framatome

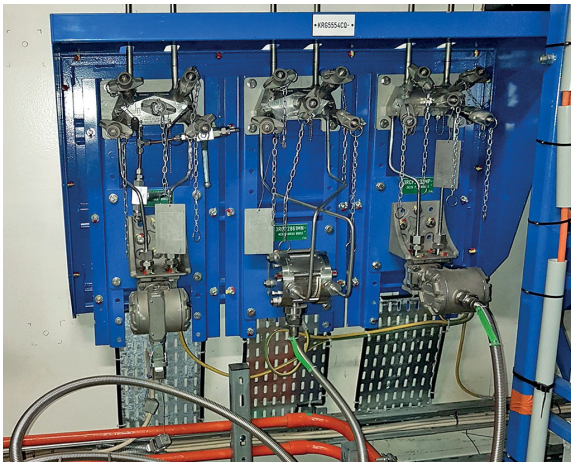
Field Instrumentation

Temperature, flow, pressure and level measurement

Framatome expertise on field instrumentation will increase safety, robustness and operational efficiency of your plant

Challenge

Each system within a nuclear power plant has a precise and usually unique function designed for operational and safety requirements. To monitor and control the correct functioning of each of these systems, nuclear plant operators require Field Instrumentation. This equipment is relied upon to acquire information and transmit the signal to upper level architecture for treatment and control decisions. To achieve full reliability of the control and command chain, each instrument chain must be carefully selected to meet the specified measuring requirements within the environment determined, and in accordance with the relevant regulatory and safety requirements. Selection of the instrumentation chain represents a major challenge for new build projects and modernization projects due to specific requirements, diversity of technologies and manufacturers, availability of qualified equipment and the need for diversity, all coupled with the sheer quantity of devices to be designed and installed (up to 10,000 on a new build reactor).



Pressure measurement and level installed in primary circuit

Solution

Based upon our expertise as a power plant designer and manufacturer of operational and safety control systems, on our qualification expertise and dedicated qualification laboratories, and on our intimate knowledge of licensing processes and extensive project experience in this domain, Framatome can provide complete, integrated and consistent Field Instrumentation solutions, or case-by-case adapted solutions. We consider all technologies available on the worldwide market for matching our customers' plant requirements and constraints, at optimized costs.

We have a full range of standard instruments to be integrated into solutions for pressure, flow, level and temperature analog measurement, or binary signals, and can also propose customized solutions for more unique situations. Once process requirements are defined, we will elaborate your Field Instrumentation solution through the following core competencies of Framatome:

- Functional requirements analysis
- Techno/economic analysis to balance technological choice with qualification requirements and overall project schedule
- Technical specifications
- Basic and detailed design
- Qualification demonstration
- Licensing support
- Site installation and commissioning
- Maintenance services, including obsolescence watch

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

Customer benefits

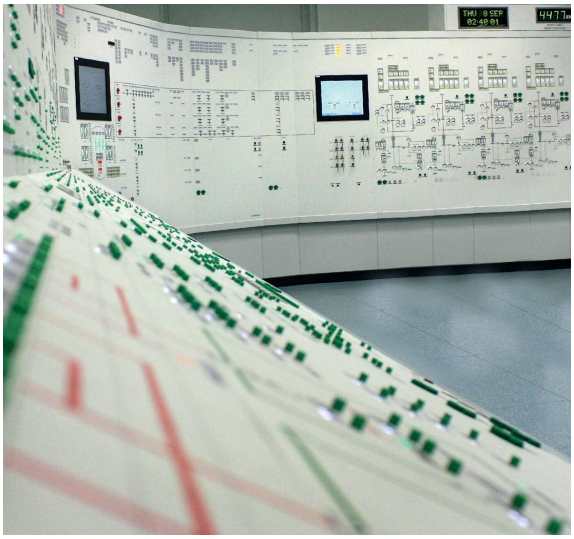
- Convenience from your single source of comprehensive solutions and services for a complete range of Field Instrumentation, including all necessary qualifications and documentation
- Project confidence drawn from significant project management expertise based upon references in nuclear power plants worldwide
- Certainty that originates from Framatome expertise in complete instrumentation chains that include field instrument technologies, transmission lines, conditioning units, and processing units
- Increased safety and operational efficiency with solutions designed and manufactured for a lifetime of use under the harshest conditions
- Pre-assembly of instrumentation packages to facilitate installation and commissioning activities, and optimize costs
- Reduced costs, and improved reliability across equipment through optimized equipment selection, consistent standards and qualification processes

Framatome works in cooperation with leading instrumentation suppliers who meet strict pre-qualification requirements and are focused on long term partnerships and proven, complete configurations. Count on the highest quality that comes from 60 years of expertise, and Framatome Field Instrumentation solutions to support the entire life cycle of your plant.

Technical information

Framatome offers a comprehensive portfolio of solutions and services that includes:

- Engineering works
  - Calculation of uncertainty, response time
  - Thresholds, offset and scale range definition
  - Amplification or conditioning
  - Connecting lines
  - Tubing, piping and complete assemblies drawings
- Integration of many analog or binary sensors including
  - Pressure transmitters: current, capacitive, inductive or piezoelectric
  - Flow: venturi, diaphragm, ultra-sounds, pitot tube, electromagnetic variable flow meter
  - Temperature: resistance probes, thermocouples
  - Level: delta P, radar, hydrostatic floaters
- Hardware definition and qualification according to all requested rules and standards
- Full project management for optimum project execution and seamless integration



Main control room

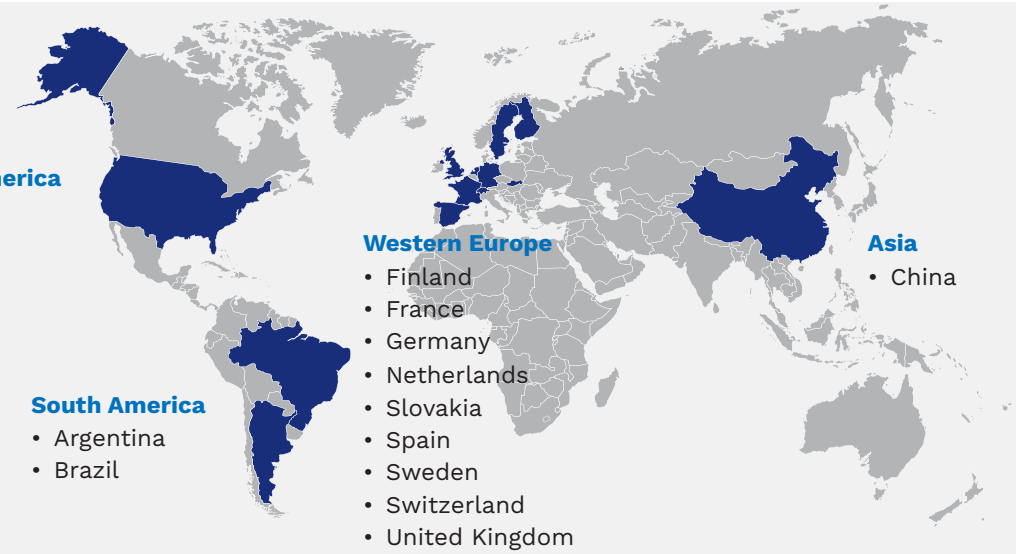
Key figures

30+ leading suppliers of proven instrumentation solutions

50+ qualified Field Instrumentation services and products in the Framatome portfolio to provide the best solution for every plant

Latest contract signed for new build project in the UK approaches **10,000** field instrumentation sensors

References



North America
- USA

South America
- Argentina
- Brazil

Western Europe
- Finland
- France
- Germany
- Netherlands
- Slovakia
- Spain
- Sweden
- Switzerland
- United Kingdom

Asia
- China

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