



Gamma Counter Purchasing Guide: GMI Certified Knowledge

Commonly used in nuclear medicine, gamma counters are a standard tool for applications such as Positron Emission Tomography (PET) scanning, radioimmunoassay (RIA), and immunoradiometric assay (IRMA). This equipment is used for diagnosing and treating diseases such as cancer, heart problems, diabetes, leukemia, ulcer, brain disorder, and problems with the central nervous system.

This purchasing guide was specifically developed to help narrow down your gamma counter search options. Know more about the requirements needed to perform successful counting applications, be familiar with the differences between manual and automatic systems, learn how to properly calibrate your gamma counter, and assess your current lab space capacity and budget before your purchase. Thanks to the wide variety of new and used gamma counters available at GMI, you will never have a hard time looking for that perfect combination of price, quality, and performance.

Application Requirements for your Gamma Counter

What kind of applications will you be performing? Answering this question will draw you one step closer to finding the right type of gamma counter to purchase. To narrow down your options further, you must consider the following:

- *Counting Efficiency*

The detection probability of the particles being counted from a radiation counter and the energy transferred from the radiation source determines the counting efficiency of a gamma counter. There are several factors that affect the relationship between radioactivity and detected gamma radiation, including the distance of a sample from the radiation source, particle scattering or absorption by a medium between the source and the detector surface, and the detector efficiency which counts all radiation photons and particles that reach the surface of the detector.

Gamma counter efficiency is important in determining how well it performs. It is critical to maintain accurate counting, especially in applications like radioimmunoassay and immunoradiometric assay because it can help treat diseases. On the hunt for a gamma counter for your RIA and IRMA applications? Check out the [Packard RIASTAR Gamma Counter](#) and [ISO Data Multiwell Gamma Counter Series](#).

- *Energy/Wavelength Range*

With an energy range between 124 keV to 10 TeV, Gamma radiation has the highest energy level in the electromagnetic spectrum because it has shorter wavelength. With this energy range, Gamma Counters can identify and treat malignant tumors and cancer cells through the process of ionizing radiation.



Gamma Counters are also used for gamma spectroscopy to identify radioactive materials based on their energy spectrum with the use of visible radiation, which typically has an energy range of 1.7 eV - 3.3 eV.

Radioactive nuclei (radio nuclei) which has an energy range starting from a few keV up to 10 MeV typically produces "line spectra". Line spectra, where many photons emit at discrete energies, is used in identifying the chemical compositions of any medium and their physical condition. This is commonly used to explore stars and other celestial bodies. Whereas "continuum spectra", where higher energies reaching more than 1 TeV occur, is needed for examining elementary particles and astrophysics.

Gamma rays or radiation can be harmful to the human body so it is important to consider the right energy range adequate to your applications.

- *Detector Models/Configurations*

Certain applications may require a specific detector model or configuration. A critical factor in choosing a gamma counter is the shielding properties of a detector material. Since it is unlikely that all gamma rays emitted will be counted, you should choose a model with a detector that is capable of absorbing a large fraction of the gamma energy.

Although it costs more, gamma counters with multiple detectors will enable you to obtain more accurate measurements versus those with only one due to the ability to produce higher spectra levels in a short amount of time. Are you looking for a gamma counter with 5 or more detectors? GMI distributes different gamma counters with multiple detectors that you should check out like the [Packard TopCount NXT Gamma Counter](#), [Packard Cobra Gamma Counter Series](#), and [Genesys Genii HE](#).

The most commonly used gamma counter detector is briefly explained below:

- Scintillation Detector

A Scintillator Detector is useful in studying new energy resource exploration, x-ray security, nuclear cameras, and gas exploration. It has fine properties such as high density, fast operation speed, low cost, production capability, and durability. With the energy range that can go up to 100 keV, Thallium-doped sodium iodide (NaI (TI)) is a powerful tool in low activity level of radionuclide with small volume samples used in radioallergosorbent test (RAST) application. The two main advantages of an NAI (TI) scintillation detector are as follows: it can be produced in large crystals that yield better efficiency, and the intense burst of light makes it popular for field applications like forensic drug chemistry.



Well-type NaI (TI) scintillation detectors provide maximum sample radiation, making them ideal for detecting weak ionizing radiation typically present in medicine, biological research, and environmental monitoring. If you are looking for a gamma counter with a well-type NaI (TI) scintillation detector for your radioallergosorbent test (RAST), you may be interested with the [LTi Genesys Genii High Energy Gamma Counter](#).

Manual or Automatic Gamma Counter

Feeding samples to be measured into a gamma counter can either be done automatically or manually. Gamma counters with an automatic system enable the instant transfer of samples from one rack to another without human intervention via a feeder. In manual mode, the samples are loaded into the detector using a sample tray with the aid of an operator.

Manual operation is best used for instances involving contamination or a malfunctioning conveyor, oversized sample vials, or for counting extremely active samples common in applications such as the dual label schilling test. To further optimize and enhance your counting process, pick a gamma counter such as the [Packard Cobra Gamma Counter Series](#) which features a built-in robotic arm that automatically moves samples from the rack in a single movement and also provides manual operation functionalities.

Single-Well vs. Multi-Well Gamma Counters

If you work in a small clinic that performs simple counting methods like Hematocrit Blood Testing, single-well counters will be sufficient enough to cover for your needs. However, if you work in a large laboratory and perform numerous counting applications like Gamma-Glutamyl Transferase (GGT) and Glomerular Filtration Rate (GFR) on a daily basis, invest in multi-well gamma counters to optimize the time and effort needed for analyzing multiple samples. In the market for a multi-well gamma counter? You may be interested in the [GENESYS 5000 Series Multi-well Gamma Counter](#).

Proper Calibration for your Gamma Counter

It is crucial to properly calibrate your gamma counter, especially if you are working on applications that require precise and accurate results such as cell counting and red cell volume determination. While many modern counters have internal calibration, you still need to check the crystal used to guarantee the accuracy of every run. Since a gamma counter relies on light emitting diodes, you have to make sure to fine-tune your system if there is very little interaction with the crystal because the light photons may not register. Additionally, having extremely high radiation levels may also result in the light merely passing through the crystal, rendering your system useless.



Evaluate your Lab Space for the Gamma Counter

The installation of your gamma counter can be a daunting task especially if you don't have enough space. Although a standard gamma counter is the same size as a cash register or photocopy machine, the equipment usually comes with a lead shield that helps protect researchers from radiation, making it heavier than it looks, so it is not easy to carry it around. For those who have a spacious clinic or research lab and an extensive workload, get a gamma counter capable of performing a medium to large volume of gamma counting like [The Genesys Genii Series](#). If you have a smaller space, then you can opt for a compact size counter like the [Genesys Gamma 1](#) and [LTi Genesys Genii High Energy Gamma Counter](#).

Work on the Designated Budget for your Gamma Counter

When deciding how to allocate your gamma counter budget, it is smart to know your options. Do a little research work on the different gamma counter manufacturers or distributors available and compare prices. This will require you to invest some time figuring out what you really need before your purchase. However, there are alternative ways to extensively reduce the cost of getting new equipment without sacrificing quality. You can always opt for [used/recertified gamma counters](#) from a trusted distributor like GMI, who has been in the industry for years.

Achieve fast and accurate counting and analysis by upscaling your systems and technology without breaking the bank. Choose a gamma counter that will not only increase your throughput but also consistently provide performance that you can depend on. If you still have questions in mind, feel free to contact industry experts from GMI to guide you in finding the ideal gamma counter that will conform to your laboratory requirements.

GMI has been providing highly advanced products and superior services to the scientific market and cost-conscious laboratories for over 20 years. As the industry-leading distributor of lab equipment with ISO 9001:2008 certified facilities, you can be sure that GMI's products have been tested, refurbished, recalibrated, and recertified in compliance with the highest quality standards. We also offer a variety of warranty agreements, renting or leasing services, and service agreements to make sure that you are satisfied with your purchase.

For questions about our new and recertified Gamma Counter equipment or for any other immediate concerns, feel free to reach us at **(888) 702-1775** or email us at sales@gmi-inc.com.