

APPEL Test Loop

Qualification Tests for Pumps

Qualification of pumps in accordance with ISO 9906 and at accidental conditions such as fast thermal transients or particle-loaded water

Challenge

Pumps must be qualified for standard conditions according to ISO 9906 as well as for accidental conditions such as fast thermal transients or for operation with particle-loaded water following a loss-of-coolant accident (LOCA).

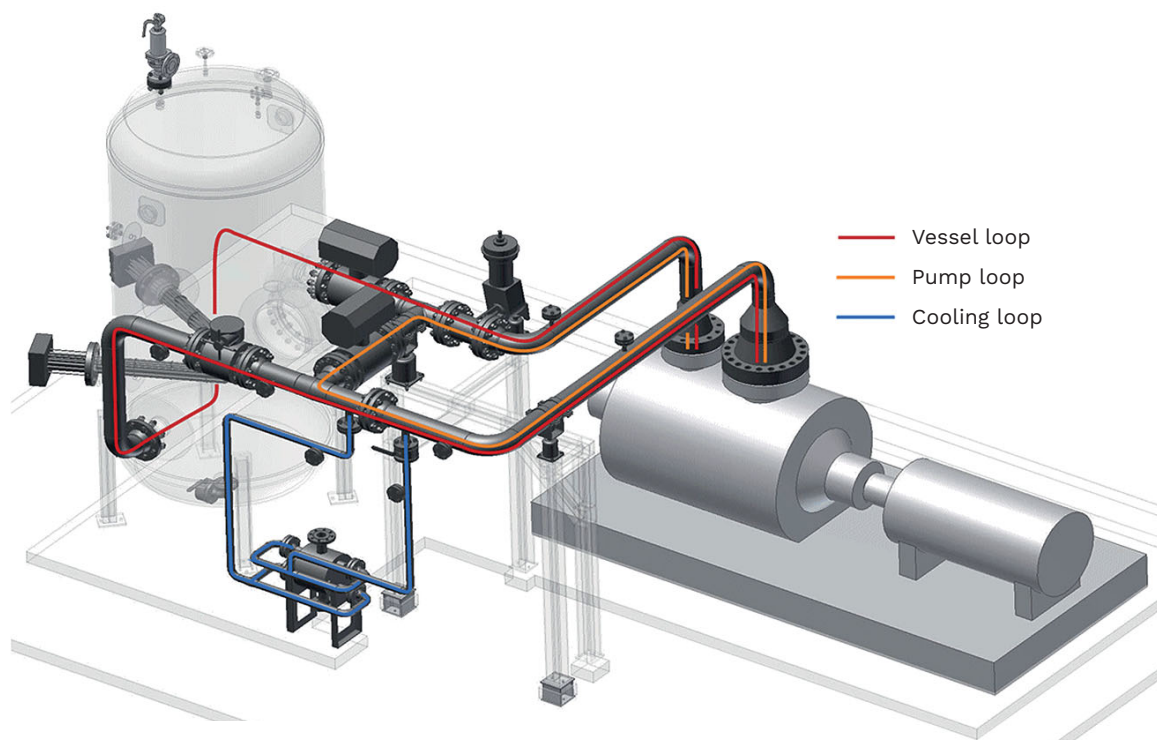
Solution

We offer a comprehensive test facility able to perform standard pump performance tests in accordance with ISO 9906 as well as special tests without changing loop components.

For pumps operating in nuclear power plants (NPPs), qualification at the standard conditions defined in ISO 9906 is often insufficient. Specific conditions such as thermal transients or pump operation with particle-loaded water must be taken into account. Endurance tests must also be performed. The APPEL facility allows maximum flexibility in performing the requested qualifications.

Customer benefits

- Flexibility: the pump test facility combines standard EN 9906 application and special tests for test cost reduction
- Extended possibilities with access to the Framatome thermal-hydraulic worldwide platform
- Reliable test results through accreditation as test and inspection body in accordance with ISO 17025 and 17020, accepted by ILAC



APPEL pump test facility

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

Technical information

Typical measurement parameters during a test are:

- Flow rate
- System pressure
- Pump discharge head
- Vibration behavior of pump and motor
- Fluid temperature
- Temperature of pump and motor components
- Motor power
- Pump rotation frequency.

During pump operation under fast thermal transient conditions, the pump can undergo a thermal shock due to as much as a 165 K temperature change in less than 30 sec. The shocks can be applied from cold to hot or even hot to cold conditions. Pump endurance tests are performed at elevated temperatures for several hundred hours, combined with frequent on/off pump switching operation. Qualification for pump operation with particle-loaded water can also be performed over a long term. We at Framatome can supply and prepare the debris mixture.

Features

- Test facility material: stainless steel
- Pump suction pressure: maximum 40 bar
- Pump discharge pressure: maximum 100 bar
- System temperature: maximum 200°C
- Flowrate: maximum 1,100 m³/h
- Drive power: maximum 450 kW

References

Qualification tests have been performed for:

- Standard chemical pumps (EN 9906)
- Single-stage / multi-stage vertical pumps (EN 9906)
- Low-head safety injection pumps (LHSPs) for EPR reactors (EN 9906, thermal transient and debris tests)
- Containment heat removal system pumps for EPR reactors (EN 9906, thermal transient and debris tests)
- LHSPs for other NPPs (EN 9906, thermal transient and debris tests).

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