

Liquid Scintillation Counter

Quantulus™ GCT 6220

Low Activity Liquid Scintillation Counter



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Description

The Quantulus GCT 6220 liquid scintillation counter is a fully loaded benchtop instrument with unsurpassed performance for measuring man made, cosmic and other natural radionuclides. Patented GCT technology combined with BGO guard background reduction accurately measures to near-background levels. Proprietary Dual PSA Discriminator and PSA Histogram improves accuracy for mixed and unknown samples.

Exclusive Standard Features

- **Patented Bismuth Germanium Oxide (BGO) and Guard Compensation Technology (GCT)** enhances discrimination against background yielding the highest E^2/B values available in a multipurpose liquid scintillation counting system.
- **TR-LSC (Time-resolved Liquid Scintillation Counting)** for high sensitivity, low background liquid scintillation counting
- **Single/Dual labeled color-corrected DPM** provides the ability to determine absolute activity levels of the sample
- **QuantaSmart™ Software** a robust multitasking, easy networking environment with unlimited assays in a secure multiuser environment
- **Alpha-Beta Separation** for efficient separation of Alpha and Beta counts in mixed samples
- **PSA Histogram** provides higher resolution of Alpha-Beta separation with up to 90% reduction in time required to count alpha/beta standards compared to legacy method
- **Dual PSA Discriminator** further reduces isotope spillover and increases Quality Metric for maximum sensitivity and lowest MDA
- **Ultralow level count mode** increases system sensitivity (E^2/B)
- **SpectraWorks 2** spectral analysis package that determines optimal counting regions, and calculates figure of merit automatically
- **Enhanced IPA (Instrument Performance Assessment)** database monitors efficiencies, backgrounds, E^2/B and Chi-square values for ^3H and ^{14}C over the life of the instrument
- **Replay** reanalyzes sample counts without recounting samples
- **Dynamic Color Correction** ensures accuracy of tracking lower energy sample spectra over a wide quench range
- **Auxiliary Spectrum Memory** stores rejected events for future analysis
- **Bi-directional Sample Conveyor** with a capacity of up to 408 (20 mL vials) or 720 (4 or 7 mL vials)
- **Varisette™** sample cassette for intermixing vial sizes without special adapters
- **Operational-status LED Indicator** for clear assay status updates at a glance

Additional Standard Features

- **Direct DPM** determines single-label DPM without the use of quench standards
- **Luminescence Detection** flags percent luminescence to alert user of possible sample problems
- **Luminescence Correction** adjusts for chemiluminescence interference
- **Temperature Control** maintains optimum conditions for a variety of samples
- **60 Quick Count Protocol Flags** with the flexibility to define unlimited assays
- **Fold-away Ergonomic Arm** adaptable to enter data either sitting or standing
- **Built in Computer** with Windows 10 Operating System
- **Date and Time Clock** provides real time display and time-stamped printouts; battery supported
- **Anti-jam Recovery** protects samples, vials and the counting system from damage if obstructions occur
- **Automatic Power-fail Recovery** restarts counting when power is restored and the instrument has reinitialized itself
- **Positive Sample Identification** provides protocol number, cassette number, sample number, user-selectable printout and data file storage for the counting time and date on each sample
- **Multi-parameter Linear Multichannel Analyzer(MCA)** offers an extended dynamic quench range and provides multi-parameter spectrum analysis to correct for luminescence, color quenching and background radiation
- **133Ba Low Energy External Standard Source and tSIE** (transformed Spectral Index of External standard) eliminates the need for repeat counting of the external standard and negates the effect of isotope on quench monitoring accuracy and precision
- **AEC (Automatic Efficiency Control)** corrects for differential quenching effects in multi-label samples. The low energy spectrum of the external standard ensures accurate tracking of ^3H , ^{14}C and other low energy sample spectra over a very wide quench range
- **Precount Delay** permits dark adaptation of samples before counting
- **Coincidence Resolving Time** enables optimized counting for a variety of liquid, solid, or bead based scintillators
- **Spectral Unfolding** separates and displays the individual radionuclide spectra of dual label samples in color analysis of sample spectrum (requires color-corrected dual label DPM option)
- **3D (Three-dimensional) Spectral Mapping** displays in color the quench standard spectra together with the spectrum of the unknown for single label DPM counting (requires color-corrected dual label DPM option)
- **SpectraBase Counting and Data Management System** provides counting and storing of complete spectra
- **Decay Computations** automatically calculates decay corrected DPM values for commonly used radionuclides
- **Group PrioStat™ Interrupt Mode** prioritizes counting status and automatically restores the interrupted protocol
- **Background Subtraction** calculated by sample, entered value or stored IPA background spectrum
- **SIS (Spectral Index of Sample)** determines counting efficiency by analysis of sample spectrum
- **Programmable Single Photon Counting** enables luminescence assay counting with optimized signal-to-background ratios to overcome problems associated with excessive luminescence
- **Preset Time and Preset Error Coincidence Termination** optimizes counting accuracy in three counting regions
- **Automatic Spectrum Plot** allows spectral documentation per sample
- **Sample Screening** screens numeric fields on several criteria including background levels, a hard number or within a range of activities or values
- **Printed Header** contains instrument serial number, user ID, and drive and path of all electronic stored data for GLP compliance
- **Password Protection** prevents unwanted changes to saved assays
- **Half-life Correction** adjusts for decay to any date and time
- **Unit Conversion** activity can be reported in becquerels, microcuries, or picocuries
- **Auto QA (Automatic Quality Assurance)** automatically prints reports for backgrounds, efficiencies, E^2/B , and Chi-square values, results can be transmitted via RS-232 for archiving.
- **Percent of Standard** calculations compared to single, dual or triple label samples
- **Automatic Processing** provides automatic, protocol specific data processing from count data to final results requiring no exporting of data to off board storage devices or computers
- **Independent Output Formatting**, provides flexibility in customizable data reporting for each protocol. Electronic data can be saved to disk in ASCII, RTF, or Microsoft® Excel® compatible format
- **Computer-aided Diagnostics** to verify all system functions
- **Sample Worklist** enables entry, editing and review of work lists for each assay

Physical Data

Dimensions	Height: 18.5 (47 cm) Width: 40.5 (103 cm) Depth: 44 in (112 cm)
Weight	523 lb (238 kg) Shipping Weight Approximately 700 lbs (318 kg)
Electrical Requirements	100-240Vac 50/60 HZ 3- prong grounded plug
Power Consumption	<800VA
Environmental	Operating ambient temperature 15 to 13 °C (59-90 °F) Operating relative humidity 30% - 80%

Factory Performance Minimum

Energy Range	0-2,000 Kev
Efficiency Normal Count Mode (Minimum Acceptable)	³ H 0 - 18.6 keV 58% ¹⁴ C 0 - 156 keV 94%
Figure of Merit (E ² /B), Normal Count Mode	³ H 1 - 18.6 keV 400 ¹⁴ C 4 - 156 keV 1000
Figure of Merit (E ² /B), Super Low Level Count Mode (SLLCM)	³ H 1 - 12.5 keV 880 ¹⁴ C 14.5 - 97.5 keV 3500

Typical Performance Data

Observed ³ H Performance with 10 mL H ₂ O in 10 mL Ultima Gold LLT and Plastic Vials with GCT high*	E ² V ² /B > 131,000 or more
Observed ¹⁴ C Performance for 11 ml Bioethanol Samples in 9 ml Ultima Gold F in Plastic Vials with GCT high**	E ² V ² /B > 1,030,000 or more

* 0-4 keV energy window, 500 minute count time, PAC of 190 was used

** 14.5 - 51 keV energy window, 500 minute count time, PAC was disabled

Other Options

- **Printer** ink jet or laser jet
- **Automatic 2D Barcode Reader** reads 2D barcodes to be used to create the sample work list (sample work list option required)
- **Instrument Utility Cart** functionally designed general purpose laboratory cart that supports any PerkinElmer bench top system
- **Enhanced Security** providing 21CFR part 11 compatibility

Note: The efficiencies, backgrounds, and E²/B values for the Normal Count Mode were determined using PerkinElmer sealed large vial glass standards set P.N. 6008500 verified with NIST standard activity. Super Low Level Count Mode Values are determined using low level sealed large glass standards P.N. 6018914 verified with NIST standard activity. No maximum is specified for background.

Safety, Radiated Emissions and Immunity: The Quantulus GCT has been tested and approved for safety, radiated emissions and immunity according to the standards of UL, IEC61010 and CE.29CFR1910.399.

In the U.S.A. the CSA approval satisfies the requirements of 29CFR 1910.399.