framatome

RCP Shaft Seal Systems

Hydrostatic seals

Framatome Jeumont know-how applied to RCP seals

Challenge

Reactor Coolant Pump (RCP) seal systems are subject to severe conditions from low pressure operations during start-up and shutdown to high pressure and high temperature conditions during normal conditions. Sealing is an integral part of reactor coolant system (RCS) pressure boundary and one of the most severe and challenging application.

Solution

For more than 50 years, Framatome Jeumont has been designing and manufacturing RCPs, motors and seals for the worldwide nuclear market.

The hydrostatic seal system provided by Framatome Jeumont is a three-stage sealing system made of three independent seals. Each seal is factory-tested under pressure and temperature conditions representative of on-site operation to guarantee optimal performance. Furthermore, Framatome is committed to identifying new compounds or designs that will enhance the hydrostatic seal system and extend its service life.

Framatome Jeumont hydrostatic seals are currently in operation in pressurized water reactor (PWR) nuclear plants featuring the 93, 93A, 93A1, 93D, 100, N4, EPR™ and CPR1000 RCP's.

Passive Shutdown Seal (PSDS): With more than 50 cumulative years of operations in the United States, Europe and Asia, the PSDS is an additional safety system for existing hydrostatic seals, installed in the No. 1 seal insert. This self-actuated device is triggered only in accidental conditions when water temperature within the shaft seal system rises. The PSDS is qualified to withstand station blackout (SBO) and extended loss of AC power (ELAP) conditions for an extended period and limits the RCS inventory losses to non-significant level.

Customer benefits

- Improved safety: in case of SBO or ELAP conditions, the PSDS ensures the sealing of the primary circuit
- Design, fabrication and testing to original design requirements
- Backed by years of operating experience
- Equivalency certification to originally supplied hardware
- Providing a comprehensive, integrated service

Your performance
is **our** everyday **commitment**

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Technical informations

Three-stage hydrostatic sealing system

- #1 seal: provides 98% reduction in pressure within the RCP
- #1 seal leakage flowrate can be adapted to suit customer's requirements.
- #2 and #3: contacting seals

Qualified performances of the PSDS

- SBO conditions : 300°C, 168 bars for minimum 168 hours.
- Leakage flowrate under 1 gpm during the event.

Key figures

Framatome has proven know-how and experience in nuclear sealing system of Reactor Coolant Pumps

400 shaft seal systems installed worldwide; of which, dozens of seal systems are installed on non-OEM pumps

50 years of experience in maintenance of shaft seal systems

Contact : g-fra-pcm-sales@framatome.com
www.framatome.com