# Spectrometer

Scientific Technical Centre RADEK

## MKSP-01 «RADEK» *portable*

**Scintillation portable gamma ray spectrometer MKSP-01 "Radek" is intended for measuring scintillation spectrums of radionuclides gamma radiation.**

It is used for determination of activities and specific activities of radionuclides in samples and in conditions of natural occurrence in geometries **2π** и **4π.** The spectrometer can be used for operation in laboratory and also in field conditions.

## Features

- Built-in GPS receiver and BlueTooth transmitter module
- Real-time clock
- Temperature sensor
- Non-volatile memory for configurations and spectrums storage
- Lamp indicator
- Software in Windows 98/ME/2000/XP/Vista/7 environment
- Software compatibility with MKGB-01 "RADEK" and RKBA-01 "RADEK"
- Performance of activity calculations in process of set of spectrum
- Performance group for operating conditions S1 under GOST 27451-87

## Operation

- The control of spectrometer by computer is carrying out by dint of universal program "ASW"
- By Pocket PC by dint of special program ASW-WM (for WindowsMobile, connection via BlueTooth)
- In field conditions the spectrometer can be controlled by dint of a button (without PC or Pocket PC)

## Sphere of application

- Emergency conditions
- Radiation safety
- In radiological laboratories of the State Sanitary and Epidemiological Supervision, timber industry departments, veterinary and agricultural services
- Indoor monitoring and environment monitoring

## Modifications (standard versions):

- BDEG-63 - on the base of monocrystal NaI(Tl) with dimensions 63x63 mm
- BDEG-80 – on the base of monocrystal NaI(Tl) with dimensions 80x80 mm
- BDEG-LB – on the base of monocrystal LaBr3

**Spectrometer of gamma-radiation MKSP-01 "RADEK" is registered in the State Register of Measuring Instruments of RF under № 46000-10.**
**Pattern Approval Certificate of Measuring Instruments RU.C.38.001.A № 42000.**
**Recalibration interval - 2 years.**

# Radiation ecology

# Spectrometer MKSP-01 «RADEK»

## Main characteristics

**Gamma radiation detection units**
BDEG-60 .....scintillator NaI(Tl) Ø 63x63 mm
BDEG-80.....scintillator NaI(Tl) Ø 80x80 mm
BDEG-LB..... scintillator $LaBr_3$ Brillance 380 Ø 80x80 mm

**Energy range**
gamma-radiation.....100-3000 keV

**Integral nonlinearity**.....< 1%
**Maximum input statistical load**.....› $5 \cdot 10^4$ $s^{-1}$

**Relative energy resolution**
BDEG-60(80) on gamma-line 661,7 keV of $^{137}$Cs radionuclide.....< 9%
BDEG-LB on gamma-line 661,7 keV of $^{137}$Cs radionuclide.....< 3%

**Instability of readings**
**(change of sensitivity) per 8 hours of working**.....± 1%

**Time of continuous operation**
from batteries without charging .....no less than 8 h
from the AC mains with voltage 220 V.....no less than 24 h

**Power**
from batteries.....12 V
from the AC mains with frequency 50 Hz .....220 V

**Power consumption**..... <4 VA

**Temperature range**
in thermal protector housing.....from -25 to +55 °C
without thermal protector housing.....from +10 to +35 °C

**Operation mode setup time**.....<5 min.

**Number of channels**
for gamma-spectrums.....1024

**Measured radionuclides**
$^{137}$Cs, $^{238}$U($^{226}$Ra), $^{232}$Th, $^{40}$K, $^{133}$Ba, $^{131}$I and etc.

**Minimum detectable activity with measuring time 1 hour**
**for laboratory performance**
$^{137}$Cs.....< 2 Bq
$^{226}$Ra.....< 8 Bq
$^{232}$Th.....< 5 Bq
$^{40}$K.....< 40 Bq
other gamma-radiating artificial radionuclides.....< n·1 – n·10

**Range of measurement of activities**
**for laboratory performance**
$^{137}$Cs.....5-20·$10^3$ Bq
$^{226}$Ra.....12-20·$10^3$ Bq
$^{232}$Th.....8-8·$10^3$ Bq
$^{40}$K.....50-20·$10^3$ Bq
other gamma-radiating artificial radionuclides.....< n·1 – n·$10^6$
**for field performance in geometry 2π, in mass proportions**
$^{40}$K.....0,5 – 15%
U ($^{226}$Ra) .....0,0005 – 0,05 %
$^{232}$Th .....0,0005 – 0,10 %
**surface activity**
$^{137}$Cs .....2 – 5000 kBq/$m^2$
**specific effective activity**
$A_{eff}$..... 50 – 2000 Bq/kg

## Overall dimensions, weight

| № | Description | Dimensions, mm | Weight, kg |
|---|---|---|---|
| 1 | Spectrometer with detection unit BDEG-63 | Ø 100x395 | 3,6 |
| 2 | Spectrometer with detection unit BDEG-80 | Ø 100x395 | 3,8 |
| 3 | Spectrometer with detection unit BDEG-63 in thermal protector housing | Ø 150x528 | 5,2 |
| 4 | Spectrometer with detection unit BDEG-80 in thermal protector housing | Ø 150x528 | 5,4 |

**The complete set "basic":** spectrometric detection unit of gamma - radiation; thermal protector housing; mains adapter 12 V; tablet PC; case for spectrometer and accessories; control sample; software "ASW"; description of software "ASW"; passport; manual; certified method of measurings (MVI); Certificate of Attestation of MVI; Pattern Approval Certificate of Measuring Instruments; Device Muster Certificate.

**Additionally you can order:** solar battery.

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