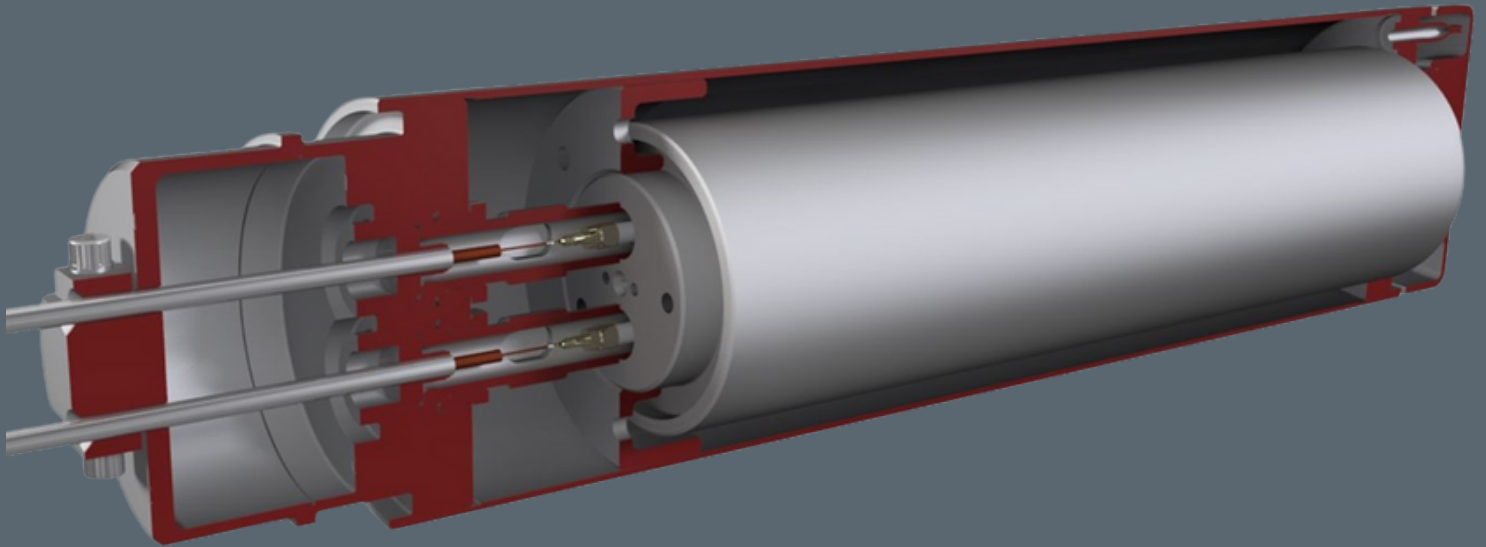


Room temperature fission chamber

Operating at up to $\sim 150^{\circ}\text{C}$



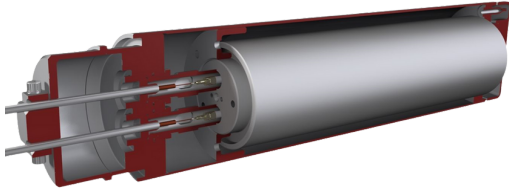
Overview

This device is a fission chamber that has been designed for use in ex-core applications to cover start-up, intermediate and power ranges of the reactor.

Key features

- Room temperature fission chamber, designed for ex-core operation (temperatures up $\sim 150^{\circ}\text{C}$)
- Sensitivity is adjustable by increasing the length and sensitive area of the device
- Single cable variant operates in pulse and Campbell modes. (multiple cable variants also operates in DC mode)
- Integrated cabling can be soft or hard cable, dependent on the application
- Mineral Insulated (MI) cable can be supplied with a termination, which can also be used as a pressure boundary

Technical specifications



Variants

The single cable device is designed for operation in pulse and Campbell modes, which will cover start up and intermediate power ranges.

Variants that deploy multiple cables are available which allow for operation of the device in pulse, Campbell and DC modes (or subsets thereof).

Materials

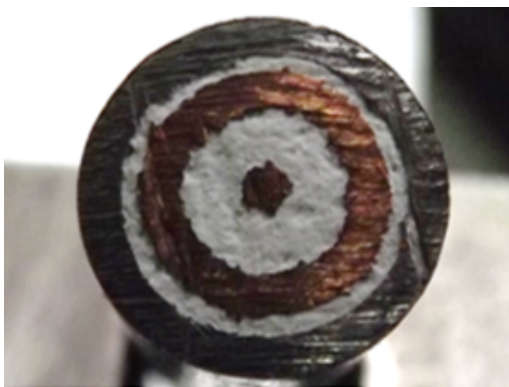
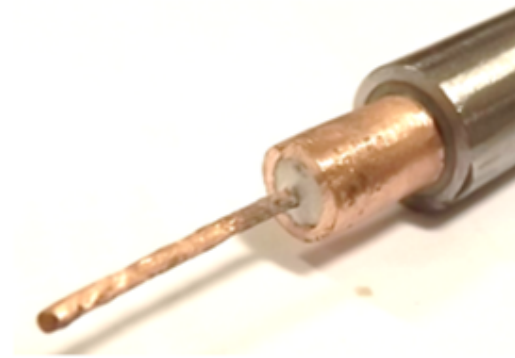
The detector utilises aluminium in its construction in order to reduce activation characteristics and consequently its susceptibility to gamma radiation.

Ceramics used in the device are made from aluminium oxide.

Cabling

Either soft or MI cabling can be used to transport the signal from the detector to the pre-amplifier or channel electronics. MI cable is recommended where long lifetime or high gamma dose rates are anticipated.

Cabling is either triaxial or coaxial. Triaxial cable is optimised for pulse and DC mode transfer, whilst the coaxial cable uses a laminate screen with multiple layers to improve noise rejection at lower frequencies, which improves signal to noise ratio for Campbell mode operation.



Performance specifications

Room temperature fission chamber performance specifications	
Dimensions	<ul style="list-style-type: none"> • Length 362 mm • Outer diameter (OD) 76 mm • MI cable length (triaxial) ≤ 22 m • MI cable OD (triaxial) 4.75 mm (nominal) • MI cable length (coaxial) ≤ 24 m • MI cable OD (coaxial) 5.4 mm (nominal) • MI cable termination length 230 mm (nominal) • MI cable termination OD 25 mm • Sensitive length 209 mm
Nucleonic performance	<p>Values can be adjusted to suit application - there may be a device dimension impact for larger sensitivity requirements:</p> <ul style="list-style-type: none"> • Pulse mode sensitivity 0.8272 cps/nv • Campbell mode sensitivity 3.63×10^{-26} A²/Hz/nv • DC mode sensitivity 2.84×10^{-13} A/nv
Materials	<ul style="list-style-type: none"> • Aluminium 1100 series • Stainless steel 300 series • Alloy 42 • Nickel • Copper (OFHC) • Aluminium oxide ceramic



About Ultra Energy

Organizations working with nuclear and industrial technologies have a responsibility to safeguard people, the environment and infrastructure. We provide solutions that give our customers complete, long-term protection and control of safety critical systems, while helping them increase the net value derived from investments over their total lifespan.

Part of Ultra Group, Ultra Energy has worked with nuclear and industrial customers for over 60 years. We're embedded in strategic national infrastructure and helping organizations develop future applications. We support continuous operation of industrial sites with protection and control solutions that monitor and manage factors such as radiation, neutrons, temperature and pressure within safety critical systems.

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