

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.

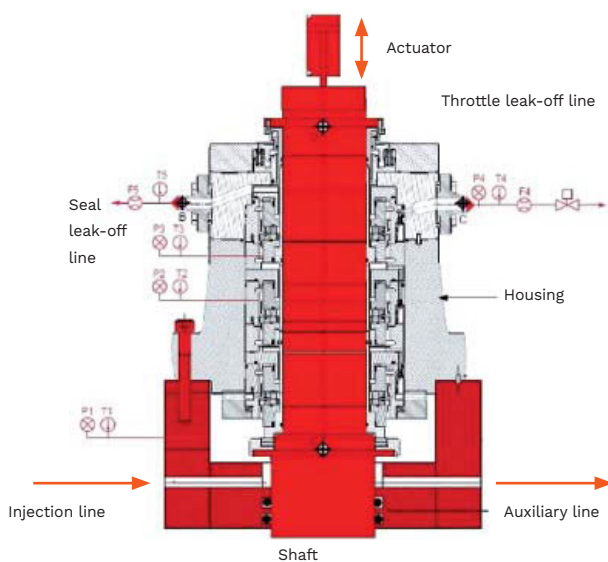
The Solution

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.

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



KARLstein DYNAMIC Shaft Seal test facility KADYSS

Characteristics of KADYSS

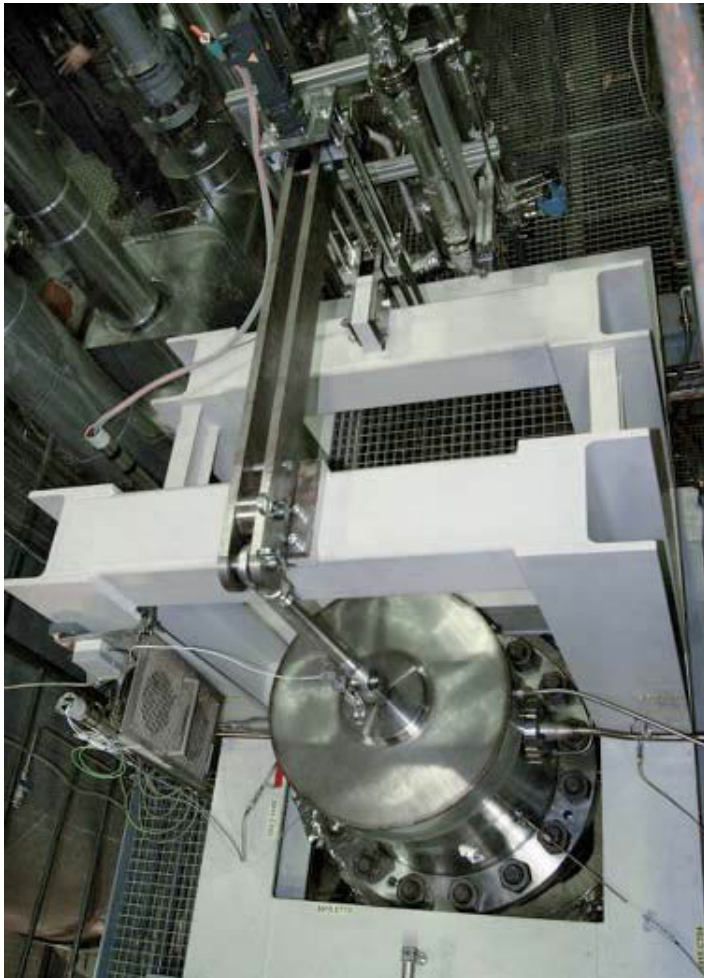
- Design Data:
 - Pressure: 185 bar
 - Temperature: 360 °C
 - Leakage flow: < 1000 l/h
- Shaft displacement system:
 - Total movement: 3.0 mm
 - Velocity: 0.05 to 10 mm/h
 - Design load: 33 kN
- Pressure and temperature control system
- Modern data acquisition
- Qualification of different types of sealing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

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.



Instrumented specimen connected to leak-off lines



KADYSS in operation

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

It is prohibited to reproduce the present publication in its entirety or partially in whatever form without prior written consent. Legal action may be taken against any infringer and/or any person breaching the aforementioned prohibitions.

Subject to change without notice, errors excepted. Illustrations may differ from the original. The statements and information contained in this publication are for advertising purposes only and do not constitute an offer of contract. They shall neither be construed as a guarantee of quality or durability, nor as warranties of merchantability or fitness for a particular purpose. These statements, even if they are future-orientated, are based on information that was available to us at the date of publication. Only the terms of individual contracts shall be authoritative for type, scope and characteristics of our products and services.

© 2019 Framatome GmbH / PS_GE_285_ENG_3-19

framatome