

# AT6102

# SPECTROMETER

Multifunctional small-sized scintillation spectrometer to detect and identify gamma radiation radionuclides, search neutron radiation sources, measure gamma radiation energy distribution and ambient gamma radiation dose rate  $\dot{H}^*(10)$  and alpha and beta radiation flux density

**Detection and identification  
gamma radionuclides.  
Detection  
neutron radiation sources**

## Features

- Multifunctionality
- Standalone unit
- Effective search mode and radionuclide identification in real time  
Basic radionuclide library:  
industrial -  $^{241}\text{Am}$ ,  $^{133}\text{Ba}$ ,  $^{57}\text{Co}$ ,  $^{60}\text{Co}$ ,  $^{137}\text{Cs}$ ,  $^{192}\text{Ir}$ ,  
 $^{232}\text{Th}$ ,  $^{22}\text{Na}$ ,  $^{54}\text{Mn}$ ,  $^{152}\text{Eu}$ ,  $^{75}\text{Se}$   
natural -  $^{40}\text{K}$ ,  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$ ,  $^{238}\text{U}$   
medical -  $^{51}\text{Cr}$ ,  $^{18}\text{F}$ ,  $^{67}\text{Ga}$ ,  $^{123}\text{I}$ ,  $^{125}\text{I}$ ,  $^{131}\text{I}$ ,  $^{99\text{m}}\text{Tc}$ ,  $^{201}\text{Tl}$ ,  $^{133}\text{Xe}$   
Basic library may be formed by consumer request taking into account spectrometer's technical capacity
- Gamma, neutron, deceleration, alpha and beta radiation source search and detection
- Standard and expert operation modes
- Built-in continuous automatic LED stabilization of the energy scale and its periodic calibration using a KCl check sample
- Digital temperature compensation of the measuring path by an internal temperature sensor
- Audible and visual alarm at identifying gamma radiation radionuclides, at dose rate and flux density threshold exceeding
- Spectrometric data readout on a backlit LCD 128x64
- Logging up to 400 spectra
- Wide-temperature operation under field conditions
- Data transfer to PC
- Alpha and beta radiation flux density measurement by an external smart probes BDPA-01 or BDPB-01



## Application

- Environmental monitoring
- Radioactive waste monitoring
- Illicit trafficking of radiation sources and materials monitoring
- Nuclear industry
- Geological survey
- Nuclear medicine
- Scientific research
- Emergency

**BDPA-01  
BDPB-01**



**α | β**



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**INSTRUMENTS AND TECHNOLOGIES FOR  
NUCLEAR MEASUREMENTS AND RADIATION MONITORING**

# Specification

## Detectors

spectrometer ..... scintillation NaI(Tl) Ø40x40 mm  
Geiger-Muller gas-discharge counter  
Neutron <sup>3</sup>He-proportional counter in  
polyethylene moderator

external smart probes:

alpha radiation BDPA-01 ..... Ø60 mm, ZnS(Ag)

beta radiation BDPB-01 ..... Ø60 mm, plastic

## Gamma radiation detection

in energy ranges ..... 20 - 1500 keV and 40 - 3000 keV

## Neutron radiation detection

in energy range ..... 0.025 eV - 14 MeV

Integral nonlinearity ..... not more than 1%

Relative energy resolution on <sup>137</sup>Cs ..... not more than 9%

Maximum input statistical load ..... not less than  $5 \cdot 10^4 \text{ s}^{-1}$

Number of channels ..... 512

## Detection

alpha radiation (BDPA-01) in the energy range . 4 - 7 MeV

beta radiation (BDPB-01) with the maximum energy

form 155 keV (<sup>14</sup>C) to 3,5 MeV (<sup>106</sup>Ru+<sup>106</sup>Rh)

Continuous operation time from built-in

accumulator unit ..... not less than 12 h

Energy scale instability for 12 h ..... not more than 1 %

## Ambient gamma radiation dose rate measuring range

NaI(Tl) ..... 0,01 - 300 µSv/h

Geiger-Muller counter ..... 10 µSv/h - 100 mSv/h

Energy sensitivity response respect to <sup>137</sup>Cs

NaI(Tl) ..... ±20%

Geiger-Muller counter ..... + 35 ÷ - 25 %

## Neutron flux density measuring

range ..... 0.1 - 10<sup>4</sup> neutron/(cm<sup>2</sup>·s)

Neutron source <sup>252</sup>Cf (1,4·10 neutron/s<sup>-1</sup>)

acquisition time on distance 20 cm ..... 5 s

## Flux density measuring range

alpha radiation (BDPA-01) 0.5 - 10<sup>5</sup> part./(min·cm<sup>2</sup>)

beta radiation (BDPB-01) 3 - 5·10<sup>5</sup> part./(min·cm<sup>2</sup>)

## NaI(Tl) sensitivity

<sup>241</sup>Am ..... 5600 cps/(mSv/h<sup>-1</sup>)

<sup>137</sup>Cs ..... 670 cps/(mSv/h<sup>-1</sup>)

<sup>80</sup>Co ..... 330 cps/(mSv/h<sup>-1</sup>)

background 0.08 mSv/h ..... 100 cps

## Neutron detector sensitivity

<sup>252</sup>Cf ..... not less than 2 cps/(neutron/s<sup>-1</sup>·cm<sup>-2</sup>)

## Intrinsic measurement error

gamma radiation dose rate ..... ± 20%

alpha and beta radiation flux density ..... ± 20%

## Spectrum acquiring time

(in increment of 1 s) ..... from 1 to 64800 s

Operating temperature range ..... -20 ÷ +50 °C

Relative air humidity at 35°C ..... 95%

## Operation mode

setup time ..... not more than 1 min

Protection class ..... IP54

## Radio disturbance

CEI/IEC CISPR 22:1997

## Electromagnetic compatibility

CEI/IEC 61000-4-2:1995

IEC 61000-4-3:1995

## Weight

spectrometer ..... 2.6 kg

BDPS-03 ..... 0.55 kg

## Dimensions

spectrometer ..... 222x108x206 mm

BDPS-03 ..... Ø87x205 mm

**Complete set:** spectrometer, AC adapter, check sample, Manual, packing case for spectrometer and its accessories.

External alpha and beta radiation smart probes BDPA-01 and BDPB-01, telescopic bar 1,6 m, cable for DC supply, kit of accessories to connect to PC and applied software to acquire and process spectra on PC and notebook are options and they are supplied on **additional order**.

The spectrometer AT6102 complies with IEC 62327 International standard requirements.

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