

Scientific Production Company "Doza"

Spectrometry

Radiation control equipment



"Progress-Beta": Scintillation beta spectrometer

- Measurement of strontium-90 in the foodstuffs, agricultural products, etc.
- Measurement of gross beta activity in sample
- Self tests using built-in LED

Physical characteristics

Detector:

- Plastic scintillator Ø70x10 mm

Sample:

- Plate Ø70 mm
- Weight: up to 15 g

Energy range:

- 0.2 ÷ 3.0 MeV

Minimum detectable activity of Sr-90 in a 10 g sample on a standard planchet, Bq/sample:

- In case of absence of K-40 in the sample: 0,1 Bq
- In case the activity of K-40 till 5 Bq/g: 0,5 Bq

Electrical characteristics

Interface:

- USB

Reference standards:

- IEC 61562

Mechanical characteristics

Weight:

- No more 50 kg

Complete set

Basic complete set:

- Detector unit with plastic scintillator, integrated power supply, amplifier, ADC
- Lead shielding
- "Progress" software
- Check source for energy calibration (Sr-90-Y-90)
- Planchet Ø 70 mm (5 items)
- Sample densification device
- Procedure manual for measurement of radionuclides' activity using the scintillation beta spectrometer "Progress"

Optional equipment and service:

- Personal computer and printer
- Calibrations for radionuclides not included in the main library of radionuclides



Progress-Beta

"Progress-Gamma": Scintillation gamma spectrometer

- Measurement of gamma activity in foodstuffs, soil samples and others environmental objects
- Identification of radionuclides in the sample
- Automatic correction for sample density;
- Self-tests using built-in LED

Physical characteristics

Detector:

- NaI (TI) Ø63x63 mm

Validated measurement geometries:

- Marinelli beakers (1 liter), Petri dishes (Ø90 mm) etc.

Energy range:

- 0.2 ÷ 3.0 MeV

Minimum detectable activity, Bq/sample:

- Cs-137: 3 Bq
- Th-232: 7 Bq
- Ra-226: 8 Bq
- K-40: 40 Bq

Electrical characteristics

Interface:

- USB

Reference standards:

- IEC 61563

Mechanical characteristics

Weight:

- No more 120 kg

Complete set

Basic complete set:

- Scintillation detector unit with NaI (TI) detector with integrated power supply, amplifier and ADC
- Lead shielding 50 mm
- "Progress" software
- Check source for energy calibration (Cs-137 + K-40)
- Marinelli beakers - 1 liter (5 items)
- Petri dishes, Ø 90 mm (5 items)
- Procedure manual for measurement of activity of radionuclides using the scintillation gamma spectrometer "Progress"

Optional equipment and service:

- Kit for radon measurements, including calibration of "IC-63" geometry for counting the charcoal samples
- Personal computer and printer
- Calibrations for user defined geometries
- Calibrations for radionuclides not included in the main library of radionuclides



Progress-Gamma

"Progress-G(P)": Portable scintillation gamma spectrometer

- Field measurements of gamma activity in environmental objects without sampling (4π geometry)
- Laboratory measurement of gamma activity in foodstuffs, soil samples and others environmental objects
- Identification of radionuclides in the sample
- Automatic correction for sample density
- Tests using built-in LED

Physical characteristics

Detector:

- NaI (TI) $\varnothing 45 \times 50$ mm
- Lead shielding: 20 mm

Validated measurement geometries:

- Marinelli beakers (0,5 liter), Petri dishes ($\varnothing 90$ mm) etc.

Energy range:

- $0.2 \div 3.0$ MeV

Minimum detectable activity in 0.5-litre Marinelli beaker:

- Cs-137: 10 Bq/kg
- K-40: 100 Bq/kg
- Ra-226: 18 Bq/kg
- Th-232: 16 Bq/kg

Minimum detectable activity in 30 min (4π geometry):

- Cs-137: 2 Bq/kg
- K-40: 30 Bq/kg
- Ra-226: 4 Bq/kg
- Th-232: 3 Bq/kg

Electrical characteristics

Power supply:

- Rechargeable battery
- 220 V, 50 Hz

Interface:

- USB, RS-232

Reference standards:

- IEC 61563

Weight:

- No more than 60 kg

Complete set

Basic complete set:

- Scintillation detector unit with NaI(Tl)
- "Progress" software
- Control unit "Sputnik" for acquisition and analysis of spectra with built-in memory for spectral data



Progress-Gamma

- Case
- Lead shielding (2 cm) for laboratory use
- 0.5-litre Marinelli beakers – 5 items
- Na-22 check source
- Power adapter BPS-01
- Operation manual
- Procedure manual for measurement of activity of radionuclides using the scintillation gamma spectrometer "Progress".

Optional equipment and service:

- Kit for radon measurements with charcoal
- Built-in dose rate meter
- Additional memory (RAM) for storage of 64 spectra
- Additional power adapter
- Notebook and printer

"Progress-AR": Alpha radiometer

- Measurement of gross activity of alpha emitting radionuclides in thin samples
- Measurement of gross activity of alpha emitting radionuclides in thick samples
- Measurement of activity deposited on aerosol filters

Physical characteristics

Detector:

- Scintillation detector ZnS ($\varnothing 60$ mm)

Sample:

- Thin sample - diameter up to 70 mm,
- Preparation technique - electro-deposition
- Thick sample - diameter 70 mm, weight 200...300 mg,
- Preparation technique - application of powders (prepared by radiochemical concentration, by water evaporation or by pounding of mineral samples) onto a planchet with the help of spirit

Energy range:

- $1.5 \div 8$ MeV

Minimum detectable activity:

- Thin samples no more than $9 \cdot 10^{-3}$ Bq/sample
- Thick samples no more than 180 Bq/kg

Mechanical characteristics

Overall dimensions, weight:

- $195 \times 120 \times 210$ mm, 3.4 kg

Complete set

Basic complete set:

- Alpha radiometer "Progress-AR"
- Check source (uranium isotopes)

Set of accessories:

- Procedure manual for measurements of radioactivity using scintillation alpha radiometer "Progress-AR"
- "Progress" software



"Progress-AR"

"Progress": Whole body counter

Several fixed positions of the detector enable to perform measurements in various geometries and to estimate the content of:

- Cs-137 in the whole body
- I-131 in thyroid
- Co-60, Cs-137, Mn-54, Cr-51 in lungs
- Database for storage of measurement data and results
- Uncertainty calculations based on measurement data
- Self tests using built-in LED

Physical characteristics

Detector:

- scintillation detector NaI (TI) Ø63×63 mm

Energy range

- 0,2 ÷ 2,8 MeV

Minimum detectable activity:

- By Cs-137 in the whole body - 1200 Bq
- By I-131 in thyroid - 100 Bq
- By Co-60, Cs-137, Mn-54, Cr-51 in lungs - 200 Bq

Mechanical characteristics

Weight:

- No more than 120 kg

Complete set

Basic complete set:

- Collimator with rotator and holder
- Detector with incorporated ADC
- Patient chair and table for collimator
- Check source Na-22
- Procedure manual for lifetime measurement of gamma-emitting radionuclides' activity in human body using the gamma-spectrometer of human radiation "Progress"
- «Progress» software

Optional equipment and service:

- Program of internal radiation committed internal radiation effective dose calculation by the standard model
- Background phantom
- Personal computer and printer



Collimator with rotator and holder



MKG-01D "Sadovnik": Spectrometry system

- Categorization of wastes for the purpose of further processing, including wastes with unknown radionuclide composition
- Measurements during the incoming waste inspection (accepting for storage, disposal)
- Certification of unconditioned and conditioned wastes in closed containers without opening them (at nuclear plants or at facilities providing collection, storage, transportation, conditioning, processing, temporal storage and final disposal of radioactive waste)
- Activity measurement of extended objects in situ without opening the equipment
- Activity measurement of extended objects after opening (for example, assessment of tubes used for oil transportation)

Physical characteristics

Detector:

- Detector unit GEM (GMX) with HPGe detector and multi-positioning cryostat CFG-PMOD4-7 with 7 litre Dewar
- Dose rate probe BDMG-200

Energy range

- With GEM detector: 40 ÷ 3000 keV
- With GMX detector: 5 ÷ 1500 keV
- Dose rate probe BDMG-200 - 50 ÷ 3000 keV

Measurement range:

- $1 \cdot 10^{-7} \div 10$ Sv/h
- Relative efficiency of detection (in photopeak) at 1332.5 keV (Co-60): 10 ÷ 150 %

Electrical characteristics

Power supply:

- 220 V, 50 Hz

Interface:

- USB

Complete set

Basic complete set:

- Spectrometric detector unit GEM (GMX) with HPGe detector and multi-positioning cryostat CFG-PMOD4-7 with 7 litre Dewar
- Portable digital multichannel analyzer DigiDART
- Dose rate probe BDMG-200
- Autonomous power supply unit with built-in battery
- Industrial computer, keyboard
- Laser range-finder



MKG-01D "Sadovnik"

- Thermographic printer
- Web-camera
- Device equipped with stepper motor, for positioning of the spectrometric detector
- Calibration device with OSGL-type reference sources (Am-241, Co-60, Ba-133, Eu-152) for energy calibration
- Removable collimators with end cap
- Measurement procedures
- "Cluster" software



Spectrometry

Radiation control equipment

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