Double mechanical seal in a PTA plant

Long service life

The CHETRA 597B/S is not a small mechanical seal: Designed for a shaft diameter of 320 mm, this double mechanical seal weighs more than 500 kg. The special design significantly improves the service life of the seal. Their use has already proven successful in the PTA plant of a petrochemical company in the Middle East.

PTA plants play an important role in the petrochemical industry - after all, PTA (Purified Terephthalic Acid) is the starting product for the production of polyester and PET.
PTA is a naphtha derivative; the conversion of the intermediate product into terephthalic acid takes place by means of acetic acid in corresponding reactors.
These are usually large installations with a shaft diameter for the seal of ≥200 mm. In the present case, the agitator was a Lightnin agitator with a shaft diameter of 320 mm. In this large diameter range, it is important to ensure stable, plane-parallel conditions on the seal's sliding surfaces.
This is of importance with regard to both leakage behaviour and the service life.
Here CHETRA relied on the proven concept of using robust, solid, non-shrunk sliding/counter rings made of special carbon and tungsten carbide. Acetic acid is extremely corrosive in combination with the other components and the high temperature, which is why the parts in contact with the product are made of titanium, and FFKM secondary seals are also used. Other materials of the seal are: Duplex (1.4462) and 1.4571, as well as FKM. Due to the changing pressure range, driving with a pressure intensifier (API Plan 53c) is usually advisable.
Here the sealing pressure follows the pressure to be sealed. With this PTA system, however, the sealing pressure is readjusted manually. On the one hand, the operator wanted to maintain this mode of operation (API Plan 53A), but on the other hand wanted to improve the service life of the mechanical seal.
It was quite clear that existing problems lay, among other things, in the driving style, as well as in some cases in the vibrations that occurred, which at times went beyond an acceptable level.
CHETRA therefore designed a double mechanical seal with special hydraulic double pressure relief and an integrated bearing in the seal. This ensures that the mechanical seal is prevented from opening when the sealing pressure is temporarily not applied. After the previously used mechanical seal failed, the CHETRA mechanical seal 597B/S-320, which was already on site, was installed by a senior service supervisor from the head office in Heimstetten (Munich) and put into operation with the plant's technicians. Due to the good results, another seven plants will be converted to CHETRA mechanical seals.

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Due to the medium to be sealed, the Chetra 597B/S-320 is designed in titanium on the product side; using high-quality secondary seals as well as sliding and counter rings made of special carbon and tungsten carbide in a solid design. The mechanical seal also has an integrated bearing.

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