

product specification

3 mm diameter in-core fission chamber

Application : The CFUR43 is a miniaturized fission chamber operating in current mode. When fitted with a driving cable, this detector is well adapted for in-core measurements of flux up to 1.5×10^{14} n.cm⁻².s⁻¹ at 350 °C and under high gamma flux. The integral cable construction makes it a fully watertight detector and allows measurements out of the «hot zone» of a nuclear power plant.

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

Nuclear characteristics

Sensitivity to thermal neutrons (1) :			
current mode		3×10^{-18}	A/n.cm ⁻² .s ⁻¹
Neutron flux range (2) :			
current mode		10^{11} to 1.5×10^{14}	n.cm ⁻² .s ⁻¹
Gamma sensitivity :		7×10^{-13}	A/Gy.h ⁻¹
Exposure limits at 350 °C:			
thermal neutrons (3)	max	1.5×10^{20}	n.cm ⁻²
gamma dose rate	max	10^7	Gy.h ⁻¹

Electrical characteristics

Insulating resistance at 150 V (4) :			
nominal at 20 °C	min	10^{12}	Ω
detector + 7 m cable at 350 °C	min	10^8	Ω
Operating voltage :			
nominal up to 350 °C		150	V
maximum at 20 °C		200	V
limit with no radiation		500	V
Detector :			
capacitance		10	pF
Cable :			
capacitance (5)		400	pF/m
characteristic impedance		8	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	0.2	mg.cm ⁻²

filling gas :		argon
pressure	110	kPa

Dimensions :

nominal diameter		3	mm
detector length		48.5	mm
overall length , on request (6) :	max	80	m
sensitive length		13	mm

Cable :

type (7)			1 coax
external diameter		1	mm
insulator			Al ₂ O ₃
curvature radius (8)	min	20	mm

Connector :

type (9)			BNC male UG 260 D/U
insulator			PTFE

Environmental characteristics

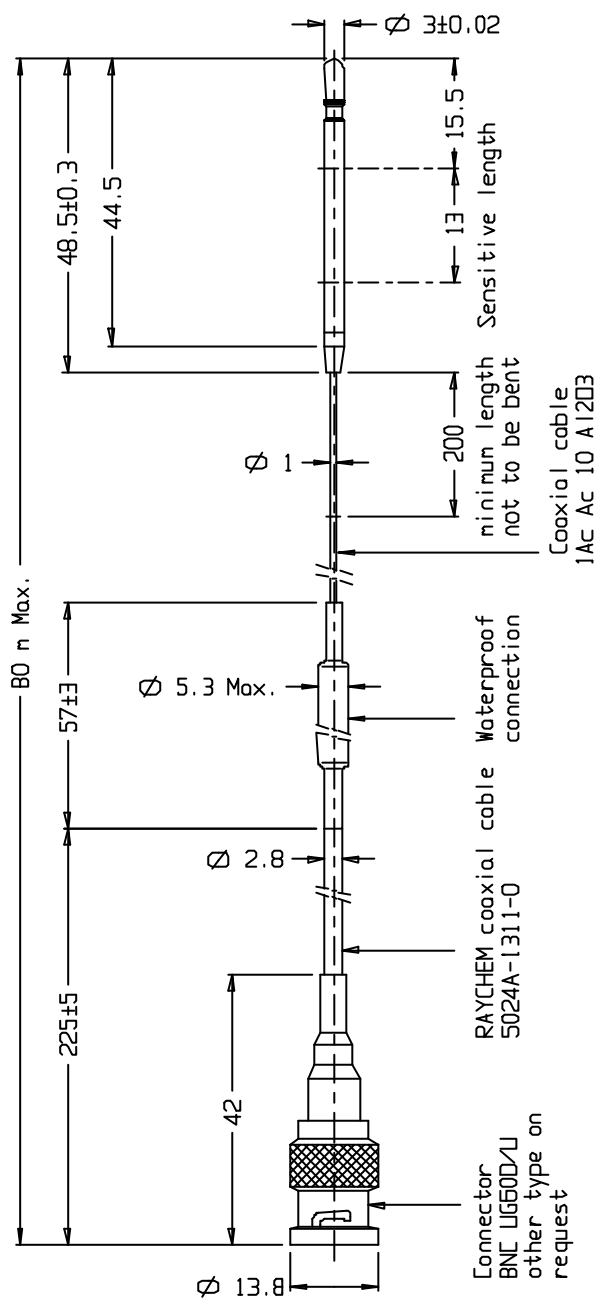
Operating temperature (10) :

detector + cable	max	350	°C
connector	max	70	°C

product specification**Notes**

- (1) Value depending on the characteristics and the calibration of the measurement equipment.
- (2) 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).
- (3) Flux corresponding to a 10 % sensitivity of the detector.
- (4) The insulating resistance measurement includes the α -current.
- (5) The capacitance of the detector alone (10 pF) is negligible compared with the capacitance of the cable.
- (6) The overall length (detector + cable + connector) constitutes the version code to be mentioned in the detector reference after the basic type number. For example CFUR43/15 indicates a detector with a 15 m overall length.
- (7) Our "coax" cable is the 1 AcAc 10 referenced cable from Thermocoax.
- (8) This is the smallest curvature radius allowing one reversible deformation.
- (9) 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.
- (10) Including temperature increase due to gamma radiation (effective above $10^4 \text{ Gy}\cdot\text{h}^{-1}$) which is similar to the gamma flux within the nuclear reactors.

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