

# AT2503B, AT2503B/1, AT2503B/2 Personal Dosimeters

## CONTROL OF X-RAY AND GAMMA RADIATION PERSONAL DOSE EQUIVALENT



Pocket-size direct-reading intelligent instruments are an ideal combination of accuracy, functionality, usability, reliability and price.

The dosimeters are designed for measurement of Hp(10) personal dose equivalent and Hp(10) personal dose equivalent rate of continuous X-ray and gamma radiation.

### Operating principle

Geiger-Muller counter tube with energy compensating filter is used as a detector.

Intrinsic background metering and microprocessor processing provides high measurement accuracy.

Microprocessor operation mode management, data processing, display on TFT screen and self-check function.

Integrated non-volatile memory allows recording and saving in de-energised state all accumulated dose data and dose accumulation history.

The dosimeter, PC-connectible reader, and application software suite make an efficient automatic system for automated control and accounting of personnel radiation burden at sites where ionizing radiation is used.

The system offers the following functions:

- Read manufacturer and individual numbers in the dosimeter
- Read the "dose log" data
- Reset (zero) the accumulated dose and "dose log" data
- Read the total operating time and the total dose accumulated by the dosimeter in the process of operation
- Dosimeter configuration:
  - Allow/deny threshold selection by a button
  - Modify individual dosimeter number
  - Adjust accumulation interval and alarm thresholds
  - Allow/deny resetting of accumulated dose by button

### Application

- Radiation protective measures in case of nuclear disasters
- Nuclear industry
- Nuclear medicine
- Radiology
- Civil protection
- Civil aviation
- Research activities
- Dose monitoring of population

### Features

- Simultaneous measurement of Hp(10) personal dose equivalent and Hp(10) personal dose equivalent rate of continuous X-ray and gamma radiation
- Autocompensation of intrinsic detector background
- Resistance to impacts and vibration, dust-and-moisture-proof, tolerance to electromagnetic interference
- Constant detector self-check and battery level monitoring
- Sound and LED alarm
- Can be integrated into a system or used separately
- Low weight and small size
- Calibrated with water phantom ISO 30x30x15 cm
- Dosimeter-to-PC communication via IR-transmitter in reader
- Average service life is not less than 15 years



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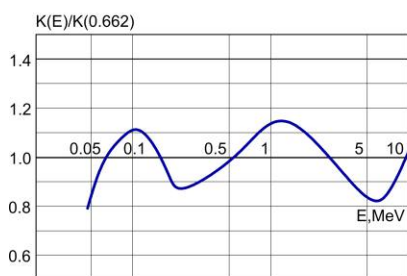
Ionizing radiations  
detectors and  
instruments

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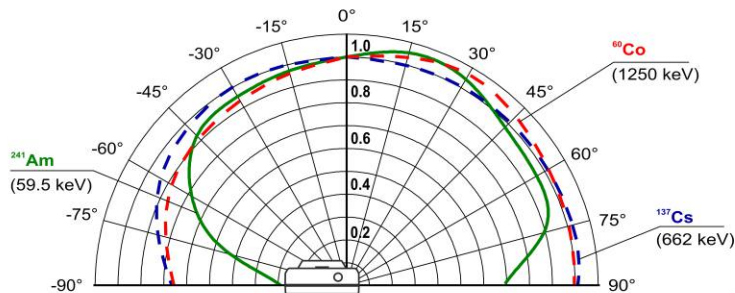
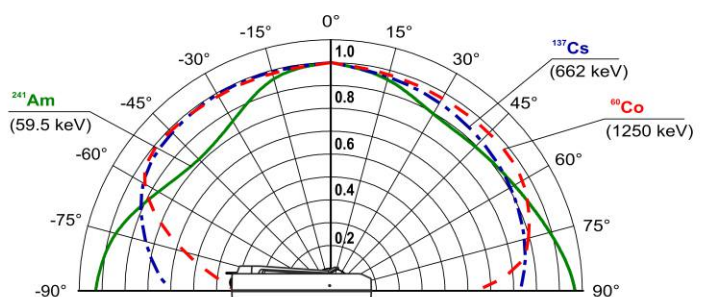
Specifications	AT2503B	AT2503B/1	AT2503B/2
Detector	Geiger-Muller counter tube		
Energy range	50 keV – 10 MeV		
Measurement range of individual dose equivalent	0.1 $\mu$ Sv – 10 Sv	0.1 $\mu$ Sv – 10 Sv	1 $\mu$ Sv – 10 Sv
Measurement range of individual dose rate equivalent	0.1 $\mu$ Sv/h – 1 Sv/h	0.1 $\mu$ Sv/h – 0.2 Sv/h	1 $\mu$ Sv/h – 10 Sv/h
Limits of variation of the response due to dose	$\pm(15+U_{relD})\%$ , where $U_{relD}$ is the relative expanded uncertainty of accepted dose value at the check point in %. Coefficient of variation $v$ above $(16-H/H_0)\%$ for the dose $H < 11H_0$ and not above 5% for the dose $H \geq 11H_0$ , where $H_0$ is the lower limit of dose measurement		
Limits of variation of the response due to dose rate	$\pm(15+U_{relDR})\%$ , where $U_{relDR}$ is the relative expanded uncertainty of accepted dose rate value at the check point in %. Coefficient of variation $v$ does not exceed: 20% for dose rates $\dot{H} < 10 \mu\text{Sv/h}$ $(21-\dot{H}/10 \mu\text{Sv/h})\%$ for dose rate value of $10 \mu\text{Sv/h} \leq \dot{H} < 60 \mu\text{Sv/h}$ 15% for dose rates $\dot{H} \geq 60 \mu\text{Sv/h}$		
Limits of variation of relative response due to gamma radiation energy (50 keV to 10 MeV) and angle of incidence ( $0^\circ$ to $\pm 60^\circ$ )	$-(29+U_{relDR})\%$ to $+(67+U_{relDR})\%$ , where $U_{relDR}$ is the relative expanded uncertainty of the conventional value of a dose rate		
Calibration error for $^{137}\text{Cs}$	$\pm 5\%$		
Response time to 10-fold dose rate change	$\leq 5$ s (for dose rate value $> 1$ mSv/h)		
Radiation overloading	$\leq 10$ Sv/h	$\leq 2$ Sv/h	$\leq 20$ Sv/h
Alarm thresholds	1 of 8 independent dose thresholds, 1 of 8 independent dose rate thresholds		
Power supply options	SR44 type batteries with nominal voltage 1.5V and minimum capacity 150 mA·h each		
Total run time on one set of batteries	$\geq 1000$ h (for $\dot{H}_p(10) \leq 10 \mu\text{Sv/h}$ )		
Protection class	IP54		
Drop protection	From $\leq 1.5$ m to a hard surface		
Average operating life	$\geq 15$ years		
Connection to PC	USB 2.0 (in the Reader)		
Operation temperature range	$-30^\circ\text{C}$ to $+60^\circ\text{C}$		
Relative air humidity	$\leq 90\%$ (Air temperature $\leq 35^\circ\text{C}$ without condensation)		
Dimensions	85x46x16 mm (w/o clip)		
Weight	70 g (w/o batteries)		

The personal dosimeters comply with: IEC 61526:2010 (confirmed by tests IAEA-EURADOS, IAEA-TECDOC-1564), GOST 27451-87 Safety requirements of IEC 61010-1:2010 EMC requirements of EN 55011:2009, IEC 61000-4-2:2008, IEC 61000-4-3:2008

Design and specifications are subject to change without notice



Typical energy dependence of dosimeters relative to energy 0.662 MeV gamma radiation  $^{137}\text{Cs}$



Typical anisotropy of the dosimeters



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