WIZARD² Automatic Gamma Counters

High quality
Superior performance
One instrument

PerkinElmer®
precisely.
WIZARD$^2$ counters give excellent for

The next generation WIZARD® Automatic Gamma Counter, WIZARD$^2$, is designed for superior counting performance with all types of samples and for every gamma counting application.

RIA studies, chromium release studies and nuclear medicine applications, such as PET research, are just some examples of possible gamma applications for WIZARD$^2$ instruments.

Unique well-type detectors and sample changer system, advanced robotics, and highly effective lead shielding result in superior counting efficiency, consistent background and minimal crosstalk.

A Windows® operating system with touch screen for easy and fast instrument operation of routine tasks makes WIZARD$^2$ the most user-friendly gamma counter on the market.

The instrument is also designed for use in clinical laboratories and is 21 CFR Part 11 compatible to support pharmaceutical industry requirements.

**Well-type detectors deliver superior counting performance.**

Well-type NaI (Tl) detectors collect signal from all around the sample, rather than just from the sides, providing the best counting efficiency possible. Instruments that use the through-hole detector are very dependent on sample position and volume. With the detector design employed in WIZARD$^2$, the effect of sample position and volume is minimal, which is a great advantage.

*Figure 1.* The WIZARD$^2$ well-type detector delivers the best possible counting efficiencies for gamma counting.
Effective lead shielding means constant background and minimal crosstalk.

In a universal gamma counter, the lead shielding around the detector is another important factor in determining the performance of the instrument. WIZARD® counters have no open elevator passages through which interfering radiation can pass to the detector. The 2480 WIZARD® has 75 mm (3.0 in), and each detector in the 2470 WIZARD® has 30 mm (1.2 in) of solid lead against the samples in the conveyor. The 2470 and 2480 WIZARD® detector assemblies are also covered by lead shielding, of thickness 12 mm (0.5 in) and 50 mm (2.0 in) respectively. As a result, WIZARD® counters surpass all others in background and crosstalk reduction.

Sample transfer from racks to measurement position employs a sophisticated robotic sample changer.

WIZARD® counters are designed with a unique sample changer system that enables lifting of samples to well-type detectors from a conveyor. The conveyor with the rest of the samples always remains hidden behind the lead shielding.
There is a WIZARD² model to fit every gamma counting application. Choose the WIZARD² counter that best meets your needs.

**2470 WIZARD²—for basic research and routine counting applications**

- **Choice of models**—available with 1, 2, 5 or 10 detectors with 550 sample capacity and 5 and 10 detectors with 1,000 sample capacity.

- **Compact footprint**—the 550-sample WIZARD² is the smallest automatic 10-detector gamma counter available. Its 65 x 77 cm (25.6 x 30.3 in) footprint will help you make the most of your lab space.

- **Counts manually**—WIZARD² can be converted into a manual multidetector counter with a single command. In manual mode, sample volumes up to 5 mL, such as LSC minivials, can be measured or flow cell determinations made.

- **Samples always visible to user**—with 2470 WIZARD², samples are never out of your sight. All parts of the counter are very easy to access.

- **Ideal for key gamma emitters**—an energy range up to 1,000 keV allows studies involving various nuclides.

- **Ideal for RIA and IRMA studies**—all RIA tube-based studies can be performed with WIZARD² instruments. The integrated software package allows efficient data analysis for different RIA applications.

- **Ideal for chromium release studies**—no crosstalk from samples on the conveyor means that the WIZARD² is ideal for working with higher energy isotopes such as Cr-51. With WIZARD², the crosstalk figures for chromium are two orders of magnitude better than in conventional multidetector counters employing through-hole detectors.

- **Isotope library** contains information for 45 radionuclides.
2480 WIZARD®—for more sophisticated research applications

• One model for all special application needs—1,000- and 270-sample capacity of 13 mm (0.5 in) and 28 mm (1.1 in) vial diameters, respectively.

• High efficiency, 3" well-type detector—delivers improved counting efficiency, extended energy range and better energy resolution.

• Excellent background reduction—efficient lead shielding and a unique sample changer design virtually eliminates crosstalk from samples on the conveyer. The 2480 WIZARD® is the leading gamma counter for both background and crosstalk reduction.

• Ideal for high energy or low activity samples—with its high-efficiency detector, the ability to count sample volumes up to 20 mL, and effective lead shielding, the 2480 WIZARD® is particularly suitable for high energy gamma emitters, low activity samples, environmental samples, or Shilling tests.

• Ideal for all gamma emitters—broad energy range (up to 2,000 keV) allows studies of various nuclides.

• Ideal instrument for various RIA and IRMA studies—all nuclides up to 2,000 keV can be counted.

• Ideal instrument for PET studies—the 2480 WIZARD® delivers the best possible performance for positron emission tomography studies with its unique sample changer design and superior lead shielding to minimize sample crosstalk.

• Isotope library contains information for 51 radionuclides.
WIZARD² counters feature technology to optimize your gamma counting

- Multichannel analyzer (MCA) technology — WIZARD² incorporates a high resolution 2,000-channel multichannel analyzer dedicated to each detector. Resolution leads to accuracy, which is critical in multilabel applications.

- Flexible counting volumes — 2470 WIZARD² 10-position racks accept a wide range of RIA tubes up to 13 mm (0.5 in) in diameter, including standard 3 mL tubes. With 2480 WIZARD², tubes up to 28 mm (1.1 in) in diameter can also be used. Typically these tubes have a volume of 20 mL. A wide range of centrifuge tubes is also suitable.

- LAN connectivity and USB bus — makes networking and data transfer easy.

- Touch screen is used for daily routine work.

- Efficient data analysis software is part of the standard instrument package. Perform concentration analysis and obtain data in CPM, CPS, DPM or Becquerel units.

- Quality control analyzer allows follow up of different assay parameters in Levey-Jennings plots, histograms and lists.

- ‘STAT’ counting — process STAT samples without touching the racks in the conveyor.

- Sample holders — allow easy changing of individual sample holders if needed. This eliminates a common source of detector contamination in other counters.

- Barcodes for protocols, multi-function and positive rack ID — WIZARD² uses a barcode system for both counter control and rack ID. Additionally, the ID clip has two labels; one for protocol call-up and the other for rack ID number or to call up special functions.

- Built-in isotope library — automatically adjusts window settings and half-lives for pre-programmed isotopes. New isotopes can also be added to the library manually.

- Live spectrum display — select and view the counting spectrum of any detector on the spectrum screen. Spectra can be zoomed to get better resolution for the image.

- Automatic normalization — all corrections (such as spillover, background and efficiency) are calculated automatically by a normalization cassette for each defined isotope. Results are automatically corrected for decay, to a user-specified date or time, or to the start of the assay. Once a nuclide has been normalized, it can be linked to single or multilabel protocols without further need for normalization.

- Library-directed dynamic normalization — WIZARD² counters employ dynamic normalization to eliminate the effects of detector imbalance. This also compensates for any drift in the performance of detectors, which may be caused by aging or environmental instability. Dynamic normalization adjusts windows each time it measures a sample.

- Instrument quality control is done by Instrument Performance Assessment (IPA™) — WIZARD² monitors nine detector parameters and provides their documentation automatically.

- 21 CFR Part 11 compatibility is supported for all WIZARD² models.

- WIZARD² instruments are manufactured according to ISO 13485 and ISO 9001 quality management systems.

Figure 7. WIZARD² racks accept all RIA tubes and vials.
PerkinElmer offers Instrument Performance Assessment (IPA) features for routine quality control tasks. WIZARD2 assures the reliability of results in several ways:

- WIZARD2 has an auto-diagnosing feature that inspects the isotope spectrum each time a sample is measured. It immediately warns of any condition that generates an unexpected result.
- WIZARD2 has an IPA system which automatically monitors a number of parameters on each detector and provides documentation on those parameters.

Quick Glance

WIZARD2 analyzes instrument parameters and picks up any errors before you do:

- **Isotope main peak channel number** — the position of the main peak of the isotope.
- **Background CPM in counting window** — an increase in background values may indicate instrument contamination. Early detection is important.
- **Relative detector efficiency** — if the instrument has several detectors, relative efficiency of the detector is determined by comparison with the other detectors in use during the IPA test.
- **Detector resolution of the main peak** — this is defined as the ratio of the half-height energy width of the peak to the energy of the top of the peak. Resolution for a given isotope depends essentially on the light production and collection efficiency. It is one of the most reliable methods for monitoring the detector condition.
- **Window coverage** — the ratio of counts in the counting window to the total counts in the spectrum.
- **Absolute detector efficiency** — for I-125, it is possible to determine the absolute efficiency of the detector by using the Horrocks method. The method does not require calibrated sources (having a known DPM value). For other isotopes, detector efficiency is obtained by dividing corrected CPM in the counting window by the isotope DPM value. This method does require the use of calibrated sources.
- **Detector stability probability** — the measured counts in repeated normalization or IPA tests are compared with each other and the program calculates the probability that differences between the expected and observed counts occurred due to statistical variation.
- **Measured CPM in counting window** — this CPM has been corrected for dead time, background and isotope decay.
- **Measured total CPM activity in whole measured spectrum** — this CPM has been corrected for dead time, background and isotope decay.
WIZARD² is designed to be simple to use in your daily operations. After your protocols are initially set up, all that is left to do is to load your samples onto the conveyor and press the START button. Results are calculated in the internal Windows® software and QC files are updated automatically.

WIZARD² instrument parameters include information for protocols, conveyor movement, result viewer, general settings and diagnostic settings:

- **STAT** allows you to measure individual samples in the middle of a long run.
- **Protocol manager** includes information such as label name, measurement time, number of repeats, option to use dynamic window, background correction and decay correction. Results can either be exported directly from the WIZARD² user interface or data can be further analyzed using WIZARD² Data Analyzer software.

- **Conveyor operations** allow the movement of the racks in the conveyor.
- **Result Viewer** exhibits data in a user-definable format.
- **General settings** allow you to edit the isotope library, system parameters and IPA limits.
- Under **diagnostics** you find all the values relevant for quality control; IPA history, waste log and background measurements data.

**Touch screen allows easy control of instrument parameters and protocol set up**
Data analysis with WIZARD² instruments is done with WIZARD² Data Analyzer software. The program is based on software that is widely used in clinical diagnostics but is also well-suited for any gamma counting studies.

• Using WIZARD² Data Analyzer different types of samples can be analyzed. Blanks, control and standard samples can be defined in rack maps.

• Concentrations of unknown samples can be easily analyzed with the WIZARD² Data Analyzer software.

• WIZARD² Data Analyzer supports a wide selection of curve fitting methods, including 4PL, 5PL, linear regression and spline methods.

• A wide selection of y-axes transformations is available. Bound/free, bound%, logarithmic and other transformations are selectable.
The Result Viewer provides customized data viewing

Data obtained using the WIZARD² Data Analyzer Software will be exported into Result Viewer. Result Viewer allows data editing, and once accepted by the user, data will be exported to a user-selectable location.

- **Data within Result Viewer** is grouped into measured, calculated and accepted data categories—data coming from WIZARD² goes first into the measured category. If all the quality control parameters are accepted, data transfers automatically into calculated data. After the user accepts the calculations, the data is transferred to the accepted section, which is then ready to be further exported or printed.

- **Each of the data groups** has data in rack and list format. Standard curve graphs, quality control information and assay log information are accessible.

- **Standard curves** can be edited after the run. Points can be excluded from the calculations and curve fitting methods can be changed after the initial measurements.

- **Automatic outlier rejection** of bad standard points can occur according to two different criteria; difference from the mean or difference from the standard curve.

- **Assay quality control parameters** can be followed under the QC section of Result Viewer. Levey-Jennings plots and histograms will be drawn and easy analysis of assay quality can be achieved.
## Ordering Information

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Model</th>
<th>Detectors</th>
<th>Sample Capacity</th>
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