framatome

Thermal-Hydraulic Platform

Unique in the World

Unique in the world facilities for operating full-scale or scaled models to perform qualification tests of systems and components or to validate codes and calculations

Challenge

Testing of components for qualification, design validation or for mechanical or thermal-hydraulic studies purposes requires well-equipped laboratories, qualified personal and a high-level quality management system.

Solution

We offer a comprehensive testing platform. The thermal-hydraulic and components testing facilities comprise a total floor space of more than 2,000 m^2 and heights of up to 32 meters.

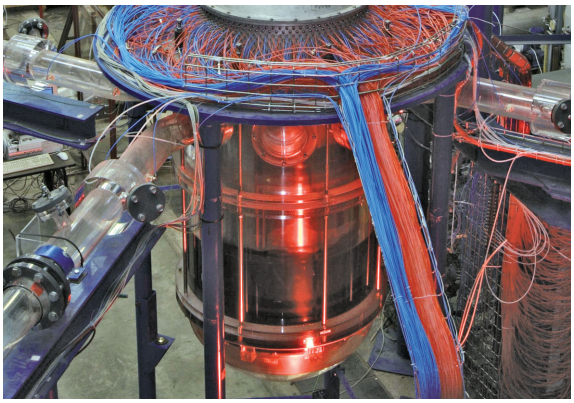
Following facilities are available:

- Crane capacities up to 100 t
- Thermal power supplies up to 25 MW
- Electrical power 20 MW
- Dose rate: 10^{-4} x limit for unrestricted release
- Advanced measurement techniques.

Our accreditation as test and inspection body according to ISO 17025 and 17020 is valid for the following ranges:

Measurements	Measuring range
Temperature	0°C – 600°C; 600°C – 1,100°C
Pressure	7.5 Pa – 40 MPa
Volume flow	0.0005 m^3/h – 100,000 m^3/h
Mass flow	0.005 kg/h – 4,000 kg/s
Force	1 N – 10,000 kN
Torque	1 Nm – 50,000 Nm
Length	1 µm – 10 m
Velocity	1 mm/s – 100 m/s
Acceleration	0.05 g – 1,000 g
Current	1 µA – 85,000 A
Voltage	1 mV – 4 kV
Electrical power	up to 20 MW
Effective power	up to 420 kW
Weight	0.005 g – 3,000 kg
Insulating resistance	50 kΩ – 200 TΩ (10 V – 1,090 V)

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



Scaled-model facility

Full-scale facility

Customer benefits

- Highly qualified, experienced scientists, engineers and technicians
- Knowledge base acquired over more than 40 years for high quality testing
- Technically convincing and economical solutions
- Reliable test results through accreditation as test and inspection body in accordance with ISO 17025 and 17020, accepted by ILAC

Technical information

Our scope covers the following activities:

- **Qualifications tests**
  - Pumps
  - Valves
  - Instrumentation and control systems for loss-of-coolant accidents conditions
  - Steam generator components
  - Auxiliary system components
- **Systems tests**
  - Pressurized water reactor (PWR) / boiling water reactor (BWR) integral systems tests
  - Integral testing of sump strainer and downstream systems
- **Heat transfer and its limitations**
  - For severe accident conditions
  - For core flow with focus on fuel assemblies
  - Heat exchangers
- **Fluid dynamics and flow-induced vibrations**
  - Core flow and core components
  - Fuel assemblies
  - Singularities (T-junctions, etc.)
- **On-site activities**
  - On-site measurements of nuclear power plant components
  - Generation of databases
  - Component inspections

Mechanical test facility

Thermal-hydraulic test facility

Some of our test loops

We operate the following test facilities:

- **KOPRA:** multifunction component test facility (fuel assemblies, control rod drive mechanisms, valves)
- **BENSON:** high-pressure thermal-hydraulic testing of separate effects
- **PKL:** large-scale test facility of a PWR primary loop with secondary side and auxiliary systems
- **PETER, BRIAN:** fluid dynamic test facilities (PWR and BWR fuel assemblies)
- **SUSI:** sump strainer test facility
- **APPEL:** sump test loop
- **GAP:** large valve test facility
- **INKA:** test facility for integral BWR tests
- **KATHY:** multifunction thermal-hydraulic test loop
- **HYDRAVIB:** vibratory validation of lower reactor pressure vessel (RPV) internals
- **ROMÉO & JULIETTE:** RPV flow distribution in upper and lower plenum
- **CALVA:** dynamic mechanical testing of components
- **MAGALY:** vibration behavior of rod cluster control assemblies and control rod guide assemblies for various flow conditions
- **Tri-axial seismic shake table**: 3.3 m x 3.3 m table platform, flexible mounting options for large equipment up to 9 tons

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