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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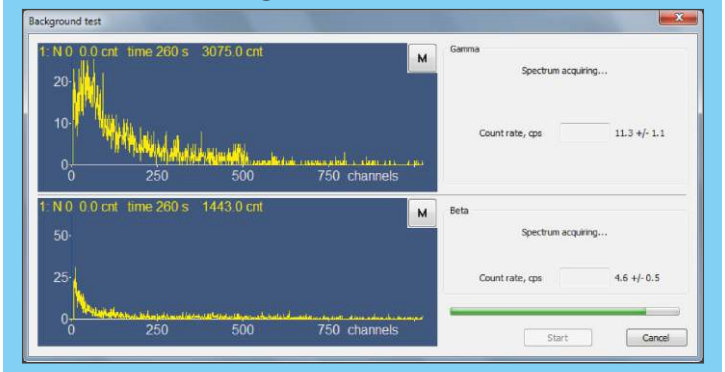
Specification

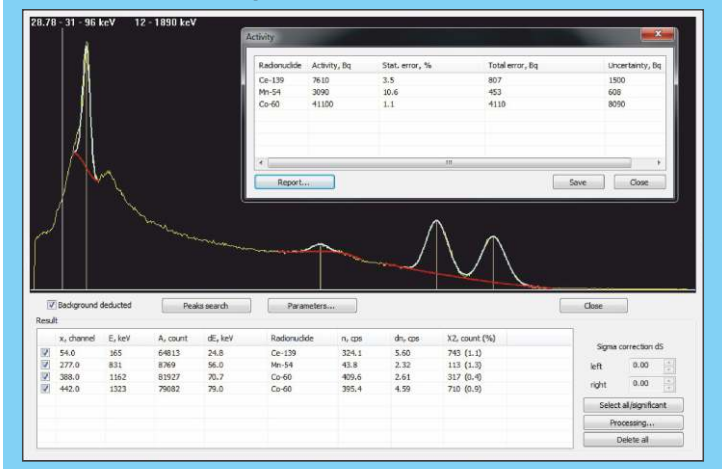
Detectors	
Gamma channel	Scintillator, NaI(Tl) ø63x63 mm
Beta channel	Plastic scintillator, ø128x9 mm
Energy range	
Gamma radiation	50 keV...3 MeV
Beta radiation	150 keV...3.5 MeV
Volumetric (specific) activity measuring range without sample concentration (in Spectrometric and Radiometric modes)	
^{137}Cs	1...10^6 Bq/l (Bq/kg)
^{40}K	20...$2{\cdot}10^4$ 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)
Intrinsic relative error of activity measurement with P = 0.95	±20% max.
Measured sample density range	0.2...1.6 g/cm^3
Lower limit of ^{90}Sr 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 (^{137}Cs)	7.5%
Maximum input statistical load	$5{\cdot}10^4$ s^{-1}
Calibration scale instability during continuous service	<2%
Measurement instability during continuous service	<5%
Number of ADC channels	1024
Continuous run time	≥24 h
Operation mode setup time	<15 min
Working temperature range	10°C...35°C
Relative 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

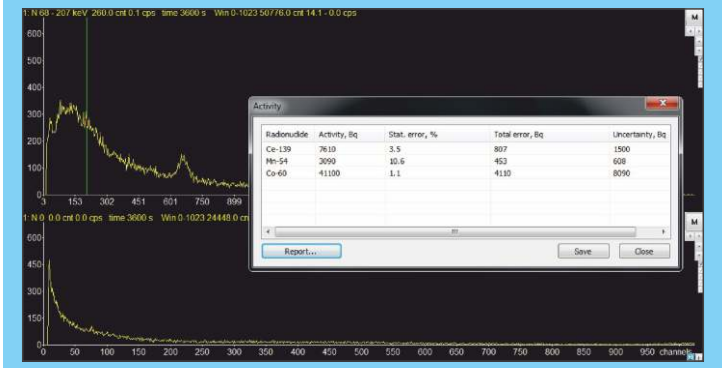
Background measurement



Spectrometric mode



Radiometric mode



AT1315 Gamma beta spectrometer meets Safety standard requirements:
IEC 61010-1:2001
EMC requirements:
EN 55011:2009
IEC 61000-4-2:2008
IEC 61000-4-3:2008

Gamma beta spectrometer has the pattern approval certificates of Republic of Belarus, Russian Federation and Kazakhstan.

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