

# 2470 WIZARD<sup>2</sup> Automatic Gamma Counters



## Description

The 2470 WIZARD<sup>2</sup>™ gamma counters present the next generation instrumentation for gamma counting. WIZARD<sup>2</sup> 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. WIZARD<sup>2</sup> 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 $\pi$  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  $\mu$ s.
- Radionuclide library consists of 45 nuclides:

125I	77Br	137Cs	123I	22Na	47Sc
57Co	11C	171Er	129I	95Nb	75Se
51Cr	18F	131I	15O	153Sm	76As
109Cd	111In	203Pb	113Sn	195Au	141Ce
67Ga	114mIn	85Sr	198Au	58Co	153Gd
103Ru	87mSr	133Ba	68Ge	43K	125Sb
99mTc	139Ba	134Cs	203Hg	13N	201Tl
64Cu	45Ti	188Re			

Open window (15-1000 keV)

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

## 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:	app. 3 mL	app. 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 Windows® XP 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.
- **Connections** include Ethernet connection and USB ports for printer and external hard disk or memory stick.
- **Datalogger** enables all assay results to be automatically stored in a text file. Format is compatible with Microsoft® Excel®.
- **Data analyses** can be done by using for example WorkOut or MultiCalc® software.
- **Remote instrument control** is possible by using remote desktop connection.

## 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.
- WIZARD<sup>2</sup> is manufactured according to **ISO 9001** and **ISO 13485** quality management systems.

## Data analyses with WIZARD<sup>2</sup>

Data analyses can be done by using, for example, WorkOut or MultiCalc® software.

WorkOut is a modern Windows®-based software, which supports analyses of RIA/IRMA applications.

- Allows the user to select different types of samples, blanks, controls and standards.
- The concentration of unknown samples can be easily defined.

- A wide selection of curve fitting methods exists, including 4 PL, 5 PL, spline and linear regression.
- Individual dilution factors can be applied to each unknown group.
- CV% of unknown replicates will be calculated.
- $EC_{(20)}$ ,  $EC_{(50)}$ ,  $EC_{(80)}$ ,  $EC_{(n)}$  can be analyzed.
- y-axes can be presented as B/B0.

MultiCalc software allows RIA/IRMA type of analyses. In addition to concentration analyses, it also has available a vast selection of assay quality control criteria.

### 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

2470-3010	Enhanced Security Option for 21CFR Part 11 compatibility (factory installation)
2470-3020	Enhanced Security Option for 21CFR Part 11 compatibility (field installation)

### Typical performance data

All background values are typical values at PerkinElmer factory in Turku, Finland. Background may vary due to local conditions.

Background:	
$^{125}\text{I}$	50 CPM
$^{57}\text{Co}$	90 CPM
Efficiency:	
$^{125}\text{I}$	78%
$^{129}\text{I}$	58%
$^{51}\text{Cr}$	3%
$^{137}\text{Cs}$	26%
$^{58}\text{Co}$	3.5%

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

Energy resolution:	
$^{125}\text{I}$	< 30%
$^{129}\text{I}$	< 30%
$^{51}\text{Cr}$	< 14%
$^{137}\text{Cs}$	< 12%
$^{58}\text{Co}$	< 8%

Spilldown:	
$^{57}\text{Co}$ into $^{125}\text{I}$ preset regions	< 3% (uncorrected) < 1% (corrected)

Detector to detector crosstalk:	
$^{125}\text{I}$	Negligible
$^{57}\text{Co}$	Negligible
$^{51}\text{Cr}$	< 0.5%
$^{137}\text{Cs}$	< 4%
$^{58}\text{Co}$	< 5%

Conveyor to detector crosstalk:	
$^{125}\text{I}$	Negligible
$^{57}\text{Co}$	Negligible
$^{51}\text{Cr}$	Negligible
$^{137}\text{Cs}$	< 0.12%
$^{58}\text{Co}$	< 0.2%

### Physical data

Dimensions:	
Height:	550/1000-sample model: 640 mm (25.1 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

**PerkinElmer, Inc.**  
940 Winter Street  
Waltham, MA 02451 USA  
Phone: (800) 762-4000 or  
(+1) 203-925-4602  
[www.perkinelmer.com](http://www.perkinelmer.com)



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