

Radiometric Detection

2480 Wizard² - IVD 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	⁸⁷ mSr
¹³³ Ba	⁶⁰ Co	⁶⁸ Ge	⁴³ K	¹²⁵ Sb	⁹⁹ mTc
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:	~ 3 mL	~ 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® 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.
- **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** 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.

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**.

Data Analysis with Wizard²

- **Optional MyAssays® Desktop Pro or Pro ES for 2480 Wizard² (21 CFR compatibility)**
 - **21 CFR part 11 compatibility and LIM System integration:**
MyAssays® Desktop Pro ES and Wizard² Enhanced Security Software can streamline 21 CFR part 11 compatibility with your ability to upload work lists and download results to a LIM system
 - **IPA:** Wizard² monitors 9 detector parameters and automatically provides their documentation
 - **LAN connectivity and USB:** Make networking and data transfer easy
 - **Results Viewer utility:** Access and export data from the Wizard² database

Available Configurations

Model	Detectors	Sample Capacity
2480-0010	1	270/1000

Options

New Instrument orders:

- 7005463 – MyAssays® Desktop Pro for Wizard²
- 7005464 – MyAssays® Desktop Pro ES Wizard²
- 7005457 – Wizard Sample Vial Barcode 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	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%

Spillover:

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

Conveyor to detector crosstalk

⁵⁹ Fe	< 0.05%
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⁶⁰ Co	< 0.06%
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Physical Data

Dimensions:

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