framatome

Qualification of Components

KATHAR Test Facility for Qualifying Pressurizer Heaters

Long-term behavior of pressurizer heaters determined under full pressure and temperature conditions with simulated service life

The Challenge

Qualifying newly designed heaters requires simulating service life (electrical loading) at design pressure and temperature. The challenge is to maintain the different electrical loading of individual heaters and simultaneously mimic the full-scale thermodynamic conditions of the nuclear power plant for longduration tests.

The Solution

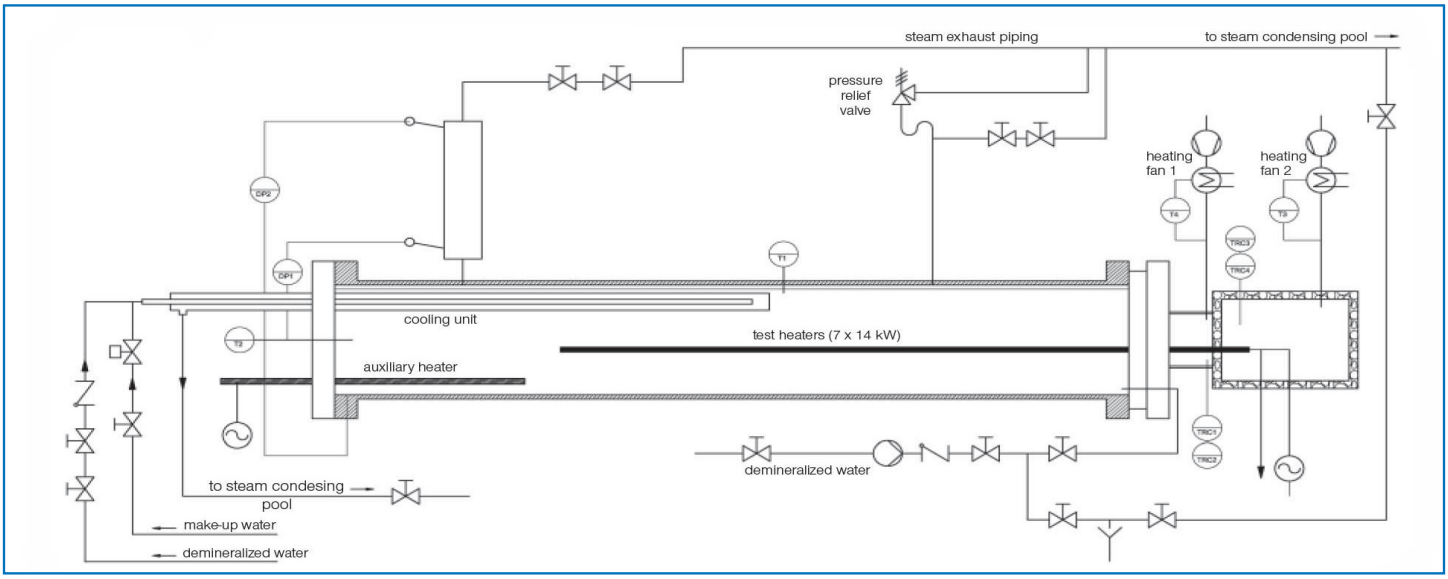
Erecting and operating the test loop meets the specified requirements. Depending on the design data of the specimen to be tested, the test loop can operate up to 7 heaters (nominal power 15 kW, current up to 700 VAC), each with individual electrical loading. The area surrounding the terminals can be heated to 350 °C or cooled down to ambient conditions. A control system monitors the parameters and manages the electrical cycling. Several threshold limits are set to protect the components from overloading. A makeup pump and drain valve maintain the water level inside the test vessel. A heat removal system ensures the pressure inside the vessel does not exceed the set value, independent of the heat produced.

The main components of the test facility are:

- Test vessel
- Heat removal system
- Pressure and water level control systems
- Temperature control system for area surrounding the terminals
- Energy supply system
- Data acquisition system

Characteristics of KATHAR Test Facility

- Design Data:
  Pressure: 185 bar
  Temperature: 360 °C
- Orientation of the test heaters:
  vertical or horizontal
- Test specimen:
  up to 7 pcs., single-phase/three-phase
- Individual energizing modes and sequences for each test heater (e.g. 60 ms ON, 3.5 s OFF), overlapping/shift
- Modern data acquisition and evaluation



Schematic of the KATHAR Test Facility

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

Powerful and Self-Sustaining Test Loop

- Long-duration, around-the-clock tests lasting several weeks, with varying energization levels and modes, individualized to each specimen
- Over 100 temperature sensors on heater surfaces to monitor temperature distributions and avoid damage
- Data sampling at different rates for different parameters (e.g. voltage at 1000 Hz, temperature at 1 Hz)
- Microcontroller and SIMATIC combine to achieve high stability and accuracy

Installed and instrumented specimen

Intelligent, controlled energy for your components

Electrical cabinet

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

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