

AT2327 Alarm Dosimeter (Pedestrian Radiation Monitors)



Application

- Radiation monitoring of pedestrians walking in front of PRM:
 - In public places and institutions
 - In airports, bus terminals, railway and underground stations
 - At entry/exit of nuclear industry objects
 - In border control and customs clearance points



Stationary two-channel Pedestrian radiation monitor (PRM) is designed for continuous and automatic detection of gamma and neutron radiation sources in a stream of people crossing borders of secured facilities.

PRM without neutron channel is available as an option.

Operating principle

PRM is based on smart gamma and neutron detection units.

PRM automatically activates natural gamma background measurement mode after power on. This measurement value is used to calculate and set the threshold gamma radiation level – alarm level.

When a pedestrian crosses the control zone line PRM switches into continuous gamma radiation measurement mode with count rate calculation where it compares the measured values to alarm threshold level and detects whether the neutron radiation is present/absent. When one of the pre-set alarm thresholds level is exceeded the sound and light (red) alarm triggers to inform staff (security) that a gamma or neutron radiation source is detected.

Multiple PRMs (up to 32) can be joined into a radiation monitoring network controlled by dedicated software on personal computer. In this case the personal computer displays status of each PRM, its location on monitored site plan, keeps alarm records and logs. Video recorder allows logging of monitored site video frames.

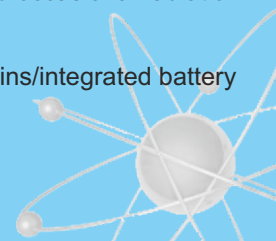
PRM consisting of:
BDKG11/1 (BDKG-19) and
BDKN-01 (BDKN-05)



PRM consisting of:
BDRM-05 and BDKN-05

Features

- Fast 2-second response when background level is exceeded:
 - by 0.05 $\mu\text{Sv/h}$ (BDKG-11/1)
 - by 0.03 $\mu\text{Sv/h}$ (BDKG-19)
 - by 0.04 $\mu\text{Sv/h}$ (BDKG-35)
 - by 0.01 $\mu\text{Sv/h}$ (BDRM-05)
- Rapid accommodation to radiation background change
- Activation of sound and light alarm when a gamma and/or neutron radiation is detected
- Multiple pedestrian radiation monitors can be joined into a network controlled by dedicated software on personal computer
- Mobility and safely lane capability
- Component self-testing during operation
- Continuous and occasional radiation monitoring
- 230V-50Hz mains/integrated battery operation



ATOMTEX[®]

INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR
MEASUREMENTS AND RADIATION MONITORING

AT2327 Alarm Dosimeter (Pedestrian Radiation Monitors)

PRM specifications

Alarm	Sound and light
Initialisation time	≤ 5 min
Power supply	1) Mains: 110-230 VAC, 50-60 Hz 2) Rechargeable battery for emergency operation
Continuous operation time when powered from rechargeable battery	≥ 6 h
False response quantity	≤ 1 for 8 h of continuous operation
PC interface	RS485
Number of monitors connected to a single PC	1 – 32
Burn-up life	≥ 100 Sv
Protection rating	IP65
Operation temperature range	-30°C to +50°C (-20°C to +50°C with BDKG-19)
Dimensions	800x600x200 mm [with BDKG-11/1 (BDKG-19) and BDKN-01 (BDKN-05)] 1400x600x300 mm [with BDKR-05 and BDKN-01 (BDKN-05)]
Relative air humidity	≤ 95% (Air temperature ≤ 35 °C without condensation)

AT2327 Alarm dosimeter meets requirements of GOST 27451-87 (Ionizing radiation measuring means), safety requirements of IEC 61010-1:2001, and EMC compatibility requirements: EN 55011:2009, IEC 61326-1:2006, IEC 61000-4-2:2008, IEC 61000-4-3:2008, IEC 61000-4-4:2004+A1:2010, IEC 61000-4-5:2005, IEC 61000-4-6:2008, IEC 61000-4-8:2009, IEC 61000-4-11:2004
Alarm dosimeter is listed in national registries of measurement instruments of Republic of Belarus, Russian Federation, Kazakhstan and Ukraine.

Specifications of detection units in pedestrian radiation monitors

Gamma radiation detection units (DU)			BDKG-11/1	BDKG-19	BDKG-35	BDRM-05
Scintillation detector			Nal(Tl) Ø63x63 mm	Nal(Tl) Ø63x160 mm	Plastic Ø70x150 mm	Plastic 1000x100x50mm
Energy range			50 keV – 3 MeV	50 keV – 3 MeV	20 кэВ – 3 МэВ	50 keV – 3 MeV
Sensitivity to gamma radiation, (cps/μSv·h ⁻¹)		Am-241	≥ 2360	≥ 7070	≥ 10000	≥ 30000
		Cs-137	≥ 1810	≥ 4430	≥ 3200	≥ 30000
		Co-60	≥ 1030	≥ 2340	≥ 1600	≥ 15000
Response time for dose rate change from 0.1 to 1 μSv/h			< 2 s	< 2 s	< 2 s	< 2 s
Minimal detectable gamma radiation dose rate level above background value 0.1 μSv/h in a period not longer than 2 s			0.05 μSv/h	0.03 μSv/h	0.04 μSv/h	0.01 μSv/h
Detection threshold for unshielded source at 1 m height under natural radiation background conditions not more than 0.1 μSv/h (Distance to source 1 m, source travel speed 5 km/h, probability of source detection 80% under confidence level P=0.95)	1 DU	Am-241 Cs-137 Co-60	34.5 MBq 500 kBq 220 kBq	17 MBq 260 kBq 120 kBq	12.3 MBq 300 kBq 150 kBq	1.3 MBq 70 kBq 35 kBq
	2 DU	Am-241 Cs-137 Co-60	–	11.6 MBq 180 kBq 95 kBq	8.4 MBq 210 kBq 110 kBq	900 kBq 46 kBq 25 kBq

Neutron radiation detection units			BDKN-01	BDKN-05
Detector			He-3 proportional counter in polyethylene moderator	Two He-3 proportional counters in polyethylene moderator
Energy range			0.025 eV – 14 MeV	
Sensitivity to source radiation at the distance of 1 m			Cf-252	≥ 1.3 counts·cm ² /neutron
Source detection threshold at 1 m height (Distance to source 1 m, source travel speed 5 km/h, probability of source detection 90% (50%*) under confidence level P=0.95)	1 DU	Cf-252	3.0·10 ⁵ neutron/s (1.65·10 ⁵ neutron/s)*	3.1·10 ⁴ neutron/s (1.9·10 ⁴ neutron/s)*
	2 DU	Cf-252	–	2.0·10 ⁴ neutron/s (1.35·10 ⁴ neutron/s)*

Design and specifications are subject to change without notice



ATOMTEX®

<http://www.atomtex.com>

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



EN
Corporate Member
of European
Nuclear
Society