

Radiometric Detection

2470 Wizard² - IVD Automatic Gamma Counters



Description

The 2470 Wizard²® gamma counters present the next generation instrumentation for gamma counting. Wizard² unites the flexibility, robustness and accuracy for applications requiring gamma radiation analysis. One, two, five or ten independent well-type detectors, automatic or manual counting mode, multi-user capability and multitasking operation environment provide flexible and efficient sample processing.

The instrument can be used as a stand-alone system or it can be easily networked. Wizard² is available in either 550-sample or 1000-sample conveyor versions.

Standard Features

- **Detector system** consists of detectors made of thallium activated, sodium iodide crystals. The crystal height is 50 mm (2.0 in) and diameter is 32 mm (1.26 in). 4 π counting geometry ensures 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 12 mm (0.48 in) of lead shielding above and below. The shielding against the conveyor is 30 mm (1.25 in) of solid lead. The shielding between the detectors is 7 mm (0.28 in) of solid lead.

- **Sample changer** has a storage capacity of 55 racks (550 samples) or 100 racks (1000 samples).
- **Linear multichannel analyzer** with 2048 channels. Dead time is 2.5 μ s.
- **Radionuclide library** consists of 45 nuclides:

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	¹⁸ F	¹³¹ I	¹⁵ O	¹⁵³ Sm	⁷⁶ As
¹⁰⁹ Cd	¹¹¹ In	²⁰³ Pb	¹¹³ Sn	¹⁹⁵ Au	¹⁴¹ Ce
⁶⁷ Ga	^{114m} In	⁸⁵ Sr	¹⁹⁸ Au	⁵⁸ Co	¹⁵³ Gd
¹⁰³ Ru	^{87m} Sr	¹³³ Ba	⁶⁸ Ge	⁴³ K	¹²⁵ Sb
^{99m} Tc	¹³⁹ Ba	¹³⁴ Cs	²⁰³ Hg	¹³ N	²⁰¹ Tl
⁶⁴ Cu	⁴⁵ Ti	¹⁸⁸ Re			
Open window (15-1000 keV)					

- **Energy range** is 15-1000 keV.
- **Maximum count rate** is 6 million DPM (app. 5 million CPM) for ¹²⁵I.

Rack and Sample Vial Specifications

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

	In Automatic Operation	In Manual Operation
Maximum Diameter:	13 mm (0.5 in)	15 mm (0.6 in) (17 mm, 0.7 in without tray)
Maximum cap diameter:	14 mm (0.6 in)	22 mm (0.9 in)
Minimum diameter:	No limit	No limit
Minimum height:	No limit	No limit
Maximum height:	90 mm (3.5 in) (including cap)	120 mm (4.7 in) (including cap)
Typical volume:	~ 3 mL	~ 3 mL

- **Tube shape** Microcentrifuge tubes can be used without adapters. Eppendorf® tubes can be measured at odd positions in sample racks.
- **Plastic sample racks** can hold 10 samples/rack. 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 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® 10 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.
- **MultiSTAT interrupt counting** enables a series of stat samples to be processed in manual mode while the assay in process is not affected. This allows the user to analyze urgent samples in the middle of long run.
- **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®.

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
- Wizard² is manufactured according to **ISO 9001**.

Optional MyAssays® Desktop Data Analysis

- Comprehensive data analysis is performed by optional MyAssays® Desktop Pro from DAZDAQ (MAD). MAD is comprehensive software specifically designed for RIA/IRMA and custom data reduction in a regulated environment.
- Data Analyses provide quantifiable accuracy for assays through sophisticated weighting, many curve fit algorithms including 4PL and 5PL, plus curve fit metrics.
- QC provides a range of inter-assay and intra-assay analysis features for continuous monitoring and automatic validation of assays.
- Report Templates use the full power of MS Word to define a report template to apply to MyAssays® Desktop outputs. Including content created in MS Word, such as headers, footers, custom images, fonts, macros, signature lines, etc.
- Upload worklists and download results easily with or without a LIM system.

Available Configurations

Models	Detectors	Sample Capacity
2470-0010	1-DET	550
2470-0020	2-DET	550
2470-0050	5-DET	550
2470-0100	10-DET	550
2470-0150	5-DET	1000
2470-0200	10-DET	1000

Options

New instrument orders:

- 7005463 MyAssays® Desktop Pro for Wizard²
- 7005464 MyAssays® Desktop Pro ES Wizard²
- 7005469 Wizard Data viewer utility for post run data and spectral data viewing
- 7005457 - Wizard Sample Vial Bar code Option

Field upgrade only:

- 7005465 - MAD Pro for Wizard² - Field Upgrade
- 7005466 - MAD Pro ES for Wizard² - Field Upgrade
- 7005467 - WorkOutPlus to MAD Pro - Field Upgrade
- 7005468 - WorkOutPlus ES to MAD Pro ES - Field Upgrade

Typical Performance Data

All background values are typical values at PerkinElmer's facility in Singapore. Background may vary due to local conditions.

Background:

¹²⁵ I	12 CPM
¹²⁹ I	6 CPM
⁵⁷ Co	90 CPM
15-1000 keV	452 CPM

Efficiency:

¹²⁵ I	78%
¹²⁹ I	58%
⁵¹ Cr	3%
¹³⁷ Cs	26%
⁵⁸ Co	3.5%

Efficiency = CPM/DPM x 100%, window 15 keV–1000 keV

Energy Resolution:

¹²⁵ I	< 30%
¹²⁹ I	< 30%
⁵¹ Cr	< 14%
¹³⁷ Cs	< 12%
⁵⁸ Co	< 8%

Spilldown:

⁵⁷ Co into ¹²⁵ I preset regions	< 3% (uncorrected) < 1% (corrected)
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Detector to detector crosstalk:

¹²⁵ I	Negligible
⁵⁷ Co	Negligible
⁵¹ Cr	< 0.5%
¹³⁷ Cs	< 4%
⁵⁸ Co	< 5%

Conveyor to detector crosstalk:

¹²⁵ I	Negligible
⁵⁷ Co	Negligible
⁵¹ Cr	Negligible
¹³⁷ Cs	< 0.12%
⁵⁸ Co	< 0.2%

Physical Data

Dimensions:

Height:	550/1000-sample model: 729 mm (28.7 in)
Width:	550-sample model: 650 mm (25.6 in) 1000-sample model: 1190 mm (46.9 in)
Depth:	550-sample model: 770 mm (30.3 in) 1000-sample model: 650 mm (25.6 in)
Weight:	150 – 165 kg (330 – 365 lb) depending on the model
Transport weight:	168 – 180 kg (370 – 400 lb) depending on the model
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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