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Case history
SEAL-U-CUP
Rod seals in polyurethane for earth-moving machines

In order to reach a continuous improvement and according to the new needs dictated by the market, we renewed our SEAL-U-CUP series. Our rod seals in polyurethane for earth-moving machines have been upgraded by changing the raw material and working on the seal cross section.

The initial targets were:

- To find a thermoplastic material suitable for new hydraulic oils and for extreme working conditions
- To find a thermoplastic material suitable for the hydrolysis and humidity effect
- To get a longer lasting of the seal thanks to the new cross section

Our solutions:

A. The thermoplastic material developed for the SEAL-U-CUP series belongs to the polyester urethane family. The new material was found to be improved in the features of the elastic module and in the permanent low deformation; moreover, it presents an excellent wear resistance and a working temperature range going from -40C° to 110C°.

B. The new thermoplastic material shows a better resistance to the hydrolysis, establishing a longer lasting in new oils with HFA and HFB base, and an unconditional stability in situations of storing where there is a high presence of humidity.

C. To guarantee the sealing at high and low pressure conditions and to avoid the oil leaking at low pressure conditions: the major leakages are to be found in oleo-dynamic applications working under 40bar pressure situations, or anyway during pressure phases lower than the cycle. To guarantee the sealing at high pressure up to 450bar increasing the life of the road seal working on the seal cross section.

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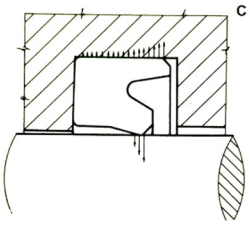

Image C) For these reasons, we chose to reject the classical “U” design of the seal, engineering a seal with asymmetric sealing lips. The design of the sealing lips allows a high difference on the loading and contact area thanks also to the only assembling deformation. The loading concentration, especially in the sealing dynamic area, is emphasised by the sealing edge.

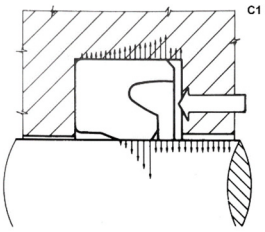

Image C1) The designed cross section improved the stability of the static sealing lip in contact with the housing and it enforced the dynamic sealing lip, that can energize in a proportional way with the increasing of the working pressure. At high pressure conditions, we assist to the complete contact of the static sealing lip to the housing surface of the back. The contact area in the dynamic zone also increases as the pressure increases, but it always results lower than the static one.

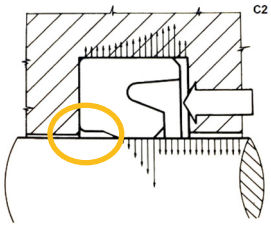

Image C2) In accordance with the radial play between the mechanical parts and not having the possibility to assemble an anti-extrusion ring, we tried to push away the sealing from the gap between the shaft and the housing. For that reason, the back part of the seal was reduced.

P/N	DESCRIPTION
2S5867	SEAL-U-CUP
3G3809	SEAL-U-CUP
4S9006	SEAL-U-CUP
5J0964	SEAL-U-CUP
5J8150	SEAL-U-CUP
5J8175	SEAL-U-CUP
5J8200	SEAL-U-CUP
5J8225	SEAL-U-CUP

P/N	DESCRIPTION
5J8238	SEAL-U-CUP
5J8275	SEAL-U-CUP
5J8300	SEAL-U-CUP
5J8325	SEAL-U-CUP
5J8350	SEAL-U-CUP
5J8375	SEAL-U-CUP
5J8400	SEAL-U-CUP

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