SEMICONDUCTOR ALPHA SPECTROMETER SEA-13P1

INTENDED USE

The SEA-13P1 semiconductor alpha spectrometer is designed for measurement of energy spectrum of alpha particles, identification of alpha-active nuclides and determination of their content in measured samples of environmental objects, as well as directly in samples of aerosol emissions into the atmosphere and air of industrial premises, collected on AFA-RSP-20 aerosol filters.

APPLICATION

SEA-13P1 is used in nuclear physics centers for research in various fields of fundamental and applied physics, in radiochemical laboratories of enterprises for monitoring technological processes, in laboratories of external dosimetry services of enterprises for monitoring environmental objects, in radiological laboratories of the State Sanitary and Epidemiological Service, in veterinary and agricultural services for monitoring the quality of water of centralized and non-centralized water supply, animal products and soils.

DESIGN AND OPERATION

SEA-13P1 is a single unit that includes an evacuated chamber with a silicon ion-implanted semiconductor detector, a spectrometric amplifier, a spectrometric ADC, and a power source for the spectrometer and detector.

The spectrometer also includes a vacuum pump, a personal computer with printer, and SpectraLineADA spectrometry software.

FEATURES

- Samples of aerosol emissions collected on AFA-RSP-20 aerosol filters can be measured without special radiochemical treatment
- Samples to be measured must be prepared by electrolytic deposition
- Samples to be measured are placed on one of ten shelves in the measuring chamber, located at distances from 5 to 50 mm from the detector in 5 mm increments
- Maximum sample diameter is 70 mm

SEA-13P1

SPECIFICATIONS

Range of registered energies	3.5 to 9.0 MeV
Background in the energy range from 3.5 to 6.0 MeV, max	0.003 cps
Energy resolution of the 5156 keV line of a ^{239}Pu source placed at a distance of 50 mm from an alpha detector with a specified area, max	20 keV (100 mm^2) 25 keV (450 mm^2) 35 keV (1000 mm^2) 50 keV (3000 mm^2)
Integral nonlinearity in the energy range up to 5.5 MeV, max	10 keV
Maximum statistical load, min	1×10^4 cps
Number of channels	4096 (8192)
Time instability for continuous operation period, max	10 keV
Operating mode setting time, max	45 min
Continuous operation	8 hours
Power supply	~220 V, (50±1) Hz, 500 V·A
Environmental	+10 to +35 °C, 75 % at +30 °C and lower temperatures without moisture condensation
Operating geometries	measurement of samples at a distance of 5 to 50 mm from the detector in 5 mm increment maximum diameter of the analyzed alpha sample is 70 mm
Dimensions and weight of the alpha spectrometer unit	(350×180×250) mm; 7.5 kg

CERTIFICATION

- Registered in the State Register of Measuring Instruments under No. 15293-09
- 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)