EagleBurgmann®

Mechanical Seal MR
in Polymerization Reactor

Information **ED08121**

Lanxess Deutschland GmbH operates several plants to produce synthetic rubber. The high quality polymers are used for technical rubber products like car tires, adhesive and latex applications.

Production process

The reaction is carried out in a stirred reactor cascade as emulsion polymerization in aqueous phase. At the beginning of the process the tanks are filled and then set to the required operating conditions. Chloroprene, water and diverse additives are used as raw materials. Through polymerization they react to form polymers which, at the end of the reaction, are present in aqueous solution as a colloidal dispersion, called latex. The outer casing of the stirred reactors is cooled continuously to -20 °C.

Operating conditions

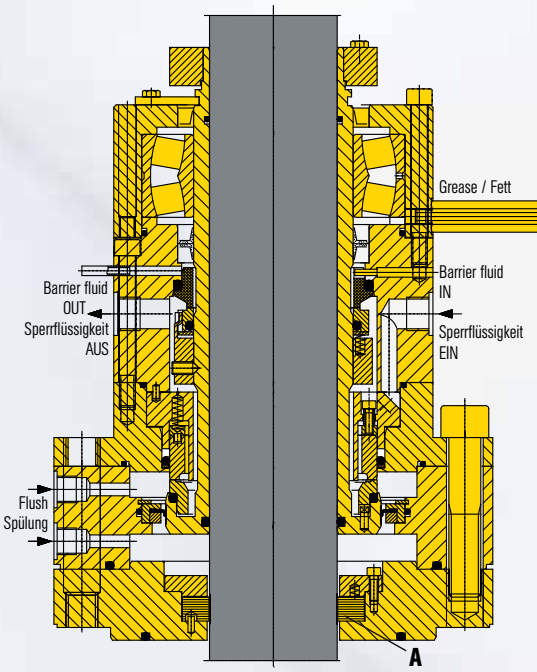
Medium: Latex, chloroprene, water
Operating temperature: about 0 °C
(max. design temperature 200 °C)
Operating pressure at seal: Vacuum to 10 bar
Speed: 160 min^{-1}

Equipment with seal and supply system

Equipment: Stirred reactor, top drive
Seals incl. materials: HSMR5L-D/100-KB2, Q2Q2K/M5GE(1.4571)-Q2BEGG (1.4122)
Mode of operation: pressurized according to API plan 53 and flush according to API plan 32
Supply system: SPA 4025A02-D1
Barrier medium: White oil
Barrier pressure: 13 bar
Flushing medium: Water
Flushing pressure: 11 bar

The solution from EagleBurgmann

After having changed the production process the reactor was rebuilt from bottom to top drive. Moreover the tank is operated with a high filling level which poses a challenge for the seal because the process medium is ready to creep which means that it penetrates very easily into the seal and tends to glue which means it may stick together the seal faces.
Another problem was that the flush broke down sometimes when additional consumers were connected to the mains. Then the product was able to penetrate into the seal and stick the seal faces together thus reducing the functionality. Therefore the flushing pressure is controlled to avoid that it falls below 11 bar.



EagleBurgmann HSMR5L-D

The technical features of the seal at a glance:

- Cartridge unit with integrated bearing.
- Flush in front of the seal at product side and throttle (A) to seal the flush against the product chamber, thus reducing the leakage → Increase of the reliability by prevention of deposits.
- High service life times due to stationary seal design and HS-grooves at product side.
- Special circulation pump, which is suitable both for water and for oil.

The mechanical seals used in this application achieve excellent life times and have been running to the full satisfaction of the customer Lanxess. Mainly the flush at the product side has contributed to the significant increase in the seal's service life.

Baypren production plant in Dormagen/Germany. Photo Lancess AG

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