	10	5	93 AU V167	24368002	○
245	220	22.5	24	12.5	6	93 AU V167	24368006	○
250	225	23.5	25	12.5	6	93 AU V167	24368007	○
260	235	23.9	25.4	12.5	6	93 AU V167	24373958	○
270	245	22.5	24	12.5	6	93 AU V167	24373583	○
320	290	28.5	30	15	7	93 AU V167	24368009	○
345	315	28.5	30	15	7	93 AU V167	24373956	○
360	330	29.5	31.5	15	7	93 AU V167	24373582	○
380	350	30	32	15	7	93 AU V167	24375290	○

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

Merkel Compact Seal T 44

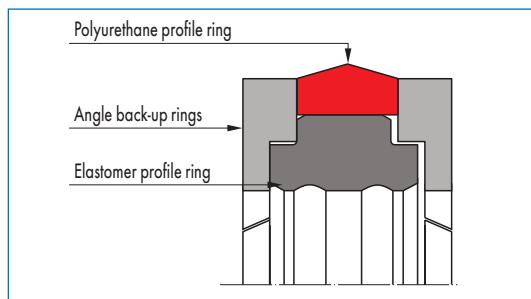


Fig. 1 Merkel Compact Seal T 44

Product description

Double-acting Merkel Compact Seal T 44 with semi-active angle back-up rings.

Product advantages

Merkel Compact Seal T 44 for sealing pistons which can be pressurised on both sides in plungers, pushers and subsidiary cylinders in self-advancing support systems

- Very good protection against extrusion even with pressure peaks
- High resistance to abrasion
- High contact pressure due to rubber profile ring
- Good media resistance, particularly with regard to aqueous solutions.

Material

Polyurethane profile ring	Back-up rings	Elastomer profile ring
93 AU V167	Polyacetal POM PO202	85 NBR B203

Operating conditions

Material 93 AU V167/NBR/POM PO202	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	150
Running speed v in m/s	0.1



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.05 ... 0.3 μm	$\leq 2.5 \mu\text{m}$
Groove base	$\leq 1.6 \mu\text{m}$	$\leq 6.3 \mu\text{m}$
Groove flanks	$\leq 3.0 \mu\text{m}$	$\leq 15.0 \mu\text{m}$

Percentage contact area $M_c > 50\%$ 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.

Gap dimension X2

The largest gap dimension occurring on the non-pressurised side of the seal in operation is of vital importance for the function of the seal → Technical Manual.

Tolerance recommendation and dimension d2

The admissible gap width, tolerances, guide play and deflection of the guide under load are to be taken into account when designing d2.

Ø d	16 MPa			26 MPa			32 MPa			40 MPa			
	Profile	D	d	X2	D	d	X2	D	d	X2	D	d	X2
... 225 ≤ 11.0 (BR 5.0 x 3.0)	H8	h9	1.1	H8	h9	0.8	H8	h9	0.6	H8	h9	0.5	
... 350 > 11.0 (BR 7.5 x 5.0)	H8	h9	1.6	H8	h9	1.2	H8	h9	0.9	H8	h9	0.7	

Tolerance recommendation for 150 MPa on enquiry.

Profile recommendation

D	S	L
≤ 200	10.0	25
$> 200 \dots 400$	12.5	25
> 400	15.0	30

Fitting & installation

Careful fitting is a prerequisite for the correct function of the seal → Technical Manual.

Merkel Compact Seal T 44

The technical drawing illustrates the cross-section of the Merkel Compact Seal T 44. It features a central vertical profile with a top cap of height H, a shoulder of width C, and a total length L. The shoulder has a 20° chamfer. The seal body has a diameter of Ød12 and a height of 15. The outer diameter is ØD₄₄. All non-dimensioned edges are rounded and burr-free.

D	d	H	L	Profile	C	Material	Article No.	
110	85	28.5	30.0	12.5	6	93 AU V167	24368011	○
125	100	23.5	25.0	12.5	6	93 AU V167	24368012	○
140	115	24	25.5	12.5	6	93 AU V167	24368015	○
140	123	22.7	24.0	8.5	5	93 AU V167	24368016	○
150	130	28.5	30.0	10	5	93 AU V167	24368017	○
155	125	28.5	30.0	15	7.5	93 AU V167	24368018	○
160	138	28.5	30.0	11	6	93 AU V167	24362541	○
160	140	28.5	30.0	10	5	93 AU V167	24351260	○
200	175	24	25.5	12.5	6	93 AU V167	24368023	○
200	175	28.5	30.0	12.5	6	93 AU V167	24368024	○
216	196	28.5	30.0	10	5	93 AU V167	24356551	○
220	190	28.5	30.0	15	7.5	93 AU V167	24368027	○
235	210	23.5	25.0	12.5	6	93 AU V167	24351264	○
345	315	28	30.0	15	7.5	93 AU V167	24359635	○

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



Merkel Compact Seal Profile 1547

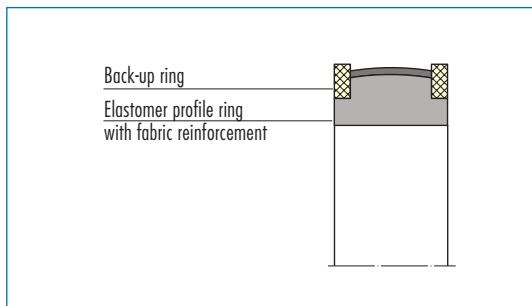


Fig. 1 Profile 1547 with back-up ring

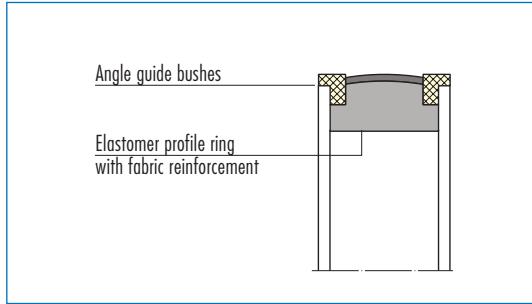


Fig. 2 Profile 1547 with angle guide bushes

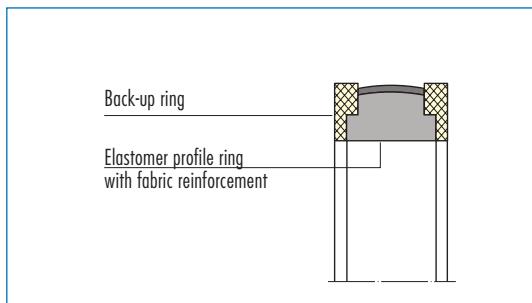


Fig. 3 Profile 1547 with back-up rings, design up to 150 MPa

Product advantages

The Merkel seal is equipped with the endless back-up ring and intended for the installation in axial open installation spaces. In special cases, the combination with open angled rings for plunge-cut grooves.

Material

Material	Designation
Profile ring	80 NBR B246/Bi-NBR/ B4B285
Angle guide bush/ back-up ring	POM PO 202

Operating conditions

Material 80 NBR B246/Bi-NBR/B4B285/POM PO 202	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	25
Running speed v in m/s	0.5

Product description

Compact three-part double-acting piston seal from an elastomer part with vulcanised fabric running surface and two integrated angle guide bushes.

Merkel Compact Seal Profile 1547

Surface quality

Surface roughness	R_a	R_{max}
Gliding 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 $M_c > 50\%$ to max. 90% for cut depth $c = Rz/2$ and reference line C ref = 0%. Abrasive surfaces, scoring, scratches and sinkholes are to be avoided.

Design notes

Please observe our general design notes in → Technical Manual.

Gap dimension

The largest occurring gap dimension in operation on the side of the seal facing away from the pressure is crucial for the seal function → Technical Manual.

Diameter d2	$\leq \emptyset 175$	$> \emptyset 175$
	$\emptyset D - 0.6 h9$	$\emptyset D - 0.8 h9$

Tolerance recommendation

Profile 1547 with back-up ring				
Nominal diameter D	D	d	d2	d3
63 – 320	H8	h9	-0.2	

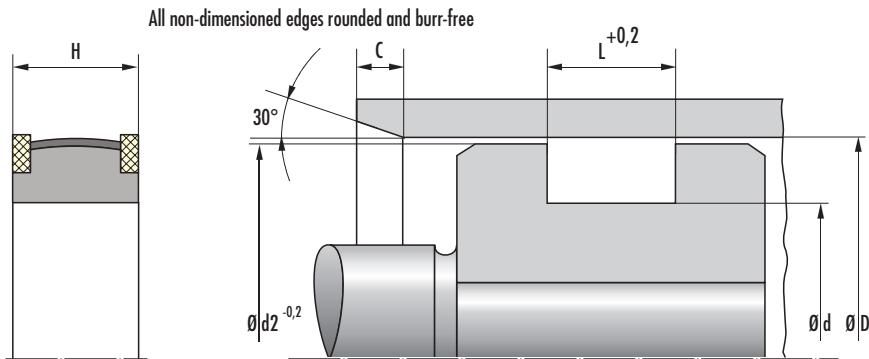
Profile 1547 with angle guide bushes				
Nominal diameter D	D	d	d2	d3
40 – 200	H8	h9	h10	h8
>200	H8	h9	-0.2	h7

Fitting

The careful fitting is a prerequisite for the trouble-free seal function → Technical Manual.



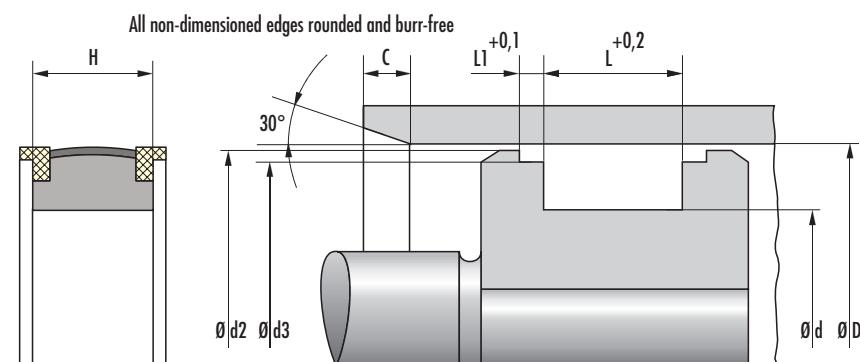
Article list Profile 1547 with back-up ring



D	d	d2	Profile	H	L	C	Material	Article No.	
63	47	62.5	8.0	19.7	20.5	4	80 NBR B246	24144809	○
95	75	94.5	10.0	19.3	20.5	5	80 NBR B246	24145857	○
105	80	104.5	12.5	21.1	22.3	6	80 NBR B246	24146130	○
115	90	114.5	12.5	22.5	22.5	6	80 NBR B246	24235710	○
320	290	319.5	15.0	30.5	31.5	7.5	80 NBR B246	24128220	○

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

Article list Profile 1547 with back-up rings, design up to 150 MPa

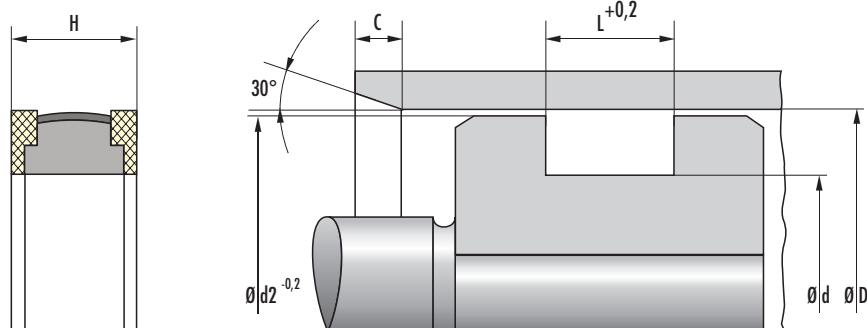


Please request this article.

Merkel Compact Seal Profile 1547

Article list Profile 1547 with angle guide bushes

All non-dimensioned edges rounded and burr-free



D	d	d2	Profile	H	L	C	Material	Article No.	
60	48	59	6.0	20.0	20.5	3.0	80 NBR B246	24132627	●
85	70	84	7.5	18.4	20.0	4.0	80 NBR B246	24257738	○
90	76	89	7.0	22.0	22.5	3.5	80 NBR B246	24193883	○
110	85	109	12.5	28.5	30.0	6.0	80 NBR B246	24242209	○
110	85	109	12.5	28.5	30.0	6.0	80 NBR B246	24242211	○
110	85	109	12.5	28.8	30.0	6.0	80 NBR B246	24175905	○
115	95	114	10.0	24.0	25.5	6.0	80 NBR B246	24269453	○
125	100	124	12.5	24.3	25.0	6.0	80 NBR B246	24102572	○
130	105	129	12.5	28.5	30.0	6.0	80 NBR B246	24269837	○
140	115	139	12.5	25.5	25.5	6.0	80 NBR B246	24269842	○
140	123	139	8.5	22.7	24.0	4.0	80 NBR B246	24217988	○
150	130	149	10.0	28.8	30.0	5.0	80 NBR B246	24191603	○
150	130	149	10.0	25.5	25.5	5.0	80 NBR B246	24240799	○
155	130	154	12.5	24.7	25.4	6.0	80 NBR B246	24102577	○
155	135	154	10.0	28.5	30.0	5.0	80 NBR B246	24236405	○
160	138	159	11.0	28.8	30.0	5.0	80 NBR B246	24190468	○
160	138	159	11.0	28.8	30.0	5.0	80 NBR B246	24231297	○
165	140	164	12.5	28.3	30.0	6.0	80 NBR B246	24170590	○
170	150	169	10.0	23.8	25.0	5.0	80 NBR B246	24358401	○
175	150	174	12.5	24.3	25.0	6.0	80 NBR B246	24106736	○
180	160	179	10.0	24.1	25.4	5.0	80 NBR B246	24114202	○
180	160	179	10.0	24.1	25.0	5.0	80 NBR B246	24231298	○
200	175	198	12.5	30.7	31.5	6.0	80 NBR B246	24102573	○
200	175	198	12.5	24.3	25.5	6.0	80 NBR B246	24269848	○
250	225	248	12.5	30.1	31.0	6.0	80 NBR B246	24266988	○
280	245	278	17.5	33.8	35.0	8.0	80 NBR B246	24228398	○
280	245	278	17.5	33.8	35.0	8.0	80 NBR B246	24269853	○
400	370	398	15.0	38.0	40.0	7.5	80 NBR B246	24360886	○

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



Merkel Compact Seal Profile 1548

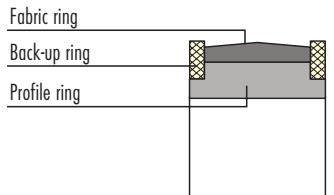


Fig. 1 Profile 1548 with back-up ring

Product description

Three-part piston seal from an elastomer part, a fabric ring and two integrated angle guide bushes or two back-up rings.

Product advantages

Compact double-acting seal set for pistons, also with integrated guide depending on design.

Material

Material	Designation
Profile ring	NBR B209
Fabric ring	BI-N B3B248
Angle guide bush/ back-up ring	POM PO202

Other materials upon request.

Operating conditions

Material NBR/fabric/POM	
HFA fluids/water t in °C	+5 ... +60
Pressure p in MPa	50
Sliding speed v in m/s	0.5

Merkel Compact Seal Profile 1548

Surface quality

Surface roughness	R_a	R_{max}
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 $M_c > 50\%$ to max. 90% for cut depth $c = Rz/2$ and reference line C ref = 0%. Abrasive surfaces, scoring, scratches and sinkholes are to be avoided.

Design notes

Please observe our general design notes in → Technical Manual.

Gap dimension

The largest occurring gap dimension in operation on the side of the seal facing away from the pressure is crucial for the seal function → Technical Manual.

Tolerance recommendation

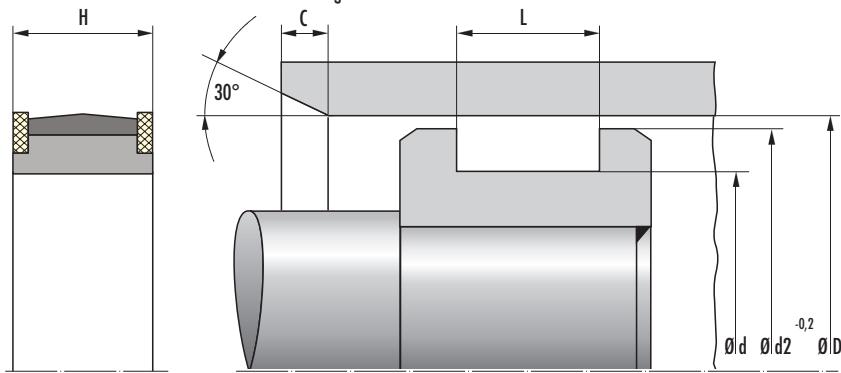
Nominal diameter D	D	d	d2
40 – 200	H8	h9	h11

Fitting

The careful fitting is a prerequisite for the trouble-free seal function → Technical Manual.



All non-dimensioned edges rounded and burr-free



D	d	d2	Profile	H	L	C	Material	Article No.	
60	44	59.5	8.0	20.0	20.5	4	NBR B209	24174845	○
63	47	62.5	8.0	20.0	20.5	4	NBR B209	24070800	○
63	50	62.5	6.5	14.0	14.0	3	NBR B209	24237607	○
63	50	62.5	6.5	13.5	14.0	3	NBR B209	24093477	○
70	54	69.5	8.0	19.7	20.5	4	NBR B209	24144366	○
80	62	79.5	9.0	22.0	22.5	4	NBR B209	24067090	○
90	75	89.5	7.5	12.4	13.5	4	NBR B209	24064122	○
100	85	99.5	7.5	15.2	16.0	4	NBR B209	24133791	○
100	82	99.5	9.0	22.0	22.5	4	NBR B209	24132840	○
100	82	99.5	9.0	21.2	22.0	4	NBR B209	24248295	○
110	95	109.5	7.5	15.5	16.0	4	NBR B209	24096315	○
110	95	109.5	7.5	14.7	16.0	4	NBR B209	24073323	○
110	92	109.5	9.0	21.6	22.5	4	NBR B209	24124609	○
115	97	114.5	9.0	21.5	22.5	4	NBR B209	24135639	○
120	98	119.5	11.0	25.0	26.2	5	NBR B209	24248304	○
120	105	119.5	7.5	15.3	16.0	4	NBR B209	24126543	○
125	110	124.5	7.5	15.1	15.8	4	NBR B209	24070855	○
130	115	129.5	7.5	14.7	15.5	4	NBR B209	24122787	○
140	125	139.5	7.5	14.7	16.0	4	NBR B209	24070856	○
150	128	149.5	11.0	26.0	26.5	5	NBR B209	24346371	○
210	190	209.5	10.0	14.7	16.0	5	NBR B209	24110687	○
250	225	249.5	12.5	31.0	31.5	6	NBR B209	24067095	○
280	255	279.5	12.5	24.3	25.0	6	NBR B209	24070936	○

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

Merkel Wiper PU 5

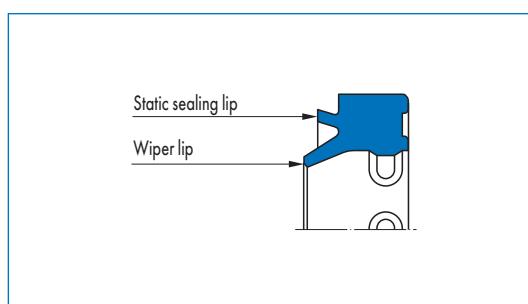


Fig. 1 Merkel Wiper PU 5

Product description

Dirt wiper with additional static sealing lip and bearing segments; sealing edge of wiper lip slightly rounded.

Product advantages

Single-acting wiper, use also in standardised housings according to ISO 6195 Type A

- Additional static sealing lip prevents ingress of dirt and water spray
- Wiper lip with slightly rounded sealing edge reliably wipes dirt away and leaves a residual oil film on the retracting rod; friction behaviour and service life are improved
- The support on the wiper heel prevents twisting in the groove as well as pressure build-up between wiper and seal.

Material

Material	Code	Hardness
Polyurethane	95 AU V149	95 Shore A

Operating conditions

Material 95 AU V149	
HFA fluids/water t in °C	+5 ... +50
Running speed v in m/s	2



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	*	*
Groove base	$\leq 1.6 \mu m$	$\leq 6.3 \mu m$
Side of groove	$\leq 3.0 \mu m$	$\leq 15.0 \mu m$

* Surface roughness of the sliding surface to suit the sealing component used.

Design notes

Please observe our general design notes in → Technical Manual.

Tolerance recommendation

Nominal $\varnothing d$	D	D_I
16 ... 200	H11	H11

The tolerance for the $\varnothing d$ is defined by the buffer seal.

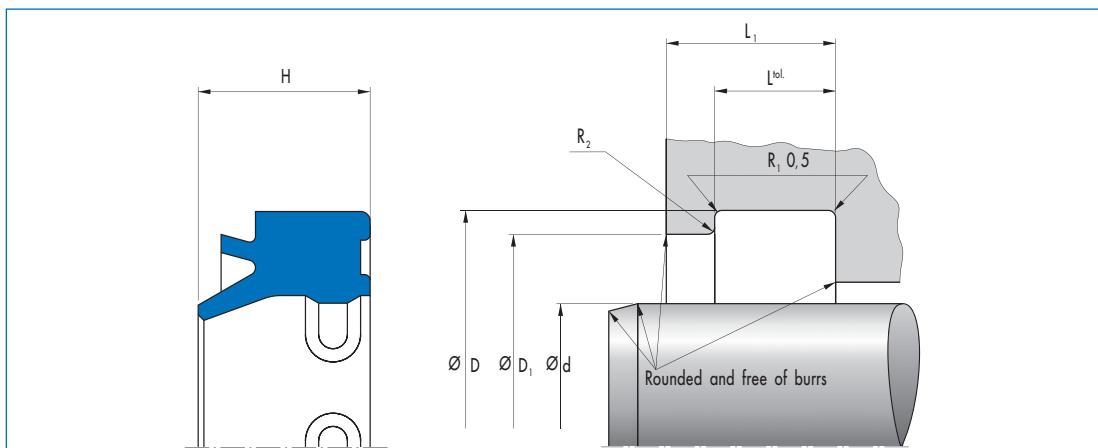
Lead-in chamfers

Length and angle are to be designed to suit the rod seal used.

Fitting & installation

Careful fitting is a prerequisite for the correct function of the Merkel Wiper PU 5. Generally, wipers can be quickly and easily fitted by deforming into a kidney shape → Technical Manual.

Merkel Wiper PU 5



d	D	D ₁	L	Tol. for L	L ₁	R ₁ max.	H	Profile	Installation space	Material	Article No.	
16	24	21.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24314500	●
16	24	22	4	0.2	5	0.3	7	4		95 AU V149	24314499	●
18	26	23.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24314502	○
18	26	24	4	0.2	5	0.3	7	4		95 AU V149	24314501	●
20	28	25.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24312946	●
20	28	26	4	0.2	5	0.3	7	4		95 AU V149	24314503	●
22	30	27.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24314506	○
22	30	28	4	0.2	5	0.3	7	4		95 AU V149	24314505	●
25	33	30.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24297872	●
25	33	31	4	0.2	5	0.3	7	4		95 AU V149	24314507	●
28	36	33.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24294374	○
28	36	34	4	0.2	5	0.3	7	4		95 AU V149	24314509	●
30	38	36	4	0.2	5	0.3	7	4		95 AU V149	24314511	●
32	40	37.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24288780	●
32	40	38	4	0.2	5	0.3	7	4		95 AU V149	24314512	●
35	43	41	4	0.2	5	0.3	7	4		95 AU V149	24314513	●
36	44	41.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24294375	●
36	44	42	4	0.2	5	0.3	7	4		95 AU V149	24314514	●
40	48	45.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24291068	●
40	48	46	4	0.2	5	0.3	7	4		95 AU V149	24311206	●
45	53	50.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24288781	●
45	53	51	4	0.2	5	0.3	7	4		95 AU V149	24310500	●
50	58	55.5	5	0.2	7	0.3	7.8	4	ISO	95 AU V149	24275192	●
50	58	55.5	5	0.2	7	0.3	7.8	4	ISO	92 AU 21100	49045956	●
50	58	56	4	0.2	5	0.3	7	4		95 AU V149	24311362	●
55	63	61	4	0.2	5	0.3	7	4		95 AU V149	24311363	●

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



d	D	D ₁	L	Tol. for L	L ₁	R _{L max.}	H	Profile	Installation space	Material	Article No.	
56	64	62	4	0.2	5	0.3	7	4		95 AU V149	24314518	●
56	66	63	6.3	0.2	8.3	0.4	9	5	ISO	95 AU V149	24289916	●
60	68	66	4	0.2	5	0.3	7	4		95 AU V149	24311364	●
60	70	67	6.3	0.2	8.3	0.4	6.3	5		95 AU V149	24275194	○
60	72	69	5.5	0.2	7	0.3	10	6		95 AU V149	24368032	○
63	71	69	4	0.2	5	0.3	7	4		95 AU V149	24311365	●
63	73	70	6.3	0.2	8.3	0.4	9	5	ISO	95 AU V149	24275195	●
65	73	71	4	0.2	5	0.3	7	4		95 AU V149	24314521	●
70	78	76	4	0.2	5	0.3	7	4		95 AU V149	24314522	●
70	80	77	6.3	0.2	8.3	0.4	9	5	ISO	95 AU V149	24288253	●
70	82	79	5.5	0.2	7	0.3	10	6		95 AU V149	24368033	○
75	83	81	4	0.2	5	0.3	7	4		95 AU V149	24314523	●
80	88	86	4	0.2	5	0.3	7	4		95 AU V149	24314524	●
80	90	87	6.3	0.2	8.3	0.4	9	5	ISO	95 AU V149	24288782	●
80	92	89	5.5	0.2	7	0.3	10	6		95 AU V149	24368034	○
85	93	91	4	0.2	5	0.3	7	4		95 AU V149	24314525	●
85	95	92	6.3	0.2	8.3	0.4	9	5		95 AU V149	49005211	●
90	98	96	4	0.2	5	0.3	7	4		95 AU V149	24314526	●
90	100	97	6.3	0.2	8.3	0.4	9	5	ISO	95 AU V149	24275179	●
90	102	99	5.5	0.2	7	0.3	10	6		95 AU V149	24368035	○
100	108	106	4	0.2	5	0.3	7	4		95 AU V149	24314527	●
100	115	110	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24275180	●
110	122	119	5.5	0.2	7	0.3	10	6		95 AU V149	24314528	●
110	125	120	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24265869	●
115	127	124	5.5	0.2	7	0.3	10	6		95 AU V149	24314529	○
120	132	129	5.5	0.2	7	0.3	10	6		95 AU V149	24314530	●
125	137	134	5.5	0.2	7	0.3	10	6		95 AU V149	24314531	●
125	140	135	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24289918	●
130	142	139	5.5	0.2	7	0.3	10	6		95 AU V149	24314532	○
140	152	149	5.5	0.2	7	0.3	10	6		95 AU V149	24314534	●
140	155	150	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24289919	●
150	162	159	5.5	0.2	7	0.3	10	6		95 AU V149	24314535	●
160	172	169	5.5	0.2	7	0.3	10	6		95 AU V149	24314536	●
160	175	170	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24289920	●
170	182	179	5.5	0.2	7	0.3	10	6		95 AU V149	24314538	○
180	192	189	5.5	0.2	7	0.3	10	6		95 AU V149	24314539	●
180	195	190	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24294376	○
200	212	209	5.5	0.2	7	0.3	10	6		95 AU V149	24314541	●
200	215	210	9.5	0.3	12	0.6	13	7.5	ISO	95 AU V149	24294377	●

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

Merkel Wiper PU 6/PH 6

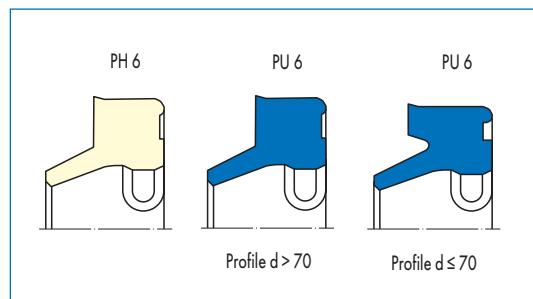


Fig. 1 Merkel Wiper PU 6

Product description

Single-acting PUR wiper with static sealing edge on the outside diameter.

Product advantages

Dirt wiper with bearing segments on the heel of the wiper and lightly rounded wiper lip

- No ingress of dirt and water spray via outside diameter
- Reliably wipes away dirt
- Leaves a residual film of oil on retracting rod
- No twisting and pressure build-up between seal and wiper
- Highly wear-resistant.

Material

Material	Code	Hardness
Polyurethane	95 AU V149	95 Shore A
Hytrel	97 TPE TP 113	

Operating conditions

Material 95 AU V149	
HFA fluids/water t in °C	+5 ... +50
Running speed v in m/s	2



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	*	*
Groove base	$\leq 1.6 \mu m$	$\leq 6.3 \mu m$
Side of groove	$\leq 3.0 \mu m$	$\leq 15.0 \mu m$

* Surface roughness of the sliding surface to suit the sealing component used.

Design notes

Please observe our general design notes in → Technical Manual.

Tolerance recommendation

Nominal Ø d	D	D _i
12 ... 200	H10	H11

The tolerance for the Ø d is defined by the buffer seal.

Lead-in chamfers

Length and angle are to be designed to suit the rod seal used.

Fitting & installation

Careful fitting is a prerequisite for the correct function of the Merkel Wiper PU 6. Generally, wipers can be quickly and easily fitted by deforming into a kidney shape → Technical Manual.

Merkel Wiper PU 6/PH 6

d	D	H	Profile	L	D1	R2	Material Wiper PU 6	Article No. Wiper PU 6	Material Wiper PH 6	Article No. Wiper PH 6
50.0	58.6	6.5	4.3	5.3	53	1.0	95 AU V149	24375907	●	—
50.0	60.6	6.5	5.3	5.3	53	1.0	95 AU V149	24004835	●	97 TPE TP113 upon request
55.0	65.6	7.0	5.3	5.3	58	1.0	95 AU V149	24004846	●	—
56.0	64.6	6.5	4.3	5.3	59	1.0	95 AU V149	24375908	●	—
56.0	66.6	7.0	5.3	5.3	59	1.0	95 AU V149	24004849	●	97 TPE TP113 upon request
60.0	70.6	7.0	5.3	5.3	63	1.0	95 AU V149	24004853	○	97 TPE TP113 24357001
60.0	72.0	13.0	6.0	8.2	66	1.0	95 AU V149	24004854	○	—
60.0	68.6	6.5	4.3	5.3	63	1.0	95 AU V149	24375909	●	97 TPE TP113 upon request
63.0	73.6	7.0	5.3	5.3	66	1.0	95 AU V149	24004859	●	97 TPE TP113 upon request
65.0	75.6	7.0	5.3	5.3	68	1.0	95 AU V149	24004869	●	97 TPE TP113 upon request
70.0	78.6	6.5	4.3	5.3	73	1.0	95 AU V149	24375910	●	97 TPE TP113 upon request
70.0	80.6	7.0	5.3	5.3	73	1.0	95 AU V149	24004881	●	97 TPE TP113 upon request
72.0	80.6	6.2	4.3	5.3	74	1.0	95 AU V149	24004886	○	—
75.0	87.2	12.0	6.1	7.2	81	1.0	95 AU V149	24004892	●	97 TPE TP113 upon request
80.0	92.2	12.0	6.1	7.2	86	1.0	95 AU V149	24004909	●	97 TPE TP113 24354925
85.0	97.2	12.0	6.1	7.2	91	1.0	95 AU V149	24004917	●	97 TPE TP113 upon request
87.0	95.0	6.5	4.0	5.3	90	1.0	95 AU V149	24004920	○	—
90.0	110.0	16.0	10	10.2	99	1.5	95 AU V149	24004929	○	—
90.0	102.2	12.0	6.1	7.2	96	1.0	95 AU V149	24004928	●	97 TPE TP113 upon request
100.0	112.2	12.0	6.1	7.2	106	1.0	95 AU V149	24004944	●	97 TPE TP113 upon request
105.0	117.2	12.0	6.1	7.2	111	1.0	95 AU V149	24004956	○	—
110.0	122.2	12.0	6.1	7.2	116	1.0	95 AU V149	24004961	●	97 TPE TP113 upon request
115.0	123.6	7.2	4.3	5.3	118	1.0	95 AU V149	24367647	○	—
115.0	130.0	15.9	7.5	10.2	122.5	1.5	95 AU V149	24004969	○	—
115.0	127.2	12.0	6.1	7.2	121	1.0	95 AU V149	24004968	●	97 TPE TP113 upon request
116.0	124.6	7.0	4.3	5.3	119	1.0	95 AU V149	24004970	○	—
118.0	126.6	7.0	4.3	5.3	121	1.0	95 AU V149	24004972	○	—
120.0	132.2	12.0	6.1	7.2	126	1.0	95 AU V149	24004975	●	97 TPE TP113 upon request
120.0	130.6	7.0	5.3	5.3	125.0	1.0	95 AU V149	24379709	○	—
125.0	140.0	16.0	7.5	10.2	132.6	1.5	95 AU V149	24004981	●	97 TPE TP113 upon request

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



d	D	H	Profile	L	D1	R2	Material Wiper PU 6	Article No. Wiper PU 6		Material Wiper PH 6	Article No. Wiper PH 6	
135.0	143.6	7.0	5.3	5.3	138.0	1.0	95 AU V149	24360299	○	-	-	-
136.0	146.0	9.7	5.0	7.2	143.0	1.0	95 AU V149	24079067	○	-	-	-
140.0	155.0	16.0	7.5	10.2	147.6	1.5	95 AU V149	24005002	●	97 TPE TP113	upon request	○
142.0	151.0	6.5	4.5	5.3	145.0	1.0	95 AU V149	24359406	○	-	-	-
150.0	162.2	12.0	6.1	7.2	156.0	1.0	95 AU V149	24368329	○	-	-	-
150.0	165.0	16.0	7.5	10.2	157.6	1.5	95 AU V149	24005013	●	97 TPE TP113	upon request	○
155.0	170.0	16.0	7.5	10.2	167.6	1.5	95 AU V149	24073871	○	-	-	-
155.0	175.0	18.0	10.0	10.2	165.0	3.0	95 AU V149	24005020	○	-	-	-
160.0	174.0	12.0	7.0	7.7	167.0	1.0	95 AU V149	24005024	○	-	-	-
160.0	175.0	16.0	7.1	10.2	167.6	1.5	95 AU V149	24005025	●	97 TPE TP113	upon request	○
160.0	175.0	12.0	7.1	8.2	167.6	1.5	95 AU V149	24093970	○	-	-	-
165.0	173.6	7.0	4.3	5.3	168.0	1.0	95 AU V149	24360226	○	-	-	-
168.0	182.2	12.0	7.1	7.3	176.0	1.5	95 AU V149	24362614	○	-	-	-
170.0	180.6	7.0	5.3	5.3	174.0	1.5	95 AU V149	24345261	○	-	-	-
175.0	190.0	16.0	7.5	10.2	182.0	1.5	95 AU V149	24375859	○	-	-	-
180.0	200.0	18.0	10.0	10.2	190.0	3.0	95 AU V149	24005039	●	97 TPE TP113	24374890	○
185.0	200.0	16.0	7.5	10.2	193.0	1.5	95 AU V149	24360729	○	-	-	-
185.5	205.5	18.0	10.	10.2	210.0	3.0	95 AU V149	upon request	○	97 TPE TP113	24373691	●
190.0	210.0	18.0	10.0	10.2	200.0	3.0	95 AU V149	24005044	●	97 TPE TP113	upon request	○
190.0	198.6	7.0	4.3	5.3	193.0	1.5	95 AU V149	24005043	○	-	-	-
200.0	220.0	18.0	10.0	10.2	210.0	3.0	95 AU V149	24005050	●	97 TPE TP113	24374889	○
205.0	213.6	7.0	4.3	5.3	208.0	1.0	95 AU V149	24362502	○	-	-	-
225.0	245.0	18.0	10.0	10.2	235.0	3.0	95 AU V149	24372677	○	-	-	-
230.0	245.0	16.0	7.5	10.2	237.6	1.5	95 AU V149	24266428	○	-	-	-
235.0	255.0	18.0	10.0	10.2	245.0	3.0	95 AU V149	24377298	○	-	-	-
240.0	260.0	18.0	10.0	10.2	250.0	3.0	95 AU V149	upon request	○	97 TPE TP113	24373692	●
265.0	285.0	18.0	10.0	10.2	275.0	3.0	95 AU V149	24265368	○	-	-	-
270.0	290.0	18.0	10.0	10.2	280.0	3.0	95 AU V149	24361220	○	97 TPE TP113	24373693	●
280.0	300.0	18.0	10.0	10.2	290.0	3.0	95 AU V149	24299202	○	-	-	-
300.0	325.0	17.3	12.5	11.7	311.0	3.0	95 AU V149	24005286	○	-	-	-
301.6	321.6	18.0	10.0	10.2	311.6	3.0	95 AU V149	24378192	○	-	-	-
320.0	345.0	20.0	12.5	12.7	332.6	3.0	95 AU V149	24360728	○	-	-	-
340.0	348.6	6.5	4.3	5.3	343.0	1.0	95 AU V149	24005114	○	-	-	-
345.0	365.0	18.0	10.0	10.2	355.0	3.0	95 AU V149	24105653	○	-	-	-
360.0	385.0	20.0	12.5	12.7	372.6	3.0	95 AU V149	24246943	○	-	-	-
365.0	390.0	20.0	12.5	12.7	377.6	3.0	95 AU V149	24023584	○	-	-	-
380.0	410.0	22.6	15.	15.2	395.0	3.0	95 AU V149	24360324	○	-	-	-
381.0	401.0	16.0	10.0	10.2	391.0	1.5	95 AU V149	24005125	○	-	-	-
384.0	404.0	16.0	10.0	10.2	394.0	1.5	95 AU V149	24005126	○	-	-	-
390.0	414.0	15.6	12.0	8.2	402.0	3.0	95 AU V149	24005128	○	-	-	-
400.0	420.0	18.0	10.0	10.2	410.0	4.0	95 AU V149	24353968	○	-	-	-
400.0	412.0	12.0	6.0	7.2	406.0	1.0	95 AU V149	24174775	○	-	-	-

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

Merkel Guide Ring SB

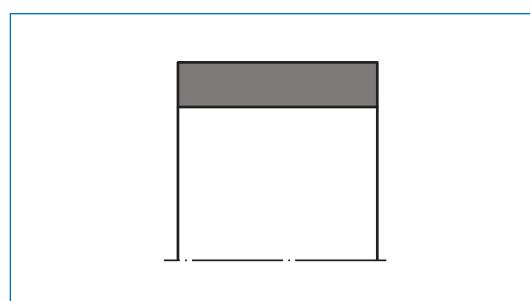


Fig. 1 Merkel Guide Ring SB

Material

Slotted Ring ≤ 300

Material	Code
Fabric-base laminate	HGW HG517

Ready to fit strip cut to size > 300

Material	Code
Fabric-base laminate	HGW HG600

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 ($d \leq 300$).

Operating conditions

Material HGW HG517/HGW HG600	
HFA fluids/water t in °C	+5 ... +60



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.05 ... 0.3 μm	$\leq 2.5 \mu\text{m}$
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 $M_c > 50\%$ 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_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.

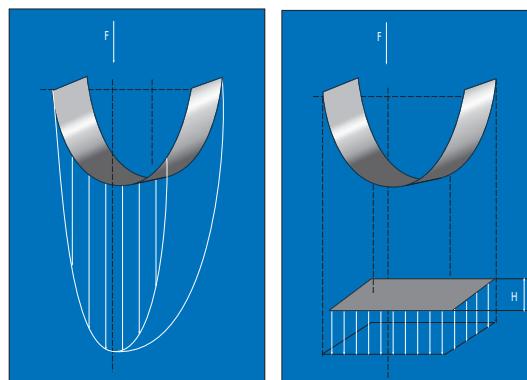
Manufacturing tolerance

Profile thickness S
-0.02 ... -0.08

Surface load

Profile thickness S
$p < 50 \text{ N/mm}^2$ up to 60°C
$p < 25 \text{ N/mm}^2$ 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]

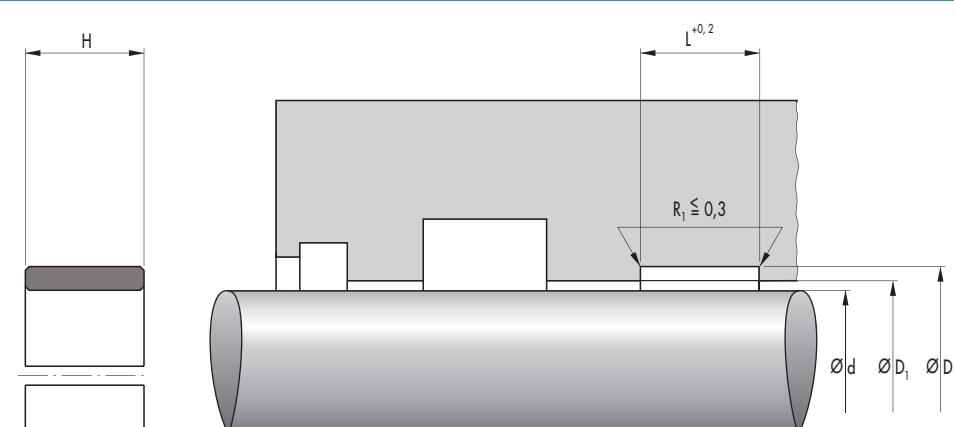
F = radial load [N]

A = projected area [mm^2]

P = perm. compression per unit area [N/mm^2]

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

Merkel Guide Ring SB



d	D _f	D _i	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	●

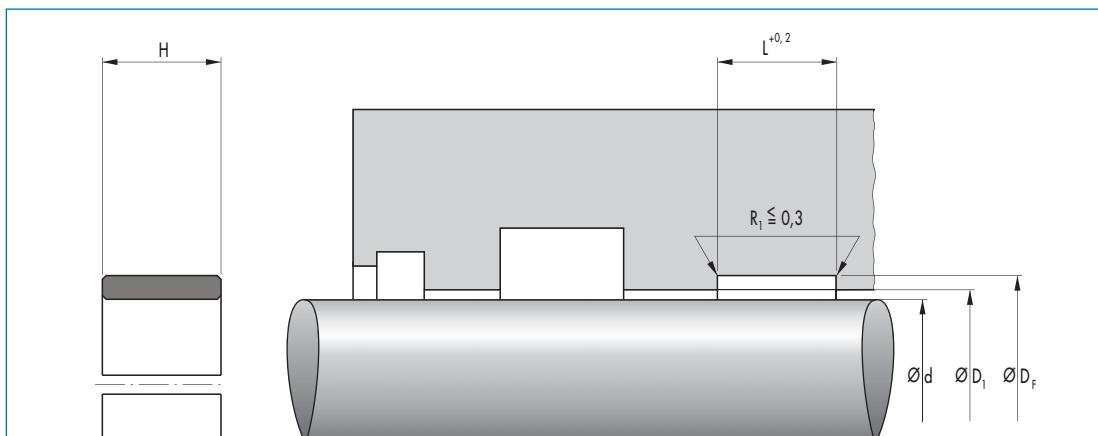
● Available from stock ○ On request: Tool is available, delivery at short notice



d	D _f	D _i	H	L	Profile	Material	Article No.	
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	●
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	○
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	●

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

Merkel Guide Ring SB



The technical drawing illustrates the cross-section and side view of the Merkel Guide Ring SB. Key dimensions labeled include: height H, length L with a tolerance of $L^{+0,2}$, inner radius $R_i \leq 0,3$, outer diameter $\emptyset d$, inner diameter $\emptyset D_i$, and front diameter $\emptyset D_f$. A small inset shows a top-down view of the ring's profile.

d	D_f	D_i	H	L	Profile	Material	Article No.	
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	○

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



d	D _f	D _i	H	L	Profile	Material	Article No.	
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	○

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Merkel Guide Ring KB

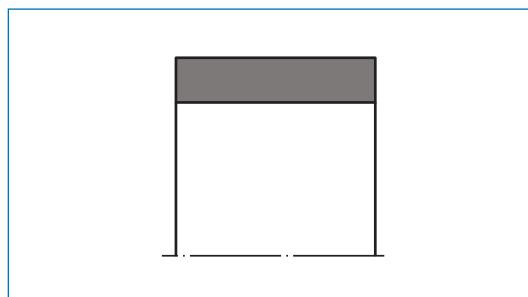


Fig. 1 Merkel Guide Ring KB

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 ($d \leq 300$).

Material

Slotted Ring ≤ 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	
HFA fluids/water t in °C	+5 ... +60

Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.05 ... 0.3 μm	$\leq 2.5 \mu\text{m}$
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 $M_c > 50\%$ up to max. 90% at cutting depth $c = R_z/2$ and reference line C ref = 0%.

Design notes

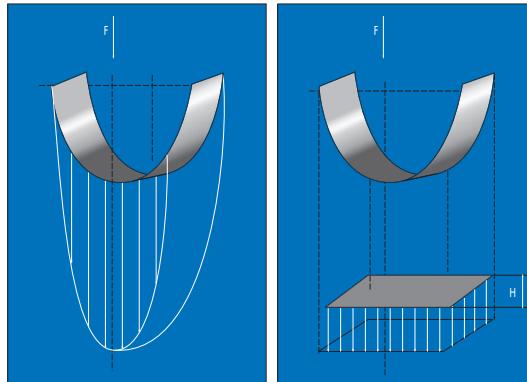
Please observe our general design notes in
→ Technical Manual.



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
$p < 50 \text{ N/mm}^2$ up to 60°C
$p < 25 \text{ N/mm}^2$ up to 100°C

$p < 50 \text{ N/mm}^2$ up to 60°C
$p < 25 \text{ N/mm}^2$ up to 100°C

For running speed, see sealing system.

$$F = P \times A$$

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

H = guide strip width [mm]

F = radial load [N]

A = projected area [mm^2]

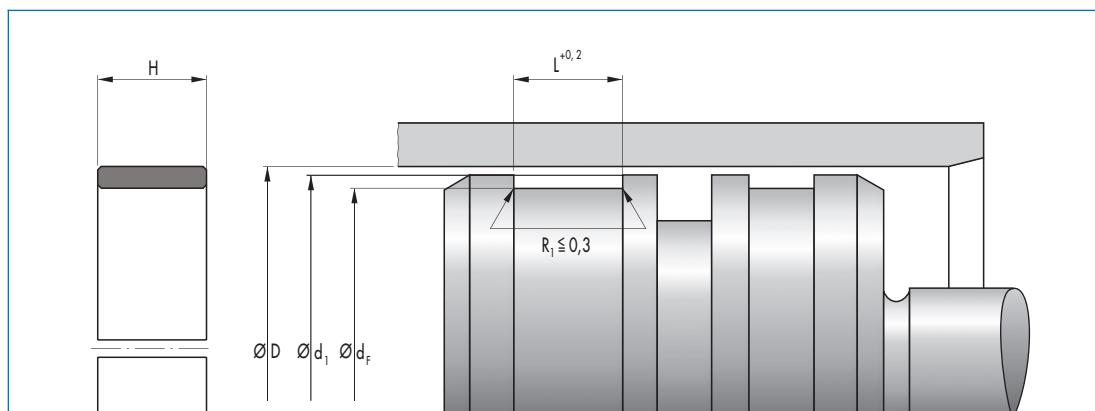
P = perm. compression per unit area [N/mm^2]

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

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.

Merkel Guide Ring KB



D	d _f	d _l	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	○

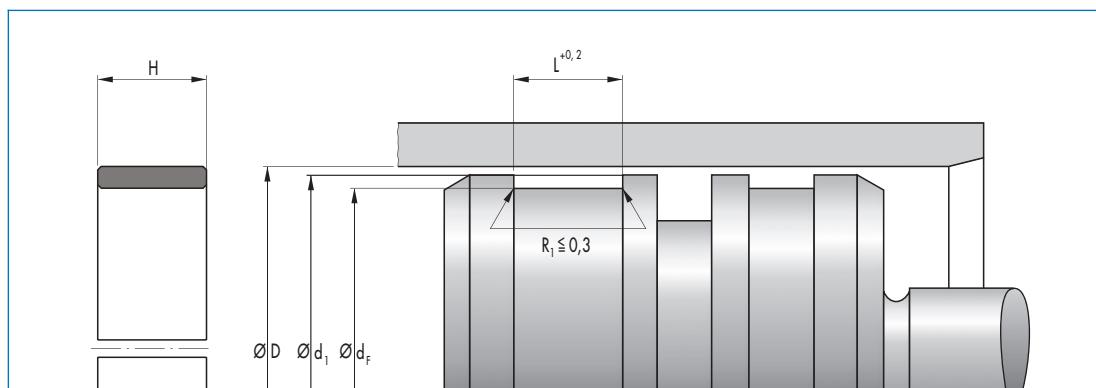
● Available from stock ○ On request: Tool is available, delivery at short notice



D	d _f	d _i	L	H	Profile	Material	Article No.	
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	○
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	○

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Merkel Guide Ring KB



D	d _f	d _i	L	H	Profile	Material	Article No.	
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	○
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	○

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



D	d _f	d _i	L	H	Profile	Material	Article No.	
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	○
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	○

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

Merkel Guide Ring Guivex SBK

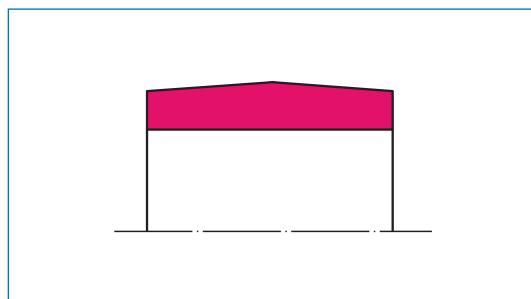


Fig. 1 Merkel Guide Ring Guivex SBK

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).

Material

\varnothing range ≤ 300

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

\varnothing range > 300

Material	Code	Colour
Fabric-base laminate	HGW HG600	Red

Operating conditions

Material HGW HG517/HGW HG650	
HFA fluids/water t in °C	+5 ... +60

Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.05 ... 0.3 μm	$\leq 2.5 \mu\text{m}$
Groove base	$\leq 1.6 \mu\text{m}$	$\leq 6.3 \mu\text{m}$
Groove flanks	$\leq 3.0 \mu\text{m}$	$\leq 15.0 \mu\text{m}$

Percentage contact area $M_c > 50\%$ to max. 90% at cutting depth $c = R_z/2$ 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 counteracting 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 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_{pkx}	<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_{vxx}	>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

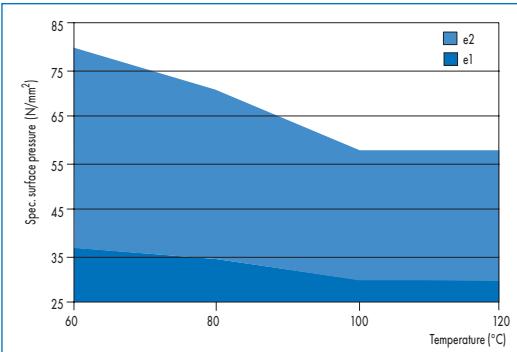
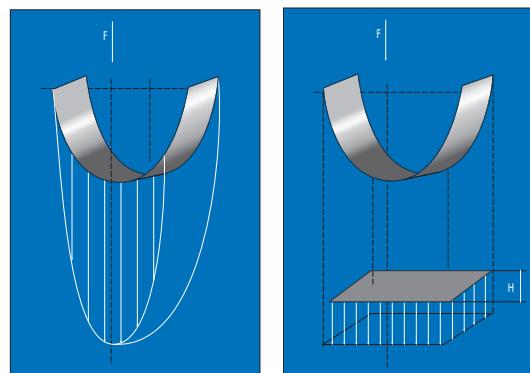


Fig. 2 Special surface pressure for parallel load

Merkel Guide Ring Guivex SBK

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^2]

P = perm. compression per unit area [N/mm^2]

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

Mode of operation

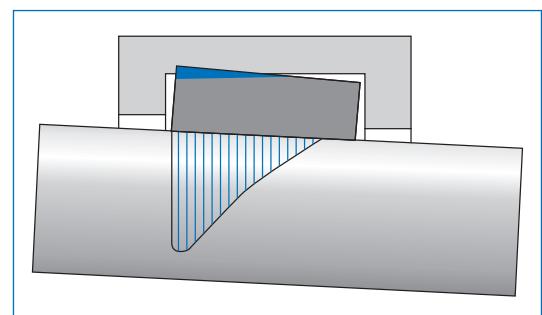


Fig. 3 Rectangular guide ring:
stress peaks in the edge area

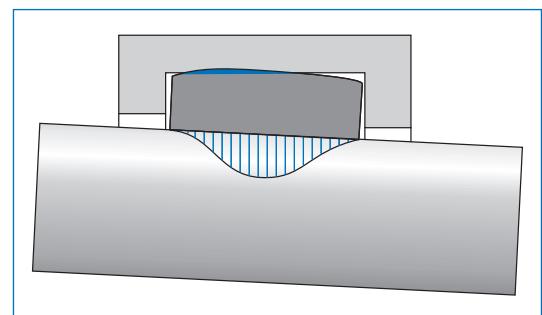
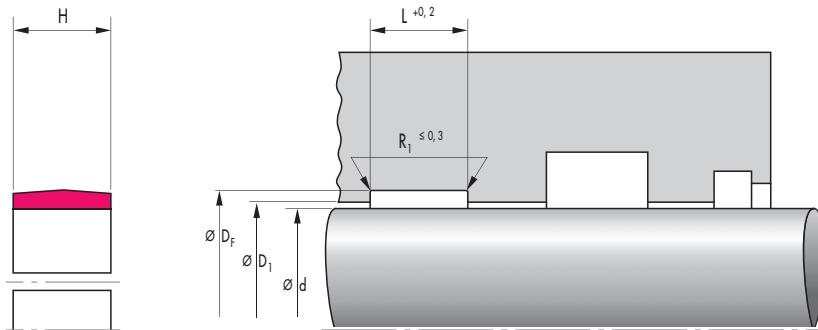


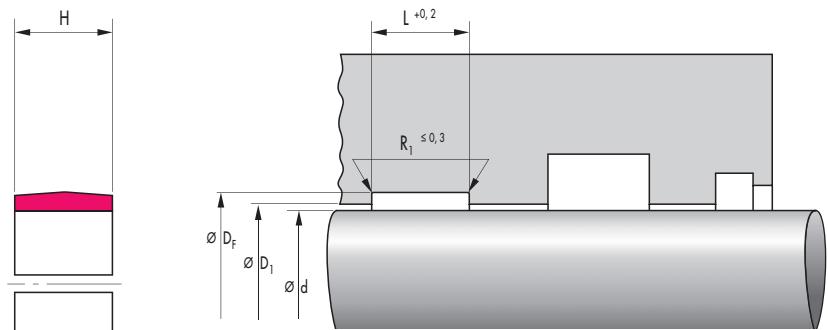
Fig. 4 Merkel Guide Ring Guivex SBK:
even distribution of stress



d	D _f	D _i	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	●

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

Merkel Guide Ring Guivex SBK



d	D _f	D _i	H	L	Profile	Material	Article No.	
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	○
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	●

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



d	D _f	D _i	H	L	Profile	Material	Article No.	
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	○
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	○

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

Merkel Guide Ring Guivex KBK

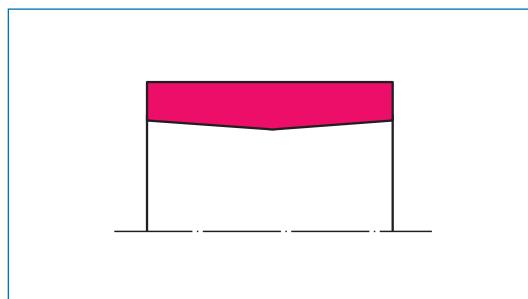


Fig. 1 Merkel Guide Ring Guivex KBK

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).

Material

\varnothing range ≤ 300

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

\varnothing range >300

Material	Code	Colour
Fabric-base laminate	HGW HG600	Red

Operating conditions

Material HGW HG517/HGW HG650	
HFA fluids/water t in °C	+5 ... +60

Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.05 ... 0.3 μm	$\leq 2.5 \mu\text{m}$
Groove base	$\leq 1.6 \mu\text{m}$	$\leq 6.3 \mu\text{m}$
Groove flanks	$\leq 3.0 \mu\text{m}$	$\leq 15.0 \mu\text{m}$

Percentage contact area $M_c > 50\%$ to max. 90% at cutting depth $c = R_z/2$ 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 counteracting 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_{pkx}	<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_{vxx}	>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 $s = 4.0$

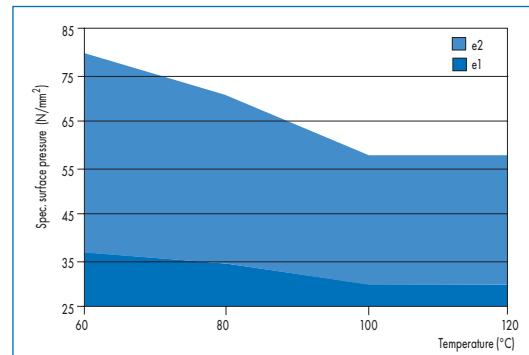
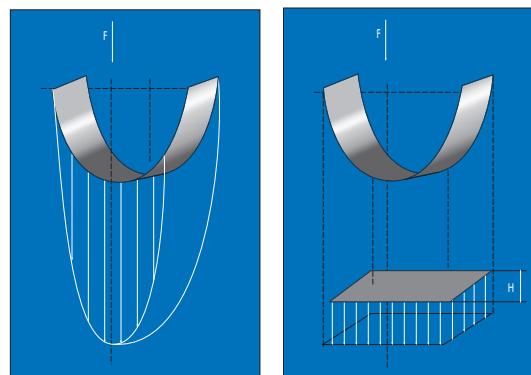


Fig. 2 Special surface pressure for parallel load

Merkel Guide Ring Guivex KBK

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^2]

P = perm. compression per unit area [N/mm^2]

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

Mode of operation

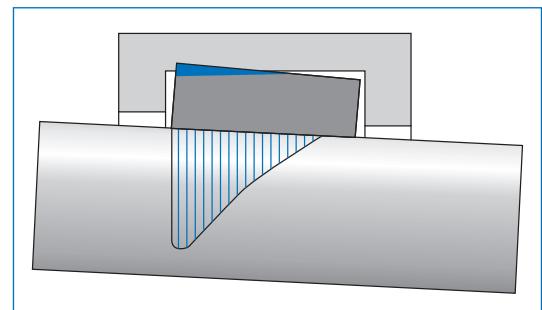


Fig. 3 Rectangular guide ring:
stress peaks in the edge area

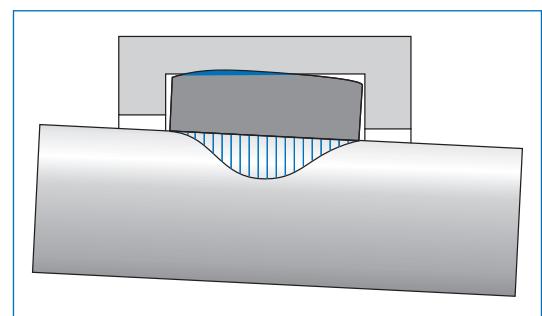
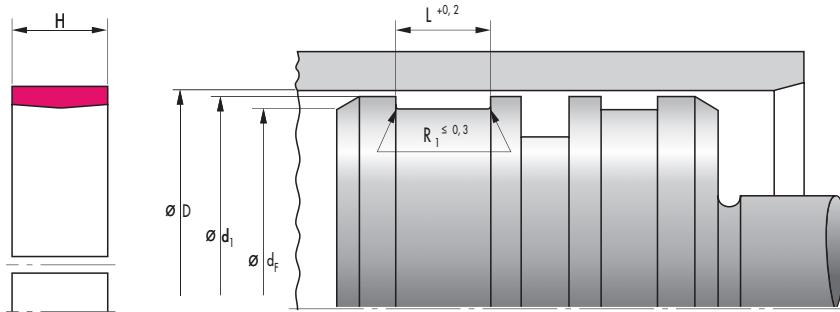


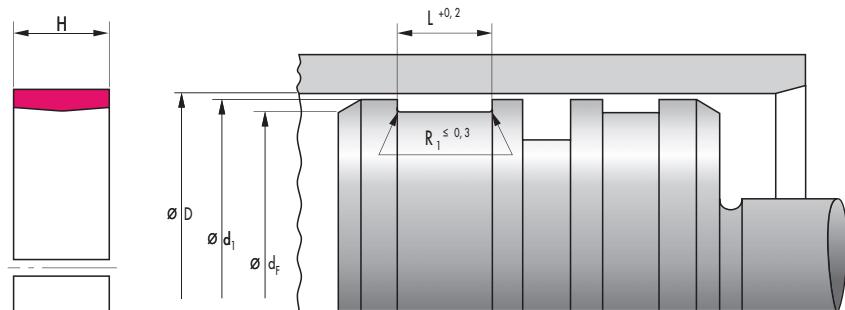
Fig. 4 Merkel Guide Ring Guivex SBK:
even distribution of stress



D	d _f	d _i	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	●

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

Merkel Guide Ring Guivex KBK



D	d_f	d_i	L	H	Profile	Material	Article No.	
140	135	138.4	20	19.8	2.5	HGW HG517	24380281	○
140	135	138.4	25	24.5	2.5	HGW HG517	528117	○
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	○

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



D	d _f	d _i	L	H	Profile	Material	Article No.	
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	●
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	○

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

Merkel Cover Seal PU 82

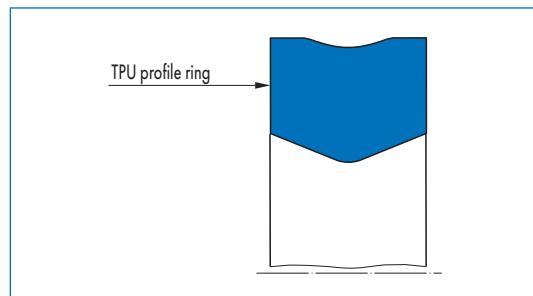


Fig. 1 Merkel Cover Seal PU 82

Application

- Higher operating pressure (up to 60 MPa)
- Gap for breathing (pipe expansion)
- Short rate of increase of the pressure (end position damping)
- Alternating in situ operating pressure
- Nominal diameter up to 2000 mm.

Material

Material	Code
Polyurethane	95 AU V142/94 AU 925

Product description

Single-piece, double-acting compact seal made from TPU for static sealing, inner sealing.

Product advantages

- Interchangeable for O-ring housings and O-ring with back-up ring
- High reliability
- Simple and secure installation
- Simplified stockkeeping
- Gas proofness.

Operating conditions

Material 95 V142/94 AU 925	
HFA fluids/water t in °C	+5 ... +50
Pressure p in MPa	60

The specified values are maximum values and must not be applied simultaneously.



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.8 μm	3.2 μm
Groove base	1.6 μm	6.3 μm
Groove flanks	6.3 μm	20 μm
Lead-in chamfer*	0.8 μm	3.2 μm

* burr-free transition

Design notes

Please observe our general design notes in → Technical Manual.

Tolerance recommendation

For pressures up to 60 MPa

Nominal $\varnothing d$	Borehole	Shaft
≤ 800	H7	f7
> 800	+0.0 +0.1	-0.05 -0.15

Fitting & installation

Careful fitting is a prerequisite for the correct function of the seal → Technical Manual.

Mode of operation

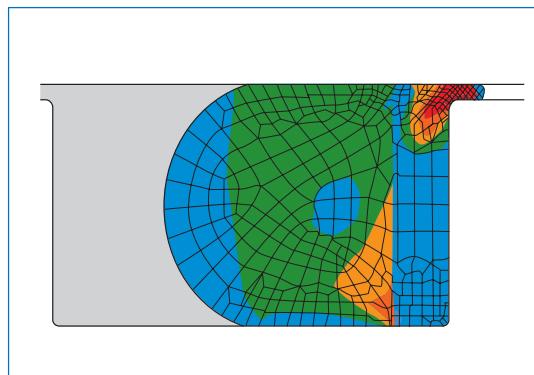


Fig. 2 O-ring with PTFE back-up ring at 40 MPa operating pressure

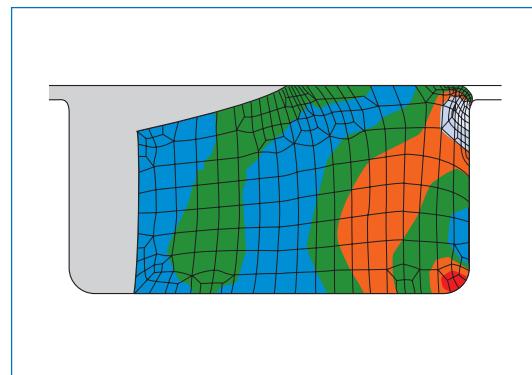
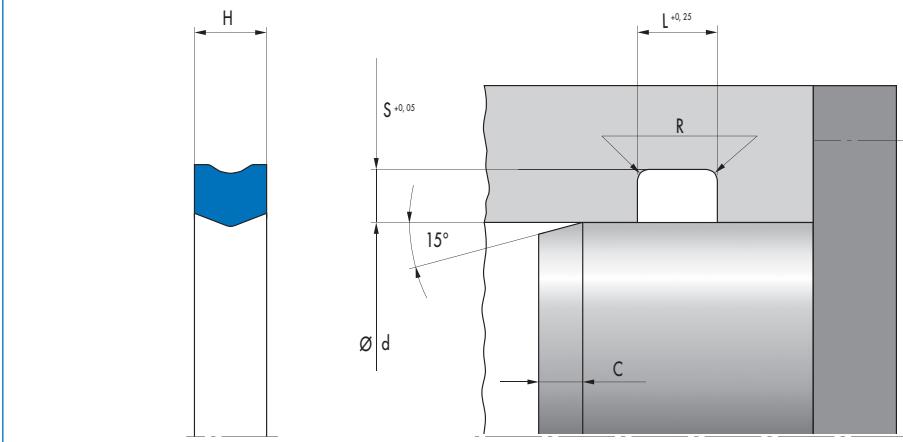


Fig. 3 Cover Seal at 40 MPa operating pressure

Merkel Cover Seal PU 82



d	D	Profile	H	L	C	ISC O-Ring	Material	Article No.	
16	21	2.5	4.2	5	3	3	95 AU V142	24359080	●
16	22	3	4.3	5	3		95 AU V142	24287685	○
20	24	2	4.1	4.8	2.5	2.5	95 AU V142	49000714	○
25	29.2	2.1	4.1	5	3	2.62	95 AU V142	49014546	○
25	33	4	5.7	6.5	3.5		95 AU V142	24377325	○
30	34	2	4.1	4.8	2.5	2.5	95 AU V142	49000656	○
35	39.5	2.25	3.8	4.5	3	2.62	95 AU V142	24361201	○
40	46	3	2.4	3	3		95 AU V142	24354007	○
50	58	4	5.6	6.4	3.5		95 AU V142	24362417	○
55	60.4	2.7	5.3	6.2	3		95 AU V142	49000660	○
60	65.5	2.8	4.5	5.2	3		95 AU V142	24368756	●
70	75.6	2.8	5.3	6.2	3	3.53	95 AU V142	49004012	○
80	90	5	9.2	10.5	4.5		95 AU V142	49000500	○
90	110	10	10.8	12.3	8		95 AU V142	49018307	○
105	112.8	3.9	5	5.8	3.5		95 AU V142	24354748	○
110	117	3.5	4	4.7	3		95 AU V142	24367583	○

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



d	D	Profile	H	I	C	ISC O-Ring	Material	Article No.	
117	123.1	3.05	4.9	5.8	3.5		93 AU V142	24245387	○
120	140	10	10.8	12.3	8		95 AU V142	49018308	○
136	141.9	2.95	4.9	5.8	3.5		95 AU V142	24250882	○
140	145.9	2.95	4.9	5.8	3.5		95 AU V142	49009024	○
149.7	165.5	7.9	11.1	12.7	6.5		95 AU V142	49006190	○
160	168.6	4.3	7.8	9	4	5.33	95 AU V142	24370625	○
170	176.3	3.15	4.9	5.8	3.5		95 AU V142	24250879	○
180	188.6	4.3	7.8	9	4	5.33	95 AU V142	49002910	○
190	201.6	5.8	10.7	12.3	5		94 AU 925	49003461	○
200	208.6	4.3	7.8	9	4		95 AU V142	533208	○
210	221.6	5.8	10.7	12.3	5	6.99	94 AU 925	24379224	○
250	258.6	4.3	7.8	9	4		95 AU V142	49004491	○
270	278.6	4.3	7.8	9	4		94 AU 925	49016834	○
275	286.6	5.8	10.7	12.3	5		94 AU 925	529839	○
280	320	20	17.9	20	15		94 AU 925	49009097	○
300	311.6	5.8	10.7	12.3	5		95 AU V142	49006854	○
320	333.4	6.7	8.6	10	6		95 AU V142	24369684	○
330	341.6	5.8	10.7	12.3	5		94 AU 925	532554	○
360	371.6	5.8	10.7	12.3	5		94 AU 925	49005757	○
400	411.6	5.8	10.7	12.3	5		94 AU 925	49014554	○
440	451.6	5.8	10.7	12.3	5		94 AU 925	531798	○
540	553.4	6.7	9.3	10.8	6		94 AU 925	49001311	○
790	803.6	6.8	9.2	10.7	6		94 AU 925	527748	○
840	853.6	6.8	9.2	10.7	6		94 AU 925	527749	○
1120	1137	8.5	14.4	16.3	7		94 AU 925	533599	○
1155	1177.4	11.2	12.4	14	9		94 AU 925	24371571	○
1320	1337	8.5	14.4	16.3	7	10	94 AU 925	49001112	○

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

Merkel Cover Seal PU 83

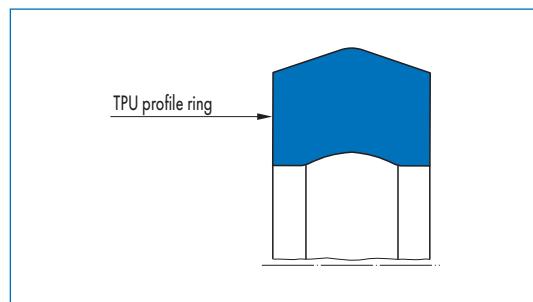


Fig. 1 Merkel Cover Seal PU 83

Product description

Single-piece, double-acting Merkel compact seal made from low temperature polyurethane for static sealing, outer sealing.

Product advantages

- Interchangeable for O-ring housings and O-ring with back-up ring
- High reliability
- Simple and secure installation
- Simplified stockkeeping
- Gas-proof height.

Application

- Higher operating pressure (up to 60 MPa)
- Gap for breathing (pipe expansion)
- Short rate of increase of the pressure (end position damping)
- Alternating in situ operating pressure
- Nominal diameter up to 2000 mm.

Material

Material	Code
Polyurethane	95 AU V142/94 AU 925

Operating conditions

Material 95 V142/94 AU 925	
HFA fluids/water t in °C	+5 ... +50
Pressure p in MPa	60

The specified values are maximum values and must not be applied simultaneously.



Surface quality

Surface roughness	R_a	R_{max}
Sliding surface	0.8 µm	3.2 µm
Groove base	1.6 µm	6.3 µm
Groove flanks	6.3 µm	20.0 µm
Lead-in chamfer*	0.8 µm	3.2 µm

* burr-free transition

Design notes

Please observe our general design notes in → Technical Manual.

Tolerance recommendation

For pressures up to 60 MPa

Nominal Ø D	Borehole	Shaft
≤800	H7	f7
>800	+0.0 +0.1	-0.05 -0.15

Fitting & installation

Careful fitting is a prerequisite for the correct function of the seal. → Technical Manual.

Mode of operation

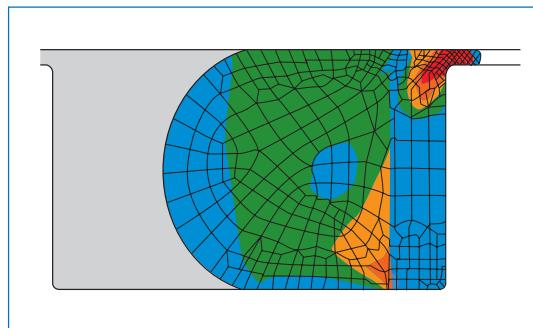


Fig. 2 O-ring with PTFE back-up ring at 40 MPa operating pressure

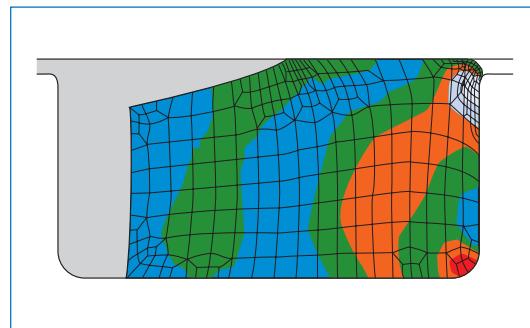


Fig. 3 Cover Seal at 40 MPa operating pressure

Merkel Cover Seal PU 83

d	D	Profile	H	L	C	ISCC O-Ring	Material	Article No.	
32.8	40	3.6	2.8	3.4	3		95 AU V142	24367566	●
42.2	50	3.9	5	5.8	3.5		95 AU V142	24334142	●
44.4	50	2.8	5.3	6.2	3.5	3.53	95 AU V142	532203	●
52.2	60	3.9	5	5.8	3.5		95 AU V142	24327617	●
54	60	3	5.3	6.2	3.5		95 AU V142	49001027	○
54.6	60	2.7	5.5	6.5	3.5		95 AU V142	24380802	●
57.2	65	3.9	5	5.8	3.5		95 AU V142	24327636	●
64.4	70	2.8	5.2	6.2	3.5	3.53	95 AU V142	532201	○
69.6	75	2.7	5.5	6.5	3.5		95 AU V142	24380803	●
73.2	81	3.9	5	5.8	3.5		95 AU V142	24295885	●
80.8	85	2.1	4.2	5	2.5	2.62	95 AU V142	24269861	○
80.1	90	5	6.7	7.8	4		95 AU V142	24362668	●
86.4	95	4.3	7.8	9	4	5.33	94 AU 925	49018330	○
87.7	95.5	3.9	5	5.8	3.5		95 AU V142	24293063	○
90	100	5	7.3	7.8	4		95 AU V142	24362292	●
91.4	100	4.3	7.8	9	4	5.33	95 AU V142	24379356	○
94.4	100	2.8	5.2	6.2	3.5	3.53	95 AU V142	532202	○
95.1	105	5	6.7	7.8	4		95 AU V142	24359847	●
101.4	110	4.3	7.8	9	4	5.33	95 AU V142	24380871	○
105.1	115	5	6.7	7.8	4		95 AU V142	24355287	●
115.6	122	3.2	5.7	6.8	4	4	95 AU V142	49001025	○
115.1	125	5	6.7	7.8	4		95 AU V142	24355288	●
116.4	125	4.3	7.8	9	4	5.33	95 AU V142	24379551	○
120.8	130	4.6	4.2	5	4		95 AU V142	24311962	○
121.4	130	4.3	7.8	9	4	5.33	95 AU V142	528353	○
130.4	140	4.8	6.6	7.7	4		95 AU V142	24362518	○
134.1	140	3	4.9	5.9	3.5		95 AU V142	24245392	●
135	145	5	7.3	8.4	4.5	5.7	95 AU V142	24359031	○
140.4	150	4.8	6.6	7.7	4		95 AU V142	24367348	●
141.9	150	4.1	8	9.2	3.5		95 AU V142	24348854	○
159.2	165	2.9	4.9	5.9	3.5		95 AU V142	24250883	○
170	180	5	7.3	8.4	4.5	5.7	95 AU V142	24378895	○

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



d	D	Profile	H	I	C	ISC O-Ring	Material	Article No.	
174.4	180	2.8	5.2	6.2	3.5	3.53	95 AU V142	49001429	○
185.9	192	3.1	4.9	5.9	4		95 AU V142	24250878	○
191.4	200	4.3	7.8	9	4	5.33	95 AU V142	49004492	○
193.9	200	3.1	4.9	5.9	4		95 AU V142	24250880	○
216.4	225	4.3	7.8	9	4	5.33	95 AU V142	531563	○
228.4	240	5.8	10.7	12.3	5	6.99	95 AU V142	24375294	○
231.4	240	4.3	7.8	9	4	5.33	95 AU V142	24360083	○
236	242	3	4.9	5.9	3.5		95 AU V142	24245390	○
253.4	265	5.8	10.7	12.3	5.5	6.99	95 AU V142	49000175	○
282	288	3	4.9	5.9	4		95 AU V142	24250877	○
463	480	8.5	14.4	16.3	7	10	94 AU 925	49004706	○
643	660	8.5	14.4	16.3	7	10	94 AU 925	49012006	○
715	730	7.5	10.7	12.2	6	8.4	94 AU 925	24360742	○
793	810	8.5	14.4	16.3	7	10	94 AU 925	49015798	○
830	813	8.5	15.6	16.3	7	10	94 AU 925	24361263	○
843	860	8.5	14.4	16.3	7	10	94 AU 925	49015799	○
943	960	8.5	14.4	16.3	7	10	94 AU 925	49012180	○

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Merkel Freudenberg Fluidtechnic

Merkel Freudenberg Fluidtechnic aspires to develop and produce seals and to offer them with comprehensive service in order to fulfill current customer requirements to the greatest extent possible.

In order to live up to this aspiration Merkel has specialised in providing seals and sealing systems for heavy industry. The individual components are optimally matched to each other in terms of material and functionality, as all individual seals are also developed as integral solutions. Long service lives and high media resistance are ensured by a choice of material and profile design selected to suit the respective industry.



Merkel seals and sealing systems in the steel and non-ferrous metal industry:
the longest service lives, even under the
toughest environmental conditions

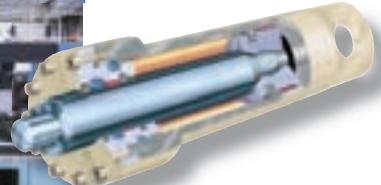


Merkel seals and sealing systems in press manufacture: high compressive strength with relatively large diameters

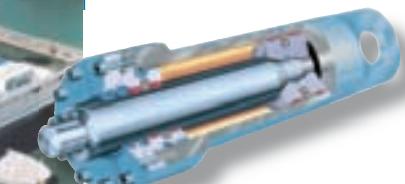




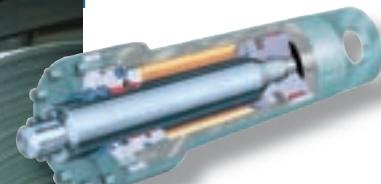
Merkel seals and sealing systems in the plastics processing industry: high dependability, even with more than 2.5 million load alternations per year



Merkel seals and sealing systems in steel hydraulics engineering or shipbuilding: high dependability, even with long maintenance intervals



Merkel seals and sealing systems in the paper manufacture: high dependability under high speeds and abrasive media



Americas

Freudenberg-NOK

Merkel Heavy Industry
11617 State Route 13
Milan, OH 44846/USA
E-mail: merkel.americas@freudenberg-ds.com

Asia

Merkel Freudenberg Fluidtechnic GmbH

c/o EKK Eagle Industry Asia Pacific Pte. Ltd.
52 Serangoon North Avenue 4
03-02, Ever Tech Building
Singapore 555853
E-mail: merkel.asia@freudenberg-ds.com

Headquarter Europe

Merkel Freudenberg Fluidtechnic GmbH

Industriestraße 64
21107 Hamburg
Phone: ++40/7 53 06-0
Fax: ++40/7 53 06-440
E-mail: merkel@freudenberg-ds.com
www.merkel-freudenberg.de



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Vibration Control

