

# MF95N for sealing highly viscous media

Information **EN07071**



Afton Chemicals produces additives for lube oils at its production plant in Feluy, Belgium. There are 12 Allweiler screw spindle pumps in use, each of them equipped with 4 seals. The plant operator requests the use of single mechanical seals.

## Media

Additives for lubricants (polyisobutylene, maleic anhydride, amines, polyisobutylene succinic anhydride)

Viscosity of process medium:  
~1,000 mPa\*s at 20 °C

## Operating conditions

Shaft diameter:  $d_1 = 40 \text{ mm}$   
Operating temperature:  $t = \text{max. } 240 \text{ °C}$   
Operating pressure:  
 $p_1 = \text{Vacuum ... } 10 \text{ bara}$   
Speed:  $n = 1,500 \text{ min}^{-1}$

## Equipment with seal and mode of operation

Pump: Twin screw pump, 4 seals per pump  
Manufacturer: Allweiler  
Seals incl. materials: MF95N/40-00, Q12Q1K1M5G1  
Mode of operation: API 682, Plan 61 with steam quench

## Problem and solution

Originally the pump was equipped with a single pusher seal by the pump manufacturer. Due to the short life times of the seal in this application of about 6 months on average an evaluation was made together with EagleBurgmann to optimise the seal life time. The result was that the pusher seal has not been suited for this application due to specific medium properties, namely the high viscosity of up to 1,000 mPa\*s at ambient temperature. Additionally the process medium tends to deposit in the seal, preferably in the area of the dynamically loaded O-ring, thus blocking the O-ring's movability resulting in a seal failure.

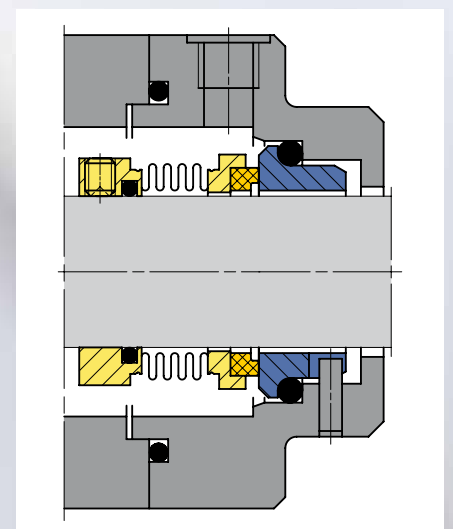
Moreover, the chemical resistance of the elastomer is a problem. Only specific perfluoroelastomer compounds are resistant against the medium over prolonged periods. In fact a pressurized dual mechanical seal would be the best solution, but a rebuilt of the pump would be required. Due to the fact that this was no option for the plant operator a single mechanical seal, a MF95N with rolled metal bellows, was selected. This seal type is very robust, also in combination with higher viscosities. Moreover the metal bellow takes over the function of the dynamically loaded O-ring so that the seal is less sensitive regarding deposits.

To avoid a hardening of the medium during shut down a steam quench is used at the atmospheric side of the seal.

Due to these features the service life of the seal could be significantly increased. Further improvement was achieved by the usage of a specific perfluoroelastomer.

## Summary

The described sealing concept with a rolled metal bellows seal achieves good service life times of more than 2 years in spite of the demanding application. This means an increase by the factor 50 and a significant reduction of the maintenance effort. Thus the maintenance costs could be reduced by about 90% for the pumps concerned.



MF95N/dw-G1