AT1121, AT1123
X-ray and gamma radiation dosimeters

Photon radiation energy range

15 keV ... 10 MeV

Portable multifunctional wide-range instruments for X-ray and gamma radiation dosimetry of the following types:

- Continuous long-term radiation
- Continuous short-term radiation
- Pulse radiation [AT1123]

Operating principle

Main function of the dosimeter is the measurement of X-ray and gamma radiation within wide ranges of ambient dose equivalent rate and energy. Additional functions: detecting soft and hard gamma and beta radiation sources, measuring pulse and short-term radiation with exposure time assessment, and detecting moving sources as well.

Dosimeters automatically save maximum dose rate value for the time of operation and are able to store up to 999 measurement results in non-volatile memory for a long time and to subsequently transfer this data to PC.

Continuous performance self-testing is done during operation.

External control unit and external alarm unit can be attached to dosimeters for remote monitoring application.

Dosimeter with external control and external alarm units

Radiation type	***AT1121***		***AT1123***	
	Ḣ*(10)	H*(10)	Ḣ*(10)	H*(10)
X-ray	+	+	+	+
Gamma	+	+	+	+
Bremsstrahlung	+	+	+	+
Continuous long-term	+	+	+	+
Continuous short-term	+	+	+	+
Pulsed	–	–	+	+
Beta (detection)	+	+	+	+

Applications

- X-ray diagnostics
- Nuclear medicine
- Radiology
- X-ray and gamma-ray flaw detection
- X-ray and gamma-ray testing
- Search X-ray and accelerating apparatus
- Radiation accidents
- Radiation monitoring
- Nuclear industry
- Accelerating installations
- Research activities

Features

- Tissue-equivalent detector - scintillation plastic
- High sensitivity results in rapid measurements with good statistical confidence
- Wide measurement range with 8 orders of magnitude and more
- Wide energy range starting from 15 keV
- Measurement of short-term exposure dose rate and time (from 0.03 s) for continuous radiation
- Measurement of average dose rate of pulse radiation with duration from 10 ns [AT1123]
- Large dedicated digital/analogue LCD screen with backlighting
- Integrated system for LED measurement path stabilization
- Sound and visual alarm in case threshold level is exceeded
- External control panel can be used for remote measurement
- Fixed installation option with external audio-visual alarm with four groups of potential-free contacts for actuator control
- Connection to PC is available in order to create a continuous monitoring system with documenting function
- Tree types of power sources
- Severe operating conditions

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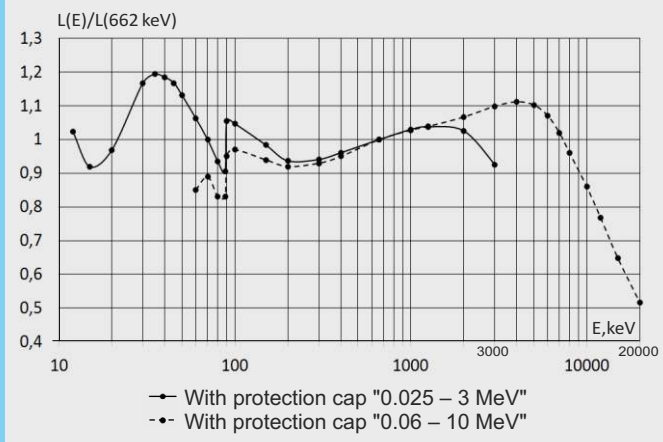
Specification

Detector	Scintillation plastic, Ø30x15 mm
Ambient dose equivalent rate measurement range	
Continuous long-term radiation	
AT1121, AT1123	50 nSv/h ... 10 Sv/h
Continuous short-term radiation	
AT1121, AT1123	5 μSv/h ... 10 Sv/h
Pulse radiation	
AT1123	0.1 μSv/h ... 10 Sv/h
Ambient dose equivalent measurement range	10 nSv ... 10 Sv
Energy range	
Continuous long-term and short-term radiation	15 keV ... 10 MeV
Pulse radiation (AT1123)	15 keV ... 10 MeV
Energy dependence relative to 662 keV (^{137}Cs)	
15 ... 60 keV (with protection cap "0.025 – 3 MeV")	±35%
60 keV ... 3 MeV (with protection cap "0.025 – 3 MeV")	±25%
60 keV ... 10 MeV (with protection cap "0.06 – 10 MeV")	±25%
10 ... 20 MeV * (with protection cap "0.06 – 10 MeV")	-50% max.
Minimum duration of pulse radiation for pulse dose rate up to 1.3 Sv/s (AT1123)	10 ns
Minimum duration of continuous short-term radiation	0.03 s
Intrinsic relative measurement error	
Continuous long-term and short-term radiation	±15% max.
Pulse radiation (AT1123)	±30% max.
Sensitivity to ^{137}Cs gamma radiation	70 cps/μSv·h^{-1}
Response time for dose rate change from 0.1 to 1 μSv/h (accuracy error ≤±10%)	<2 s
Time of ^{137}Cs gamma radiation dose rate measurement with statistical error ±15% (P=0.95) for the following dose rate:	
50 nSv/h	≤60 s
0.3 μSv/h	≤10 s
over 2 μSv/h (Up to 10 Sv/h)	≤2 s
Sensitivity to associated beta radiation of ^{90}Sr + ^{90}Y with filter (with protection cap "0.06 – 10 MeV") at 5 cm distance	3·10^{-7} μSv·h^{-1}·Bq^{-1}
Burn-up life	≥100 Sv
Operation mode setup time	1 min
Power supply and continuous run time	
Alternate or direct current mains	≥24 h
Internal battery	
AT1121	≥24 h
AT1123	≥12 h
Protection class	Ip54

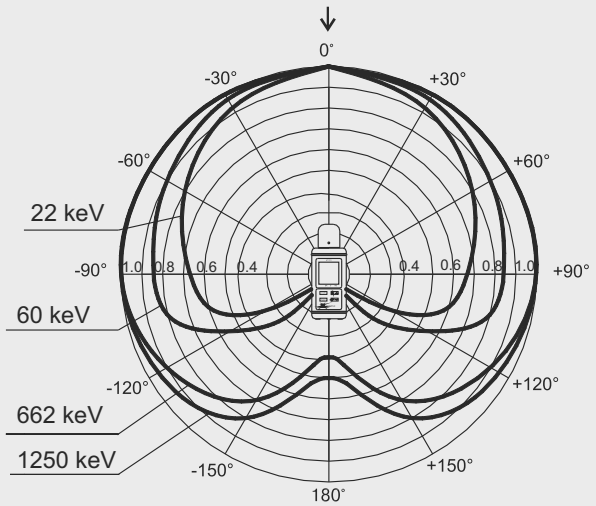
Design and specifications are subject to change without notice

Working temperature range	-30°C ... +50°C
Relative humidity with air temperature ≤35°C without condensation	≤95%
Overall dimensions	233x85x67 mm
Weight	0.9 kg



Normal energy dependence relative to 662 keV (^{137}Cs)

(*Energy dependence in 10 ... 20 MeV range is based on Monte Carlo method and is for reference only)



Normal dosimeter anisotropy for horisontal plane

The X-ray and gamma radiation dosimeters meet Safety standard requirements: IEC 61010-1:1990
EMC requirements: EN 55011:2009, IEC 61000-4-2:2008, IEC 61000-4-3:2008, IEC 61000-4-4:2004, IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-11:2004

The X-ray and gamma radiation dosimeters have the pattern approval certificates of Republic of Belarus, Russian Federation, Kazakhstan, Ukraine, Lithuania, Uzbekistan, Azerbaijan

ATOMTEX®
http://www.atomtex.com
5, Gikalo st.,220005 Minsk, Republic of Belarus
Tel./fax: +375 17 2928142
E-mail: info@atomtex.com

ISO 9001

Corporate Member of European Nuclear Society