

GR-206/207A TLD neutron detector



Overview

The GR-206/207A lithium fluoride thermoluminescent detector is a passive, solid-state integrating-type detector. Its key features include small size (high spatial resolution), effective atomic number close to that of air and human tissue, immunity to electromagnetic interference, a wide measurement range, low lower detection limit, good reproducibility, and the

capability to measure high-dose-rate pulsed radiation fields. It is applicable to personal monitoring of ionizing radiation, environmental monitoring, and measurement in specific radiation fields (including differential measurement in mixed neutron-gamma fields). It can also be applied in fields such as radiological medicine, radiobiology, reactor engineering, and archaeology.

The GR-206A $^6\text{LiF:Mg,Cu,P}$ detector is used for neutron dose measurement in mixed fields, while the GR-207A $^7\text{LiF:Mg,Cu,P}$ thermoluminescent detector is used for gamma-ray dose measurement in mixed fields. The latter can also be used for monitoring the personal dose equivalent $H_p(10)$ of radiation workers and for photon energy discrimination.

Applicable Standards

- GB 18871-2002 *Basic Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources*
- EJ 1153-2004 *Specifications for Individual Monitoring of X and γ External Exposure*
- GB 10264-2014 *Thermoluminescence Dosimetry Systems for Personal and Environmental Monitoring*
- GB/T 13161-2015 *Radiation Protection Instrumentation — Measurement of Personal Dose Equivalents $H_p(10)$ and $H_p(0.07)$ for X, Gamma, Neutron and Beta Radiations — Direct Reading Personal Dose Equivalent Meters*
- GBZ 128-2019 *Specifications for Individual Monitoring of Occupational External Exposure*

Specifications

Parameter	Specification
Detector	$^6\text{LiF:Mg,Cu,P}$ disc detector and $^7\text{LiF:Mg,Cu,P}$ disc detector
Dimensions	$^6\text{LiF:Mg,Cu,P}$ detector: $\phi 4.5 \times 0.8$ mm $^7\text{LiF:Mg,Cu,P}$ detector: $\phi 4.5 \times 0.8$ mm
Measurement Range	0.01 mGy to 12 Gy

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Parameter	Specification
Dispersion	$\leq \pm 5\%$
Energy Response	$\leq \pm 20\%$ (photons from 30 keV to 3 MeV)
Batch Uniformity	$\leq 5\%$
Light Effect	No significant response to indoor scattered sunlight, incandescent light, or fluorescent light; responsive to direct sunlight (UV)
Storage Information Stability	No significant fading after one month storage at room temperature; fading $< 3\%$ after one month storage at 50 °C
Operating Environment	T < 50 °C; RH $< 60\%$

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