framatome

Qualification of Components

KADYSS Test Facility for Qualifying Pump Seal System

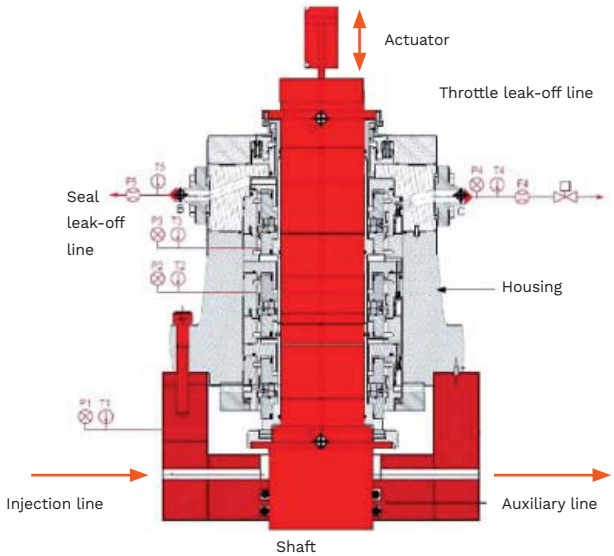
Facility simulates effects of station blackout on pump-shaft seal systems in nuclear power plants

The Challenge

Simulating station blackout (SBO) conditions in a long-duration test of the circulation pump-shaft seal requires feedwater at PWR conditions to compensate for the leakage flow of the sealing system. Mimicking the shaft's thermal expansion due to the internal thermal transients requires precise control of the shaft displacement.

The Solution

The KArlstein DYnamic Shaft Seal test facility simulates the effect of SBOs on the shaft-seal systems of nuclear power plant (NPP) circulation pumps. The facility operates under full PWR conditions. Thermal-hydraulic conditions such as pressure and temperature are kept stable while the Karlstein infrastructure compensates for the leakage flow of the shaft-seal system.



KArlstein DYnamic Shaft Seal test facility KADYSS

The heart of KADYSS is a shaft-displacement system developed to realize very precise axial movements at very low velocities. KADYSS is equipped with extensive instrumentation for pressure, temperature and mass flow.

The main components of KADYSS are:

- Electrically heated pressurizer
- Cold-water injection pump
- Test vessel
  - simulates the connection to the primary loop
- Pressure and temperature control systems
- Precisely controlled shaft displacement
- High-pressure filter system
- Data acquisition system

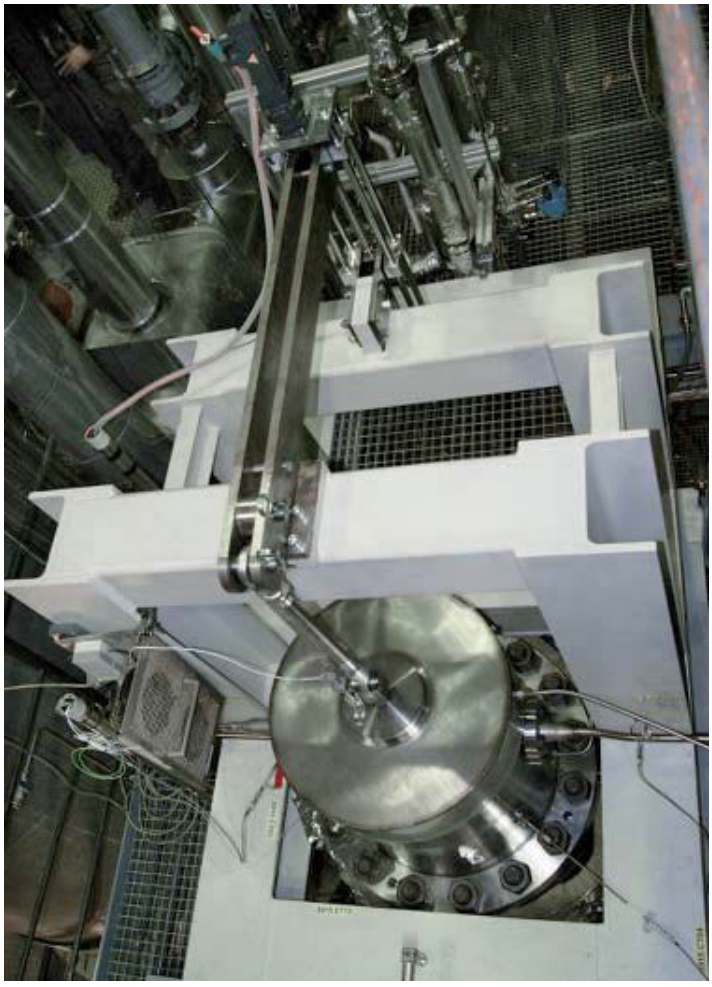
Characteristics of KADYSS

- Design Data:
  - Pressure: 185 bar
  - Temperature: 360 °C
  - Leakage flow: < 1000 l/h
- Shaft displacement system:
  - Total movement: 3.0 mm
  - Velocity: 0.05 to 10 mm/h
  - Design load: 33 kN
- Pressure and temperature control system
- Modern data aquisition
- Qualification of different types of sealing principles

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

Versatile and Multifunctional Test Loop

- Performs SBO tests on shaft seal systems of different types of circulation pumps and different types of sealing principles.
- Tests under simulated accident conditions up to 185 bar and 360 °C.
- Tests pressure and temperature transients and precise axial shaft displacements.



KADYSS in operation

Instrumented specimen connected to leak-off lines

Your benefits at a glance

- Testing under full scale test conditions
- Long duration tests
- Integration with and access to Framatome's thermal-hydraulic platform
- Accredited test and inspection body
- Accepted by ILAC

KADYSS puts your seal system under pressure

Contact:
test-labs@framatome.com

www.framatome.com