



## Gamma spectrometry - STUK

<b>Measurement</b>	Gamma Spectrometry
	Environmental
	Water
	Terrestrial
	Air (particles)
<b>Method used for matrices</b>	Air (gases)
	Biological
	Foodstuff
	Industrial products
	Swipe filters
<b>Separation Method</b>	No separation
<b>Radionuclide(s)</b>	Gamma emitting radionuclides
<b>Quantity of sample used (in kg, l, ...)</b>	0.3 kg (k.p.) soil or sediment
<b>Counting time for the method</b>	16 hours
<b>MDA of the technique</b>	K-40: 20 Bq/kg, Cs-134, Cs-137: 0,5 Bq/kg, Co-60: 0,5 Bq/kg
<b>FWHM (Energy MeV)</b>	-
<b>Method Evaluated</b>	No
<b>Method Accredited</b>	Yes
<b>Procedure</b>	

### Description of the method

The activity concentration of gamma-emitting nuclides are measured with a low-background, high-resolution HPGe spectrometers. The detectors are placed in cylindrical background shields made of 12–14 cm thick lead. The inside of the shields are lined with cadmium and copper to absorb the x-rays from lead. The measured energy range is 30–2700 keV and the conversion gain is 8192 channels. The relative efficiency of the detectors range from 35% to 90% and energy resolution 1.6 keV to 2.0 keV at 1.33 MeV. The samples are measured in simple cylindrical beakers (diameters 42 mm and 74 mm, height 26 mm) or 0.5 liter standard reentrant (Marinelli) beaker on top of the detector end-cap.

The efficiency calibrations of the detectors have been obtained with both separate single-line nuclides in water solution and multinuclide standard source. The following nuclides have been used: K-40, Cr-51, Co-57, Co-60, Zn-65, Y-88, Cd-109, Sn-113, Cs-137, Hg-203, Pb-210 and Am-241.

The spectra are analysed using either UniSampo/Shaman software package or STUK-developed GAMMA-99 computer code. The correction for sample height and density, as well as the effect of true coincidence summing, are taken into account in calculation of the results. The uncertainties include both statistical uncertainty and uncertainty due to the efficiency calibration.

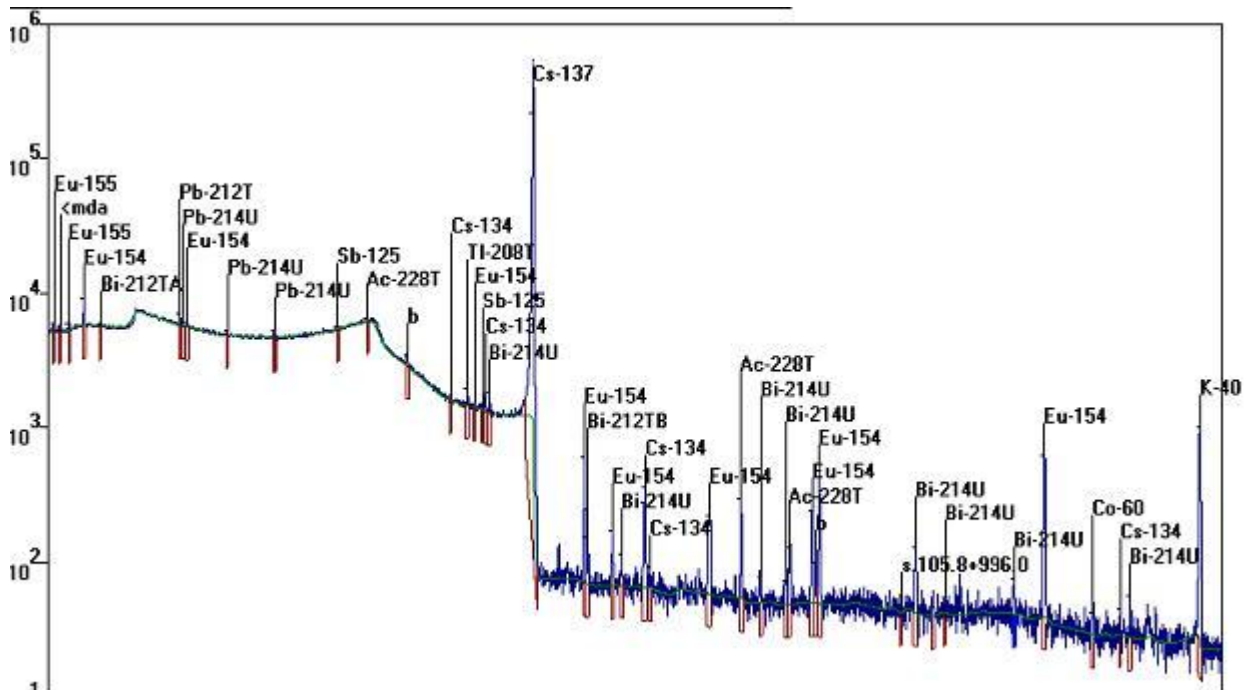


Figure. Gamma spectrum of environmental sample.

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## Contact details

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