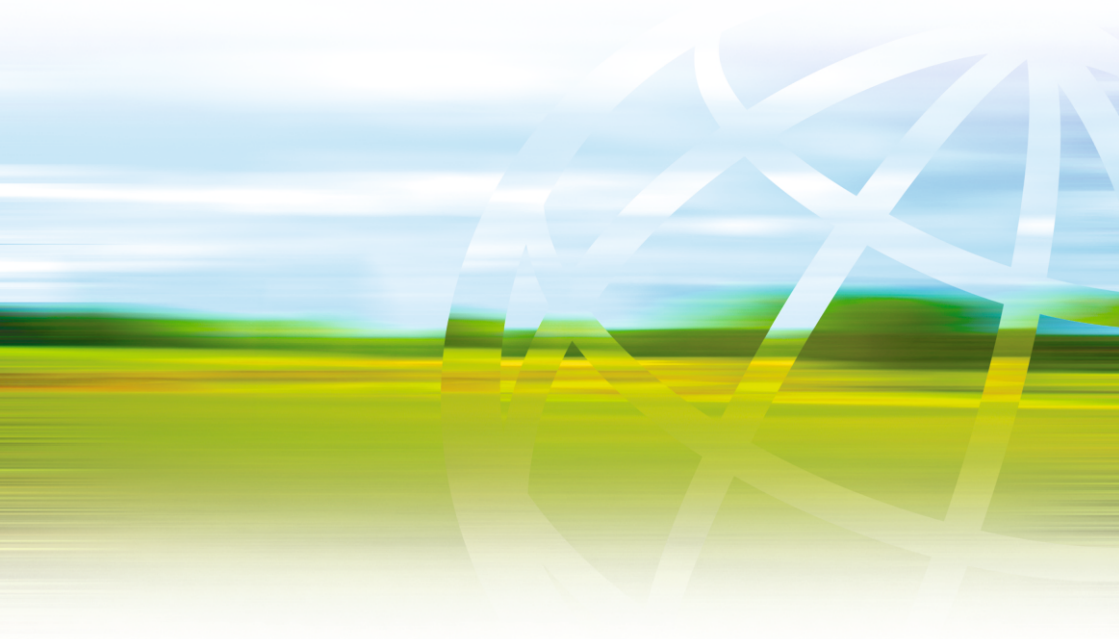
ECOTEST®

Radiation Measurement Instruments



CATALOGUE

BUREAU VERITAS
Certification

Private Enterprise "Scientific and Production Private Enterprise "Sparing-Vist Center"

33 Volodymyr Velyky Str., Lviv, 79026, Ukraine

Bureau Veritas Certification certify that the Management System of the above organization has been audited and found to be in accordance with the requirements of the management system standard detailed below

Standard

ISO 9001:2008

Scope of certification

Development, sale, production, warranty and post-warranty services of radiation control devices.

Certification cycle start date: **06 October 2012**

Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **05 October 2015**

Original certification date: 06 October 2006

Certificate No. UA226931 Version 0, Revision date: **05 July 2012**

O. Adamenko

UKAS MANAGEMENT SYSTEMS
008

Certification body address: Brandon House, 180 Borough High Street, London, SE1 1LB, United Kingdom
Local office: 5th floor, 28, Simon Petlyura St., Kyiv, 01032, UKRAINE

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization.
To check this certificate validity please call **+380 44 354 16 00.**

your radiation safety

ECOTEST®
Radiation Measurement Instruments

The Scientific and Production Private Enterprise “Sparing-Vist Center” is a well-known developer and manufacturer of radiation measurement instruments of ECOTEST trademark in Ukraine and worldwide.

Over 200 highly-qualified and experienced specialists in the field of radio engineering

For almost three decades our dedicated team of the best experts has been working to protect people against radiation hazard.

Over 30 instruments and systems of radiation measurement

We offer a full line of comprehensive solutions including personal, hand-held, transportable devices as well as fixed systems designed to solve diverse measurement problems. The majority of our products have been certified and included in the State Register for Measuring Instruments of Ukraine and other countries of the world.

Export to more than 80 countries. 30 official dealers worldwide

We sell globally with partnerships and distribution channels in Europe, Asia, Africa, Australia, North and Latin America, to a variety of clients – from Ukrainian and Kazakh ministries and governmental agencies to Korean and Bulgarian nuclear power plants, as well as to individual customers. We appreciate trust and confidence of every particular client.

International technical assistance programs

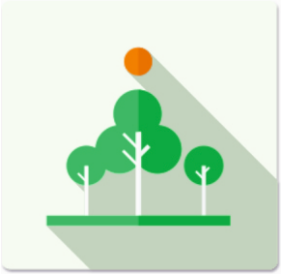
Participation in international technical assistance programs since 2002, including the program on equipping the Second Line of Defense, gave us considerable experience as well as opportunity to confirm our longstanding reputation as a reliable partner.

We handle the orders of many ministries and departments

"ECOTEST" TM products are used by: Ministry of Defense of Ukraine, State Emergency Service of Ukraine, State Border Guard Service of Ukraine, Ministry of Ecology and Natural Resources of Ukraine, Security Service of Ukraine, Ministry of Internal Affairs of Ukraine, Ministry of Health, State Guard Service of Ukraine, the Border Service of Republic of Kazakhstan and the Border Service of Republic of Uzbekistan.

ISO 9001-2008 certificate of standard compliance

We have been working in accordance with the introduced and implemented Quality Management System since 2006, which is ascertained by the ISO 9001-2008 certificate of standard compliance, issued by the International Association "BUREAU VERITAS". The existing quality management system of the company guarantees stable quality of products, including the processes of devices development, production, supply to the customer, as well as warranty (2 years) and post-warranty servicing.



Continuous improvement and innovations

We constantly improve our products and enhance their functional capabilities considering the needs of the market by using innovative technologies, modern component parts and materials. In a new economic era our management took up a challenge and became the leader of change. Production of high quality products, professional administration, entrepreneurial spirit and promotion of team spirit are considered to be the main terms of long-lasting leading presence of the ECOTEST TM products on the market.

Every challenge is accepted!

We believe that long-term partnership is the most effective approach to problems solving. That is why we are always ready to offer our clients customized approach to fully meet their specific requirements.

The “ECOTEST” TM products are subdivided into:

• Handheld detection

TERRA
  Dosimeter-radiometer MKS-05
STORA-TU
  Gamma, Beta Radiation Radiometer-Dosimeter RKS-01
CADMIUM
  Search Alarm Dosimeter DKS-02PN
SPECTRA
  Search Dosimeter-Radiometer MKS-11GN
aGent-R
  Gamma Radiation Warning Device

• Personnel Exposure Monitoring

EcotestCARD
  Personal Gamma Radiation Dosimeter DKG-21
DKG-21M
  Personal Gamma Radiation Dosimeter
PDC ECOMONITOR
  Software for Programming and Dosimetry Control
ASIDC-21
  Automated System of Individual Dosimetry Control

• Isotope Identification

SPECTRA
  Search Dosimeter-Radiometer MKS-11GN

• Contamination and activity measurement

MKS-U
  Multipurpose Dosimeter-Radiometer
MKS-UM
  Multipurpose Dosimeter-Radiometer
POSHUK
  Search Dosimeter-Radiometer MKS-07
VIRTUOSO
  Multipurpose environment activity radiometer RKG-14

• Survey Monitors

POSHUK
  Search Dosimeter-Radiometer MKS-07
STORA-TU
  Gamma, Beta Radiation Radiometer-Dosimeter RKS-01
CADMIUM
  Search Alarm Dosimeter DKS-02PN
SPECTRA
  Search Dosimeter-Radiometer MKS-11GN
MKS-U
  Multipurpose Dosimeter-Radiometer
MKS-UM
  Multipurpose Dosimeter-Radiometer

• Area monitoring

IT-09T
  Data Panel
IT-09
  Data Panel
BDBG-09
  Intelligent Detecting Unit of Gamma Radiation
BDBG-09
  Intelligent Water-Resistant Detecting Unit of Gamma Radiation
BDBG-15S-09 and BDBG-15S-23
  Detecting Units of Gamma Radiation
RadSpace
  Automated system of remote radiation monitoring
RadMonitor
  Computer-Aided System of Radiation Control
POSHUK
  Search Dosimeter-Radiometer MKS-07
STORA-TU
  Gamma, Beta Radiation Radiometer-Dosimeter RKS-01

• Detecting units

BDBG-09
  Intelligent Detecting Unit of Gamma Radiation
BDBG-09
  Intelligent Water-Resistant Detecting Unit of Gamma Radiation
BDBG-15S-09 and BDBG-15S-23
  Detecting Units of Gamma Radiation
BDPN-07
  Detecting Unit of Neutron Radiation
BDPA-07
  Detecting Unit of Alpha Radiation

• Solutions for special purpose vehicles

DRG-T
  Radiation Survey Device
GeoRad
  Hardware and Software System
BDBG-15S-09 and BDBG-15S-23
  Detecting Units of Gamma Radiation
KDU-6BM
  Shipboard radiation monitoring equipment

• Your personal safety

TERRA-P
  Dosimeter-Radiometer MKS-05 for Household Use
aGent-R
  Gamma Radiation Warning Device

For convenience of the catalogue users and to make the matter of choice easier the “ECOTEST” TM products are presented in the tables below divided into the branches of their use.

Table 1

Branch of Use		“ECOTEST” TM products
Customs and Border Services		MKS-05 “TERRA” DKS-02PN “CADMIUM” MKS-11GN “SPECTRA” MKS-07 “POSHUK” (+ BDPN-07, BDPA-07) RKS-01 “STORA-TU” “GeoRad” KDU-6BM
Law enforcement agencies	Army	MKS-05 “TERRA” MKS-U MKS-UM IT-09T DKG-21M DRG-T BDBG-15S-09 BDBG-15S-23 KDU-6BM
	Ministry of Internal Affairs	MKS-05 “TERRA” DKS-02PN “CADMIUM” MKS-11GN “SPECTRA” MKS-07 “POSHUK” DKG-21 “EcotestCARD” IT-09T “aGent-R” KDU-6BM
	State Security Services	MKS-05 “TERRA” DKS-02PN “CADMIUM” MKS-11GN “SPECTRA” MKS-U MKS-UM IT-09T
	Guard services	MKS-05 “TERRA” DKS-02PN “CADMIUM”
Emergency Services and Civil Defense		MKS-U MKS-UM MKS-05 “TERRA” IT-09T DKG-21 “EcotestCARD” ASIDC-21 DKG-21M

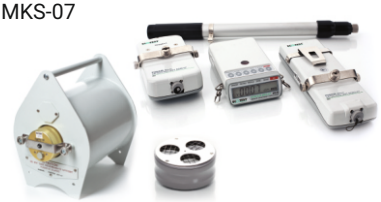
Branch of Use		"ECOTEST" TM products
Emergency Services and Civil Defense (continued)		DRG-T "GeoRad" BDBG-15S-09 BDBG-15S-23 KDU-6BM RadSpace
Industry	Nuclear power industry	IT-09T IT-09 BDBG-09 DKG-21 "EcotestCARD" MKS-U MKS-UM MKS-07 "POSHUK" (+ BDPN-07, BDPA-07) "RadMonitor" BDBG-09 (water-resistant) BDBG-15S-09 BDBG-15S-23 RadSpace
	Metallurgy and scrap metal storage	MKS-07 "POSHUK" IT-09T IT-09 BDBG-09 DKG-21 "EcotestCARD" RKS-01 "STORA-TU" DKS-02PN "CADMIUM"
	Mining industry	MKS-07 "POSHUK" IT-09T BDBG-09 DKG-21 "EcotestCARD" RKS-01 "STORA-TU" RKG-14 "VIRTUOSO" RadSpace
	Vehicles monitoring, seaports and airports	MKS-07 "POSHUK" (+ BDPN-07, BDPA-07) DKS-02PN "CADMIUM" MKS-11GN "SPECTRA" MKS-05 "TERRA"
	Construction industry	MKS-07 "POSHUK" RKS-01 "STORA-TU" RKG-14 "VIRTUOSO"
	Logging and woodworking industry	MKS-07 "POSHUK" RKS-01 "STORA-TU" RKG-14 "VIRTUOSO"

Branch of Use		"ECOTEST" TM products
Sanitary dosimetry and ecology	Environmental inspectorates	MKS-05 "TERRA" DKS-02PN "CADMIUM" MKS-11GN "SPECTRA" MKS-07 "POSHUK" (+ BDPN-07, BDPA-07) RKS-01 "STORA-TU" "GeoRad" BDBG-09 (water-resistant) BDBG-15S-09 BDBG-15S-23 RadSpace
	Sanitary and epidemiological services	MKS-07 "POSHUK" (+ BDPN-07, BDPA-07) RKS-01 "STORA-TU" DKG-21 "EcotestCARD" IT-09T BDBG-09 MKS-05 "TERRA" MKS-11GN "SPECTRA"
	Radiological laboratories	MKS-07 "POSHUK" MKS-U MKS-UM DKG-21 "EcotestCARD" ASIDC-21 IT-09T IT-09 MKS-05 "TERRA" "RadMonitor" BDBG-09 (water-resistant)
	Labor protection	DKG-21 "EcotestCARD" MKS-05 "TERRA" RKS-01 "STORA-TU" MKS-07 "POSHUK" (+ BDPN-07, BDPA-07) IT-09T
	Radioactive waste storage sites	IT-09T IT-09 BDBG-09 MKS-U MKS-UM

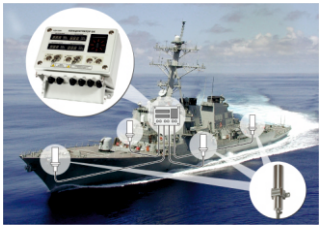
Branch of Use		"ECOTEST" TM products
Sanitary dosimetry and ecology (continued)	Radioactive waste storage sites (continued)	DKG-21 "EcotestCARD" DKS-02PN "CADMIUM" "RadMonitor" MKS-11GN "SPECTRA" RadSpace
Medicine		DKG-21 "EcotestCARD" IT-09 BDBG-09 MKS-07 "POSHUK" MKS-05 "TERRA"
Educational programs		MKS-05 "TERRA-P" MKS-05 "TERRA" RKG-14 "VIRTUOSO"
Household use		MKS-05 "TERRA-P" RKG-14 "VIRTUOSO" "aGent-R"

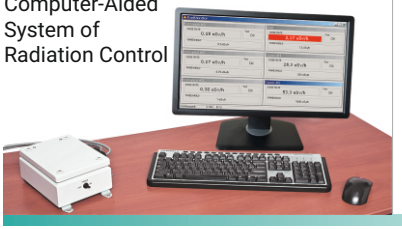
Table 2

"ECOTEST" TM product		Branches of Use
TERRA Dosimeter-Radiometer MKS-05		- Customs and Border Service - Law enforcement agencies (Army, Ministry of Internal Affairs, State Security Services, guard services) - Emergency Services and Civil Defense - Vehicles monitoring, seaports and airports - Environmental inspectorates - Sanitary and epidemiological services - Radiological laboratories - Labor protection - Medicine - Educational programs
TERRA-P Dosimeter-Radiometer MKS-05 for Household Use		- Educational programs - Household use
EcotestCARD Personal Gamma Radiation Dosimeter DKG-21		- Nuclear power industry - Emergency Services and Civil Defense - Radiological laboratories - Labor protection - Medicine - Sanitary and epidemiological services - Ministry of Internal Affairs - Metallurgy - Mining industry - Radioactive waste storage sites
DKG-21M Personal Gamma Radiation Dosimeter		- Army - Emergency Services and Civil Defense
CADMIUM Search Alarm Dosimeter DKS-02PN		- Customs and Border Services - Law enforcement agencies (Ministry of Internal Affairs, State Security Services, guard services) - Metallurgy and scrap metal storage - Vehicles monitoring, seaports and airports - Environmental inspectorates - Radioactive waste storage sites

"ECOTEST" TM products	Branches of Use
POSHUK Search Dosimeter-Radiometer MKS-07 	- Ministry of Internal Affairs - Metallurgy and scrap metal storage - Mining industry - Construction industry - Logging and woodworking industry - Radiological laboratories - Medicine
POSHUK (+ BDPN-07, BDPA-07) Search Dosimeter-Radiometer MKS-07 	- Customs and Border Service - Nuclear power industry - Vehicles monitoring, seaports and airports - Sanitary dosimetry and ecology (environmental inspectorates, sanitary and epidemiological services, labor protection)
STORA-TU Gamma, Beta Radiation Radiometer-Dosimeter RKS-01 	- Environmental inspectorates - Metallurgy and scrap metal storage - Mining industry - Construction industry - Logging and woodworking industry - Customs and Border Services - Sanitary and epidemiological services - Labor protection
SPECTRA Search Dosimeter-Radiometer MKS-11GN 	- Customs and Border Services - Law enforcement agencies (Ministry of Internal Affairs, State Security Services) - Vehicles monitoring, seaports and airports - Environmental inspectorates - Sanitary and epidemiological services - Radioactive waste storage sites
MKS-U Multipurpose Dosimeter- Radiometer 	- Army - State Security Services - Emergency Services and Civil Defense - Nuclear power industry - Radioactive waste storage sites - Radiological laboratories

"ECOTEST" TM products	Branches of Use
MKS-UM Multipurpose Dosimeter-Radiometer 	- Army - State Security Services - Emergency Services and Civil Defens - Nuclear power industry - Radioactive waste storage sites - Radiological laboratories
DRG-T Radiation Survey Device 	- Army - Emergency Services
VIRTUOSO Multipurpose environment activity radiometer RKG-14 	- Logging and woodworking industry - Construction industry - Mining industry - Educational programs - Household use
aGent-R Gamma Radiation Warning Device 	- Ministry of Internal Affairs - Household use
BDBG-09 Intelligent Detecting Unit of Gamma Radiation 	- Nuclear power industry - Metallurgy - Mining industry - Sanitary and epidemiological service - Radioactive waste storage sites - Medicine

"ECOTEST" TM products	Branches of Use
BDBG-09 Intelligent Water-Resistant Detecting Unit of Gamma Radiation 	- Nuclear power industry - Environmental inspectorates - Radiological laboratories
BDBG-15S-09 and BDBG-15S-23 Detecting Units of Gamma Radiation 	- Army - Emergency Services - Environmental inspectorates - Nuclear power industry
KDU-6BM Shipboard radiation monitoring equipment 	- Army - Ministry of Internal Affairs - Customs and Border Services - Emergency Services and Civil Defense
IT-09T Data Panel 	- Emergency Services and Civil Defense - Law enforcement agencies (Army, Ministry of Internal Affairs, State Security Services) - Nuclear power industry - Radiological laboratories - Radioactive waste storage sites - Labor protection - Metallurgy - Mining industry - Sanitary and epidemiological service

"ECOTEST" TM products	Branches of Use
IT-09 Data Panel 	- Nuclear power industry - Metallurgy - Radiological laboratories - Radioactive waste storage sites - Medicine
ASIDC-21 Automated System of Individual Dosimetry Control 	- Emergency Services and Civil Defense - Nuclear power industry - Radiological laboratories
GeoRad Hardware and Software System 	- Border Service - Emergency Services and Civil Defense - Environmental inspectorates
RadSpace Automated system of remote radiation monitoring 	- Emergency Services and Civil Defense - Nuclear power industry - Mining industry - Environmental inspectorates - Radioactive waste storage sites
RadMonitor Computer-Aided System of Radiation Control 	- Nuclear power industry - Radiological laboratories - Radioisotope products storage sites - Radioactive waste storage sites

CE

Number U1524-07 in State Register for Measuring Instruments

Hygienic conclusion of the State Sanitary-Hygienic Expertise # 5.10/6300 of February 20, 2002

ТУ У 33.2-22362867-006:2001
ТУ У 33.2-22362867-006-01-2003 (military accepted)

Branches of Use

- Customs and Border Service
- Law enforcement agencies (Army, Ministry of Internal Affairs, State Security Services, guard services)
- Emergency Services and Civil Defense
- Vehicles monitoring, seaports and airports
- Environmental inspectorates
- Sanitary and epidemiological services
- Radiological laboratories
- Labor protection
- Medicine
- Educational programs

State Sanitary-Epidemiological Conclusion for use in educational establishments # 05.03.02-04/ 20545 of April 09, 2009

Purpose of Use

- Measurement of gamma and X-ray radiation ambient dose equivalent rate (DER).
- Measurement of gamma and X-ray radiation ambient dose equivalent (DE).
- Measurement of surface beta-particles flux density.
- Measurement of ambient dose equivalent accumulation time.
- Real time measurement (clock), alarm clock.

Specifications

Measurement ranges and main relative errors:	
- Gamma and X-ray radiation ambient dose equivalent rate (^{137}Cs)	0.1 … 9 999 μSv/h ; ± (15+2/Ḣ*(10))%, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h
- Gamma and X-ray radiation ambient dose equivalent (^{137}Cs)	0.001 … 9 999 mSv; ±15%
- Beta-particles flux density (^{90}Sr+^{90}Y)	10 … 100 000 1/(cm^2×min); ±(20 + 200/φβ)%, where φβ is a numeric value of measured beta-particles flux density equivalent to part./(cm^2×min)
- Ambient dose equivalent accumulation time and accuracy of measurement	1 min … 9 999 h ; ±0.1s per 24 h

Energy ranges of measurement and energy dependence:		
- Gamma and X-ray radiation	MeV	0.05…3.0; ±25%
- Beta radiation	MeV	0.5…3.0
- Resolution of threshold level programming for: • dose rate • dose • flux density	 μSv/h mSv 10^3/(cm^2×min)	 0.01 0.001 0.01
- Battery life*	hours	1 500
- Operating temperature range	°C	-20…+50
- Weight	kg	0.2
- Dimensions	mm	120 x 52 x 26

* under gamma background not more than 0.3 μSv/h, switched off display backlight and alarm system

Features

- Big display with luminescent backlight.
- Simultaneous indication of units of measurement, measurement errors, threshold level and real time on the display.
- Analog ten-segment indicator of registered radiation intensity.
- Ability to perform measurements with a preset error.
- Four-level indication of battery discharge.
- Built-in memory which allows storing up to 1200 measurements.
- Mode of PC connection via Bluetooth.

Features (continued)

- Five independent measuring channels with alternate indication of data on the single liquid crystal display.
- Built-in gamma, beta sensitive Geiger-Muller counter.
- Prompt evaluation of gamma background within 10 seconds.
- Automatic subtraction of gamma background at measurement of beta contamination.
- Measurement results averaging, manually and automatically interrupted.
- Automatic setting of measurement intervals and ranges.
- Audio, vibration and vibration-audio alarm of each detected gamma-quantum or beta-particle that can be switched off.
- Two-tone audio, vibration and vibration-audio alarm of exceeded programmed threshold levels.
- Two AAA batteries.
- Shock-resistant body.
- Small weight and dimension parameters.

A description of communications protocol with the PC and a demo program have been prepared and can be downloaded from ***www.ecotest.ua.***

Delivery Kit

- MKS-05 "TERRA" dosimeter-radiometer;
- operating manual;
- leather case;
- "Cadmium ECOMONITOR" software;
- packing box.

"Cadmium ECOMONITOR" Software

Is used for:

- readout of measurement results from the dosimeter memory into the PC as a dosimeter measurement protocol;
- viewing measurement results on the PC monitor, preparation and printout of the report, saving measurement results to a file without changes or as a report for further use.

CE

Hygienic conclusion of the State Sanitary-Hygienic Expertise # 5.10/6300 of February 20, 2002

State Sanitary-Epidemiological Conclusion for use in educational establishments # 05.03.02-04/ 20545 of April 09, 2009

ТУ У 33.2-22362867-006:2001

Branches of Use

- Educational programs
- Household use

Purpose of Use

- Measurement of gamma and X-ray radiation ambient dose equivalent rate (DER).
- Measurement of gamma and X-ray radiation ambient dose equivalent (DE).
- Evaluation of surface contamination by beta radionuclides.
- Clock, alarm clock.

Household Application

- Apartment, building and construction monitoring; personal radiation safety; ground-surface of infields and vehicles monitoring.
- Evaluation of radiation contamination of food products, in particular forest berries and mushrooms.
- Visual aids for educational institutions.

Specifications

Measurement ranges and main relative errors:

- Gamma and X-ray radiation ambient dose equivalent rate	0.1 … 999.9 µSv/h ; ± (25+2/Ḣ*(10))%, where Ḣ*(10) is a numeric value of measured DER equivalent to µSv/h
- Gamma and X-ray radiation ambient dose equivalent	0.001 … 9 999 mSv; ±25%

Specifications (continued)

- Beta-particles flux density with possible evaluation of surface contamination by beta radionuclides (^{90}Sr+^{90}Y)	1/(cm^2×min)	10 … 100 000
Energy ranges of measurement and energy dependence:		
- Gamma and X-ray radiation	MeV	0.05 … 3.0 ; ±25%
- Beta radiation	MeV	0.5 … 3.0
Measurement time intervals	seconds	5 … 70
Battery life*	hours	6 000
Operating temperature range	°C	-10 … +50
Weight	kg	0.15
Dimensions	mm	120 x 52 x 26

* under gamma background not more than 0.3 μSv/h, switched off alarm system

Features

- Three independent measuring channels with alternate indication of data on the single liquid crystal display.
- Built-in gamma, beta sensitive Geiger-Muller counter.
- Automatic setting of measurement intervals and ranges.
- Audio signaling of each registered gamma-quantum or beta-particle.
- Programming of audio alarm threshold level of gamma radiation dose rate.
- Liquid crystal display.
- Two AAA batteries.
- Four-level indication of battery discharge.
- Shock-resistant body.
- Small weight and dimension parameters.

Delivery Kit

- MKS-05 “TERRA-P” dosimeter-radiometer;
- operating manual;
- leather case;
- packing box.

"TERRA-P" dosimeter-radiometer is recommended by the Scientific-Methodical Council under the Ministry of Education of Ukraine for use in educational process in secondary schools

CE

ТУ У 33.2-22362867-010:2007

Meets the requirements of IEC 61526 standard

Number U2514-07 in State Register for Measuring Instruments

State Sanitary-Epidemiological Conclusion # 05.03.02-04/25552 of May 23, 2007

Branches of Use

- Nuclear power industry
- Emergency Services and Civil Defense
- Radiological laboratories
- Labor protection
- Medicine
- Sanitary and epidemiological services
- Ministry of Internal Affairs
- Metallurgy
- Mining industry
- Radioactive waste storage sites

Purpose of Use

- Measurement of gamma and X-ray radiation individual dose equivalent rate (DER).
- Measurement of gamma and X-ray radiation individual dose equivalent (DE).
- Clock, alarm clock.

Application

The dosimeter may be used as an electronic direct reading device.
It can be applied together with “PDC ECOMONITOR” software and as a stand-alone device.

Specifications

Measurement ranges and main relative errors:

- gamma and X-ray radiation individual dose equivalent rate $H_p(10)$	μSv/h	0.1…1 000 000; (1…10 μSv/h; ±20%; 10 μSv/h…1 Sv/h; ±10%)
- gamma and X-ray radiation individual dose equivalent $H_p(10)$	mSv	0.001 … 9 999 ; ±15%
Energy range of detected gamma and X-ray radiation and energy dependence	MeV	0.05 … 6.0 (0.05 … 1.25; ±25%)
Recording resolution of dose accumulation history in the nonvolatile memory	minutes	5 … 255
Time of data storage in the nonvolatile memory	years	not less than 10
Data exchange rate through infrared port	bit/s	38 400
Positive data exchange distance between the dosimeter and the infrared port adapter	m	not more than 0.3
Lithium battery (CR2450) life*	hours	2 200
Operating temperature range	°C	-10 … +50
Weight	kg	0.08
Dimensions	mm	90 x 55 x 10

* under gamma background not more than 0.3 μSv/h, switched off alarm system

Features

- Stand-alone use or use within automated system of personal dosimetry control.
- Storage of dose accumulation history in the nonvolatile memory with real time reference.
- Transfer of dose accumulation history through the infrared port to the computer.
- Blocking the mode of power supply switch off until the data reading procedure finished.
- DER and DE threshold levels programming of gamma and X-ray radiation with the help of the computer or manually with control keys.
- Blocking certain indication modes in response to the computer command.
- Light and audio alarms when programmed threshold levels exceeded on DER and DE of gamma and X-ray radiation.

Features (continued)

- Display automatic switch off if current gamma background is lower than the preset threshold level with instant switching on at:
  - pressing any control key;
  - gamma background increase above the preset threshold level;
  - alarm clock ringing.
- Periodic self-testing of batteries and detector.
- Energy-compensated Geiger-Muller counter.

Delivery Kit

- DKG-21"EcotestCARD" dosimeter;
- operating manual;
- case with a clip;
- packing box.

Meets the requirements of IEC 61526 standard *TY Y 33.2-22362867-010:2007*

Branches of Use

- Army
- Emergency Services and Civil Defense

Purpose of Use

- Measurement of gamma and X-ray radiation individual dose equivalent rate (DER).
- Measurement of gamma and X-ray radiation individual dose equivalent (DE).
- Clock, alarm clock.

Application

The dosimeter may be used as an electronic direct reading device. It can be applied together with “PDC ECOMONITOR” software and as a stand-alone device.

Features

- IP54 ingress protection rating.
- Stand-alone use or use within automated system of personal dosimetry control.
- Storage of dose accumulation history in the nonvolatile memory with real time reference.
- Transfer of dose accumulation history through the infrared port to the computer.
- Blocking the mode of power supply switch off until the data reading procedure finished.
- Gamma radiation DER and DE threshold levels programming with the help of the computer or manually with control keys.
- Blocking certain indication modes in response to the computer command.

- Light and audio alarms when programmed threshold levels exceeded on DER and DE of gamma radiation.
- Display automatic switch off if current gamma background is lower than the preset threshold level with instant switching on at:
  - pressing any control key;
  - gamma background increase above the preset threshold level;
  - alarm clock ringing.
- Periodic self-testing of batteries and detector.
- Energy-compensated Geiger-Muller counter.

Specifications

Measurement ranges and main relative errors:		
- gamma and X-ray radiation individual dose equivalent rate $H_P(10)$	μSv/h	0.1…1 000 000; (1…10 μSv/h; ±20%; 10 μSv/h…1 Sv/h; ±10%)
- gamma and X-ray radiation individual dose equivalent $H_P(10)$	mSv	0.001 … 9 999 ; ±15%
Energy range of registered gamma and X-ray radiation and energy dependence	MeV	0.05…6.0; (0.05…1.25; ±25%)
Recording resolution of dose accumulation history in the nonvolatile memory	minutes	5…255
Time of data storage in the nonvolatile memory	years	not less than 10
Data exchange rate through the infrared port	bit/s	38 400
Positive data exchange distance between the dosimeter and the infrared port adapter	m	not more than 0.3
Lithium battery (CR2450) life*	hours	2 200
Operating temperature range	°C	-20…+50
Weight	kg	0.14
Dimensions	mm	56 x 96 x 16

* under gamma background not more than 0.3 μSv/h, switched off alarm system

Delivery Kit

- DKG-21M dosimeter;
- special key for battery compartment;
- operating manual;
- packing box.

Complies with the ANSI 42.32 standard
Complies with the ANSI 42.33 standard

ТУ У 33.2-22362867-023:2011

Branches of Use

- Customs and Border Services
- Law enforcement agencies (Ministry of Internal Affairs, State Security Services, guard services)
- Vehicles monitoring, seaports and airports
- Radioactive waste storage sites
- Metallurgy and scrap metal storage

Purpose of Use

- Search (detect and localize) for radioactive and nuclear materials by their external gamma and neutron radiation.
- Measurement of ambient dose equivalent rate (DER) of gamma, X-ray and neutron radiation.
- Measurement of ambient dose equivalent (DE) of gamma and X-ray radiation.
- Determination of gamma, X-ray and neutron radiation intensity.

Specifications

Gamma sensitivity for ^{137}Cs, not less than	$\frac{\text{pulse/s}}{\mu\text{Sv/h}}$	200
Neutron sensitivity for: - thermal neutrons, not less than - fast neutrons, not less than	$\frac{\text{pulse} \times \text{cm}^2}{\text{neutron}}$	 1.2 ± 0.12 0.12 ± 0,012

Specifications (continued)

Indication range of photon-ionizing radiation DER	0.01μSv/h ... 1Sv/h	
Indication range of neutron radiation DER	0.01μSv/h ... 10Sv/h	
Measurement range for Gamma and X-ray radiation ambient dose equivalent	0.1 μSv ... 10 Sv	
Indication range of photon-ionizing radiation count rate	cps	1 ... 25 000
Indication range of neutron radiation count rate	cps	0.01 ... 25 000
Main relative permissible error limit of photon-ionizing radiation DER measurement in the range from 0.1 to 100 μSv/h with confidence probability of 0.95 (^{137}Cs)	±(15+2/$\dot{H}$*(10))%, where $\dot{H}$*(10) is a numeric value of measured DER equivalent to μSv/h	
Energy range of detected photon-ionizing radiation	MeV	0.02 ... 3.00
Energy dependence of the dosimeter readings during photon-ionizing radiation DER measurement in the energy range of 0.05 - 3.00 MeV in relation to 0.662 MeV energy (^{137}Cs)	%	±25
Energy range of detected neutron radiation	from thermal neutrons to 14 MeV	
Setup time of operating mode of the dosimeter, not more than	min	1
Calibration time relative to gamma background	s	2 ... 60
Response time for photon-ionizing radiation DER variation greater than 10 times	s	0.25
Operating supply voltage of the dosimeter from Li-Ion storage battery	V	3.7
Time of continuous operation of the dosimeter with fully charged storage battery under conditions of normal background radiation with switched off display backlight	h	not less than 200
Operating temperature range	°C	-20...+50
Dimensions of the dosimeter, not more than	mm	67 x 127 x 30
Weight of the dosimeter, not more than	kg	0.28

Features

- New generation high sensitivity CsI scintillation detectors of gamma and LiI of neutron radiation with solid state (silicon) photomultiplier.
- Color display with high resolution.
- Integrated GPS/GLONASS-receiver.
- No “microphone effect”.
- High thermal stability.
- Audio and vibration alarm of threshold levels exceeding.
- Light color alarm (indication) of threshold levels exceeding (gamma radiation – red color, neutron – blue) and visual alarm on the side of the device.
- The dosimeter communicates with a PC via USB-port.
- Powered by built-in lithium polymer storage battery that can be charged via USB-cable.
- Ingress protection rating IP67.

Delivery Kit

- Search Alarm Dosimeter DKS-02PN “Cadmium”;
- charger;
- operating manual;
- software;
- packing case.

“Events Reader” Software

Is used for:

- reading measurement results and critical events from the dosimeter memory into the PC
- report preparation and printout
- display of the obtained dosimetric information with the GPS-coordinates on the area map.

ТУ У 22362867.003-99

Number U1207-07 in State Register for Measuring Instruments

Hygienic conclusion of the State Sanitary-Hygienic Expertise # B-7.02/28 of November 04,1999

Branches of Use

- Customs and Border Service
- Ministry of Internal Affairs
- Nuclear power industry
- Metallurgy and scrap metal storage
- Mining industry
- Vehicles monitoring, seaports and airports
- Construction industry
- Logging and woodworking industry
- Sanitary dosimetry and ecology (environmental inspectorates, sanitary and epidemiological services, radiological laboratories, labor protection)
- Medicine

Purpose of Use

- Measurement of gamma and X-ray radiation ambient dose equivalent rate (DER).
- Measurement of gamma and X-ray radiation ambient dose equivalent (DE).
- Measurement of surface beta-particles flux density.
- Measurement of surface alpha-particles flux density with the help of the BDPA-07 detecting unit of alpha radiation (on demand).
- Measurement of thermal and fast neutron flux density with the help of the BDPN-07 detecting unit of neutron radiation (on demand).

Specifications

Measurement ranges and main relative errors:	
Gamma and X-ray radiation dose equivalent rate (^{137}Cs)	0.1 μSv/h … 2.0 Sv/h
Main relative permissible error limit of DER measurement with confidence probability of 0.95: - in precise measurement mode - in search mode	±(15+2/Ḣ*(10)) %, ±(25+2/Ḣ*(10)) %, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h
Gamma and X-ray radiation ambient dose equivalent (^{137}Cs)	1.0 μSv … 9 999 mSv ±15 %
Beta-particles flux density (^{90}Sr+^{90}Y)	5 … 100 000 1/(cm^2×min)
Main relative permissible error limit of surface beta-particles flux density measurement with confidence probability of 0.95: - in precise measurement mode - in search mode	±(15+200/φβ) %, ±(25+200/φβ) %, where φβ is a numeric value of measured flux density equivalent to part./(cm^2×min)

Energy ranges of measurement and energy dependence:		
Gamma and X-ray radiation	MeV	0.05 … 3.0 ; ±25%
Beta radiation	MeV	0.15 … 3.0
Measurement time intervals	seconds	2 … 5
Storage battery life (four NiMH AA batteries)*	hours	not less than 400
Operating temperature range	°C	-25 … +55

Weight and dimensions:	Weight (kg)	Dimensions (mm)
Control panel	0.5	154 x 86 x 35
Gamma radiation detecting unit	0.6	214 x 80 x 36
Beta radiation detecting unit	0.5	154 x 82 x 43
Delivery kit in packing	4.2	445 x 255 x 85

* under gamma background not more than 0.3 μSv/h, switched off display backlight and alarm system

Features

- Geiger-Muller counters without return run of counting response.
- Analog indicator of radiation intensity.
- Up to 4096 measurement results recording in the nonvolatile memory with further transfer to the computer through infrared port.
- Review of the recorded measurement results on the display.
- "Precisely" channel with the average result indicated on the display for the fixed measurement time from 1 to 99 minutes, and "start-stop" measurement mode.
- Detection of soft beta radiation.
- Programmable threshold levels of gamma and X-ray radiation dose equivalent rate and beta-particles flux density.
- Audio signaling of detected gamma-quanta, beta-particles, and exceeded programmed threshold levels of dose equivalent rate of gamma and X-ray radiation or beta-particles flux density.
- Display backlight.
- Multilevel indication of battery discharge.

Delivery Kit

- control panel;
- gamma radiation detecting unit;
- beta radiation detecting unit;
- telescopic tube;
- connecting cable;
- technical description and operating manual;
- logbook;
- battery charger;
- packing bag of close and waterproof cloth used to carry the device on one's shoulder;
- exchange infrared port adapter and software (at the customer's request).

ТУ У 33.2-22362867-008-2004

Number U720-07 in State Register for Measuring Instruments

State Sanitary-Epidemiological Conclusion
 # 05.03.02-04/90835 of November 23, 2010

Branches of Use

- Environmental inspectorates
- Metallurgy and scrap metal storage
- Mining industry
- Construction industry
- Logging and woodworking industry
- Customs and Border Services
- Sanitary and epidemiological services
- Labor protection

Purpose of Use

- Measurement of gamma and X-ray radiation ambient dose equivalent rate (DER).
- Measurement of surface beta-particles flux density.
- Real time and date display, alarm clock function.

Specifications

Measurement ranges and main relative errors:		
- Gamma and X-ray radiation ambient dose equivalent rate (^{137}Cs)	μSv/h	0.1 … 999.9; ±(15+2/Ḣ*(10))%, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h
- Beta-particles flux density (^{90}Sr+^{90}Y)	1/(cm^2×min)	5 … 100 000; ±(20+200/φβ)%, where φβ is a numeric value of measured beta-particles flux density equivalent to part./(cm^2 ×min)
Energy ranges of measurement and energy dependence:		
- Gamma and X-ray radiation	MeV	0.05 … 3.0 ; ±25%
- Beta radiation	MeV	0.5 … 3.0
Resolution of threshold level programming for: - dose rate - flux density	 μSv/h 10^3/(cm^2×min)	 0.01 0.01
Time of continuous operation with fully charged batteries*	hours	2 500
Operating temperature range	°C	-20 … +50
Weight	kg	0.44
Dimensions	mm	160 x 75 x 35

* under gamma background not more than 0.3 μSv/h, switched off display backlight and alarm system

Features

- Damp and dustproof body IP54.
- Big display with luminescent backlight.
- Simultaneous indication of measurement units, measurement errors, threshold level and real time.
- Analog twelve-segment indicator of registered radiation intensity.
- Ability to perform measurements with a preset error.
- Four-level indication of battery discharge.
- Built-in memory which allows storing up to 1200 measurements and 999 numbers of the measured objects with ability to view the recorded information on the display of the device.
- Mode of PC connection via Bluetooth.

Features (continued)

- Three independent measuring channels with alternate indication of data on the single liquid crystal display.
- Prompt evaluation of gamma background within 5 seconds.
- Automatic subtraction of gamma background at measurement of beta contamination.
- Four built-in gamma, beta sensitive Geiger-Muller counters.
- Automatic setting of measurement intervals and ranges.
- Audio signaling of each detected gamma-quantum and beta-particle that can be switched off.
- Two-tone audio alarm of exceeded programmed threshold levels.
- Operation with telescopic tube.
- Two AAA batteries.

A description of communications protocol with the PC and a demo program have been prepared and can be downloaded from ***www.ecotestgroup.com***

Delivery Kit

- RKS-01 "STORA-TU" radiometer-dosimeter;
- case of close and waterproof cloth used to carry the device and telescopic tube on a shoulder;
- telescopic tube;
- operating manual;
- "Cadmium ECOMONITOR" software;
- packing box.

"Cadmium ECOMONITOR" Software

Is used for:

- readout of measurement results from the radiometer memory into the PC as a measurement protocol.
- viewing the radiometer measurement protocol on the PC, preparation and printout of the report, saving the protocol to a file without changes or as a report for further use.

Complies with the ANSI 42.48 standard
Complies with the ANSI 42.32 standard
Complies with the ANSI 42.33 standard

ТУ У 33.2-22362867-023:2011

Branches of Use

- Customs and Border Services
- Emergency Services and Civil Defense
- Law enforcement agencies (Ministry of Internal Affairs, State Security Services, guard services)
- Vehicles monitoring, seaports and airports
- Sanitary dosimetry and ecology
- Radioactive waste storage sites

Purpose of Use

- Identification of the radionuclides type by their amplitude gamma spectra.
- Measurement of ambient dose equivalent rate (DER) of gamma, X-ray and neutron radiation.
- Measurement of ambient dose equivalent (DE) of gamma and X-ray radiation.
- Determination of gamma, X-ray and neutron radiation intensity.
- Saving amplitude gamma spectra and events logs in the nonvolatile memory.

Specifications

Gamma sensitivity for ^{137}Cs, not less than	$\frac{\text{pulse/s}}{\mu\text{Sv/h}}$	200
Neutron sensitivity for: - thermal neutrons, not less than - fast neutrons, not less than	$\frac{\text{pulse} \times \text{cm}^2}{\text{n}}$	 1.2 ± 0.12 0.120 ± 0.012
Measurement range of photon-ionizing radiation DER	0.01μSv/h ... 1Sv/h	
Measurement range of neutron radiation DER	0.01μSv/h ... 10Sv/h	
Measurement range for Gamma and X-ray radiation ambient dose equivalent	0.1 μSv ... 10 Sv	
Indication range of photon-ionizing radiation count rate	cps	1 ... 25 000
Indication range of neutron radiation count rate	cps	0.01 ... 25 000
Main relative permissible error limit of photon-ionizing radiation DER measurement with confidence probability of 0.95 (^{137}Cs)	±(15+1/$\dot{H}$*(10))%, where $\dot{H}$*(10) is a numeric value of measured DER equivalent to μSv/h	
Energy range of detected photon-ionizing radiation	MeV	0.02 ... 3.00
Energy dependence of the dosimeter readings during photon-ionizing radiation DER measurement it the energy range of 0.05 to 3.00 MeV relative to 0.662 MeV energy (^{137}Cs)	%	±25
Energy range of detected neutron radiation	from thermal neutrons to 14 MeV	
Number of amplitude gamma spectrum channels	channel	2048
Setup time of operating mode of the dosimeter, not more than	min	1
Calibration time relative to gamma background	s	2 ... 60
Response time for photon-ionizing radiation DER variation greater than 10 times	s	0.25
Operating supply voltage of the dosimeter from Li-Ion storage battery	V	3.7
Time of continuous operation of the dosimeter with fully charged storage battery under conditions of normal background radiation with switched off display backlight	h	not less than 200

Specifications (continued)

Operating temperature range	°C	-20...+50
Dimensions of the dosimeter, not more than	mm	67 x 127 x 30
Weight of the dosimeter, not more than	kg	0.28

Features

- New generation high sensitivity CsI scintillation detectors of gamma and LiI of neutron radiation with solid state (silicon) photomultiplier.
- Color display with high resolution.
- Storage and transfer of 250 complete gamma radiation spectra.
- Powerful CPU and improved algorithms for spectra processing.
- Measurement range for Gamma and X-ray radiation ambient dose equivalent 0.1 μSv ... 10 Sv.
- New software for detailed laboratory research and spectra processing.
- Integrated GPS/GLONASS-receiver.
- No "microphone effect".
- High thermal stability.
- Powered by built-in lithium polymer storage batteries that can be charged via USB-cable.
- The dosimeter communicates with a PC via USB-port.
- Real-time identification of spectra.
- Identification of radionuclides with specification of the categories they belong to (in compliance with IAEA requirements):
  - medical radionuclides: ^{18}F, ^{67}Ga, ^{51}Cr, ^{75}Se, ^{89}Sr, ^{99}Mo, ^{99}mTc, ^{103}Pd, ^{111}In, ^{123}I, ^{125}I, ^{131}I, ^{153}Sm, ^{201}Tl, ^{133}Xe;
  - industrial radionuclides: ^{57}Co, ^{60}Co, ^{133}Ba, ^{137}Cs, ^{192}Ir, ^{152}Eu, ^{22}Na, ^{241}Am;
  - special nuclear materials: ^{233}U, ^{235}U, ^{237}Np, Pu [Reactor grade plutonium (more than 6% ^{240}Pu)];
  - naturally occurring radioactive materials: ^{40}K, ^{138}La, ^{226}Ra, 2^{32}Th-decay series, ^{238}U-decay series.

***Note**. The list of nuclides the device is able to identify may be extended if needed.*

- Threshold alarm system with four independent threshold levels:
  - search threshold level (threshold level of count rate from the detector photon and neutron ionizing radiation);
  - safety threshold level (threshold level of photon and neutron ionizing radiation DER).
- Light color alarm (indication) of threshold levels exceeding (gamma radiation – red color, neutron – blue) and visual alarm on the side of the device.
- Ingress protection rating IP67.
- Calibrated by using Th232 (Thorium).

Delivery Kit

- Search Dosimeter-Radiometer MKS-11GN "SPECTRA";
- charger;
- operating manual;
- software;
- packing case.

"Spectra Reader" Software

Is used for:

- reading measurement results and critical events from the dosimeter memory into the PC
- report preparation and printout
- display of the obtained dosimetric information with the GPS-coordinates on the area map.

ТУ У 22362867.005-2000

ТУ У 33.2-22362867-005-01-2003 (military accepted)

Number U1355-07 in State Register for Measuring Instruments

Hygienic conclusion of the State Sanitary-Hygienic Expertise # B-7.03/140 of October 24,2000

Branches of Use

- Army
- State Security Services
- Emergency Services and Civil Defense
- Nuclear power industry
- Radioactive waste storage sites
- Radiological laboratories

Purpose of Use

- Measurement of ambient dose equivalent rate of gamma and X-ray radiation (DER).
- Measurement of ambient dose equivalent of gamma and X-ray radiation (DE).
- Measurement of surface beta-particles flux density.
- Measurement of accumulation time of gamma and X-ray radiation ambient dose equivalent.

Specifications

Measurement of gamma and X-ray radiation parameters:			
Measurement range of ambient dose equivalent rate with the combined detecting unit		0.1μSv/h ...10 Sv/h	
Measurement range of ambient dose equivalent rate with the remote detector		Sv/h	0.01...100
Measurement range of gamma and X-ray radiation DE with the detector built in the control panel and main relative error		mSv %	0.001...9 999 ±15
Main relative permissible error limit of DER measurement when calibrated to ^{137}Cs:	- for the combined detecting unit	±(15+2/Ḣ*(10)) %, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h	
	- for the remote detector	±(15+200/Ḣ*(10)) %, where Ḣ*(10) is a numeric value of measured DER equivalent to mSv/h	
Energy range of measurement		MeV	0.05...3.0
Measurement range of DE accumulation time and accuracy of measurement		1 min ...100 h ±1 min per 100 h	
Measurement of beta radiation parameters:			
- Measurement range of surface beta-particles flux density		1/(cm^2×min)	10 ... 200 000
- Energy range of measurement		MeV	0.3 ... 3.0
- Main relative permissible error limit of beta-particles flux density measurement when calibrated for ^{90}Sr+^{90}Y		±(20+200/φβ) %, where φβ is a numeric value of measured flux density equivalent to part./(cm^2×min)	
Measurement time intervals		seconds	2 ... 50
Storage battery life		hours	100
Operating temperature range (for digital display)		°C	-40 ... +50 (-40 ... +95)
Weight of the control panel with the detecting unit		kg	2.4
Dimensions of the control panel		mm	160 x 125 x 80
Weight of the dosimeter's kit in packing case		kg	8
Dimensions of the dosimeter's kit in packing case		mm	554 x 420 x 123

Features

- Automatic setting of measurement intervals and ranges.
- Audio signaling of each registered gamma-quantum or beta-particle.
- Display and control keys backlight if operating in the dark.
- Storage battery (five AA nickel-cadmium batteries) charging by the built-in charger from:
  - integral heliobattery;
  -12 V automobile battery;
  -220 V/50 Hz industrial network by voltage converter.
- Multilevel indication of power supply discharge.
- Ability to operate under atmospheric precipitation, dusty conditions and at immersion of the remote detector in water at 0.5 m depth.
- Measurement of gamma radiation DER action levels by placing the remote detector at up to 30 m distance.
- Analog indicator of radiation intensity.
- Up to 4096 measurement results recording in the nonvolatile memory with further transfer through infrared port to the computer.
- Viewing the recorded measurement results on the display.
- Ability to operate with the personal protective equipment (rubber gloves).
- Wide operating temperature range (-40...+50 °C).
- Display resistant to the temperature of up to +95 °C

The device includes

- gas-discharge Geiger-Muller counters without return run of counting response;
- silicon beta radiation detector;
- emergency scintillation gamma radiation detector (CsI-scintillator-photodiode).

Complete Delivery Kit

- control panel with non-detachable combined detecting unit of gamma and beta radiation;
- heliobattery;
- short telescopic tube for the detecting unit with a clip to be fixed on a belt;
- 12V cable (10m) used for charging from the automobile battery;
- 220/12V adapter;
- AA nickel-cadmium batteries (5 pcs.);
- headphones;
- packing case;
- operating manual;
- logbook;
- emergency detecting unit kit:
  - remote gamma radiation detector with a 30 m cable;
  - telescopic tube (5m) with a cable hanger for cable winding;
  - telescopic tube case;
- spare parts;
- exchange infrared port adapter and software (on customer's request).

The kit may be completed on the customer's request.

ECOTEST®
Radiation Measurement Instruments

Special-Purpose Delivery Kit

A special-purpose delivery kit is suggested for the fire fighting services and does not include: emergency detecting unit kit and heliobattery.
The detecting unit is fixed to the housing of the device control panel.
The storage battery is charged with the built-in charger from:
- 12V automobile battery;
- 220V/50Hz industrial network by voltage converter.

Weight of the control panel with the detecting unit – 2.4 kg.
Dimensions of the control panel – 160 x 125 x 80 mm.

Compliant with the international standards IEC 60846 and IEC 60325

Branches of Use

- Law enforcement agencies
- Emergency Services and Civil Defense
- Nuclear power industry
- Radioactive waste storage sites
- Radiological laboratories

Purpose of Use

- Measurement of ambient dose equivalent rate (DER) of gamma and X-ray radiation.
- Measurement of ambient dose equivalent (DE) of gamma and X-ray radiation.
- Measurement of beta-particles surface flux density and beta-particles surface activity.
- Measurement of alpha-particles surface flux density and alpha-particles surface activity.
- Measurement of accumulation time of gamma and X-ray radiation DE.
- Archive of measurement results tagged to location coordinates.

Features

- Possibility to measure ambient dose equivalent rate (DER) of gamma radiation with the detector which is built in the control panel.
- Automatic selection between measurement intervals and ranges.
- Audio signalling of each registered gamma-quantum or beta particle.
- Backlit indicator and control keys for operation in the dark.
- Rechargeable lithium-ion battery charging by the built-in charger from:
  - internal solar battery;
  - 12 V automobile battery;
  - 220 V/50 Hz mains power using a voltage converter.

Features (continued)

- Multilevel indication of battery discharge.
- Operates under conditions involving atmospheric precipitation, dusty atmosphere (IP67); waterproof removable detector down to 0.5 m water depth.
- Measures emergency gamma DER levels by placing the removable detector at up to 30 m distance.
- Analog indicator of radiation intensity.
- Logging of up to 1500 measurement results tagged to location coordinates in the nonvolatile memory via infrared port to the PC (built-in GPS/GLONASS receiver).
- Viewing of logged measurement results on the display.
- Easy to operate even if wearing personal protection – rubber gloves.
- Wide operating temperature range – from -30...+55 °C.
- Display temperature resistance – +95 °C.

Detector types

- gas-discharge Geiger-Muller counters without return run of counting response;
- silicon beta radiation detector;
- emergency scintillation gamma detector (CsI – scintillator-photodiode).

Specifications

Measurement of gamma and X-ray radiation parameters			
Measurement range of gamma and X-ray DER with the BDKS-01 combined detecting unit			0.1 μSv/h ...10 Sv/h
Measurement range of gamma and X-ray DER with the BDKS-02 combined detecting unit			0.1 μSv/h ... 2 Sv/h
Measurement range of gamma and X-ray DER with the wide range removable detector		Sv/h	0.01 ... 100
Measurement range of gamma and X-ray DE with the detector integrated in a control panel and main relative permissible error		mSv	0.001 ... 9 999
		%	±15
Main relative permissible errors in DER measurement when calibrated with ^{137}Cs for:	– BDKS-01 and BDKS-02 combined detecting units	%	±(15+2/$\dot{H}$*(10)), where $\dot{H}$*(10) is a numeric value of measured DER in μSv/h
	– wide range removable detector	%	±(15+200/$\dot{H}$*(10)), where $\dot{H}$*(10) is a numeric value of measured DER in mSv/h
Energy range of measurement		MeV	0.05 ... 3.0
Measurement range of DE accumulation time and measurement precision			1 min ... 100 h; ±1 min per 100 h

Specifications (continued)

Measurement of beta radiation parameters		
Measurement range of surface beta-particles flux density with the BDKS-01 and BDKS-02 combined detecting units	$1/(cm^2 \cdot min)$	10 … 200 000
Measurement range of beta-particles surface activity with the BDKS-01 and BDKS-02 combined detecting units	Bq/cm^2	0 … 13 500
Energy range of measurement with the BDKS-01 combined detecting unit	MeV	0.3 … 3.0
Energy range of measurement with the BDKS-02 combined detecting unit	MeV	0.15 … 3.0
Main relative permissible error in measurements of beta-particles flux density when calibrated to $^{90}Sr+^{90}Y$	%	±(20+200/φβ), where φβ is a numeric value of measured surface flux density part./($cm^2 \cdot min$)
Main relative permissible error in measurements of beta-particles surface activity when calibrated to $^{90}Sr+^{90}Y$	%	±(20+10/B), where B is a numeric value of measured beta-particles surface activity Bq/cm^2
Measurement of alpha radiation parameters		
Measurement range of surface alpha-particles flux density with the BDKS-02 combined detecting unit	$1/(cm^2 \cdot min)$	10 … 300 000
Measurement range of alpha-particles surface activity with the BDKS-02 combined detecting unit	Bq/cm^2	0 … 13 500
Energy range of measurement with the BDKS-02 combined detecting unit	MeV	from 4.0 and more
Main relative permissible error in measurements of alpha-particles flux density when calibrated to ^{239}Pu	%	±(15+300/φ), where φ is a numeric value of measured surface flux density part./($cm^2 \cdot min$)
Main relative permissible error in measurements of alpha-particles surface activity when calibrated to ^{239}Pu	%	±(15+15/A), where A is a numeric value of measured alpha-particles surface activity Bq/cm^2
Time of continuous operation when powered from a rechargeable lithium-ion battery	h	100
Operating temperature range (digital display)	°C	-40 … +50 (-40 … +95)

Specifications (continued)

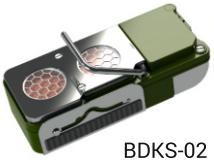
Weight and dimensional characteristics	*Weight, kg*	*Dimensions, mm*
Control panel (without case)	1.3	156 x 120 x 60
BDKS-01 detecting unit without the cable	0.3	Ø48 x 165
BDKS-02 detecting unit without the cable	0.6	160 x 73 x 43
The delivery kit in a carrying case	9	554 x 420 x 123

Delivery Kit

- control panel;
- BDKS-01 combined gamma/beta detecting unit;
- BDKS-02 combined gamma/alpha/beta detecting unit;
- solar battery;
- short telescopic tube for the detecting unit;
- 10 m long cable for charging from the automobile battery;
- 220/12 V adapter;
- rechargeable lithium-ion battery;
- headphones;
- carrying case;
- operating manual;
- logbook;
- spare parts;
- exchange infrared adapter and software – on request.

The delivery kit may be completed upon customer's request

BDKS-01



BDKS-02

ТУ У 33.2-22362867-011:2009

Branches of Use

- Army
- Emergency Services

Purpose of Use

The DRG-T radiation survey device is designed for use in special-purpose vehicles to control continuously and measure exposure dose rate (EDR) of gamma and X-ray radiation, as well as to provide audio and light alarms of dangerous levels of radiation, and to issue commands to start the actuators of protection equipment.

Application

The device is designed for installation in special-purpose vehicles, in particular in radiochemical reconnaissance units of civil defense, and armed forces.

Specifications

- Measurement range of gamma radiation EDR from 1×10^{-5} to 1000 R/h.
- Energy range of detected gamma radiation from 0.66 to 1.25 MeV.
- Main relative permissible error limit during measurement of gamma radiation EDR (relative to ^{137}Cs) with confidence probability of 0.95:

$$\delta\dot{X} = \left(15 + \frac{0{,}2}{\dot{X}}\right)\%$$

where $\dot{X}$ is a numeric value of measured EDR in miliroentgens per hour.

- Energy dependence of the device readings during measurement of gamma radiation is ±25 % within the range of 0.66 - 1.25 MeV.
- The device generates commands and signals in the presence of gamma radiation (during not less than 3 s) in the place of the device location with gamma quanta energy of 0.66 MeV, EDR of which exceeds the threshold level “R” (EDR more than 50 mR/h).

ECOTEST® Radiation Measurement Instruments

Specifications (continued)

- The device generates commands and signals in the presence of gamma radiation (during not less than 0.1 s) in the place of the device location with gamma quanta energy of 1.25 MeV, EDR of which exceeds the threshold level “A” (EDR more than 14 400 R/h).
- The device is powered from the DC onboard mains of 9.0 - 28.5 V voltage.
- Current consumption at rated voltage of 24 V is not more than 1.0 A.
- Time of continuous operation is not less than 48 hours, with subsequent switching off for not less than 2 hours.
- Operating temperature range from -40 to +60 °C.
- Dimension parameters of the device – 160 x 160 x 110 mm.
- Weight of the device is not more than 4 kg.
- IP56 ingress protection rating.
- Mean time between failures is not less than 4000 hours.
- Mean service life is not less than 20 years including scheduled maintenance in 10 years.
- Mean shelf life is not less than 15 years.

Features

- Highly resistant to shock and vibration.
- Considers different attenuation degrees of gamma radiation.
- Produces signals to display information on data panels of the vehicle.
- Issues commands to start the actuators of crew protection equipment.
- Ensures self-testing function of the device performance with and without commands issuing to the actuators.
- Transfers data to the onboard computer.

Delivery Kit

- DRG-T radiation survey device;
- operating manual;
- logbook;
- mounting parts kit;
- packing box.

Supplied after metrological testing

Branches of Use

- Logging and woodworking industry
- Construction industry
- Mining industry
- Educational programs
- Household use

Purpose of Use

- Detection of ^{137}Cs and ^{134}Cs cesium radioisotopes (hereinafter-radiocesium) in food and objects of the environment.
- Evaluation of the detected radiocesium content in the quantities of specific, volume and surface activity.
- Control of the level of background radiation in the environment, including assessment of radiocesium radiation level as the value of ambient dose equivalent rate purely from radiocesium as the part of natural background.
- Measurement of specific and volume activities of naturally occurring radioactive materials ^{40}K, ^{226}Ra, ^{232}Th (hereinafter NORM) in the objects of the environment.

Features

- Portable, practical.
- Requires no special training of the user, operates in the interactive mode.
- Does not require sampling – measurement is done by putting the device to the tested object (material, product, soil, etc.), or by holding it over the studied surfaces.
- Requires no special preparation of the food sample (the product remains inside its packaging).
- Requires no special protection.

Specifications

Measurement range of specific activity of radionuclides ^{137}Cs, ^{134}Cs in the objects of the environment in geometries «2π», «4π»	Bq/kg	50 … 200 000
Main relative permissible error limits of measurement of specific activity of radionuclides ^{137}Cs, ^{134}Cs in the objects of the environment in geometries «2π», «4π», P=0.95	%	±35
Estimation range of surface activity of radionuclides ^{137}Cs, ^{134}Cs in the objects of the environment	Bq/m^2	500 … 1 000 000
Measurement range of the effective specific activity of naturally occurring radionuclides ^{226}Ra, ^{232}Th, ^{40}K in the objects of the environment in geometries «2π», «4π»	Bq/kg	200 … 20 000
Main relative permissible error limits of measurement of the effective specific activity of naturally occurring radionuclides ^{226}Ra, ^{232}Th, ^{40}K in the objects of the environment in geometries «2π», «4π», P=0.95	%	±35
Measurement range of gamma radiation ambient dose equivalent rate from ^{137}Cs, ^{134}Cs	μSv/h	0.001 … 10
Main relative permissible error limits of measurement of gamma radiation ambient dose equivalent rate from ^{137}Cs, ^{134}Cs, given P=0.95	%	±20
Unstable readings of the radiometer during 8 hours of operation, not more than	%	5
Measurement range of gamma radiation ambient dose equivalent rate $\dot{H}$*(10)	μSv/h	0.01 … 50.00
Main relative permissible error limits of gamma radiation ambient dose equivalent (DER) measurement, given P=0.95	%	±(15+1/$\dot{H}$*(10)), where $\dot{H}$*(10) is a numeric value of gamma radiation DER, μSv/h
Sensitivity to gamma radiation for ^{137}Cs, ^{134}Cs, not less than	$\frac{\text{pulse/s}}{\mu\text{Sv/h}}$	500
Energy dependence of readings for energies 59 keV (^{241}Am), 1.3 MeV (^{60}Co) and 0.66 MeV (^{137}Cs)	%	30
Dependence of sensitivity from the angle of recorded radiation incidence (anisotropy), does not exceed	%	30

Specifications (continued)

Number of amplitude gamma spectrum channels	1024	
Setup time of operating mode of the device – not more than	min	1
Time of continuous operation with fully charged storage batteries at gamma background (not more than 0.5 μSv/h) – not less than	hours	24
Operating temperature range	°C	-20 ... +50
Ingress protection rating	IP54	
Dimensions of the detecting device, not more than	mm	114 × 36 × 83
Weight of the detecting device without case (with the installed battery)	kg	0.352

Delivery Kit

- RKG-14 "VIRTUOSO" multipurpose environment activity radiometer;
- leather case;
- charger;
- transport case;
- passport;
- packing box.

- The software is available for free download.
- Android smartphone or tablet is not included in the standard delivery kit, but can be included upon customer's request (at extra cost).

Virtuoso application provides:

- information about the status of the detector, dosimetric and spectrometric data which is transferred via Bluetooth from Virtuoso detecting unit to a smartphone or a tablet (Android-based);
- display of gamma radiation dose rate and amplitude gamma spectrum in graphical view;
- detection of cesium isotopes in food, soil and wood, evaluation of their specific/volume and surface activities, evaluation of dose rate from cesium;
- detection of naturally occurring radioactive materials (K, Ra, Th), evaluation of their specific/volume activities;
- possibility to check the measurement quality of the device using standard metrological samples in Marinelli vessels;
- both beginners (simplified display of measurement progress in the “Found-Not found” mode) and experts (display of activity spectrum and trends) can operate the device;
- reports about measurement, their transfer to PC via Bluetooth, email, etc.;
- automatic adjustment of the detector's spectrometric parameters at each measurement, device calibration in a separate mode;
- making and receiving calls, sending and receiving messages, starting and using other applications, etc., without interrupting the process of measurement and loss of data.

Branches of Use

- Ministry of Internal Affairs
- Household use

Purpose of Use

Detection of the increased levels of gamma radiation and their estimation by means of the four-level threshold alarm system

Specifications

- Dynamic range of gamma radiation registration from 10 µR/h to 1000 R/h.
- Energy range of gamma radiation registration from 0.05 to 3.0 MeV.
- Threshold level values of gamma radiation dose rate:
  - 100 µR/h;
  - 1.0 mR/h;
  - 100 mR/h;
  - 10 R/h.
- Relative error in threshold levels determination ± 25 %.
- Time of continuous operation with new batteries – not less than 1300 hours*.
- Operating temperatures range – from -20 to + 50 °C.
- Weight – 80 g.
- Dimensions without a strap – 55 x 55 x 27 mm.
- Mean time between failures – not less than 6000 hours.
- Average service life – not less than 6 years.
- Average shelf life – not less than 6 years.

* provided that background radiation is normal (less than 100 µR/h), ambient air temperature is within 20±2°C, and the battery is tested not more than 3 times per 24 hours.

Features

- Wrist warning device.
- Non-stop performance monitoring of the warning device.
- LED and vibrating alarm of threshold levels exceeding with the option to turn off the vibrating alarm.
- Non-stop performance monitoring of the built-in Geiger-Muller counter.
- Manual control of the built-in vibration instrument and residual capacity of batteries with the corresponding LED indication.
- Periodic vibrating and LED alarm when residual battery capacity becomes less than 10 %.
- Automatic vibrating and LED alarm when residual battery capacity is less than 5 %, with the following switching-off of the warning device.
- Two AAAA batteries.
- Shock-resistant plastic housing with IP67 ingress protection rating.

Delivery Kit

- "aGent-R" gamma radiation warning device;
- batteries;
- leather case with a clip;
- operating manual;
- packing box.

BDPN-07 | Detecting Unit of Neutron Radiation

Supplied after metrological testing

Purpose of Use

Search for neutron radiation sources and measurement of thermal and fast neutrons flux density.

Application

- As a unit of MKS-07 "POSHUK" search dosimeter-radiometer.
- As a part of automated systems of radiation control.

Specifications

Measurement range of thermal neutron flux density	$N/(cm^2 \times min)$	$10 \dots 10^5$
Measurement range of fast neutron flux density	$N/(cm^2 \times min)$	$50 \dots 10^5$
Main relative permissible error limit of thermal and fast neutron flux density measurements when calibrated for Pu-Be with 0.95 confidence probability	%	20+200/N, where N is a numeric value of measured neutron flux density
Registered neutron energy range	eV	$0.025 \dots 14 \cdot 10^6$
Neutron radiation sensitivity of: - fast neutrons - thermal neutrons	$(pulse \times cm^2)/neutron$	 4.5 13.0

Specifications (continued)

Maximum gamma radiation exposure dose rate that does not introduce additional error in measurement of neutrons flux density	mR/h	10.0
Operating temperature range	°C	-25 ...+55
Additional permissible error limit of measurement, caused by ambient temperature change from - 25 to +55 °C	%	5 per each 10 °C deviation from 20 °C
Dimensions of the detecting unit with the main moderator	mm	Ø76 x 195
Dimensions of the detecting unit with the protective cap	mm	Ø76 x 175
Dimensions of the additional moderator	mm	215 x 295 x 270
Weight of the detecting unit with the main moderator	kg	0.8
Weight of the detecting unit with the protective cap*	kg	0.55
Weight of the additional moderator*	kg	8.0

*without the telescopic tube clamp of 0.125 kg weight

Delivery Kit

- BDPN-07 detecting unit of neutron radiation (with the main moderator);
- additional moderator;
- protective cap;
- telescopic tube fastening clamp;
- operating manual;
- packing box.

ECOTEST® Radiation Measurement Instruments

Supplied after metrological testing

Purpose of Use

Search for alpha radiation sources and measurement of surface alpha-particles flux density.

Application

- As a unit of MKS-07 "POSHUK" search dosimeter-radiometer.
- As a part of automated systems of radiation control.

Specifications

Measurement range of surface alpha-particles flux density	$1/(cm^2 \times min)$	$1 \dots 10^5$
Main relative permissible error limit of surface alpha-particles flux density measurement when calibrated for ^{239}Pu with 0.95 confidence probability	%	15+10/A, where A is a numeric value of measured surface alpha flux density
Energy range of registered alpha radiation	MeV	4.0 ... 8.0
Detector	–	counters in corona discharge mode
Mica thickness	μm	10 ... 11
Alpha-particles detection efficiency	%	24 ... 32
Window area	cm^2	21
Operating temperature range	°C	-25 ... +55

Specifications (continued)

Maximum gamma radiation exposure dose rate that does not introduce additional error in measurement of surface alpha-particles flux density	mR/h	10.0
Additional permissible error limit of measurement, caused by ambient temperature change from -25 to +55 °C measurement	%	5 per each 10 °C deviation from 20 °C
Dimensions of the detecting unit *	mm	Ø104 x 50
Weight of the detecting unit *	kg	0.65

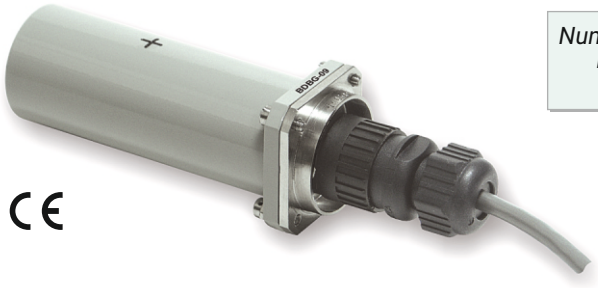
* without the telescopic tube holder of 0.036 kg weight

Delivery Kit

- BDPA-07 detecting unit of alpha radiation;
- operating manual;
- logbook;
- packing box.

BDBG-09

Intelligent Detecting Unit of Gamma Radiation



Number U2071-05 in State Register for Measuring Instruments

State Sanitary-Epidemiological Conclusion # 05.03.02-04/ 90055 of November 19, 2010

ТУ У 33.2-22362867-009:2004

Meets the requirements of IEC 61000-4-2:2008, IEC 61000-4-3:2007, IEC 61000-4-4:2008 standards.

Branches of Use

- Nuclear power industry
- Metallurgy
- Mining industry
- Sanitary and epidemiological service
- Radioactive waste storage sites
- Medicine

Purpose of Use

Measurement of ambient dose equivalent rate (DER) of gamma radiation.

Application

The detecting unit can be used both within data panels and automated systems of radiation monitoring.

Specifications

Measurement range of gamma radiation DER and main relative error		0.05 μSv/h ...10 Sv/h; (0.05 μSv/h ...100 Sv/h on demand) ±(15+2/Ḣ*(10))%, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h
Energy range of registered gamma and X-ray radiation and energy dependence	MeV	0.05 ... 3.0 (0.05 ... 1.25; ±25%)
Integration time	seconds	2 ... 420
Setup time of operating mode of the detecting unit	min	3

Specifications (continued)

Operating supply voltage of the detecting unit from external power supply	V	7 ... 13
Maximum current consumption of the detecting unit	mA	30
Operating temperature range	°C	-40 ... +60
Weight of the detecting unit without fastening elements	kg	0.5
Dimensions of the detecting unit without fastening elements	mm	170 x 60 x 60

Features

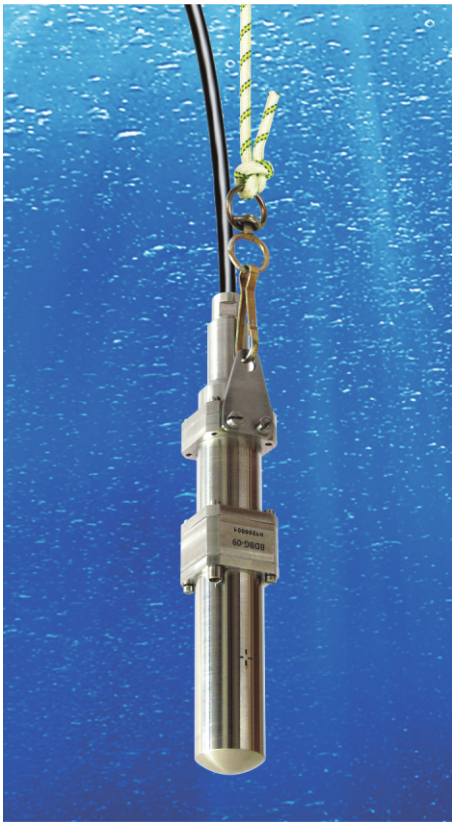
- Data exchange between the detecting unit and the data display system through RS-485 interface.
- Constant self-testing.
- Indication of the statistical measurement error.
- Ingress protection rating – IP67.
- Average service life of the detecting unit – not less than 10 years.

Delivery Kit

- BDBG-09 detecting unit of gamma radiation;
- corbel for vertical mounting of the unit;
- cable connector;
- technological kit used for testing of the detecting units (one kit per one consignment of the detecting units on demand), including:
  - serial port adapter with power supply unit for a PC connection;
  - technological cables (2 pcs.);
  - technological software CD (1 pc.);
- technical description and operating manual (one copy per one consignment of the detecting units);
- logbook;
- packing box.

BDBG-09

Intelligent Water-Resistant Detecting Unit of Gamma Radiation



Meets the requirements of IEC 61526 standard

Branches of Use

- Nuclear power industry
- Radiological laboratories
- Environmental inspectorates

Purpose of Use

Measurement of ambient dose equivalent rate (DER) of gamma radiation.

Application

BDBG-09 can be used as a part of the computer-aided systems for radiation monitoring of DER measurement in water bodies and artificial reservoirs.

Features

- Gamma detecting unit based on the Geiger-Muller counter.
- Hermetically sealed stainless steel housing.
- Data exchange between the detecting unit and the data display system through RS-485 interface.
- Constant self-testing.
- Indication of the statistical measurement error.
- Ingress protection rating – IP68.
- When immersed in water, the detecting unit is resistant to exposure of:
  - water temperature from +3 to +60 °C;
  - maximum depth of immersion in water – 20 m.
- The detecting unit is resistant to sinusoidal vibrations according to regulatory documents.

Specifications

Measurement range of gamma radiation DER	0.01 μSv/h ...10 Sv/h;	
Main relative permissible error limit of gamma radiation DER measurement when calibrated to ^{137}Cs with 0.95 confidence probability	±(15+2/Ḣ*(10))%, where Ḣ*(10) is a numeric value of measured DER equivalent to μSv/h	
Energy range of registered gamma radiation	MeV	0.05 ... 3.0 (0.05 ... 1.25; ±25%)
Anisotropy of the detecting unit at gamma quanta incidence at angles of +60° to −60° vertically and horizontally to the main direction of measurement marked by "+" symbol is not more for: – ^{137}Cs and ^{60}Co isotopes – ^{241}Am isotope	%	25 60
Operating supply voltage range of the detecting unit from external stabilized power supply	V	7 ... 13
Current consumption of the detecting unit for overall range of gamma radiation DER to be measured	mA	30
Setup time of operating mode and measurement time of the detecting unit, not more than	min	3
Operating temperature range	°C	-40 (+3 in water) ...+60
Maximum depth of immersion of the detecting unit	m	20
Dimensions of the detecting unit: - hermetically sealed housing; - length of the connecting cable, not more than	mm m	49 x 57.5 x 310 25*
Weight of the detecting unit (with the connecting cable), not more than	kg	5

* Other cable length available on request

Delivery Kit

- BDBG-09 detecting unit of gamma radiation (water-resistant);
- connecting cable (25 m);
- capron rope (25 m);
- operating manual (one copy per one consignment of the detecting units);
- logbook;
- packing box.

The delivery kit may include software along with RS-485/USB serial port adapter upon request.

Branches of Use

- Army
- Emergency Services
- Environmental inspectorates
- Nuclear power industry

Purpose of Use

Intelligent detecting units for measurement of ambient dose equivalent rate (DER) of gamma radiation in a wide range of values.

Application

Portable robotic devices, unmanned aerial vehicles, automated systems of radiation monitoring.

Specifications

- Measurement range of gamma radiation DER – from 0.01 μSv/h to 1.0 Sv/h.
- Main relative error in measurements – not more than 15 %.
- Energy range – from 50 keV to 3.0 MeV.
- Energy dependence – not more than ±25 %.
- Sensitivity for ^{137}Cs at 1.0 μSv/h not less than:
  - 200 cps for BDBG-15S-09,
  - 500 cps for BDBG-15S-23.
- Operating temperature range – from -30 to +50 °C
- Supply voltage – 12 V.
- Current consumption – not more than 50 mA.
- Digital interface – RS-485 or UART (RX,TX-3.3V), selected by the customer.

Specifications (continued)

- Weight, not more than:
  - 0.25 kg for BDBG-15S-09,
  - 0.35 kg for BDBG-15S-23.
- Dimensions:
  - 57 x 103 x 28.5 mm for BDBG-15S-09,
  - 70 x 140 x 37 mm for BDBG-15S-23.

Detector types

- Scintillation CsI (Tl) detector with a photomultiplier for measurements in the 0.01 μSv/h to 50 μSv/h range (spectrum-dose function):
  - 9 cm^3 for BDBG-15S-09,
  - 23 cm^3 for BDBG-15S-23;
- Energy-compensated Geiger-Muller counter for measurements in the 50 μSv/h to 1.0 Sv/h range.

Features

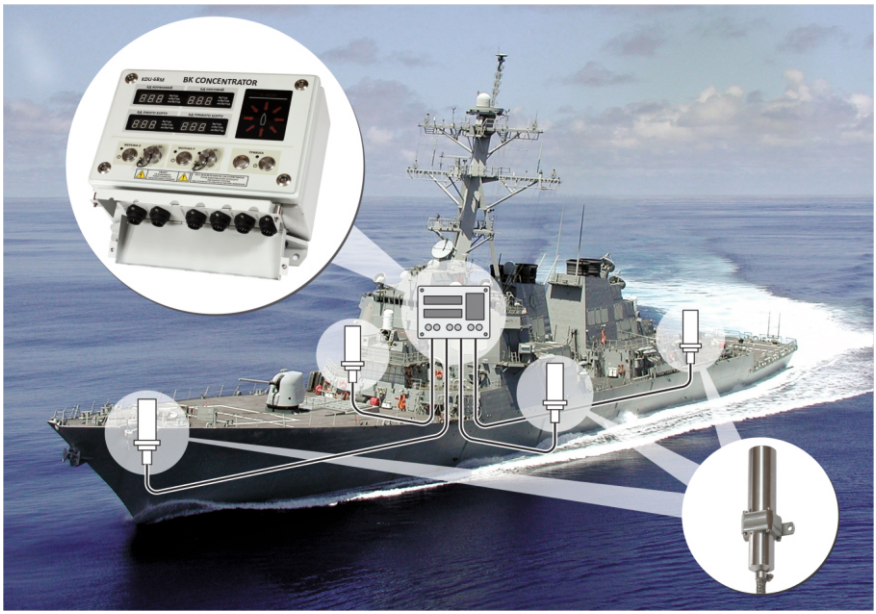
- High sensitivity regardless of minimum weight and dimensions.
- Ability to extend a measurement range up to 5.0 Sv/h (on request).
- Availability of amplitude spectrum (1024 channels).
- Ingress protection rating – IP65.
- High mechanical immunity.
- No microphonics.
- Calibrated by using Th232 (Thorium).

Delivery Kit

- detecting unit;
- connecting cable with a connector;
- passport;
- packing box.

KDU-6BM

Shipboard radiation monitoring equipment



Branches of Use

- Army
- Ministry of Internal Affairs
- Customs and Border Services
- Emergency Services and Civil Defense

Purpose of Use

- Display of measurement results of ambient dose equivalent rate (DER) of gamma radiation obtained from the BDBG-6BM detecting units of gamma radiation.
- Determining the direction towards the source of radiation.
- Sound and light alarms of exceeding the gamma DER threshold levels.

Features

- Display of measured gamma radiation DER from 4 detecting units is simultaneous and continuous.
- Application of the intelligent detecting units.
- Detecting units have the function of the integrated detectors efficiency control with generation of check information.
- Three-color digital indicators of measurement results have been applied.
- Ability to automatically switch from the basic power system to the backup one without information loss.

Specifications

Key specifications of the detecting units

Measurement range of gamma radiation DER	μSv/h	0.05 … 10^7
Main relative permissible error limit of DER measurement at ^{137}Cs calibration with 0.95 confidence probability	%	±(15+2/$\dot{H}$*(10)), where $\dot{H}$*(10) is a numeric value of DER in μSv/h
Energy range of the detected gamma radiation	MeV	0.05 … 3.00
Energy dependence of measurement results of the detecting unit while gamma DER measurement within the energy range from 0.05 to 1.25 MeV	%	±30
Anisotropy of the detecting unit at gamma quanta incidence at angles from +60° to -60° on horizontal and vertical planes with regard to the main measurement direction marked with "+" symbol, for ^{137}Cs and ^{60}Co isotopes does not exceed	%	±30
Operating supply voltage range of the detecting unit from external stabilized power supply	V	7 ... 13
Useful current of the detecting unit for the whole range of the measured gamma radiation DER, not more than	mA	30
Time of operating mode setting and measurement time of the detecting unit, not more than	min	3
Unstable readings of the detecting unit during 24 hours of continuous operation, not more than	%	5
Additional relative permissible error limit at measurement caused by environmental temperature change from -40 to +60 °C	%	5 per each 10 °C of deviation from +20 °C
Interface		RS-485
Dimensions of the detecting unit without fastening elements, not more than	mm	100 x 80 x 250
Weight of the detecting unit without fastening elements, not more than	kg	0.5
Ingress protection rating		IP57

Specifications (continued)

Environment of use		
– air temperature	°C	-40 ... +60
– relative humidity	up to 100 % given +50 °C and lower temperatures with humidity condensation	
Key specifications of the concentrator unit		
Range of gamma radiation DER values display	μSv/h	0.01 ... 10^7
Time of operating mode setting, not more than	min	1
Time of continuous operation	hrs	24
Operating supply voltage	V	~220 (50 Hz)
Power consumption, not more than	W	25
Dimensions, not more than	mm	390 × 390 × 175
Weight, not more than	kg	19
Ingress protection rating	IP23	
Environment of the concentrator unit use		
– air temperature	°C	0 ... +40
– relative humidity	up to 98 % given +40 °C and lower temperatures, non-condensing	

The product provides for the two threshold levels of 0.3 μSv/h and 5 μSv/h. In case of exceeding, the concentrator unit changes the color of gamma radiation DER display, highlights the transparencies of the established direction towards the radiation source, and triggers audio alarm.

If the value of the gamma radiation DER measured by any of the detecting units exceeds 5 μSv/h, the concentrator unit lights up "IN ZONE" transparency.

Delivery Kit

- BK concentrator unit, 1 pc.;
- BDBG-6BM gamma radiation detecting unit, 4 pcs.;
- the set of spare tools and accessories, 1 pc., including: BDBG-6BM detecting unit, BK-6BM.01 module, BK-6BM.02 module, BK-6BM.03 module, BK-6BM.04 module, passport, case;
- logbook;
- operating manual;
- package.

Delivery kit may vary depending on the customer's demands.

Information display instrument

Branches of Use

- Emergency Services and Civil Defense
- Law enforcement agencies
  (Army, Ministry of Internal Affairs, State Security Services)
- Nuclear power industry
- Radiological laboratories
- Radioactive waste storage sites
- Labor protection
- Metallurgy
- Mining industry
- Sanitary and epidemiological services

Purpose of Use

- Display of measurement results of ambient dose equivalent rate (DER) of gamma radiation obtained from the BDBG-09 detecting unit of gamma radiation.
- Real time display.
- Display of ambient temperature.
- Audio and light alarming when threshold levels of gamma radiation DER exceeded.

Specifications

- DER display range - 0.01...10^7 μSv/h.
- Number of digits for DER display – three.
- Real time display error - not more than ± 0.1 minute per 48 hours.
- Number of digits for real time display – four.
- Ambient temperature display range - from -40 to +50 °C.
- Temperature display error - not more than ±1°C in the range of -15 to +50 °C and not more than ± 2 °C in the range of -40 to -15 °C .
- Number of digits for temperature display – two.
- Three threshold levels programming in the range of 0.01 μSv/h to 9.99 Sv/h with 0.01 μSv/h discreteness.

Specifications (continued)

- Signaling when threshold levels exceeded – audio (with different soundings for each threshold level), and light (color change of DER measurement display).
- Operation in the network through the RS-485 interface.
- Power supply from industrial network (220 V) through the power adapter.
- Operating mode – 24-hour continuous.
- Distance between the panel and the detecting unit - from 0.5 to 50 m.
- Dimensions - not more than 748 x 135 x 40 mm.
- Weight (without the power adapter) - 2.05 kg.
- Mounting method – upright wall-mounted.

Operating conditions

- Air temperature from -20 to +50 °C.
- Relative humidity – up to 95 % at +35 °C, and lower temperatures, non-condensing;
- Atmospheric pressure – from 84 to 106.7 kPa.

Delivery Kit

- IT-09T data panel;
- kit of the BDBG-09 detecting unit of gamma radiation;
- connecting cable;
- 220 V power adapter;
- operating manual;
- packing box.

Information display instrument

Branches of Use

- Nuclear power industry
- Metallurgy
- Radiological laboratories
- Radioactive waste storage sites
- Medicine

Purpose of Use

- Display of measurement results of ambient dose equivalent rate (DER) of gamma radiation obtained from the BDBG-09 detecting unit of gamma radiation.
- Audio and light alarming when threshold levels of gamma radiation DER exceeded.

Specifications

- DER display range - 0.01...10^7 μSv/h.
- Number of digits for DER display – three.
- Three threshold levels programming in the range of 0.01 μSv/h to 9.99 Sv/h with 0.01 μSv/h discreteness.
- Signaling when threshold levels exceeded – audio (with different soundings for each threshold level), and light (color change of DER measurement display).
- Operation in the network through the RS-485 interface.
- Power supply from industrial network (220 V) through the power adapter.
- Operating mode – 24-hour continuous.
- Distance between the panel and the detecting unit - from 0.5 to 50 m.

Specifications (continued)

- Dimensions - not more than 345 x 135 x 40 mm.
- Weight (without the power adapter) - 1.0 kg.
- Mounting method – upright wall-mounted.

Operating conditions

- Air temperature from -20 to +50 °C.
- Relative humidity – up to 95 % at +35 °C, and lower temperatures, non-condensing.
- Atmospheric pressure – from 84 to 106.7 kPa.

Delivery Kit

- IT-09 data panel;
- kit of BDBG-09 detecting unit of gamma radiation;
- connecting cable;
- 220 V power adapter;
- operating manual;
- packing box.

Purpose of Use

Providing power supply to the IT-09T (IT-09) data panel.

Features

- Operates from single-phase mains, a built-in rechargeable battery.
- Power for the data panel is supplied from mains, if any, keeping the rechargeable battery constantly charged.
- Power for the data panel is supplied from the rechargeable battery when voltage is switched off.
- Automatic switching-off of the rechargeable battery at full discharge.
- Short circuit protected.
- Visual alarms for supply voltage, output voltage, operation from the rechargeable battery and battery status.
- Audio alarm for emergency situations: power outage, full battery discharge.
- Single switching-off of the audio alarm of the current emergency event with the “Alarm OFF” button located on the side panel of the housing.
- Permanently disable/enable the audio alarm by configuration jumpers located on the control board.
- Ingress protection rating is IP30.

Specifications

Range of input AC line voltage	V	90 ... 264
Frequency of input AC line voltage	Hz	47 ... 63
Output DC supply voltage	V	15 ± 0.2
Maximum output DC current	A	2
Nominal voltage of rechargeable battery	V	12
Nominal capacity of rechargeable battery	Ah	18
Time of operation of the data panel with a fully charged rechargeable battery of DBZh-09 (in case of a power outage) at +25±5 °C temperature and at the gamma background level, not less than	h	11
Charging time of a fully discharged rechargeable battery, not more than	h	30
Battery life at temperature of +25±5 °C, not more than	yr.	4 ... 5
Dimensions of DBZh-09 without the cables and mounting brackets, not more than	mm	300 x 300 x 120
Weight of DBZh-09 without the cables, mounting brackets and rechargeable battery, not more than	kg	5.8

Operating Conditions

- Ambient temperature from 0 °C to +40 °C.
- Relative humidity of up to 80% at +35 °C temperature, non-condensing.
- Atmospheric pressure from 84 kPa to 106.7 kPa.

Delivery Kit

- DBZh-09 unit;
- power cord – 1.8 m;
- power cable – 3.0 m;
- rechargeable battery (screws, nuts, M5 washers (2 sets) included);
- uninsulated tips (2 pcs.);
- mounting parts kit for mounting the DBZh-09 unit vertically;
- passport;
- packing box.

ASIDC-21

ТУ У 33.2-22362867-007-2003

Branches of Use

- Nuclear power industry
- Emergency Services and Civil Defense
- Radiological laboratories

Purpose of Use

- Measurement of gamma radiation individual dose equivalent rate HP(10);
- Measurement of gamma radiation individual dose equivalent HP(10);
- Automated database support of radiation burden of the staff;
- Display of statistical information about dosimetry data;
- Generation and print-out of different types of reports, as well as their export to different formats.

Features

- Support of the database of dosimetry measurements with an option to present the reporting information about radiation burden of staff in a graphic and a tabular view, as well as export to .doc .xls and .xml formats.
- Data exchange between the dosimeter and the automated workstation SW is done via the infrared port with a noncontact method at a 0.3 m maximum distance between the dosimeter and the port adapter.
- Programming of threshold levels of sound and light alarm of the dosimeter relative to individual gamma dose equivalent and its rate from the terminal.
- Programming of the frequency of individual gamma dose equivalent history recording in the dosimeter from the terminal.

Features (continued)

- Denying the display of certain indication modes on the dosimeter's indicator from the terminal, as well as the option to switch off the dosimeter until its data is read.
- Information about unauthorized power shutdown of the dosimeter.
- Option of remote access to the database and its management via the Internet.

System components

- DKG-21 EcotestCARD or DKG-21M Personal Gamma Radiation Dosimeter in the amount as requested by the customer;
- Computer hardware for the requested number of workstations and servers;
- IR port adapters for reading for each automated workstation;
- ASIDC Ecotest Software for server-end and client-end of the system.

Branches of Use

- Border Service
- Emergency Services and Civil Defense
- Environmental inspectorates

Purpose of Use

- Measurement of ambient dose equivalent rate (DER) of gamma radiation and acceptance of geographical coordinates and current time from navigation satellites.
- Display of geo-referenced measurement results on the PC and archiving of these data.
- Transfer of measured data through a radio channel.

Application

The hardware and software system (HSS) can be fixed on the vehicle and is used for construction of portable radiological and radiochemical laboratories

HSS components

- two BDBG-09 detecting units of gamma radiation;
- BI-09 interface unit;
- GPS-antenna BULLET III TRIMBLE;
- PC with the installed programs “Radiation Tracking”, “OziExplorer”;
- PC power adapter.

Main technical specifications

Name	Unit of measurement	Standardized values according to the technical specifications
Number of gamma radiation DER measurement channels	pcs	2
Instrument for gamma radiation DER measurement	BDBG-09 detecting unit of gamma radiation	
Measurement range of gamma radiation DER	μSv/h	0.1 ... 10^7
Main relative permissible error limit of gamma radiation DER measurement when calibrated to ^{137}Cs with confidence probability of 0.95	%	±(15+2/$\dot{H}$* (10)), where $\dot{H}$* (10) is a numeric value of measured DER equivalent to μSv/h
Energy range of registered gamma radiation	MeV	0.05 ... 3.00
Energy dependence of measurement results during gamma radiation DER measurement in the energy range from 0.05 MeV to 1.25 MeV	%	±25
Navigation system	GPS	
Navigation receiver	EB-500 TRANSYSTEM INC	
Maximum root-mean-square error in location determination	m	< 50
"Cold" start time	s	35
"Hot" start time	s	1.5
Operating supply voltage range *	V	9 ... 36
Supply current *, not more than	mA	100

* for all component parts of HSS apart from PC and PC power adapter.

Specifications

- Records measurement results of gamma radiation DER from each channel, as well as geographical coordinates and measurement time within a 500-ms interval.
- Displays and saves measurement results on the PC as a text and as route points with reference to geographical map. There are two modes of information display: in set time intervals or when shifted for a specified distance.

Specifications (continued)

- Supports two threshold levels setting: warning threshold level and danger threshold level relative to each measurement channel of gamma radiation DER.
- Sends sound signals and changes the information display color on the PC monitor when the measured DER exceeds the set threshold levels.
- Warns about failures of the detecting units and the interface unit with sound signals, messages on the PC monitor and LEDs that become highlighted on the interface unit.
- Audio signals about threshold levels exceeding and equipment failures are generated by the PC's acoustic system.
- Works either with scanned geographical maps of the Client, or electronic maps GoogleMaps, GoogleEarth, etc.

Figure 1. Example of current measurement results display as a text.

Figure 2. Example of current measurement results display as route points on a geographical map.

ECOTEST®
Radiation Measurement Instruments

Branches of Use

- Emergency Services and Civil Defense
- Nuclear power industry
- Mining industry
- Environmental inspectorates
- Radioactive waste storage sites

Purpose of Use

- Measurement of ambient dose equivalent rate (DER) of gamma radiation.
- Display of measurement results on a PC screen.

Features

- Remote continuous computer-aided radiation monitoring of the environment.
- Acceptance and display of measurement results of ambient dose equivalent rate (DER) from BDBG type detecting units, located at considerable distances from the server.
- Acceptance and display of measurement results of ambient dose equivalent rate (DER) from BDBG type detecting units to the fixed or portable server (via GSM modem).
- Real-time visualization of measurement results in numeric and graphic form.
- Setting of a separate threshold level for each detecting unit.
- Generation of emergency and warning notifications when DER measurement results of the specified threshold levels are exceeded.
- Storage of DER measurement results on a PC hard drive.
- Possibility to expand functionality through integration of devices, equipped with RS-485 interface (e.g., weather stations or other types of detectors).
- For assessment of radiation situation directly at the installation site of the monitoring point, it is possible to connect IT-09 (T) data panel or to display the information on the PC screen with the help of “RadMonitor” software.
- Possibility to equip the system with reserve power supply to maintain its working efficiency in case of electric power supply shortages.
- Generation of printable reports.

Specifications

Name	Unit of measurement	Standardized values according to the technical specifications
Number of gamma radiation DER measurement channels per one processing unit	pcs	1 - 4
Method of data transfer from the monitoring points to the server	Batch communication via GPRS channel	
Instrument for gamma radiation DER measurement	BDBG-09 detecting unit of gamma radiation	
Measurement range of gamma radiation DER	μSv/h	0.1 … 10^7 (0.1 … 10^8 on demand)
Main relative permissible error limit of gamma radiation DER measurement when calibrated to ^{137}Cs with confidence probability of 0.95	%	±(15+1/$\dot{H}$*(10)), where $\dot{H}$*(10) is a numeric value of measured DER equivalent to μSv/h
Energy range of registered gamma radiation	MeV	0.05 ... 3.00
Energy dependence of measurement results during gamma radiation DER measurement in the energy range from 0.05 MeV to 1.25 MeV	%	±25
Operating supply voltage range	VAC	220
Dimensions of the processing unit	Depending on the system's functionality and protection (IP) requirements. Minimal approximate dimensions are 300 × 120 × 200 mm	
Dimensions of the detecting unit without fastening elements	mm	170 × 60 × 60

Operating conditions

Operates on the IBM compatible computers running Windows 7 Professional

Delivery Kit

- BDBG type detecting units of gamma radiation (1 – 4 pcs. per one processing unit);
- Processing units of dosimetric information with GPRS antenna according to customer's requirements;
- "EcotestMonitor" software for server.

Branches of Use

- Nuclear power industry
- Radiological laboratories
- Radioisotope products storage sites
- Radioactive waste storage sites

Purpose of Use

Continuous automated radiation monitoring of the environment at radiation hazardous sites.

Specifications

- Acceptance and display of measurement results of ambient dose equivalent rate (DER) from 24 BDBG-09 detecting units or IT-09, IT-09T data panels at a time.
- Setting of a separate threshold level for each detecting unit or data panel.
- Generation of "alarm" audio signal and a red blinking indicator when DER measurement results of the specified threshold levels are exceeded.
- Storage of DER measurement results on the PC hard disk in a text file format.
- Adjustable saving intervals in the range from 1 to 99 minutes.

Use Requirements

The “RadMonitor” Computer Aided System of Radiation Control (CASRC) operates on IBM-compatible PCs running Windows XP Professional or Windows 7 Professional OS.

A sound card and a loudspeaker are needed to generate audio signals.

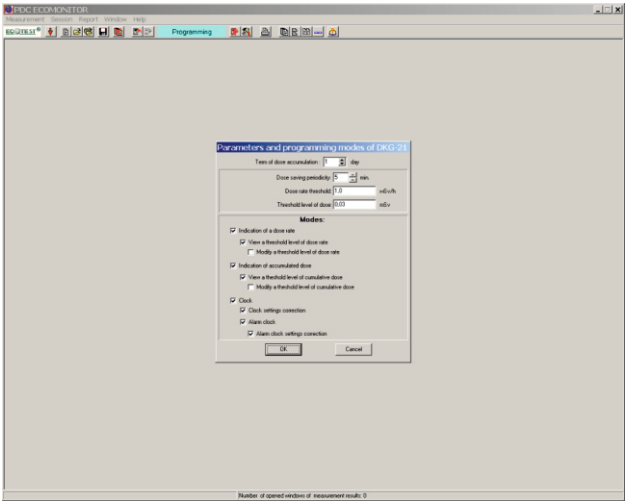
BDBG-09 detecting units or IT-09, IT-09T data panels are connected to USB-ports of the PC with the help of the isolated RPII-6BD (RPII-6IT) interface converters.

System components

- BDBG-09 gamma radiation detecting units or IT-09, IT-09T data panels – up to 24 kits;
- isolated RPII-6BD (RPII-6IT) interface converters – up to 4 kits;
- "RadMonitor" software;
- PC running Windows XP Professional or Windows 7 Professional, a sound card and loudspeaker;
- mounting parts kit;
- packing box.

PDC ECOMONITOR

Software for Programming and Dosimetry Control



Purpose of Use

- Automated noncontact programming of the operating modes of DKG-21 “EcotestCARD” dosimeter.
- Automated noncontact reading of dosimetric measurement results of DKG-21 “EcotestCARD”, MKS-U and MKS-07 ”POSHUK” dosimeters.

Application

The program can be used by companies and institutions, as well as by individual users to program DKG-21 “EcotestCARD” dosimeters and also for reading and computer processing of dosimetric measurement results of DKG-21 “EcotestCARD”, MKS-U and MKS-07 “POSHUK” dosimeters.

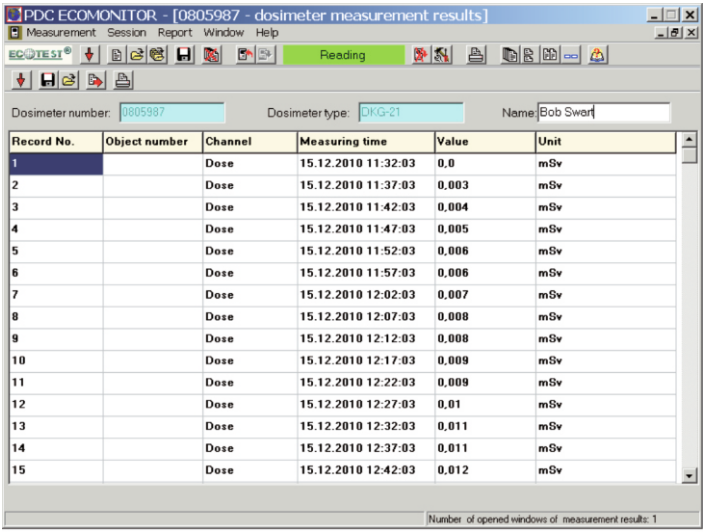
Specifications

“PDC ECOMONITOR” allows to:

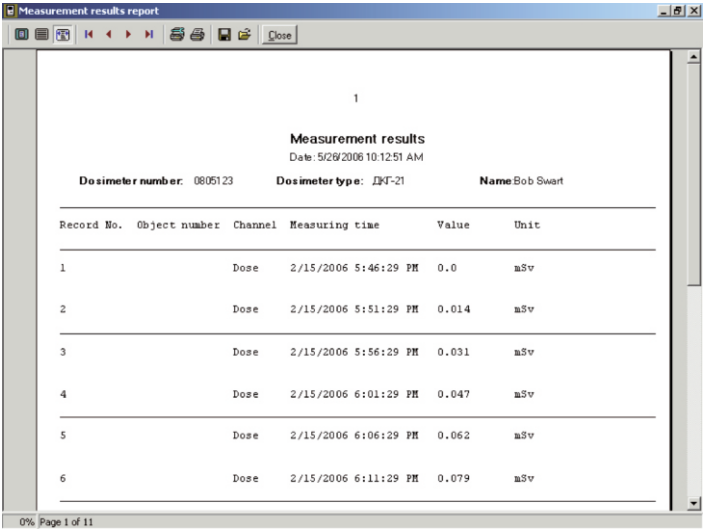
- program parameters and operating modes of DKG-21 “EcotestCARD” dosimeters;
- read dosimetric measurement results of DKG-21 “EcotestCARD”, MKS-07 “POSHUK”, and MKS-U dosimeters;
- save the readout measurement results to files;
- load and process previously saved dosimetric measurement results;
- view and print the dosimetric information as reports;
- save the information as reports or text files for further processing by other word processors;
- export the readout information to Microsoft Excel for further processing in Excel.

Operating Conditions

The "PDC ECOMONITOR" program operates on the computers running Windows XP Professional or Windows 7 Professional, and connected infrared port adapter (included in the delivery kit).



Record No.	Object number	Channel	Measuring time	Value	Unit
1		Dose	15.12.2010 11:32:03	0,0	mSv
2		Dose	15.12.2010 11:37:03	0,003	mSv
3		Dose	15.12.2010 11:42:03	0,004	mSv
4		Dose	15.12.2010 11:47:03	0,005	mSv
5		Dose	15.12.2010 11:52:03	0,006	mSv
6		Dose	15.12.2010 11:57:03	0,006	mSv
7		Dose	15.12.2010 12:02:03	0,007	mSv
8		Dose	15.12.2010 12:07:03	0,008	mSv
9		Dose	15.12.2010 12:12:03	0,008	mSv
10		Dose	15.12.2010 12:17:03	0,009	mSv
11		Dose	15.12.2010 12:22:03	0,009	mSv
12		Dose	15.12.2010 12:27:03	0,01	mSv
13		Dose	15.12.2010 12:32:03	0,011	mSv
14		Dose	15.12.2010 12:37:03	0,011	mSv
15		Dose	15.12.2010 12:42:03	0,012	mSv



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1		Dose	2/15/2006 5:46:29 PM	0.0	mSv
2		Dose	2/15/2006 5:51:29 PM	0.014	mSv
3		Dose	2/15/2006 5:56:29 PM	0.031	mSv
4		Dose	2/15/2006 6:01:29 PM	0.047	mSv
5		Dose	2/15/2006 6:06:29 PM	0.062	mSv
6		Dose	2/15/2006 6:11:29 PM	0.079	mSv

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Radiation Measurement Instruments

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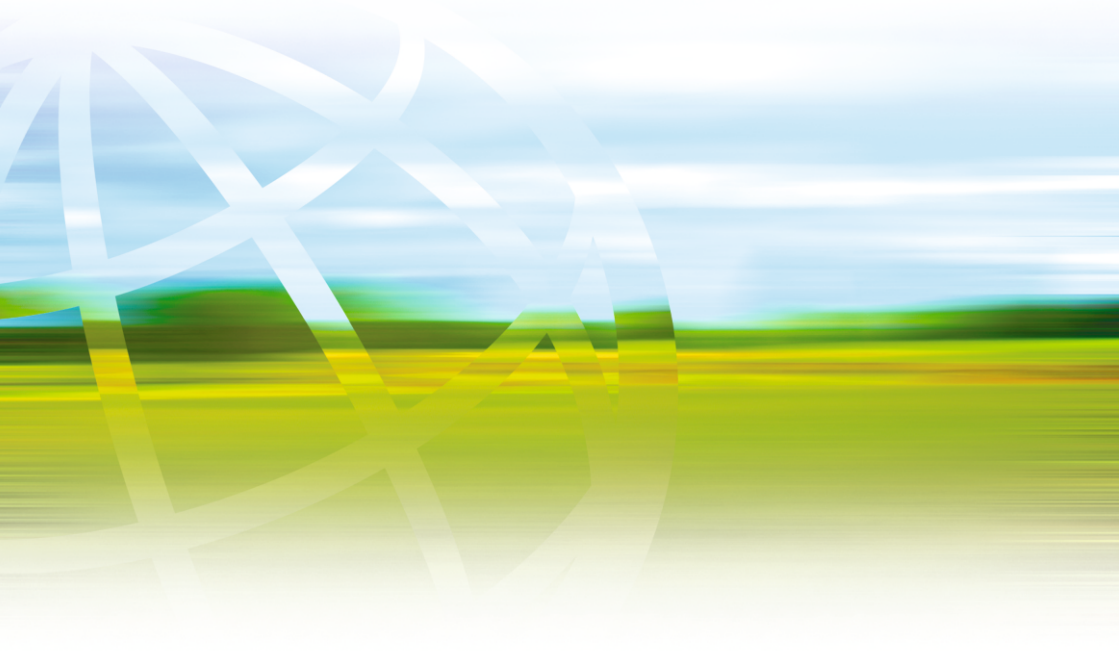
your radiation safety



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