



**NEUTRON  
DOSIMETER**

**AT1117M  
Radiation Monitor**

**Consisting of:**

- BDKN-03 Neutron radiation smart probe
- PU2 Processing unit

This configuration of Radiation monitor is a hand-carried measurement instrument and is designed to measure neutron radiation ambient dose equivalent rate and ambient dose equivalent, as well as to simultaneously monitor gamma radiation ambient dose equivalent rate and ambient dose equivalent.

**Operating principle**

BDKN-03 Smart probe sends data to PU2 Processing unit, where it is displayed on a big LCD-screen. Operator can manually record measurement results.

Operation algorithm provides measurement continuity and real time statistical processing of measurement results.

**Application**

- Dosimetric monitoring in Nuclear Power Plants, manufacturing facilities, research laboratories, medical institutions, etc.

**Features**

- Quick accommodation to changes in radiation level
- Wide energy range
- Sound and visual alarm of exceeded threshold level
- Performance self-check
- Measurement results can be written and stored in non-volatile memory of Radiation monitor
- Operation in harsh weather conditions

**Specification**

|   |                 |   |
|---|-----------------|---|
| Registered radiation  | PU2             | Gamma radiation ( $\gamma$ )  |
|   | BDKN-03         | Neutron radiation (n)   |
| Detector  | PU2             | Geiger-Muller counter tube  |
|   | BDKN-03         | $^3\text{He}$ proportional counter in polyethylene moderator  |
| Energy range  | PU2( $\gamma$ ) | 60 keV ... 3 MeV  |
|   | BDKN-03(n)      | 0.025 eV ... 14 MeV   |
| Measurement range of ambient radiation dose rate equivalent   | PU2( $\gamma$ ) | 1 $\mu\text{Sv/h}$ ... 10 mSv/h   |
|   | BDKN-03(n)      | 0.1 $\mu\text{Sv/h}$ ... 10 mSv/h   |
| Measurement range of ambient radiation dose equivalent  | PU2( $\gamma$ ) | 1 $\mu\text{Sv}$ ... 1 Sv   |
|   | BDKN-03(n)      | 0.1 $\mu\text{Sv}$ ... 10 Sv  |
| Energy dependence relative to 662 keV ( $^{137}\text{Cs}$ ) [PU2 ( $\gamma$ )]                      |                 | -25%...+35%<br>(for energy range from 60 keV to 3 MeV)  |
| Sensitivity to $^{137}\text{Cs}$ gamma radiation [PU2]  |                 | 1.0 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$   |
| Response time for dose rate measurement (for dose rate $\geq 10 \mu\text{Sv/h}$ ) [PU2( $\gamma$ )] |                 | $\leq 2$ s<br>(accuracy error $\leq \pm 10\%$ )   |
| Sensitivity to Pu-Be neutron radiation [BDKN-03]  |                 | 0.355 cps/ $\mu\text{Sv}\cdot\text{h}^{-1}$   |
| Neutron flux density measurement range [BDKN-03]  |                 | 0,1 – $10^4$ neutron $\cdot\text{s}^{-1}\cdot\text{cm}^{-2}$  |
| Neutron fluence measurement range [BDKN-03]   |                 | 1 – $3\cdot 10^6$ neutron $\cdot\text{cm}^{-2}$   |
| Sensitivity to Pu-Be neutron radiation [BDKN-03]  |                 | 0.5 cps/(neutron $\cdot\text{s}^{-1}\cdot\text{cm}^{-2}$ )  |
| Limit of intrinsic relative measurement error   |                 | $\pm 20\%$  |
| Continuous run time   |                 | $\geq 24$ h   |
| Working temperature range   |                 | $-30^\circ\text{C}$ ... $+50^\circ\text{C}$   |
| Burn-up life  |                 | $\geq 100$ Sv   |
| Protection class  |                 | IP64  |
| Power supply  |                 | Integrated rechargeable battery pack;<br>+12V external power supply unit;<br>220 V 50 Hz external power supply unit |
| Overall dimensions, weight  | PU2             | 200x85x36 mm, 0.5 kg  |
|   | BDKN-03         | 314x220x263 mm, 7.8 kg  |

|   | n-radiation source                 | BDKN-03           |
|---|------------------------------------|-------------------|
| Relative sensitivity coefficients for standard neutron radiation sources with different energies for ambient dose equivalent rate measurement | Thermal, $E_n=0.025$ eV            | 0.225 $\pm$ 0.045 |
|   | Ra-Be, $E_n=100$ keV               | 0.81 $\pm$ 0.08   |
|   | $^{252}\text{Cf}$ , $E_n=2.13$ MeV | 1.02 $\pm$ 0.10   |
|   | Pu-Be, $E_n=4.16$ MeV              | 1.0               |

|   | n-radiation source                 | BDKN-03             |
|---|------------------------------------|---------------------|
| Relative sensitivity coefficients for standard neutron radiation sources with different energies for flux density measurement | Thermal, $E_n=0.025$ eV            | 0.0064 $\pm$ 0.0013 |
|   | Ra-Be, $E_n=100$ keV               | 0.182 $\pm$ 0.018   |
|   | $^{252}\text{Cf}$ , $E_n=2.13$ MeV | 1.01 $\pm$ 0.10     |
|   | Pu-Be, $E_n=4.16$ MeV              | 1.0                 |

Radiation monitor meets requirements of the following International standards: IEC 60846-1:2009, IEC 60846-2:2007, IEC 60325:2002, IEC 61005:2003, and the following safety standards: IEC 61010-1:1990, and Electromagnetic compatibility requirements of: EN 55022:1998+A1:2000+A2:2003, EN 55024:1998+A1:2001+A2:2003  
Radiation monitor has been added to state registries of approved measurement instruments of Republic of Belarus, Russian Federation, Ukraine, Kazakhstan, Uzbekistan, Azerbaijan and Turkmenistan.

Design and specifications are subject to change without notice

