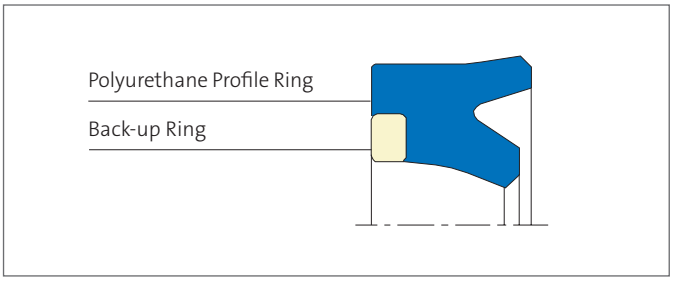
MERKEL U-CUP TYPE 0503

Merkel U-Cup Type 0503 is a two-piece seal set used as rod seal, comprising an U-Cup made of polyurethane with asymmetrical profile, and a back-up ring.



VALUE TO THE CUSTOMER

- Functional safety in case of radial shaft misalignment by using large profile overlap
- Operational safety due to robust polyurethane profile ring
- High sealing function due to distinctive sealing edge (high line load)
- Safety against metallic contact due to large extrusion gaps possible by using back-up ring for high extrusion resistance
- Easy and secure mounting

Applications
Can be used as a single seal for working pressures up to 50 MPa. Suitable for large extrusion gaps and large diameters (nominal diameter up to 2.000 mm).

Material

Profile Ring

Material	Designation	Color
Polyurethan	95 AU V142	dark blue

or

Material	Designation	Color
Polyurethane	95 AU 925	light blue

Back-up Ring

Material	Designation	Color
Polyamide	PA 6G200	white

or

Material	Designation	Color
Polyoxymethylen	POM 202	white

The material is determined by the nominal diameter and the production process involved.

FEATURES AND BENEFITS

Operating Conditions

Material	95 AU V142/94 AU 925
Hydraulic Oils, HL, HLP	−30 ... +110 °C
HFA Fluids	+5 ... +50 °C
HFB Fluids	+5 ... +50 °C
HFC Fluids	−30 ... +40 °C
HFD Fluids	–
Water	+5 ... +40 °C
HETG (rape-seed oil)	−30 ... +60 °C
HEES (synth. ester)	−30 ... +60 °C
HEPG (glycol)	−30 ... +40 °C
Mineral Greases	−30 ... +110 °C
Pressure	50 MPa
Sliding Speed	0,5 m/s

The figures given are maximum values and must not be applied simultaneously.

Surface Finish

Peak-to-valley heights	R_a	R_{max}
Sliding Surface	0,05 ... 0,3 µm	≤2,5 µm
Groove	≤1,6 µm	≤6,3 µm
Groove Sides	≤3,0 µm	≤15,0 µm

Material content M_r > 50 % to max. 90 %, with cut depth c = R_z/2 and reference line C_{ref} = 0 %

The long term behavior of a sealing element and its dependability against early failures are crucially influenced by the quality of the counter surface. Therefore a precise description and assessment of the surface is critical.
Based on recent findings, we recommend supplementing the above definition of surface finish for the sliding surface by the characteristics detailed in the table below. With these new characteristics derived from the material content, the hitherto merely general description of the material content is significantly improved, not least in regard to the abrasiveness of the surface. Please also consult our Technical Manual.

Surface finish of the sliding surfaces

Characteristic Value	Limit	
R_a	>0,05 µm	<0,30 µm
R_{max}	<2,5 µm	
R_{pkx}	<0,5 µm	
R_{pk}	<0,5 µm	
R_k	>0,25 µm	<0,7 µm
R_{vk}	>0,2 µm	<0,65 µm
R_{vkx}	>0,2 µm	<2,0 µm

The limit values listed in the table do not currently apply for ceramic or semi-ceramic counterfaces. Please also consult our Technical Manual.

Gap dimension

The dimension D_2 is determined by factoring in the maximum permissible extrusion gap, the tolerances, the guide clearance, the deflection of the guide under load, and the pipe expansion. Please also consult our Technical Manual.
The maximum permissible extrusion gap with a one-sided position of the piston rod is significantly determined by the maximum operating pressure and the temperature-dependent dimensional stability of the seal material.
Please also consult our Technical Manual.

Profile Dimension	Max. permissible gap dimension [mm]				
Profile [mm]	16 MPa	26 MPa	32 MPa	40 MPa	50 MPa
10,0 ... <15,0	0,7	0,7	0,7	0,6	0,5
15,0 ... 30,0	1,1	1,1	1	0,9	0,7

GLAND DESIGN AND INSTALLATION

Tolerances

Diameter D [mm]	Tolerance
≤400	H11
>400	+0,4

The tolerance for the diameters d and D_2 is specified in connection with the gap dimension calculation. In typical hydraulic applications up to a nominal dimension of 1.000 mm, the tolerance fields f7 and f8 or H7 and H8 are usually chosen.

Design Notes

U-ring seal sets can be generally mounted into a pierced groove by hand. Dependent on the relation of profile and nominal diameter, in some cases an axial accessible installation space might be necessary.

Housing recommendation for larger diameters

d [mm]	D [mm]	L [mm]	C [mm]
>320 ... 600	d–30	25	11
>320 ... 720	d–40	32	12
>720 ... 2.000	d–50	40	16

Please note the general design remarks in our Technical Manual.

Installation & Assembly

Dependent on the diameter ordered, the back-ring is delivered with a certain over-length and has to be cut to size just before mounting on site.
Precondition for a flawless function of the seal is its accurate mounting. Please also consult our Technical Manual.

Installation Diagram