

product specification

4.7 mm diameter in-core fission chamber

Application : The CFUF43 is a fission chamber for detection of thermal neutrons in flux up to 10^{14} n.cm⁻².s⁻¹ . This detector is well adapted for in-core measurements under very severe environmental conditions such as high temperature (up to 350 °C), high humidity and high gamma flux. A movable CFUF43P version including a driving Teleflex cable is available (refer to CFUF43P specification).

Unless otherwise stated, all characteristics are given at 20°C

Nuclear characteristics

Sensitivity to thermal neutrons (1) :			
fluctuation mode (2)		3×10^{-31}	A ² .Hz ⁻¹ /n.cm ⁻²
current mode		10^{-17}	A/ n.cm ⁻² .s ⁻¹
Neutron flux range :			
fluctuation mode		10^{10} to 10^{14}	n.cm ⁻² .s ⁻¹
current mode (3)		10^{10} to 10^{14}	n.cm ⁻² .s ⁻¹
Gamma sensitivity :	max	2×10^{-12}	A/Gy . h ⁻¹
Exposure limits at 350 °C :			
thermal neutrons (4)		1.5×10^{20}	n.cm ⁻²
gamma dose rate	max	10^7	Gy.h ⁻¹

Electrical characteristics

Insulating resistance at 150 V (5)			
nominal at 20 °C	min	10^{12}	Ω
detector and 7 m-cable at 350 °C	min	1×10^8	Ω
Operating voltage :			
nominal up to 350 °C		150	V
maximum at 20 °C		200	V
limit with no radiation		800	V
Cable :			
capacitance (6)		400	pF/m
line resistance		50	Ω/m

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Mechanical and physical characteristics

Detector :			
materials :			
case, electrodes			stainless steel (Co<0.05 %)
insulator			Al ₂ O ₃
brazing			copper
sensitive layer : Uranium enriched in ²³⁵ U			> 90 %
mass	0.16		mg.cm ⁻²
filling gas :			argon
pressure	110		kPa
Dimensions :			
nominal diameter		4.7	mm
detector length		86	mm
overall length , on request (7) max	80	m	
sensitive length		27	mm
Cable :			
type (8)			1 coax
external diameter		1	mm
insulator			Al ₂ O ₃
curvature radius (9)	min	20	mm
Connector :			
type (10)			BNC male UG 260 D/U
insulator			PTFE

Environmental characteristics

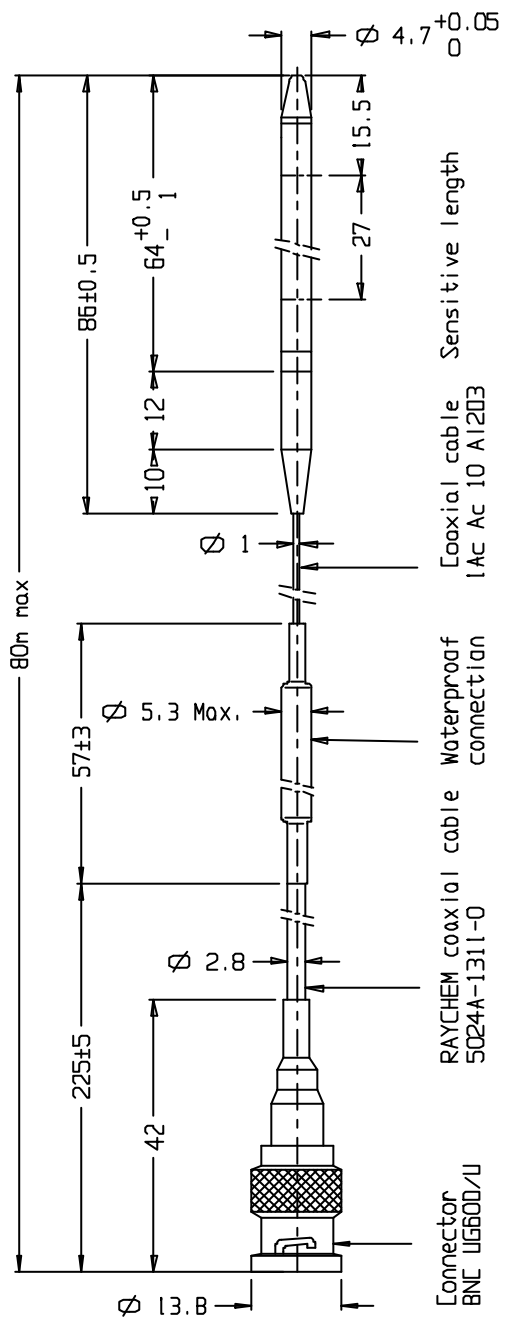
Operating temperature (11) :			
detector + cable	max	350	°C
connector		max	70 °C

product specification**Notes**

- (1) Values depending on the characteristics and the calibration of the measurement equipment.
- (2) Fluctuation mode sensitivity is given for an electronic chain having a 1 to 30 kHz pass band.
- (3) Current mode operating range : the lower limit of the current mode operating range depends on the electronics (specially on the input amplifier) and on the signal / parasitic current ratio (parasitic current = leakage current + gamma current + α -current). The upper limit is depending both on the detector and the electronics (loss of linearity).
- (4) Flux corresponding to a 10 % sensitivity loss of the detector.
- (5) The insulating resistance measurement includes the α -current.
- (6) The capacitance of the detector alone (10 pF) is negligible compared with the capacitance of the cable.
- (7) The type of connector (male or female) as well as the overall length (detector + cable + connector) constitute the version code to be mentioned in the detector reference after the basic type number. For example CFUF43/15 indicates a detector with a 15 m overall length.
- (8) Our "1 coax" cable is the 1 AcAc 10 referenced cable from Thermocoax. This electric cable is fitted with a driving cable from Teleflex that allows the driving of the chamber inside the measurement channels in PWR cores of the FRAMATOME system. Consult FRAMATOME / ATEA for details.
- (9) This is the smallest curvature radius allowing one reversible deformation.
- (10) In order to avoid humidity penetration during storage, the connector is closed with a cap to be removed just before use. As a general rule, prevent any humidity penetration at the connection level (refer to "Instructions for use and handling" in the package). Other connector types are possible. To be required when ordering.
- (11) Including temperature increase due to gamma radiation (effective above 10^4 Gy.h^{-1}) which is similar to the gamma flux within the nuclear reactors.

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All dimensions in mm



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