

## Radiometric Detection

# 2480 WIZARD<sup>2</sup>

## Automatic Gamma Counters



### Description

The 2480 WIZARD<sup>2</sup>® 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:

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

- **Energy range** is 15-2000 keV.
- **Maximum count rate** is 10 million DPM (app. 8 million CPM) for <sup>125</sup>I, with high activity mode max count rate is 30 million DPM for <sup>125</sup>I. 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® 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 WorkOut Plus or WorkOut Plus ES (21CFR compatibility) Wizard with WorkOut Plus, utilizes Windows® 7 easy to use interface, has the flexibility to run the simplest assays to the most complex. WorkOut Plus's ability to store preprogrammed assay templates, and transfer them to other Wizard<sup>2</sup> counters saves time and effort in your busy laboratories while complying with electronic records regulations.

## 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 Analysis with WIZARD<sup>2</sup>

- **2480 WIZARD<sup>2</sup> with optional WorkOut Plus or WorkOut Plus ES (21CFR compatibility)**

The ultimate gamma counter for the clinical setting, the 3470 WIZARD<sup>2</sup> delivers all the features and benefits of the 2470 WIZARD<sup>2</sup> in the same small footprint, in addition to the following:

- **21CFR part 11 compatibility and LIM System** integration. WorkOut Plus ES (21CFR compatibility) and WIZARD<sup>2</sup> Enhanced Security Software streamlines 21 CFR part 11 compatibility and your ability to upload work lists and download results to a LIM system
- **IPA.** WIZARD<sup>2</sup> 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 WIZARD<sup>2</sup> database

## Available Configurations

Model	Detectors	Sample Capacity
2480-0010	1	270/1000

## Options

### New Instrument orders:

- 7005426 – WorkOut Plus Data Analysis software for WIZARD<sup>2</sup>
- 7005427 - WorkOut Plus Security Analysis software for WIZARD<sup>2</sup>

### Field upgrade only:

- 7005429 – Upgrade kit Workout Plus
- 7005430 - Upgrade Workout Plus ES

## Typical Performance Data

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

### Background:

<sup>125</sup> I	30 CPM
<sup>51</sup> Cr	25 CPM
<sup>129</sup> I	10 CPM
15–2000 keV	328 CPM

### Efficiency:

<sup>125</sup> I	78%
<sup>129</sup> I	58%
<sup>51</sup> Cr	6%
<sup>137</sup> Cs	47%

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

### Energy Resolution:

<sup>125</sup> I	< 30%
<sup>129</sup> I	< 30 %
<sup>137</sup> Cs	< 10%

### Spillover:

<sup>57</sup> Co into <sup>125</sup> I preset regions	< 3% (uncorrected) < 1% (corrected)
Conveyor to detector crosstalk	
<sup>59</sup> Fe	< 0.05%
<sup>60</sup> 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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