EagleBurgmann®

SHFV Mechanical Seal

for Boiler Circulation Pumps

Information **ED08041**

The boiler circulation pump generates a forced circulation in a closed system, such as a heating system, forced circulation boiler, etc. The construction type of these pumps is determined by the frequently high temperature of the pumped medium and the rather low delivery head as compared to the high system pressure, which corresponds to the pressure head loss in the circulation system. Horizontal, single stage volute casing pumps are often used.

The operating conditions for a mechanical seal are quite arduous, in addition to high pressure the seal has to perform at high temperature. An engineered seal design is definitely required to give a long lifetime of the equipment.

Application

At Centrica Power Station, UK, a 380 MW CCGT power station with four high pressure boiler circulation pumps they had trouble with the realiability of a competitors mechanical seal right from the beginning.

Problem

The original mechanical seal type had been troublesome since the station was commissioned in 1994 with repetitive seal failures. Life expectancy of 1 to 6 months maximum resulting in high leakage rates, consequently leading to various safety related issues, reduced plant efficiency, costly pump down-time and repairs.

EagleBurgmann solution

The deficiencies of the pump design relate to the short axial distance between impeller and stuffing box and also the design / efficiency of the pump jacket cooling. The EagleBurgmann SHFV design compensated for these problems by using an EagleBurgmann Thermostop ring that has contact free running and during standstill close down and provides a barrier between the hot product on the pump side and cool product in the plan 23 loop.

The prevention of fluid interchange means that thermal deflections are reduced and thus eliminates static leakages, which lead to root cause of the failures. First SHFV installed November 2002. Following continued 6 month monitoring by plant and EagleBurgmann UK, remaining 3 off duty pumps upgraded along with two spare pump cartridges.

The seals have been in continuous service for more than five years with no leakage or problems.

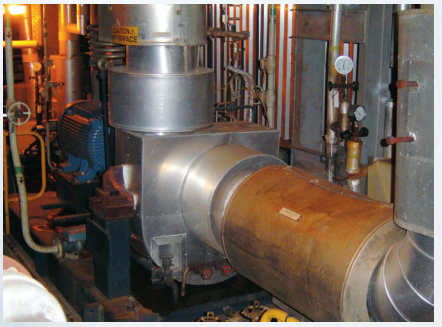
This success has far exceeded this power plants expectations for reliability and cost on such a critical application.

Operation conditions

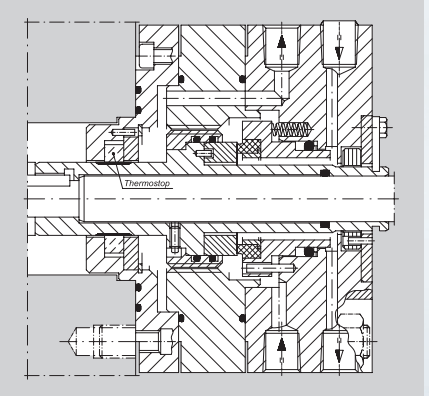
Medium: Boiler feed water
Temperature of medium t = 297 °C
Pressure p = 90 barg (stuffing box)
Rotational speed v_g = 1,480 min^{-1}

Seal type including materials used:

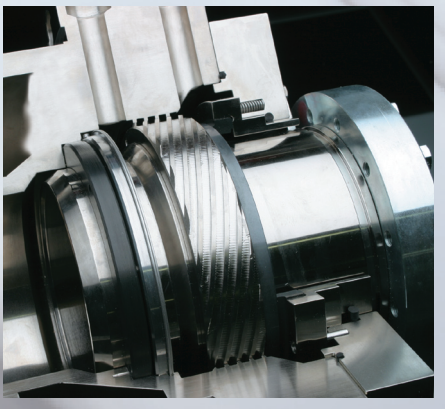
Single seal SHFV3/95-ET1 AQ2EGG (1.4571)
Quenching fluid: Water
Operating mode: API plan 2 + 23 + 61



Boiler Circulation Pump at Centrica Power Station
Kesselumwälzpumpe im Kraftwerk Centrica



SHFV3/95-ET1



Cut-away model of a SHF single mechanical seal
Schnittmodell einer Gleitringdichtung des Typs SHF

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