

Radiometric Detection

2480 WIZARD²

Automatic Gamma Counters



Description

The 2480 WIZARD² gamma counter is the premier system for counting high-energy gamma emitters, as well as low activity and environmental samples. The instrument has a maximum capacity of 1000 samples and its state-of-the-art radiation shield delivers optimal performance in gamma measurements.

Standard features

- **Detector system** consists of a thallium activated, sodium iodide crystal. The crystal height is 80 mm (3.15 in) and diameter 75 mm (2.95 in). The detector uses 4p counting geometry to ensure optimal counting efficiency of the sample.
- **Radiation shielding** is present for the detector assembly and the conveyor. The detector assembly is surrounded by a minimum of 50 mm (2.0 in) of lead shielding above and below. The shielding against the conveyor is 75 mm (2.95 in) of solid lead.
- **Sample changer** has a storage capacity of 100 racks (1000 samples, 3 mL tubes) or 54 racks (270 sample, 20 mL tubes)
- **Linear multichannel analyzer** with 2048 channels. Dead time is 2.5 µs.
- **Counting efficiency** is not highly dependent on sample volume. In 20 mL LSC vial, < 1%/mL change in relative counting efficiency for any nuclide in the range 0–20 mL is achieved.

- **Radionuclide library** consists of 51 nuclides, including the following:

¹²⁵ I	⁷⁷ Br	¹³⁷ Cs	¹²³ I	²² Na	⁴⁷ Sc
⁵⁷ Co	¹¹ C	¹⁷¹ Er	¹²⁹ I	⁹⁵ Nb	⁷⁵ Se
⁵¹ Cr	⁴⁷ Ca	¹⁸ F	¹³¹ I	¹⁵ O	¹⁵³ Sm
⁷⁶ As	¹⁰⁹ Cd	⁵⁹ Fe	¹¹¹ In	²⁰³ Pb	¹¹³ Sn
¹⁹⁵ Au	¹⁴¹ Ce	⁶⁷ Ga	¹¹⁴ mIn	⁸⁶ Rb	⁸⁵ Sr
¹⁹⁸ Au	⁵⁸ Co	¹⁵³ Gd	⁴² K	¹⁰³ Ru	^{87m} Sr
¹³³ Ba	⁶⁰ Co	⁶⁸ Ge	⁴³ K	¹²⁵ Sb	^{99m} Tc
¹³⁹ Ba	¹³⁴ Cs	²⁰³ Hg	¹³ N	²⁰¹ Tl	⁶⁴ Cu
⁴⁵ Ti	¹⁸⁸ Re	⁴⁶ Sc			
Open window (15-2000 keV)					

- **Energy range** is 15-2000 keV.
- **Maximum count rate** is 10 million DPM (app. 8 million CPM) for ¹²⁵I, with high activity mode max count rate is 30 million DPM for ¹²⁵I. Dead time error < 1% to 2 million CPM.

Rack and sample vial specifications

- **Sample tube** specifications are shown in the table below.

	Sample rack 1	Sample rack 2
Samples/rack:	10	5
Length:	164 mm (6.5 in)	164 mm (6.5 in)
Width:	18 mm (0.7 in)	33 mm (1.3 in)
Max sample diameter:	13 mm (0.5 in)	28 mm (1.1 in)
Min sample diameter:	No limit	No limit
Minimum height:	No limit	No limit
Maximum height:	95 mm (3.7 in) (including cap)	95 mm (3.7 in) (including cap)
Typical volume:	app. 3 mL	app. 20 mL

- **Plastic sample racks** of two different types can be used. They can be intermixed on the conveyor and are automatically identified. Racks have barcodes for protocol and rack number identification. Supported barcode languages are code 128, interleaved 2/5, code 39 and codabar. Sample racks can have protocol barcodes 1-999. Sample racks are compatible with most centrifuges. Maximum centrifugation force is 2500 x G.
- **Contamination guards** are inherent in rack construction, protecting the detectors from contamination. Samples are separated from the detectors by liquid-tight, disposable sample holders.

Operational features

- **Built-in LCD touch screen** for routine usage.
- **Built-in computer** controlling the system is an industry standard computer with Microsoft® Windows® 7 operating system. The computer contains a USB connection for a memory stick, an external hard drive, a printer and an Ethernet connection for networking.
- **Alphanumeric keyboard and mouse** for advanced usage on a pullout shelf.
- **Live spectrum display** of counts, CPM or CPS values can be displayed on the screen. Counting spectrum can be displayed or plotted on the printer.
- **Multi-user capability** stores 999 assay protocols which can be called into use automatically with barcode clips.
- **Up to six different nuclides can be measured simultaneously.** Spillup and spilldown corrections are carried out automatically.

- **Automatic normalization** is carried out using a normalization cassette for each defined nuclide.
- **Datalogger** enables all assay results to be automatically stored in a text file. Format is compatible with Microsoft® Excel®.
- **Data Analysis** can be done with optional StatLIA® Quantum Premium software for RIA/IRMA assays or the optional StatLIA® Quantum Premium GxP version for regulated environments. The WIZARD Data Viewer allows post run reporting of acquired raw data and spectral data. Microsoft® Office 2010 Home and Business includes the standard AutoPrint Excel® utility that provides simple CPM/DPM reports

Quality control and regulations

- **Instrument Performance Assessment (IPA™)** allows follow up of variable instrument parameters for quality control purposes. IPA automatically monitors data, evaluates monitored data for quality assurance and provides out-of-control warnings for nine detector parameters including:
 - isotope main peak channel number
 - background CPM in counting window
 - relative detector efficiency
 - detector resolution
 - absolute detector efficiency
 - window coverage
 - detector stability probability
 - measured CPM in counting window
 - measured total CPM in whole spectrum.
- **Enhanced security option** to support 21 CFR Part 11 requirements is available.
- WIZARD² is manufactured according to **ISO 9001** and **ISO 13485** quality management systems.

Data analysis with WIZARD²

StatLIA® Quantum Premium provides comprehensive software specifically designed for RIA/IRMA and custom data reduction. StatLIA® Quantum Premium GxP is proven comprehensive software specifically designed for RIA/IRMA and custom data reduction in a regulated environment.

- The standard AutoPrint Excel® utility provides simple CPM/DPM reports.

- WIZARD Data Viewer allows post run reporting of acquired Data and Spectra
- Provides TrueFit™ data analyses which provides quantifiable accuracy for your assays through sophisticated Weighting, 5PL curve fit algorithms, and curve fit metrics.
- Includes Statistical Assay Analysis that measures the performance of all immunoassay components: pipetting, separation, label, tracer, antibody, buffer, incubation, standards, controls, and unknowns
- Provides sophisticated QC analysis that include standard responses, control specimen responses and concentrations, curve fit statistics, ED 20/50/80, min/max detectable concentrations, and more.
- Upload worklists and download results easily to a LIM system
- StatLIA® Quantum Premium GxP satisfies requirements for compatibility with 21 CFR Part 11 regulations, Includes security for log on, electronic data, record keeping and electronic signatures.

Available configurations

Model	Detectors	Sample Capacity
2480-0010	1	270/1000

Options

7005353	StatLIA Quantum Premium RIA data analysis
7005354	StatLIA Quantum Premium GxP software (for regulated environments)
2470-3010	Enhanced Security Option for 21 CFR Part 11 compatibility (factory installation). Includes 2470-9040 WIZARD ² Enhanced Security Manual

Typical performance data

All background values are typical values at PerkinElmer factory in Downers Grove, IL U.S.A. Background may vary due to local conditions.

Background:

¹²⁵ I	30 CPM
⁵¹ Cr	25 CPM
¹²⁹ I	10 CPM
15–2000 keV	328 CPM

Efficiency:

¹²⁵ I	78%
¹²⁹ I	58%
⁵¹ Cr	6%
¹³⁷ Cs	47%

Efficiency = CPM/DPM x 100%, window 15 keV–2000 keV

Energy resolution:

¹²⁵ I	< 30%
¹²⁹ I	< 30 %
¹³⁷ Cs	< 10%

Spilldown:

⁵⁷ Co into ¹²⁵ I	< 3% (uncorrected)
preset regions	< 1% (corrected)

Conveyor to detector crosstalk

⁵⁹ Fe	< 0.05%
⁶⁰ Co	< 0.06%

Physical data

Dimensions:	
Height:	729 mm (28.7 in)
Width:	1190 mm (46.9 in)
Depth:	650 mm (25.6 in)
Weight:	Approx. 325 kg (720 lb)
Transportation weight:	375 kg (830 lb)
Electrical requirements:	100 – 240 V at 50/60 Hz, 150 VA maximum
Environmental requirements:	Temperature range from +15 °C to +35 °C
Maximum humidity:	85%

Electrical Safety Requirements

The design of the instrument is based on the following electrical safety requirements:

EN 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use

EN 61326-1 Electrical equipment for measurement, control and laboratory use – EMC requirements

EN 61010-2-101 Safety requirements for electrical equipment for measurement, control, and laboratory use

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June 2011