



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.

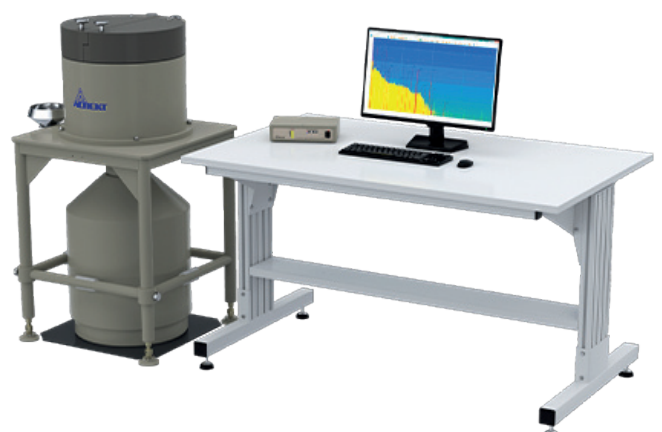
GAMMA-1P can come with various accessories: containers and devices for sample measurements, positioning devices, devices for filling the detector with liquid nitrogen, and a desk for equipment.

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





GAMMA-1P

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 | 5·10 ⁴ or 1·10 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) | ±(5 to 30) % |
| Operating mode setting time, max | 30 minutes |
| Continuous operation, min | 24 hours |
| Time instability for continuous operation period, max | ±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 OPB-88/97
- Complies with the Customs Union Technical Requirements "Safety of Low Voltage Equipment" (CU TR 004/2011) and "Electromagnetic Compatibility of Technical Means" (CU TR 020/2011)

