



GAMMA-1P

GAMMA SEMICONDUCTOR SPECTROMETER

INTENDED USE

The GAMMA-1P laboratory precision gamma semiconductor spectrometer is used for qualitative and quantitative analysis of complex radionuclide samples.

DESIGN AND OPERATION

GAMMA-1P includes a semiconductor detecting unit, a spectrometric device, a lead protective shield, an operator's workstation.

The semiconductor detecting unit converts the energy of gamma rays into electrical signals proportional in amplitude for their subsequent processing. The type of the semiconductor detector is selected to meet the customer's specifications.

The spectrometric device is used to receive spectrometric information from the semiconductor detector. The choice of a specific model of the spectrometric device is determined by the tasks and needs of the customer.

The lead protective shield reduces the level of the external gamma background recorded by the semiconductor detector thus increasing the spectrometer sensitivity. For some applications, such as high activity samples, there may be no need for a shield.

The operator's workstation with installed specialized software allows you to manage accumulation, display, processing of information and output of processing results to external devices.

GAMMA-1P can come with various accessories: containers and devices for sample measurements, positioning devices, devices for filling the detector with liquid nitrogen, and a desk for equipment.

APPLICATION

- Laboratories of external dosimetry services, environmental services, radiological laboratories of concerned ministries and departments - to control various environmental samples for the presence of gamma-emitting radionuclides
- Radiochemical laboratories - to control technological processes
- Nuclear physics centers - for research in various areas of fundamental and applied physics

FEATURES

- The spectrometer composition depends on the tasks, needs and capabilities of the customer
- Efficiency calibration of the spectrometer is done for a point 5 cm, point 25 cm, and 1 l Marinelli vessel geometries. Calibrations using other geometries are also possible upon the customer's request
- The detector is characterized to correct the radionuclide library for true summation





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SPECIFICATIONS

Range of detected gamma energies	0.05 to 10.0 MeV
Range of measured gamma energies	0.05 to 3.0 MeV
Number of analyzer channels	8192 or 16,384 depending on the spectrometric device used
Energy resolution for gamma line with the energy, max	122 keV (^{57}Co): 0.8 keV (typical value) 1332 keV (^{60}Co): 1.8 keV (typical value)
Relative detection efficiency at the peak of total absorption of gamma quanta for point geometry ^{60}Co along a line with an energy of 1332 keV, at a source-detector distance of 25 (depending on the volume of the detector used), min	10 % (efficiency depends on the selected SCD)
Integral non-linearity, max	0.05 %
Maximum statistical input load, min	$5 \cdot 10^4$ or $1 \cdot 10^5$ cps (depending on the spectrometric device used)
Minimum measured activity of ^{137}Cs in a sample with shield application for 1 hour measurement, max	1.5 Bq
Confidence limits for activity measurement error ($P = 0.95$)	$\pm(5 \text{ to } 30) \%$
Operating mode setting time, max	30 minutes
Continuous operation, min	24 hours
Time instability for continuous operation period, max	$\pm 0.1 \%$
Power supply	(50 ± 1) Hz, ~ 220 V
Operating conditions	$+10$ to $+35$ °C humidity up to 75 % at $+30$ °C and lower temperatures without moisture condensation

CERTIFICATION

- Registered in the State Register of Measuring Instruments under No. 18392-08
- Complies with the requirements for products of safety class 4N according to NP-001-97, NP-001-15, NP-016-05, NP-033-11
- Complies with the requirements of the Technical Regulations of the Customs Union on safety of low voltage equipment (TR CU 004/2011), Technical Regulations of the Customs Union on electromagnetic compatibility of technical means (TR CU 020/2011)

