

RELY ON EXCELLENCE

Rotates silently and unobtrusively

Solution – SeccoMix R with DiamondFace for the agitators of mobile vessels

Sealing the agitator shaft of a mobile vessel is a very special task when dealing with a process in vaccine production. Liquid lubricated seals offer the best conditions for this application, but require a supply system. This conflicts with the flexible handling of the mobile vessels. With dry running seals this effort is eliminated.

At an international pharmaceutical company, EagleBurgmann demonstrated that the operation of dry running seals is as convenient as it is reliable and safe.

At the shaft passage, the seal must prevent the highly sensitive substances from becoming contaminated and from leaking into the atmosphere and endangering production personnel. The leakage of the supply medium for liquid lubricated seals must not exceed specified values; the supply medium itself must be matched to the product and installed in a vessel near the seal.

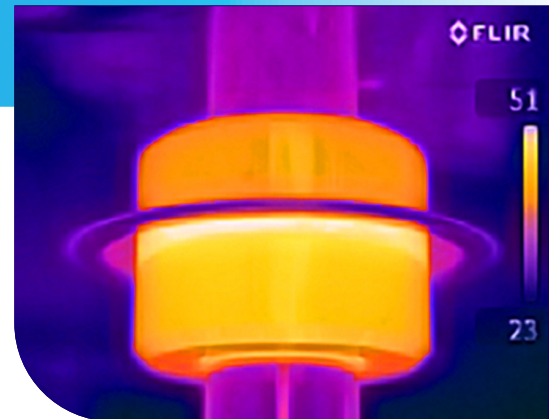
A further hurdle is synthetic carbon, the classic material for mechanical seals, which is not always approved for use in pharmaceutical production. The risk that particles will separate from the sliding faces due to abrasion and get into the product is too high. It would not only be very time-consuming to clean the vessel from wear particles; if the active ingredients were to become so heavily contaminated that they were no longer usable, production losses would be in the millions.

Noise development and highest ATEX requirements

At the Asian production site of the pharmaceutical group, the agitator shafts of a mobile vessel were therefore equipped with

seals of the SHJ series from EagleBurgmann in hard-hard pairing. During operation, however, the combination of silicon carbide on silicon carbide repeatedly led to unacceptable squeaking noises during poor lubrication conditions.

At about the same time, the pharmaceutical company changed the requirements for explosion protection at a European location. There, SHJ seals from EagleBurgmann had also been installed on the top driven agitator shafts of mobile vessels. These now had to comply with ATEX category 1, zone 0 (temperature class T4) due to the prevailing explosive atmosphere in the vessels. The seals were lubricated with glycerin and had been in use for more than a decade.



The SeccoMix R, taken with a thermal imaging camera. The temperature values were significantly below the permitted values of temperature class T4.

DiamondFace increases the service life of mechanical seals many times over. Maintenance intervals are extended, life cycle costs are reduced.



In the meantime, EagleBurgmann had developed the SeccoMix R dry running seal, which was now the better solution as a single seal for mobile vessels. It requires no supply system and can be operated without lubrication at the low speeds of the agitator shaft. Now only the issue of „noise development through hard-hard pairing“ needed to be solved.

High ATEX requirements, no noise development, flexible handling of the mobile vessels – EagleBurgmann satisfied these demanding requirements of a globally operating manufacturer of vaccines.

Comprehensive test runs

EagleBurgmann relied on the experience with DiamondFace for this. The surfaces of the seal faces were coated with microcrystalline, artificially produced diamonds in a special process. This makes them extremely wear-resistant and very effective at dissipating heat from the seal.

The SeccoMix R was then extensively tested in several stages. The basic technical principle of the seal was initially tested for wear and noise development. The subsequent test

was meant to show whether the temperature development on the surface of the seal faces remains below the maximum permitted value despite dry running. A few weeks for optimization were necessary and then the field test started in the original machine. There was no noise, temperatures remained very low and the conditions of ATEX category 1, zone 0 were met. The sliding faces of the seal were as good as new thanks to DiamondFace. The pharmaceutical company gave the green light for use in production.

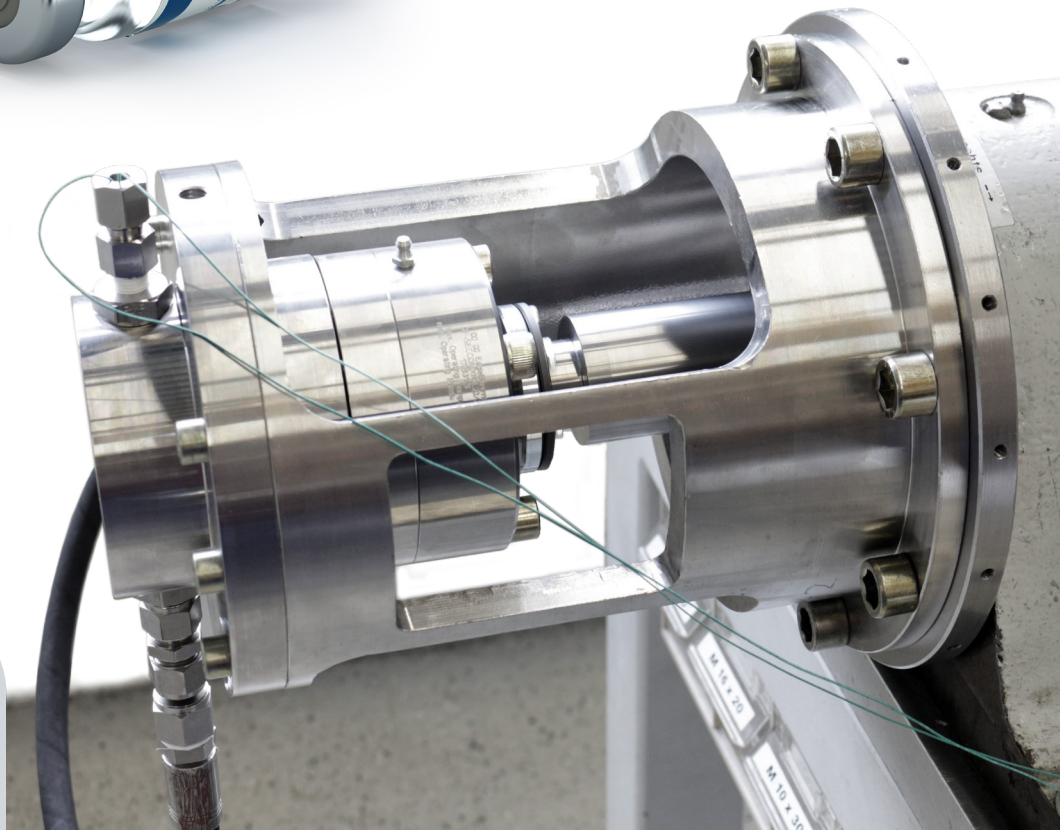
Easy to clean

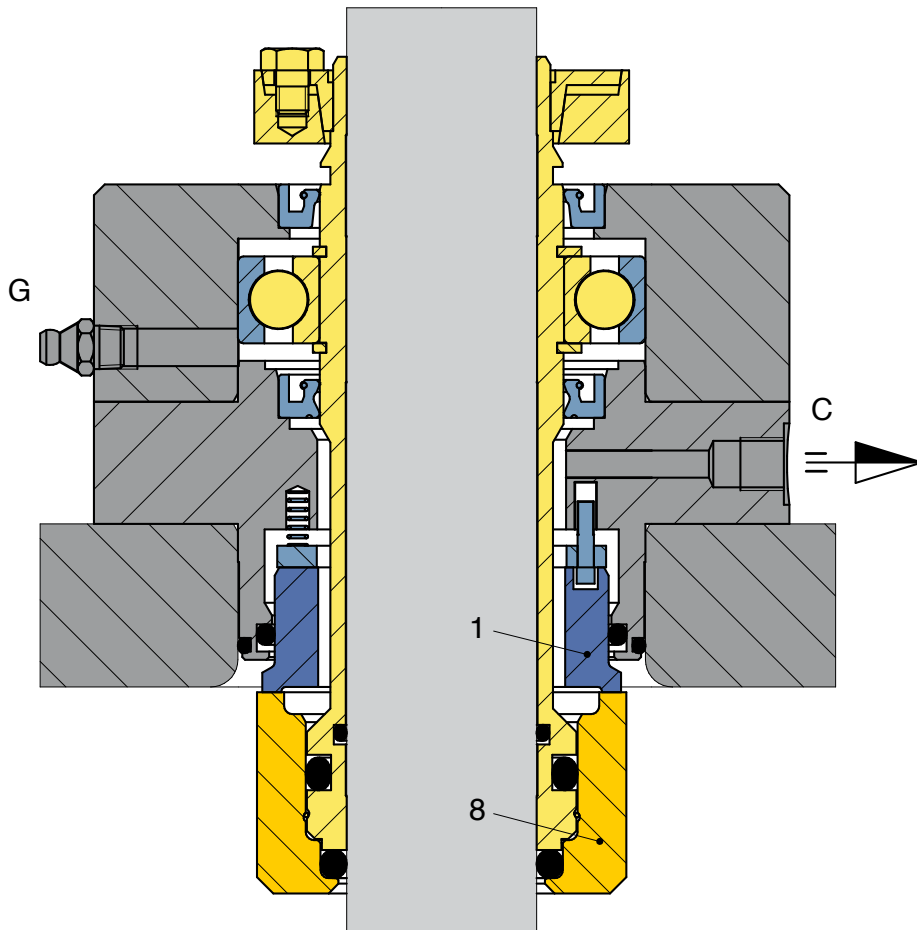
The advantage of the SeccoMix R is that it can be cleaned and sterilized without requiring disassembly. The smooth, dead space-free design allows easy cleaning according to the high sterile level in vaccine production. The materials for sealing elements such as sliding elements and secondary seals that come into contact with the produced active ingredients are approved by the FDA (U.S. Food and Drug Administration).

Since the end of 2018, twelve DF-SeccoMix R have been installed on the agitators of the vessels with a capacity of 200 to 500 liters at the European location. They prove their reliable and robust properties from batch to batch.



The SeccoMix R with DiamondFace was tested intensively at EagleBurgmann. The picture shows the test set-up.





1 = Seal face
 8 = Seat
 C = Drainage
 G = Grease

Yellow areas: rotating parts of the seal
 Blue areas: stationary parts of the seal
 Gray areas: Shaft and housing parts

Operating conditions

- Shaft diameter: $d = 35 \text{ mm}$ (1.37")
- Pressure: $p = 3 \text{ barg}$ (43.5 PSIG)
- Temperature: $t = 40 \text{ }^\circ\text{C}$ (104 $^\circ\text{F}$)
- Sliding velocity: $v_g = 1.5 \text{ m/s}$ (5 ft/s)
- Medium: pharmaceutical media

EagleBurgmann – at the leading edge of industrial sealing technology

Our products are used wherever safety and reliability count: in the industries of oil & gas, refineries, petrochemicals, chemicals, pharmaceuticals, food, power, water and many more. About 6,000 employees contribute their ideas, solutions and dedication every day to ensure that customers around the globe can rely on our seals. With our modular TotalSealCare Service, we emphasize our strong customer orientation and offer custom-tailored services for every need. [Rely on excellence.](#)

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