

## February 2023 - Scalable high-speed sealing systems

**As electrification continues, KACO is setting the standard in high-speed dynamic radial shaft sealing systems. Bidirectional high-speed applications can be reliably sealed across a wide range of customers in terms of shaft diameter and circumferential speed.**

As is well known, electric drives require sealing systems that function independently of the direction of rotation on the drive machine. However, the systems known so far had a preferred direction of rotation for forward travel (V-max) and a correspondingly good performance in terms of reverse travel speed profiles.

Since, on the one hand, the requirements for reversing have tended to increase and, above all, "back-to-back"<sup>1</sup> electric machine arrangements on one axle are being used more and more, KACO has taken on the task of developing a sealing system that permits installation on both sides. This means that the seal must fulfill the load spectrum of forward travel without a preferred direction in both directions of rotation, which means that reverse travel can also be realized in terms of speed and duration analogous to forward travel.

Thanks to intensive cross-departmental cooperation between materials development, product development and testing, we have succeeded in presenting a sealing system that meets all common customer specifications in amine-containing gear oils, irrespective of the direction of rotation. As shown in Figure 1, this sealing system has already been successfully scaled and tested in applications up to 45 m/s with a shaft diameter of 60 mm. According to current findings, this already covers more than 90% of all known customer profiles in a secure manner.

**Scaling of the Sealing Systems**

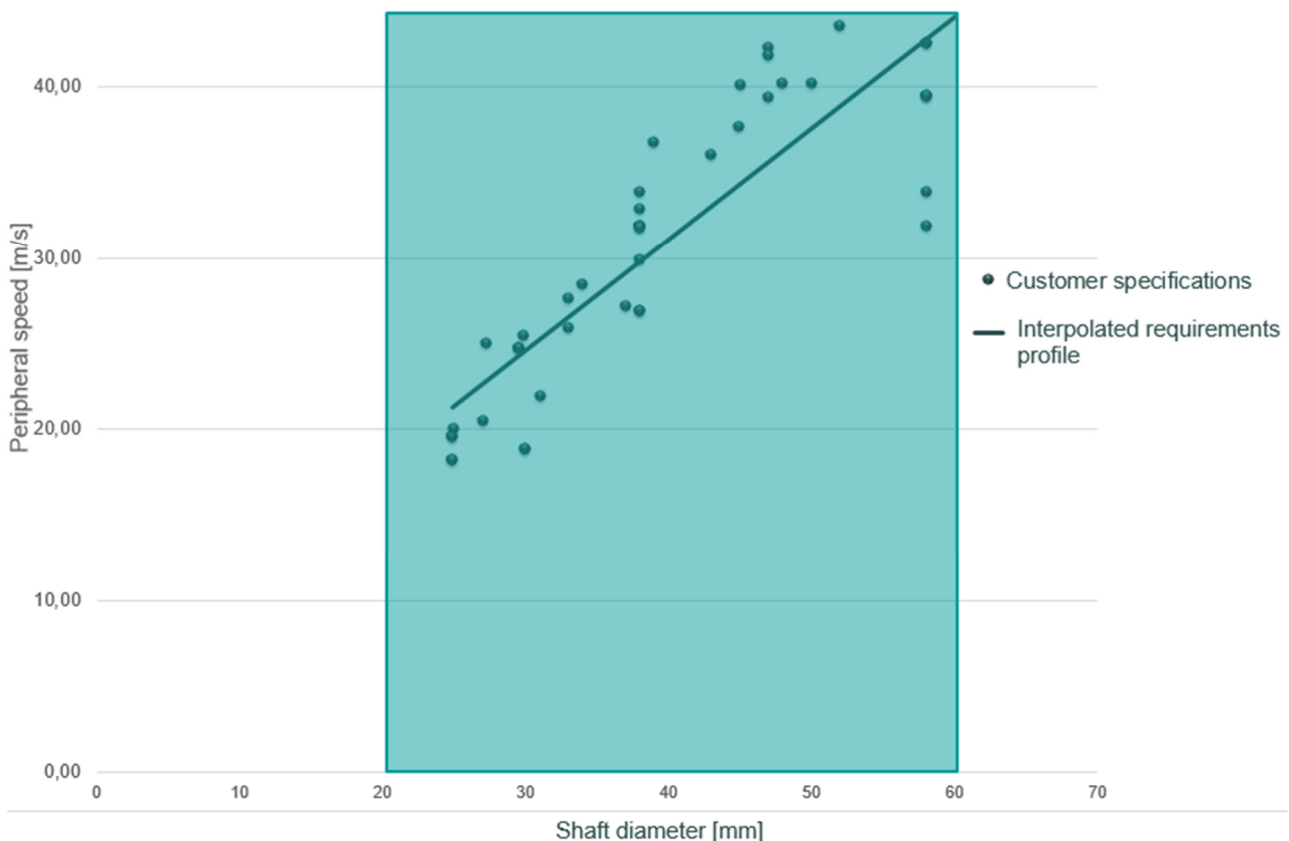


Figure 1: Scaling of the sealing system

<sup>1</sup> In the back-to-back process, an electric motor drives an identical motor that works as a generator. The power then "cycles" electrically and mechanically between the two units, with only the power loss having to be supplied from outside.

## PRESS RELEASE

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„Bidirectional alternating twist designs have been increasingly used with spring-loaded shaft seals at the output end, i.e. at relatively low circumferential speeds. In addition to the development of the new material, the further development of the swirl design for a KACO FRed® seal, i.e. a sealing lip with a laydown design without spring loading, was also decisive for the use in electrically high-speed drives. By using state-of-the-art simulation and testing capabilities, we have succeeded in optimizing the swirl structures to a bidirectionally effective conveying principle across the entire speed band. KACO is thus setting new standards for bidirectional sealing systems," says Andreas Genesisius, Vice President Engineering.



Figure 2: High Speed Seal of KACO

KACO GmbH + Co KG, a subsidiary of the Zhongding Group, is one of the world's leading developers and manufacturers of high-precision, application-oriented sealing solutions for the automotive and mechanical engineering industries. The company, which is based in Germany, is characterized by the highest sealing quality and innovative strength and stands for recognized development and manufacturing expertise. KACO has six plants in Germany, Austria, Hungary, China and the USA and delivers its products all over the world. As a close partner of the automotive industry and its suppliers, the company has been keeping pace with the high demands and technical changes in the industry for decades.

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