EXOSENS
REVEAL THE INVISIBLE

HIGH TEMPERATURE FISSION CHAMBERS ENGINEERED FOR AMR/SMR SAFETY AND PERFORMANCE

Discover Why EXOSENS Detectors are Essential for Advanced Reactor Monitoring in Extreme Conditions

As the global energy landscape shifts towards safer, smaller, and more flexible nuclear power, Small Modular Reactors (SMRs) and Gen. IV* technologies are at the forefront of innovation. These advanced designs pose new challenges in size, efficiency, and operating environment that traditional instrumentation and control solutions aren't always designed to handle.

As a global leader in nuclear instrumentation and radiation detection, Exosens designs and manufactures one of the industry's most robust and reliable portfolios of neutron detectors for in-core and ex-core neutron monitoring. Among those, high-temperature fission chambers are built to withstand extreme reactor conditions, providing operators with the dependable data needed to maintain control, ensure safety, and optimize performance across the source, intermediate, and power ranges.

DETECTORS DESIGNED FOR EXTREME TEMPERATURES

Exosens fission chambers are specifically engineered for long-term performance under extreme thermal and radiological conditions. From in-core locations—directly within the reactor vessel, close or in-between fuel assemblies/rods—exposed to intense neutron flux, to ex-core locations exposed to harsh gamma radiation, our detectors are rated for temperatures up to 600°C with safe neutron monitoring of up to 11 decades of flux. Their designs benefit from decades of combined operational experience in the UK's Advanced Gas-cooled Reactor (AGR) fleet and France's Phénix and Superphénix Sodium Fast Reactors (SFRs).

In-Core Detectors

Exosens' in-core fission chambers are fully customizable for integration into next-generation reactor cores. These sensors are built for consistent operation at elevated temperatures, up to 600°C, enabling reliable neutron detection directly within harsh in-core environments.

Ex-Core Detectors

Our ex-core fission chambers are optimized for high-temperature, high-radiation settings.

Designed for thermal neutron detection, they deliver wide-range flux monitoring under continuous exposure to intense gamma radiation and heat, with proven performance at up to 600°C. Their robust build ensures durability and accuracy over extended lifetimes.

TAILORED SOLUTIONS FOR NEXT - GEN REACTORS

Standard instrumentation and control solutions aren't always suitable for advanced reactor designs. Exosens bridges that gap with custom-built neutron detectors that support the evolving needs of SMRs, Generation IV systems, and advanced fuel cycles.

Our Exosens Development & Adaptation teams can perform various detector customizations based on the individual need of each SMR application, including:

- Integration of high-immunity mineral-insulated cables into detectors
- Protection for Loss-Of-Coolant-Accidents (LOCA) and post-LOCA operation
- Customized designs to meet with innovative core configurations – connectors, material, integration system, etc.

RELIABILITY BACKED BY DECADES OF EXPERIENCE

Since the 1940s, Exosens has supported nuclear programs across Europe and around the world, especially within the French and the United-Kingdom nuclear industry. Our detectors are developed under strict quality systems, including:

- ISO 9001 and ISO 19443
- ASME NQA-1, RCC-E, and HAF604 compliance
- A dedicated nuclear manufacturing organization ensuring traceability, safety, and long-term performance

YOUR TRUSTED PARTNER FOR INNOVATIVE & CARBON-FREE SOLUTIONS

From commercial nuclear power plants and small modular reactors (SMRs), to fuel reprocessing and radioactive waste storage, Exosens' neutron and gamma detection systems form the foundation of safe reactor control and monitoring.

In a world where precision is power, and safety is non-negotiable, Exosens delivers instrumentation you can trust—today and into the nuclear future.

Interested in advanced nuclear detection solutions?

Connect with our team by scanning the link!

** Gen. IV - Gen IV reactors are a new generation of nuclear reactors that are designed to be safer, more efficient, and more sustainable than their predecessors (VHTR, SFR, LFR, GFR, MSR, and SCWR)*

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