

LB 6419

Neutron and Gamma Dose Rate Monitor for Continuous and Pulsed Fields

Concept

The neutron detector LB 6419 is designed to derive dose and dose rates at particle accelerators. In this environment, very specific conditions for dose monitoring prevail like pulsed radiation or high beam energies. Many conventional measuring devices for ionized radiation suffer greatly from dead-time effects and are therefore only limited suitable for the measurement of pulsed radiation fields. In addition, many types of detectors do not have the necessary sensitivity at high energies or high dose rates and tend to underestimate the radiation field intensities significantly.

The design of the dose rate monitor LB 6419 is unique in many respects:

- **Dual Detector Design** with ^3He and scintillation detector
- Measurement of neutron and gamma dose (rate)
- Measurement of prompt and delayed neutrons
- Measurement of low and high energy neutrons
- Unsurpassed level of measurement and data security through dual detection design and data storage

The **Dual Detector Design** is patented and provides outstanding features. Whereas prompt neutrons can be detected in the ^3He tube, those from pulsed sources produce short lived reaction residuals in the plastic scintillator or the surrounding which are observed with very high efficiency. The dose is derived from the intensity of those residuals between the pulses. Under typical pulsed beam conditions the probe does not suffer from saturation effects up to neutron dose rates of approx. 1 Sv/h in the burst. The primary reaction channels are: $^{12}\text{C}(n,p)^{12}\text{B}$, $^{12}\text{C}(n,p\alpha)^8\text{Li}$, $^{12}\text{C}(n,p^3\text{He})^9\text{Li}$. Furthermore, the gamma dose rate in the pulse can be detected with the plastic scintillator as well.

The **Dual Detector Design** provides in addition a security far better than any other REM counter. Both detectors are applied independently and controll themselves mutually. Two independent interlock signals round out the security concept.

Detector signals of two pulses and the intermediate decay time of the reaction residuals

Technical Data

Dose Rate Detectors

Radiation detector	Organic scintillator ^3He tube
Measurement modes	Neutron- and γ measurement simultaneously and separate, prompt and delayed neutron

Ambient Conditions

Temperature range	0 °C to + 40 °C (operation)
Rel. humidity	≤ 80 %, non-condensing

Mechanical Data

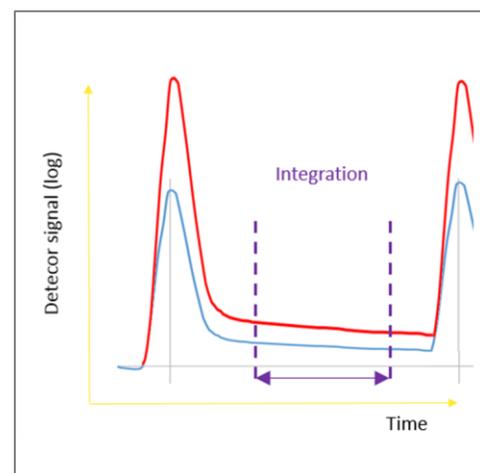
Dimensions	(L x W x H in mm) 300 x 200 x 600
Weight	approx. 11.5 kg

Electronics

Data Processing	FLASH-ADC board integrated in steel housing
Interfaces	RJ 45 Ethernet connector
Mains supply	110 V – 230 V
Data analysis	Read out through dedicated PRM software Display of Dose from <ul style="list-style-type: none"> • High energy Neutrons • Low energy neutrons • Gamma radiation
Alarm	Two independent interlock outputs

Accessories (optional)

PRM Software	Software for PC
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This instrument is not intended to be used for diagnostic and/or therapeutic purpose for human beings and is not a medical device - according to the definitions of the European Council Directive 93/42/ECC concerning medical devices.