

AT1315 Gamma Beta Spectrometer

Radionuclide monitoring of water, foods, raw and other materials



Gamma beta spectrometer

Two channel scintillation gamma and beta spectrometer is designed for simultaneous and selective detection of the following:

- ^{137}Cs , ^{134}Cs , ^{131}I and ^{90}Sr radionuclide specific activity in natural samples
- Specific effective activity of ^{40}K , ^{226}Ra , ^{232}Th in construction materials

Can be used for rapid radioactive purity determination of standardized sample heat of metal.



Operating principle

Operating principle of AT1315 Gamma and beta spectrometer is based on measurement and transformation of gamma and beta radiation, detected by standalone detection units, into amplitude distributions, which are further transformed into digital code and saved in the detection unit memory.

The spectrometer can be delivered w/o beta channel according to customer request.



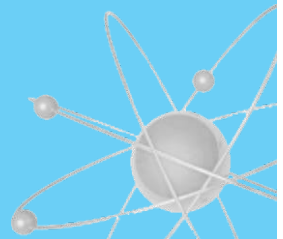
Gamma spectrometer

Applications

- Spectrometric and radiometric monitoring of radionuclide content in water, foods, agricultural raw materials, industrial, construction and forestry materials, environmental objects (soil, vegetation, etc.), metallurgical industry produce and products of other industries.
- Activity measurement of ^{137}Cs , ^{134}Cs , ^{131}I , ^{90}Sr , ^{40}K , ^{226}Ra , ^{232}Th , etc.

Features

- 1024-channel analogue-to-digital converter is integrated into smart probes
- Continuous automatic LED stabilisation of spectrometric path in measurement mode
- Calibration integrity monitoring by means of integrated radioisotope check sample with less than the minimum significant activity
- Computer spectra processing with maximum likelihood method
- Automatic recording of sample density
- Spectra metering with on-line visualisation
- Simultaneous spectra metering and processing
- Methodological support of measurements



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Instruments and Technologies for Nuclear
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Zievert

Ionizing radiations
detectors and
instruments

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Specification

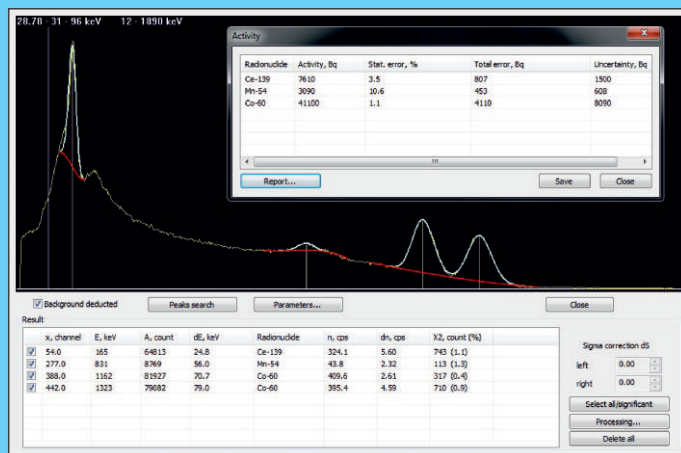
Detectors	
Gamma channel	Scintillator, NaI(Tl) ø63x63 mm
Beta channel	Plastic scintillator, ø128x9 mm
Energy range	
Gamma radiation	50 keV – 3 MeV
Beta radiation	150 keV – 3.5 MeV
Volumetric (specific) activity measuring range without sample concentration (in Spectrometric and Radiometric modes)	
¹³⁷ Cs	1 – 10 ⁶ Bq/l (Bq/kg)
⁴⁰ K	20 – 2·10 ⁴ Bq/l (Bq/kg)
²²⁶ Ra	3 – 10 ⁴ Bq/l (Bq/kg)
²³² Th	3 – 10 ⁴ Bq/l (Bq/kg)
⁹⁰ Sr (In Radiometric mode only)	10 – 10 ⁶ Bq/l (Bq/kg)
¹³¹ I (In Spectrometric mode only)	10 – 10 ⁵ Bq/l (Bq/kg)
¹³⁴ Cs (In Spectrometric mode only)	6 – 10 ⁵ Bq/l (Bq/kg)
Limits of tolerable intrinsic relative error ±20%	
Measured sample density range 0.2 – 1.6 g/cm ³	
Lower limit of ⁹⁰Sr measurement range with sample concentration in conversion to "wet" sample	
For potable water	0.1 Bq/l
For milk, baby food	0.8 Bq/l
For potatoes, corn, grain, agricultural raw materials	1.0 Bq/kg
Integral nonlinearity <1%	
Typical resolution at 662 keV (¹³⁷Cs) 8%	
Maximum input statistical load ≥5·10 ⁴ s ⁻¹	
Calibration scale instability during continuous service <2%	
Measurement instability during continuous service <5%	
Number of ADC channels 1024	
Continuous operation time ≥24 h	
Operation mode setup time <15 min	
Operation temperature range +10°C to +35°C	
Relative air humidity with air temperature ≤30°C without condensation ≤75%	
Power supply PC USB port	
Overall dimensions, weight	
Gamma detection unit	ø98x330 mm, 2 kg
Beta detection unit	ø138x323 mm, 2.5 kg
Protection unit (with Beta detection unit)	ø474x910 mm, 194 kg
Measurement vessels volume	
For "wet" samples	Marinelli beaker, 1 l; Flat vessel, 0.5 and 0.1 l
For concentrated samples	Flat vessel, 0.2 l and 0.03 l

Design and specifications are subject to change without notice

Background measurement



Spectrometric mode



Radiometric mode



The gamma beta spectrometer complies with:
GOST 27451-87, GOST 17209-89, GOST 23923-89,
Safety requirements of IEC 61010-1:2010,
EMC requirements of EN 55011:2009,
IEC 61000-4-2:2008, IEC 61000-4-3:2008



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