

ElroSeal™ rotary shaft seal with injection-molded housing for aircraft wing adjustment

Challenge	Modern aircraft have highly complex adjustment mechanisms that are crucial for the safe flight and landing characteristics of the aircraft. The protection of these safety-critical actuator units of "flap" and "slat" is subject to high requirements. This requires innovative and reliable sealing systems to protect the mechanisms from external media ingress such as water, ice and dirt.
Solution	To protect the actuators, ElringKlinger further developed the existing sealing concept of PTFE sealing lip and anodized aluminum housing into an injection-molded ElroSeal™ radial shaft seal.
Result/Conclusion	The result of further development is the "injection-molded rotary shaft seal". This innovative seal consists of a glass-fiber-reinforced injection-molded housing and a PTFE compound sealing lip. The reinforced plastic housing reduces the component weight by 40% and enables faster and more flexible production than the existing seal concept.

Adjusting wing geometries are well established in aviation and are essential for today's state-of-the-art machines. This safety-critical area must be protected from external media ingress from the environment in order to provide you with maximum safety and reliability in the air.

Last year, we were able to demonstrate our know-how within a project for one of our customers in the field of passenger air transport. The aim was to further develop our existing sealing concept of a high-performance PTFE sealing lip and an anodized aluminum housing for the actuators for "Slat" wing adjustment.

To meet this requirement, various solution concepts with different housing materials were investigated. The challenge of media resistance to anti-wear greases, as well as the wide temperature application range of -54°C to +90°C, were technically solved in addition to a number of other conditions.

The result of this further development is the "injection-molded rotary shaft seal". This ElroSeal™ sealing ring consists of a high-performance PTFE compound as the sealing lip and a media-resistant glass-fiber-reinforced plastic, which is injection-molded around the sealing lip. The glass-fiber-reinforced plastic housing allows the overall weight to be reduced by 40% compared with the existing seal concept with aluminum housing. The high sealing performance is retained. In addition, the new design enables faster production times and agile availability with high reproducibility.

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