Laboratory gamma-ray spectrometer

GEORADIS

RT-50

RT-50 with LabCenter has been specifically designed to monitor and detect the presence of radiation in metals, metals by-products, geological samples, construction materials, environmental commodities and many other materials.

Floor standing and easy to operate, the specially designed RT-50 gamma spectrum analyser is an indispensable part of any analytical laboratory. As an integral part of your laboratory analysis the RT-50 will rapidly detect and accurately measure extremely low levels of radioactive contamination.

New, sophisticated evaluation techniques allow a high sensitivity precision measurement and a complete analysis in less than 5 minutes. A real time graphic displays the spectrum as it is accumulated. The final accuracy of the measurement is as low as 0.02 Bq/g (^{60}Co). Analysis data is viewed on screen, printed (as required), and automatically archived together with all sample information to provide a complete log. All Data is accessible for transfer to an external network as needed.

The RT-50 system assembly comprises three distinct components.

- The multichannel gamma-ray spectrum analyser (MCA) in a high density shielding floor standing cabinet;
- a dedicated PC running LabCentre software
- scale and a set of calibration standards

At the heart of the system, the MCA is a highly reliable self contained 1024 channel pulse amplitude analyser featuring a high performance Sodium Iodide (thallium doted) NaI (TI) scintillation crystal. Internal digital processing performs real time energy linearization and provides a fully linear spectrum. The sophisticated, heavily shielded, lid construction allows smooth, low force access to the easy to clean sample container. The stable cabinet design features heavy internal lead or steel (optional) shielding elements to maximise sensitivity.

The MCA is controlled by LabCentre software preloaded in the PC. LabCentre is a multiplatform programme (Windows, Linux) which integrates calibration, sample measurement and results archiving.

TYPICAL USE

- **Fast monitoring of metal, slag and dust radioactive contamination**
- **Applicable in steel, scrap and other metal industry**
- **Measurement of natural radioisotopes concentration applicable in geology and geophysics**
- **Routine monitoring of environment.**

An open source SQL database facilitates easy and rapid integration of all data into the customer's own systems.

LabCentre simplifies user input of sample descriptors and output protocols. Different evaluation methods from simple total count to background count comparisons or a complex multicomponent analysis can be chosen by the user. Optimised calibration and premeasured standards from the internal library eliminates long calibration procedures.

With the RT-50 you get high quality data and reliability having completely analysed your sample right in your laboratory.

RT-50 Features

- **Sensitivity – Accurately measure the radioactivity in a given sample. Measurement sensitivity 0.02 Bq/g**
- **Multichannel Analyser – Self contained 1024 channel pulse amplitude analyser utilising a high sensitivity NaI(TI) scintillator**
- **Speed – Full sample analysis in only 5 mins**
- **Ease of use – With little training the operator can use the graphic menu driven interface to input sample data and measure results quickly and efficiently.**
- **Calibration – Optimised calibration eliminates long calibration times.**
- **Integration – All data stored in multi-platform open source SQL database to allow easy integration into customer's own systems**
- **Analysis Data – May be viewed, printed, archived or transferred to a network**

TECHNICAL DATA

Detector and analog processor

Type and size: Sodium Iodine (thallium doted) NaI(Tl) volume 0.35l diameter 75 mm (3") height 75 mm (3"), Photomultiplier bialkali

Resolution: Better then 9 % FWHM at energy 662 keV.

Energy range: 20keV - 3.0 MeV

Reference source: External, ^{137}Cs activity 9 kBq (approx. 0.25 Ci)

Shaping: Bipolar, time constant 1 s

Coarse gain: Digitally controlled by High Voltage

Fine gain: Digitally controlled +/- 3 % in 1024 gain steps

Spectrum stabilization: Two point – offset and gain correction. Position 662 keV typically at 220 channel +/- 0.1 channel

High voltage: Range 500 - 1000V DC, digitally controlled in 4096 steps.

Analog to digital converter.

Type: Successive Approximation ADC, double buffered, high speed 1.5 s with digital linearization

Number of channels: 1024 (Ch#1,2 Life Time, ch# 3 - 1023 spectral data, ch# 1024 cosmic channel)

ADC Dead time: Zero additional dead time (including memory cycle)

Integral nonlinearity: max 0.1%, full scale over top 99% of range

Differential nonlinearity: max 1 %, full scale over top 99 % of range

Lover threshold: Digitally adjustable

Upper threshold:: Fixed to channel #1023, all pulses above this level are Cosmic and are accumulated in 1024th channel

ADC Offset: Digitally adjustable

Dead time correction: Automatic, 0.1% precision.

Communication interface: USB type A(M) 2.0/1.0/1.1 compatible

Power requirements: 5V/ 100 mA DC, powered from USB

Mechanical.

Shielding: Lead, minimal thickness 85 mm, optionally steel

H x W x D: 770 mm x 360 mm x 620 mm (30"x14"x24")

Weight: 1280 lbs (580 kg)

PROPERTIES

- **High sensitivity for gamma**
- **Fast and accurate activity determination**
- **High volume sample chamber: 150 mm Diameter, 150 mm Height**
- **Easy shielding lid manipulation**

Environmental.

Working temperature range: 0 to +40 °C

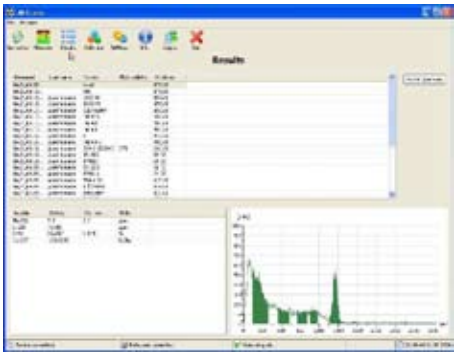
Store temperature: -20 °C to + 60 °C

RFI/EMI Emission: Complies with FCC rules (47 CFR Part 15) for class A.

Software.

Operating system: Windows 2K, XP or Linux with Kernel 2.6

Database server: Firebird SQL 2.0,ISO/IEC 9075-1, 14



RT-50 Laboratory Gamma Spectrometer consisting of:

RT-50 cabinet with lead shielding containing RT-50 MCA with NaITl detector 3"x3".

Personal desktop computer with flat screen 15" LCD monitor.

Scales, Interconnection cables.

Set of calibration standards for steel applications.

LabCenter software with operating system (Windows XP or Linux) and SQL database server.

Operating manual

Options:

Standards for different applications (Dust samples, Slag, Rocks, Environmental, Food industry).

Steel shielding.

Variety of NaI/Tl detectors (2"x2", 3"x3" Well for wipe tests, 3"x4").

Sample containers 100 or 250 ml.

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