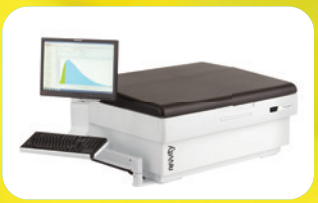
# Scintillating results at your lowest concentrations



**Quantulus™ GCT and Tri-Carb®**
Liquid Scintillation Counters

For research use only. Not for use in diagnostic procedures.

revvity

# It’s liquid scintillation counting with confidence

## Count on the industry leader in LSC

Whether you’re in drug discovery, environmental protection, energy production, or performing basic research, your industry has some of the strictest regulations in the world. So to enable better decisions on drug pathways, protect your lab environment, or determine contamination in the natural world, you need the most sensitive, stable, accurate liquid scintillation technology available. Systems you can have confidence in.

That’s why research and environmental labs around the world recognize one top brand for their liquid scintillation application needs — our Tri-Carb® and Quantulus™ GCT families of liquid scintillation counters. Tri-Carb LSC systems have been redesigned with enhanced features and optional Alpha-Beta separation mode. The new Quantulus GCT, with patented technology, delivers the same ultralow-level sensitivity you trust, in a lighter benchtop footprint that fits any lab.

Not only are these the most sensitive detectors on the market, capable of meeting or exceeding the requirements of your most demanding application, but they’re also backed by our more than 60 years’ experience and innovation in liquid scintillation analysis.

Plus, we offer high-quality, optimized liquid scintillation cocktails and counting supplies to complement your LSC instrumentation and ensure optimum counting results with your application.

Put it all together, and this is LSC technology and expertise you can count on.

## Proven Technology Is Built Right In

Revvity is the industry leader in low-level detection and the only source for the world's top LSC brand. Its advanced design and broad range of features enable you to choose the LSC system that's right for the work you do.

| Research & Development | Research & Development | Environmental & Research | Environmental |
|---|---|---|---|
| **Tri-Carb 4810TR** | **Tri-Carb 4910TR** | **Tri-Carb 5110TR** | **Quantulus GCT 6220** |
| An excellent choice for labs doing basic research applications – an economical CPM/direct DPM instrument. | The ideal LSC system for more advanced research applications and demanding DPM counting — versatile enough to expand for environmental applications. | Advanced LSC suited for the most demanding research applications. Loaded with Alpha-Beta separation, ultralow-level counting mode, pulse amplitude comparison, and more. | A superior instrument for multiuser labs that perform environmental and routine counting for research applications. Especially well-suited for environmental applications that need to detect extremely low-level Alpha and Beta radioactivity. |

# The LSC family you can count on time after time

**The most frequently cited LSC systems in scientific literature, Tri-Carb computer-controlled benchtop liquid scintillation counters are the most versatile and sensitive instruments available for detecting small amounts of Alpha and Beta radioactivity.**

**Choose the Tri-Carb LSC that best meets your application requirements. You can be confident knowing that all Tri-Carb instruments are designed and manufactured under an ISO 9001 certified system, and they're tested to ensure they conform with appropriate UL, EU, and IEC standards. So you can count on these systems today – and for years to come.**

## Tri-Carb 4810TR

**The affordable, powerful solution for basic research**

The Tri-Carb 4810TR offers superb value in a completely integrated system, making it ideal for basic research and CPM/direct DPM applications. It's also expandable for more demanding applications when needed. The system has a built-in computer complete with the 64-bit Microsoft® Windows® 10 OS, 4 GB of RAM and 250 GB for hard disk (minimum), four high-speed USB ports, and dual-gigabit Ethernet support for easy networking. Plus, onboard QuantaSmart™ software provides a simple, familiar user interface, helping you get the information you need as efficiently as possible.

The system also delivers:

- TR-LSC® electronic background discrimination
- Live spectral display and plotting
- Sample nuclide library with preset or user-defined radionuclide settings for three separate regions
- 15 user acquisition protocols with the ability to define unlimited assays
- Single-photon counting for bioluminescence assays
- A fold-away ergonomic arm that provides the flexibility to enter data either sitting or standing
- Auxiliary spectrum memory, enabling rejected counts to be viewed and analyzed
- SpectraWorks 2 spectral analysis package
- Worklist software for positive sample identification

## Overview of capabilities of Tri-Carb 4810TR models

| Feature | Capability | Base | Basic plus | S-D labeled DPM |
|---|---|---|---|---|
| Spectraworks 2 software | Spectrum analysis | Yes | Yes | Yes |
| Replay | Ability to reanalyze sample spectra instanteously for recently run or historical sample runs | No | Yes | No |
| Varisette sample cassettes | Ability to run intermixed samples in a single run | No | Yes | Yes |
| Single/dual labeled color-corrected DPM | Ability to determine absolute activity levels of the sample | No | No | Yes |
| Luminescence correction | Improved data accuracy and quicker results | No | No | Yes |

## Tri-Carb 4910TR

**Versatility and value for research applications**

The Tri-Carb 4910TR is the workhorse of the Tri-Carb family, ideal for more demanding DPM and environmental applications. You get all the popular standard features you need for many research and environmental applications. The Tri-Carb 4910TR delivers all the features of the Tri-Carb 4810TR, plus:

- Color-corrected single- and dual-label DPM
- Replay sample recall and reprocessing without recounting
- 30 user protocols with unlimited assays

## Tri-Carb 5110TR

**Unmatched features for research and environmental labs**

The Tri-Carb 5110TR is the perfect system for advanced research and environmental work in a multiuser lab, providing all the versatility and flexibility of the Tri-Carb 4910TR, plus:

- Instrument Performance Assessment (IPA) for monitoring eight critical parameters historically
- Triple-label DPM for counting three radionuclides in the same sample
- Ultralow-level count mode for reduced backgrounds
- Pulse Amplitude Comparator (PAC)
- Pulse Shape Analyzer (PSA)
- Alpha-Beta separation with PSA histogram and dual PSA discriminators

Other options include 2D barcode reader, temperature control, and 21CFR part 11 compatibility.

## Overview of capabilities of Tri-Carb 4910TR/5110TR models

| Feature | Capability | 4910TR | | | | | |
|---|---|---|---|---|---|---|---|
| | | Base | Lum-HSCM | IPA-LDC | High Sensitivity | Alpha-Beta Separation | Tri-Carb 5110 |
| Replay | Ability to reanalyze sample spectra instanteously for recently run or historical sample runs | Yes | Yes | Yes | Yes | Yes | Yes |
| Single/dual labeled color-corrected DPM | Ability to determine absolute activity levels of the sample | Yes | Yes | Yes | Yes | Yes | Yes |
| High-sensitivity counting | Increased sensitivity due to reduced background | No | Yes | No | Yes | Yes | Yes |
| Luminescence correction | Improved data accuracy and quicker results | No | Yes | Yes | Yes | Yes | Yes |
| Enhanced Instrument Performance Assessment (IPA) | Ability to monitor performance, ensure data integrity, and document compliance | No | No | Yes | Yes | Yes | Yes |
| Alpha-Beta separation | Ability to efficiently separate Alpha and Beta counts in mixed samples | No | No | No | No | Yes | Yes |
| Ultralow-level count mode | Ability to detect counts at extremely low concentrations | No | No | No | No | No | Yes |

*Yes: Included*
*No: Not Included*
*Add on: Add on feature that requires an additional part number to be ordered*

# Delivering the highest levels of low-level detection

**With its extremely high sensitivity and low-level Alpha and Beta detection, the Quantulus™ GCT 6220 is the ideal solution for even the most demanding environmental applications.**

**In the Quantulus GCT 6220, a unique Bismuth Germanium Oxide (BGO) detector guard completely surrounds the sample. The BGO guard translates external gamma radiation to the photomultiplier tubes, allowing the externally generated counts to be discounted, further reducing background. The BGO guard works in conjunction with patented Guard Compensation Technology (GCT) background reduction to further lower the instrument background, enhancing sensitivity to accurately measure near-background sample activity. This sophisticated technology is designed to use ordinary glass or plastic vials so counting is easy and inexpensive.**

## Quantulus GCT

**The premium LSC for environmental and research use**

The Quantulus GCT 6220 delivers all the sophisticated features of the Tri-Carb 5110TR system, plus:

- Bismuth germanium oxide (BGO)
- Guard Compensation Technology (GCT)
- Temperature control for very reproducible counting
- Transportable, space-saving benchtop design
- Measures $^{3}H$ water samples to less than 1 Bq/L
- $^{14}C$ benzene sample-dating up to 51,000 years
- Measures $^{14}C$ in bioethanol concentration less than 1%
- Optional 2D barcode reader and enhanced security

While the Quantulus GCT 6220TR is particularly well suited for the detection of extremely low-level Alpha and Beta applications, its high sample capacity allows a greater throughput than the original Quantulus system. This means more flexibility to address an increased number of demanding liquid scintillation counting applications.

The system is ideal for:

- Radiocarbon dating of archaeological samples
- Tritium, radon, radium, and uranium measurements in drinking water
- Strontium in food
- $^{14}C$ in food, alcohol, and biofuels
- Evaluations of tritium and $^{14}C$ emissions from nuclear power plants
- Monitoring of radioactivity during decommissioning of nuclear reactors
- Tracer measurements in oil exploration
- ADME studies

# Tri-Carb and Quantulus GCT System Configurations at a Glance

| Capability | Quantulus GCT 6220 | Tri-Carb | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 5110TR | 4910TR | | | | | 4810TR | | |
| | | | Alpha-Beta Separation | High Sensitivity | LUM-HSCM | IPA-LDC | Base | S-D Labeled DPM | Basic Plus | Base |
| Integrated computer with 64-bit Win 10 OS | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| QuantaSmart Software - intuitive user interface | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| BGO Detector Guard - background reduction | Yes | No | No | No | No | No | No | No | No | No |
| Patented Guard Compensation Technology (GCT) background reduction algorithm | Yes | No | No | No | No | No | No | No | No | No |
| Ultralow-level count mode (ULLCM) | Yes | Yes | No | No | No | No | No | No | No | No |
| Pulse amplitude comparison (PAC) background reduction | Yes | Yes | No | No | No | No | No | No | No | No |
| Alpha-Beta separation | Yes | Yes | Yes | No | No | No | No | No | No | No |
| Pulse shape analysis (PSA) reduces spill between Alpha and Beta emitters Enhanced Security software | Yes | Yes | Yes | No | No | No | No | No | No | No |
| Patent-pending PSA histogram method – ~90% decrease in A/B standards count time | Yes | Yes | Yes | No | No | No | No | No | No | No |
| Patent-pending dual PSA discriminators –decreases spill and improves quality metric | Yes | Yes | Yes | No | No | No | No | No | No | No |
| High-sensititivity count mode (HSCM) | No | No | Yes | Yes | Yes | No | No | No | No | No |
| TR-LSC background reduction | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Auxilary spectrum memory – a MCA view rejected counts | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

| Capability | Quantulus GCT 6220 | Tri-Carb | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 5110TR | 4910TR | | | | | 4810TR | | |
| | | | Alpha-Beta Separation | High Sensitivity | LUM-HSCM | IPA-LDC | Base | S-D Labeled DPM | Basic Plus | Base |
| Spectraworks 2 software | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Enhanced replay sample recall and reprocessing | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No |
| Luminescence correction | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No |
| Enhanced IPA/charts and tables | Yes | Yes | Yes | Yes | No | Yes | No | No | No | No |
| Triple-label DPM | Yes | Yes | No | No | No | No | No | No | No | No |
| Live spectral display and plotting | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Temperature control | Yes | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | No | No | No |
| Varisette sample cassettes - run intermixed sample sizes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| Direct DPM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Single/dual labeled color-corrected DPM | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No |
| Sample PrioStat for special-function interrups | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No |
| LED system status indicator | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| WorkList | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| ISO 11929 macro | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on |
| 2D barcode reader - positive sample ID | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on |
| Enhanced Security – 21 CFR Part 11 compatibility | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | Add-on | No | No | No |
| Number of protocol flags | 60 | 60 | 30 | 30 | 30 | 30 | 30 | 15 | 15 | 15 |

*Yes: Included*
*No: Not Included*
*Add on: Add on feature that requires an additional part number to be ordered*

# Software that brings out the best in you

## Software that's not just smart – it's QuantaSmart

All LSC systems include QuantaSmart system software running under the Windows® 10 OS, enabling robust multitasking and easy networking in a secure environment. Additional applications can be run on the internal PC and data can be transferred automatically through the three high-speed USB ports to the application for data reduction.

QuantaSmart software is based on an intuitive dialogue interface that reduces the chance of assay setup errors. Cautions are issued for incompletely defined assays, missing standards, or incorrect count modes. The software stores all sample data for the life of the instrument in an incorruptible form. And QuantaSmart also reports all acquisition parameters, including drive and path of electronically stored data, instrument serial and model number, software version number, and calibration data.

## Keep pace with your most stringent regulations

The Enhanced Security option delivers three separate 21 CFR Part 11 compatible features: Instrument Access Security limits an instrument's use to only those individuals who are authorized to access it. The Data Security and Verification feature allows you to be sure your data hasn't been tampered with. And Audit Logs capability provides an audit trail record of events for each instrument.

Enhanced Security is easy to implement: Use the 21 CFR Part 11 Configuration program to enable the feature and implement settings for secure data storage, and your data is then stored as data bundles (all data related to an assay or protocol) in a secure location for verification.

## Keep an eye on performance

The Instrument Performance Assessment (IPA) feature monitors eight critical instrument performance parameters to support the validity of experimental data. It employs highly sensitive counting conditions to detect even the smallest change in performance. In addition, an IPA database of historical charts and tables is standard on the Tri-Carb 5110 and Quantulus 6220 model systems.

IPA is automatically initiated, but the instrument operator can initiate IPA any time, on demand, by activating the SNC/IPA protocol flag. And with IPA, performance record-keeping is as easy as printing out IPA files or saving IPA data electronically. Calibration and reference sources supplied with each LSC system, so no other calibration standards need to be purchased.

What's more, IPA serves as an incorruptible early warning system, alerting you of any change in your system's performance – before it affects your results.

## Fast, accurate, and sensitive quench measurements

All liquid scintillation samples exhibit some degree of quenching, which affects sample count rate. External standardization is a good method of quench correction, independent of sample count rates. The Transformed Spectral Index of the External Standard (tSIE) is determined by evaluating the sample's spectrum and the Compton electron spectrum of the $^{133}$Ba external standard source with the multichannel analyzer (MCA). In this way, you can overcome the interferences that affect external standard quench measurements to yield the highest accuracy in the shortest time – eliminating repeat measurements.

Plus, our SpectraBase spectrum-based library conveniently stores quench standards in a spectral library for use with any assay. The optional Replay feature allows recall of sample data and quench standards for reprocessing. And a barcode-based sample tracking option handles numeric, alphanumeric, and byte data and imports it into the sample work list or file.

# Complete solutions bring about the best results

## Keeping you and your lab safer

Occupational safety in laboratories is critically important. Traditional cocktail formulations contain flammable, toxic solvents that permeate through polyethylene and may represent a hazard to laboratory workers, create disposal problems, and add hidden costs. Our safer cocktails have many of the properties you're looking for in a responsible cocktail solution, including:

- Very high flash point based on high flash-point solvent
- Low vapor pressure
- Low volatility
- Lower toxicity compared to LSC cocktails based on low flash-point solvent
- High counting efficiency
- High quench resistance

## Optimal safety and performance

The Ultima Gold™ line of safer cocktails is ideal for a wide range of routine and specialized counting. Available in seven varieties, each developed for specific sample types (aqueous or organic), sample size (high volume or microplates), and applications (low-level environmental monitoring to alpha/beta discrimination).


Ultima Gold™ scintillation cocktails

## The classical cocktails you've come to rely on

We also offer classical liquid scintillation cocktail formulations that are optimized for the highest counting efficiency and maximum sample holding capacity. Our prepared cocktails are easy to use, save preparation time, and minimize laboratory errors. And our carefully controlled blending and quality-assurance procedures provide high performance, batch homogeneity, and lot-to-lot uniformity.

## The perfect vial for the work you do

Our high-quality vials are designed for a variety of sample types and range of sample volumes (4 mL to 20 mL) available with patented antistatic treatment. Glass vials are manufactured from low-potassium glass tubing, and the tube diameter and wall thickness are closely quality controlled, giving you exceptional counting reproducibility. These vials are chemically inert for use with aggressive reagents and solubilizers.

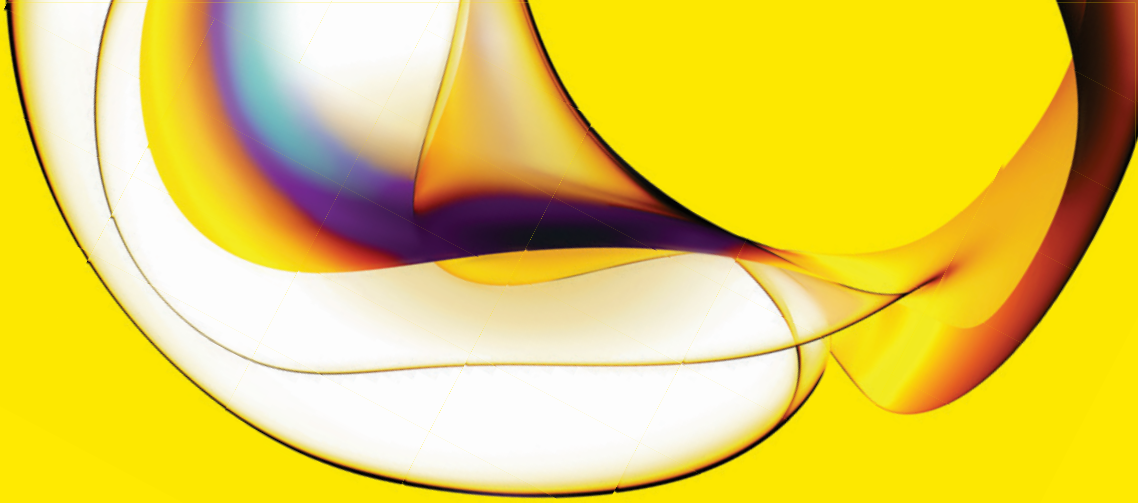
Our plastic vials are injection-molded to exacting specifications from virgin, high-density polyethylene that provides lower background level and higher counting efficiency than glass vials. And we offer a specialized low-diffusion polyethylene vial with aluminum foiled cap that reduces cocktail diffusion, enabling long-term low measurements that reach the lowest detectable activity level.

What's more, all our caps are recessed to assure reliable loading and transfers in automatic sample changers, with no skipping or jamming. These caps come unlined, foiled lined (for an airtight seal), or poly-cone lined (for use with aggressive reagents).

Selection of glass and plastic vials in a range of sizes.

## Standards of measurement

We supply a wide variety of Quenched and Unquenched standards to establish efficiency and quench correlation curves to improve your counting accuracy.



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