EagleBurgmann®
Rely on excellence

High-pressure seals for pipeline pumps

ESPO (East Siberia Pacific Ocean) is a project of superlatives. The Russian state-owned company TransNeft is currently building the ESPO pipeline in two sections: it is nearly 5,000 km long and will supply China, Japan and Korea with Siberian oil. It is scheduled to be completed and fully in use by 2014. The first section (2,757 km) has been in operation since the end of 2009.
Our technical competence in the oil and gas industry and extensive experience in sealing crude oil pipeline pumps under difficult conditions qualified EagleBurgmann to supply high-pressure mechanical seals from our tried and tested SH and HR series.

Extreme conditions

Pumping stations on the 1.2 m diameter pipeline, once completed, will be approx. 150 km apart. There are 11 pumping stations along the ESPO-1 pipeline for the time being, spaced approx. 250 km apart. The pumping stations are hard to access and in impassable terrain. And, not least, the extreme climatic and geological conditions present major challenges to pump and seal manufacturers. Operators must be able to rely on high quality, robust, highly-reliable, long-lasting components. What is more, the logistics involved mean that service, maintenance and repair costs should be extremely low.

EagleBurgmann seal solutions

To meet the extremely high demands on the seal design reliably, FEA (finite element analysis) was applied to optimize the SH seals for fluctuating pressures, temperatures and speeds involved in operation and to ensure the optimum geometry for seal face and seat.

Successful seal design: EagleBurgmann SHPV-D (section model)

ESPO pipeline route from Taishet to Kozmino

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DE110801 / E1 / 10.11 / 1.000 / 2.7.5

Also, lubricating grooves were incorporated in the seal face of the rotating seat to ensure optimal running properties. Then comprehensive static and dynamic tests were run to improve how the seals behaved in use under varying operating conditions still further. Friction and leakage were significantly less than what the customer specified.

EagleBurgmann scope of delivery

24 single high-pressure seals for booster pumps, 60 double high-pressure seals for main pipeline pumps and 24 barrier systems to API plan 53B with heat exchangers have been supplied in 2007. For the first extension of ESPO-1 another 45 dual seals and 20 API 53B barrier systems were delivered.

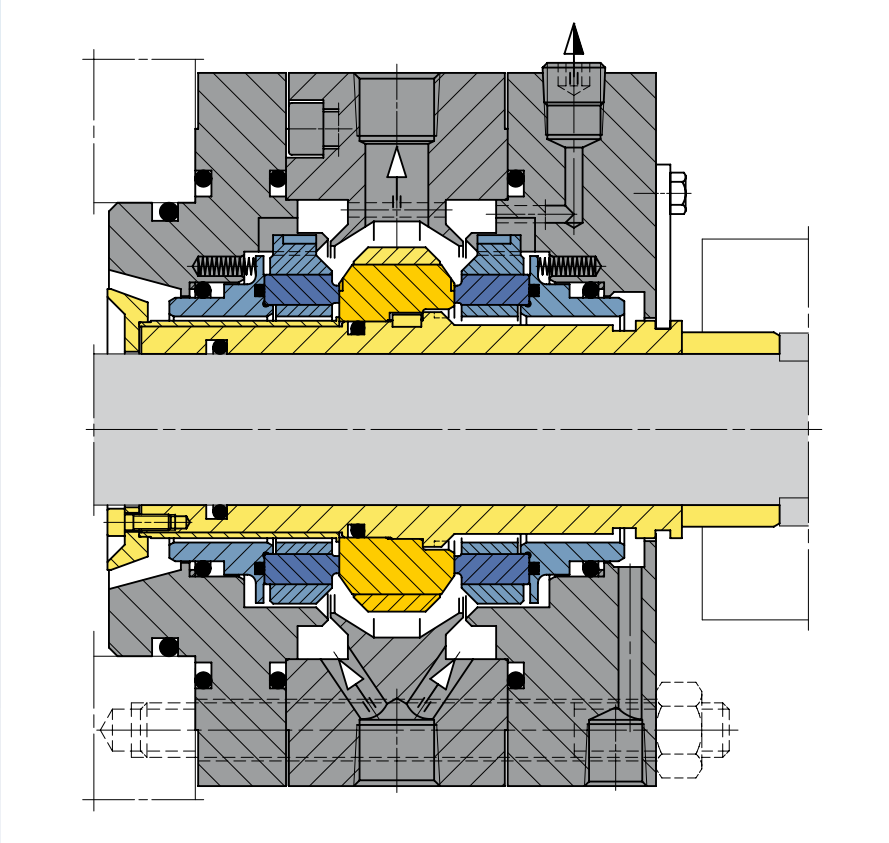
For the main pipeline pumps for ESPO-2, we also supplied 63 HRS8-type single mechanical seals with matching cyclone separators.

Operating conditions

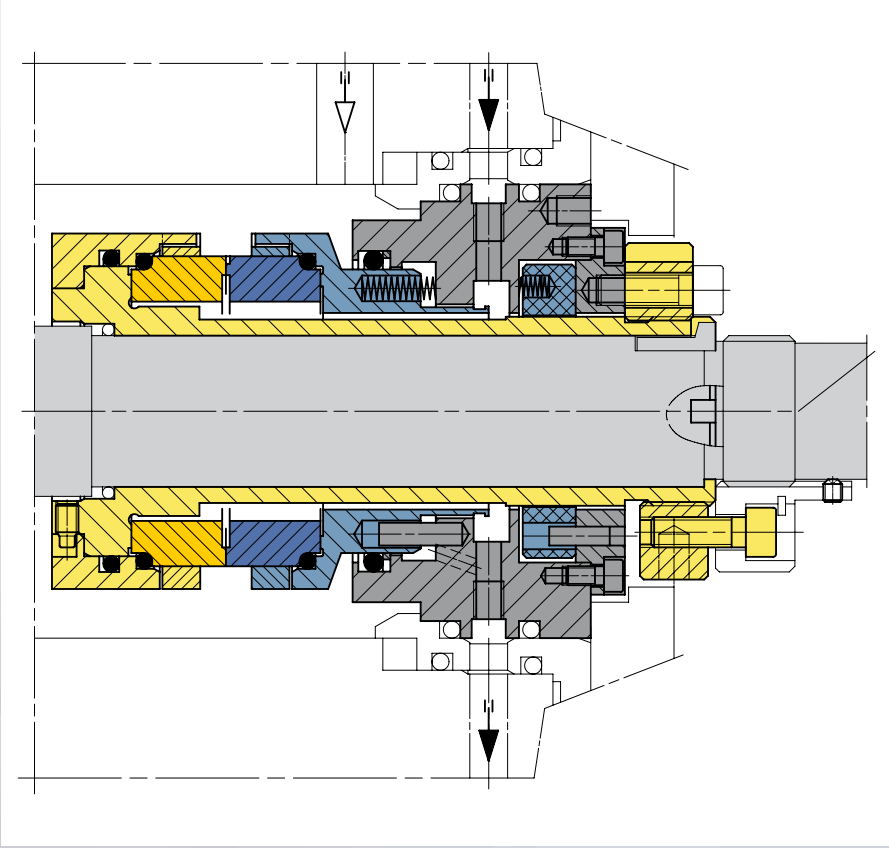
Seal: SHPV11-D/SHFVI-D
Pressure:
p_1 = 10 ... 78 bar (145 ... 1,131 PSI)
(four pumps in series in each case)
Temperature:
t = -15 °C ... +60 °C (5 °F ... 140 °F)
Speed: n = 1,500 / 3,000 min^{-1}
Barrier pressure: p_3 = 90 bar (1,305 PSI)
Barrier medium: water

Seal: HRS8/138-E2
Temperature:
t = -15 °C ... +60 °C (5 °F ... 140 °F)
Speed: n = 3,000 min^{-1}
Pressure p = 5 ... 62 bar (73 ... 899 PSI)
(four pumps in series in each case)
Cyclone separator: EagleBurgmann ZY203

The EagleBurgmann products have proved themselves to the operator's full satisfaction. 22 stations and 88 pumps are proposed for the impending extensions to ESPO-1 and ESPO-2.



Double mechanical seal SHPVI1-D



Single mechanical seal HRS8