

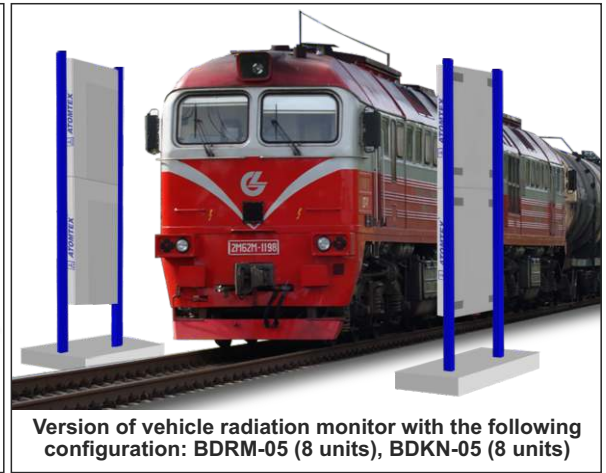
# AT2327 Alarm Dosimeter (Vehicle Radiation Monitor)



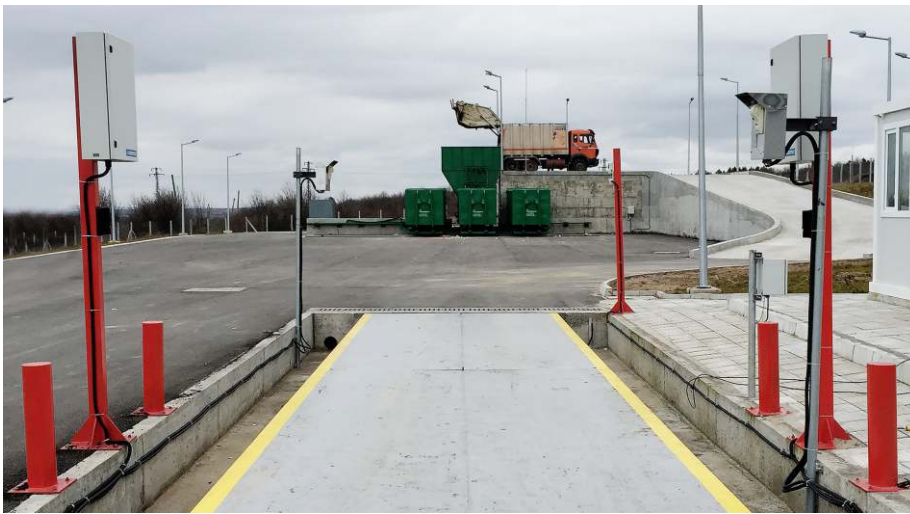
Version of vehicle radiation monitor with the following configuration: BDKG-19 (2 units), BDKN-05 (2 units)



Version of vehicle radiation monitor with the following configuration: BDRM-05 (4 units), BDKN-05 (4 units)



Version of vehicle radiation monitor with the following configuration: BDRM-05 (8 units), BDKN-05 (8 units)



Automatic stationary solution for continuous radiation monitoring designed to detect sources of gamma and neutron radiation in vehicles crossing access control points.

## Operating principle

Operating principle of vehicle radiation monitor is based on detection units, which detect gamma and neutron radiation. One or two detection units are located and wired inside a cabinet to form a measurement device. Measurement devices are mounted on posts arranged on both sides of vehicle passage lane. Two or one measurement device are mounted on each side of the passage depending on external dimensions of vehicles to control.

After initialization the alarm dosimeter switches to natural radiation background measurement mode. This procedure is indicated by a yellow light on Alarm unit. When this measurement procedure is over the count rate threshold levels is calculated and a green indicator lights when the alarm dosimeter is ready for operation.

When a moving vehicle crosses the control zone line, it breaks the beam from the IR emitter to the photoelectric detector IR receiver, and all detection units are automatically switched from the background measurement mode to the detection mode. Count rate data from each detection unit in detection mode is transferred through RS485 interface to a remote control panel, which is located in a control room.

When the set count rate threshold level is exceeded the audio and red light alarm is actuated on the Alarm unit to inform the staff about gamma or neutron radiation source detection.

In case of malfunction of one or multiple detection units the radiation monitor recalculates threshold levels for the rest detection units.

Control panel is used for setting threshold calculation parameters for each detection unit, controlling detection units state, correcting real-time clock, password protection of selected functions, viewing count rate fluctuation history and threshold levels crossing in each reference point.

## Application

- Access control points
- Public utility companies for solid domestic waste disposal
- Scrap metal salvage and reprocessing facilities and smelters
- Nuclear industry facilities

## Features

- Automatic switching from background radiation measurement to detection when a vehicle crosses the control zone line
- Rear side of gamma radiation detection unit is screened by lead plates
- Set threshold levels are automatically corrected according to changes of natural radiation background
- Sound and light alarm in case threshold levels are exceeded
- Self-monitoring of component parts
- Severe operating conditions
- Count rate levels and cases of threshold crossing are automatically recorded into the history log
- Backup power source is available: Continuous operation for up to 6 hours (4 detection units)



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INSTRUMENTS AND TECHNOLOGIES FOR NUCLEAR MEASUREMENTS AND RADIATION MONITORING

# AT2327 Alarm Dosimeter (Vehicle Radiation Monitor)

## Specification of vehicle radiation monitors

Passage width / height	6 m / 4 m
Detection time per one vehicle	≤20 s
Alarm	3-stage light alarm and sound alarm
False response rate	≤1 per 1000 crossings
Initialisation time	≤5 min
Power supply	1) Mains: 110-230 VAC, 50-60 Hz 2) Rechargeable battery for emergency power
Continuous operation time when powered from rechargeable battery	≥6 h
Burn-up life	≥100 Sv
Protection rating	IP65
Operation temperature range	From -30°C to +50°C (From -20°C to +50°C with BDKG-19) <i>Optional:</i> From -50°C to +50°C, when located inside cabinets (For BDKG-11/1, BDKG-19, BDKG-35, 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 vehicle radiation monitors

Gamma radiation detection units (DU)		BDKG-11/1	BDKG-19	BDKG-35	BDRM-05
Detector		Nal(Tl) scintillator, Ø63x63 mm	Nal(Tl) scintillator, Ø63x160 mm	Scintillation plastic, Ø70x150 mm	Scintillation plastic, 1000x100x50 mm
Energy range		50 keV – 3 MeV	50 keV – 3 MeV	20 keV – 3 MeV	50 keV – 3 MeV
Sensitivity to gamma radiation, min. (cps/μSv·h <sup>-1</sup> )	Am-241 Cs-137 Co-60	2360 1810 1030	7070 4430 2340	10000 3200 1600	30000 15000
Response time		<2 s (For dose rate change from 0.1 to 1 μSv/h)			
Minimal detectable gamma radiation dose rate level above background value (0.10 ± 0.05) μSv/h for maximum period of 2 s		0.05 μSv/h	0.03 μSv/h	0.04 μSv/h	0.01 μSv/h

Minimal detectable activity of Cs-137 source. Probability of source detection is 0.95		BDKG-11/1	BDKG-19	BDKG-35	BDRM-05
<i>For motor vehicles</i> Passage: Width – 6 m, height – 4 m Travel speed is 10 km/h	1 DU at each side of passage	–	2.1 MBq	2.7 MBq	0.38 MBq
	2 DU at each side of passage	2.6 MBq	1.5 MBq	1.9 MBq	0.30 MBq
	4 DU at each side of passage	–	–	–	0.21 MBq
<i>For railway vehicles</i> Passage: Width – 6 m, height – 4 m Travel speed is 25 km/h	1 DU at each side of passage	–	–	–	0.63 MBq
	2 DU at each side of passage	–	–	–	0.45 MBq
	4 DU at each side of passage	–	–	–	0.35 MBq

Neutron radiation detection units	BDKN-05
Detector	Two He-3 proportional counters in polyethylene moderator
Energy range	0.025 eV – 14 MeV
Sensitivity to neutron radiation of Cf-252 source at the distance of 1 m, not less	20 impulse·cm <sup>2</sup> /neutron

Minimal detectable activity of Cf-252 source Probability of source detection is 0.9 (0.5)		BDKN-05	
		Probability is 0.9	Probability is 0.5
<i>For motor vehicles</i> Passage: Width – 6 m, height – 4 m Travel speed is 10 km/h	1 DU at each side of passage	6.5·10 <sup>4</sup> neutron/s	4.2·10 <sup>4</sup> neutron/s
	2 DU at each side of passage	4.3·10 <sup>4</sup> neutron/s	2.9·10 <sup>4</sup> neutron/s
	4 DU at each side of passage	3.0·10 <sup>4</sup> neutron/s	2.2·10 <sup>4</sup> neutron/s
<i>For railway vehicles</i> Passage: Width – 6 m, height – 4 m Travel speed is 25 km/h	1 DU at each side of passage	–	–
	2 DU at each side of passage	–	–
	4 DU at each side of passage	4.0·10 <sup>4</sup> neutron/s	2.9·10 <sup>4</sup> neutron/s

Design and specifications are subject to change without notice