

# Quant GR1

Unique Solution for  
Mobile Laboratory  
Radionuclide Analysis



*Picture courtesy of EDF Energy*

# Quant GR1®

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POWERED BY THE  
WORLD'S SMALLEST  
AND HIGHEST  
RESOLUTION ROOM  
TEMPERATURE  
GAMMA-RAY  
SPECTROMETER



## Quant GR1 Applications

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- Environmental Monitoring
- Decommissioning
- Waste Disposal
- Food Inspection



## High accuracy and precision

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Quant GR1\* is a unique solution for measuring the activity of radionuclides in beakers.

The low power, small form factor, reliability, and no requirement for cooling, enable measurements of samples, without the need for time consuming transport back to offsite laboratory.

Quant GR1 utilises mature cadmium zinc telluride (CZT) technology, provides less than 2% energy resolution, unmatched by conventional scintillator detector based instruments such as LaBr<sup>3</sup> and NaI. This high resolution performance enables clear separation of gamma energy peaks within complex mixed radionuclide samples for accurate quantification of individual radionuclides without the need for chemical separation.

Quant GR1 comes with an optimised and integrated lead/copper shield that enables operation in both standard and raised backgrounds. The enhanced lid locking mechanism has a simple-to-use push switch, which offers positive and secure closing.

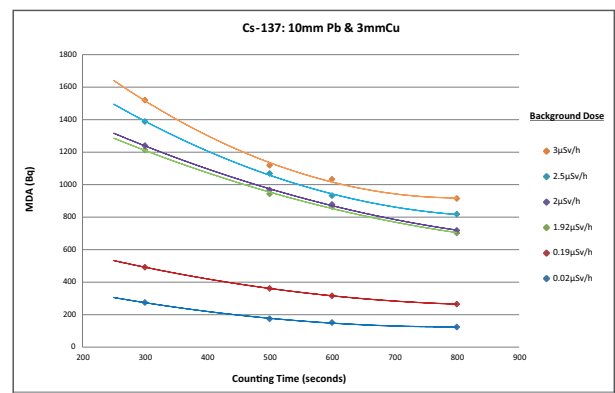


# MultiSpect™ Analysis Premium Software

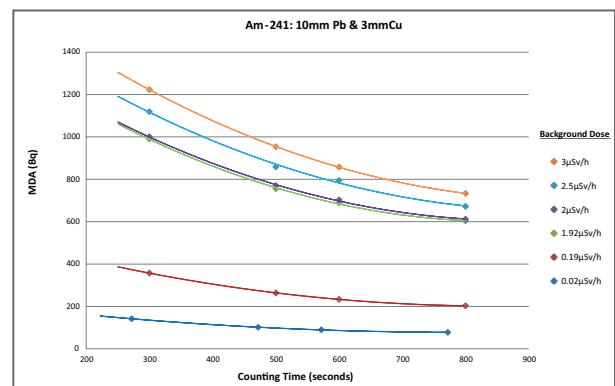
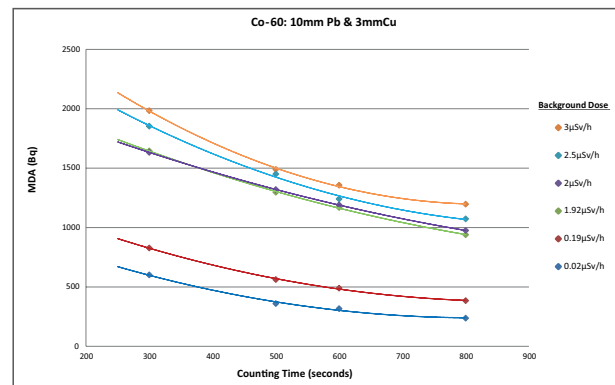
Quant GRI comes with MultiSpect Analysis Premium (MSA Premium) which includes a dedicated Quantitative Activity Analysis module. It enables full spectrum visualisation, radionuclide identification and activity analysis with adjustable confidence levels.

The results are stored within a database that can be exported to CSV file format, and reports output to PDF.

Samples can be tested in efficiency optimised beakers filled with distributed material.



MDA for 1 litre beaker with background doses for various sources



## Feature-rich software

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Quant GR1 comes with MultiSpect Analysis Premium (MSA Premium) which includes a dedicated Quantitative Activity Analysis module.

# MultiSpect™ Analysis Premium Software

MSA Premium offers a predefined Quant GR1 geometry for samples in the provided beaker with hard-coded efficiency factors for activity analysis.

The screenshot displays the software interface with several key components highlighted:

- Activity Analysis Table:** A table showing results for selected radionuclides.
 

Source	Energy (keV)	Result (Bq/kg)	Uncertainty (Bq/kg)	MDA (Bq/kg)
Co-60	601.46	1.7E+05	1074	3.6E+03
Am-241	59.54	4.1E+05	2251	5.3E+03
- Activity Analysis Options:** A dialog box for configuring analysis parameters such as background windows, ROI width factor, confidence levels, and geometry.
- Activity Analysis Nuclides:** A dialog box for selecting radionuclides from a library, including options for Industrial, Am-241, Co-60, and Cs-137.

Activity Analysis Options allow the user to select the required statistics

Activity Analysis Table displays the result, uncertainty and MDA of each selected radionuclide with the ability to export to CSV

User configurable radionuclide library

## MSA Premium Features Relevant to Quant GR1

User definable confidence limits	✓
Quantitative library of 3 nuclides	✓
User ability to add energy and efficiency calibrations for further quantitative analysis	✓
User customisable libraries	✓
Display calibrated spectra at the same energy scales to allow comparison	✓
Thumbnail indication of loaded spectra	✓
Ability to save spectra in SPE or CSV formats	✓
Ability to export data	✓
Ability to save detector calibration information	✓
Association of calibration data with particular detectors by serial number	✓
Aggregation of multiple spectra into one spectrum	✓
Built in library of 416 isotopes for identification and basic analysis	✓
Industry standard categorisation of isotopes	✓
Automated peak analysis of Spectra	✓

The screenshot shows two configuration dialog boxes:

- Peak Analysis Options:** Configures parameters like Lower Background window, Upper Background window, Peak ROI width factor, Confidence level for critical limit, Confidence level for confidence limits, Minimum Half-Life, Maximum Half-Life, Minimum intensity, Energy, and Second proportion of max.
- Activity Analysis Options:** Configures parameters like Lower Background window, Upper Background window, Peak ROI width factor, Critical limit, Confidence limits, Geometry (Quant for GR1, Maypack, Filter, etc.), Beaker Options (Volume, Weight), and a Disclaimer.

Configuration options for the analysis based on statistical significance.

Drivers available for both Windows® (7, 8, & 10) and Linux® operating systems

# Manual Efficiency Calibration

Where the detector and radioactive sources are used in a fixed geometry, an efficiency calibration of the system can be used, together with the measured count rates in spectrum peaks, to

calculate source activity. Tools are provided allowing the user to determine the efficiency of their system using a calibration source of known activity.

**1. Acquire a spectrum from a calibrated radioactive source**

**2. New 'Efficiency Calibration' tab in 'Device Settings'**

**3. Click 'Add Cursor Point' to calculate efficiency from the acquired spectrum at the position of the cursor**

**4. Select the radionuclide**

**5. Enter the source activity and MultiSpect calculates the efficiency value**

**6. Choose the equation for fitting the data**

**7. View the fit confidence limits graphically to check the quality of the calibration, then save as a "Favourite" for future use**

**8. Calculate the activity of any radioactive source measured in the same geometry**

Energy (keV)	Efficiency	Efficiency Error
121.7817	4.3058E-3	7.6400E-5
244.6974	2.2149E-3	1.0900E-4
344.2785	1.1363E-3	3.4700E-5
778.9045	2.3419E-4	3.8400E-5
964.079	1.7974E-4	2.8600E-5
1408.013	1.0464E-4	1.5500E-5

Source	Energy (keV)	Relative Intensity %	Net Count Rate (cps)	Source Activity (Bq)	Activity Upper Confidence (Bq)	Activity Lower Confidence (Bq)
Cs-137	661.7	91.63	107.50	398317	436334	360299

## Standard kit includes:

- Quant GR1 device including optimised background shield
- Integrated GR1+ <2% resolution
- MultiSpect Analysis Premium Software - Licence key provided with device
- Quant GR1 Beaker (1L)
- Custom built PELI case



## Accessories:

- Q4GR-002-OE - Quant GR1 Beaker 1L (Pack of 1)
- Q4GR-003-OE - Quant GR1 Beaker 1L (Pack of 5)



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