

2100TR Liquid Scintillation Counter

Specification Sheet
01012008

Isotech Services Ltd.

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Description

The Tri-Carb® 2100TR liquid scintillation counter is computer-controlled, bench top liquid scintillation analyzer for detecting small amounts of alpha, beta and gamma radioactivity.

Standard Instrument Features

Patented TR-LSC® (Time-Resolved Liquid

Scintillation Counting) using unique after pulse rejection technology is featured for high sensitivity, low background counting of LS samples. TR-LSC increases sample throughput and reduces cocktail consumption.

Built-in IBM® compatible, Pentium® class single board computer features 4 MB RAM; 3.5 inch, 1.44 MB floppy disk; video graphics adapter card; high resolution color SVGA CRT display; clock calendar with battery support; serial communications and parallel printer port; and IBM® PC DOS 2000 or higher operating system.

A cassette-loaded, bidirectional conveyor mechanism is standard with fully accessible sample capacity of either 408 standard 20 mL vials or 720 small 4 or 7 mL vials, depending upon configuration purchased.

High resolution linear Spectralyzer™ memory, calibrated in keV has three measuring regions with preset and user adjustable settings. The high resolution multichannel analyzer accumulates all sample counting information. Spectra can be interpolated to the nearest 1/10 keV over an energy range of 0-2,000 keV.

SNC (Self-Normalization and Calibration) recalibrates the Spectralyzer and quench indicating parameters via a 14C sealed reference for absolute activity calculations via the Direct DPM technique.

IPA™ (Instrument Performance Assessment) database stores the results for each of eight IPA parameters into a built-in database for instant recall as tables, and as time vs. performance charts. IPA data may also be transmitted through RS-232 for storage. IPA shows trends of IPA parameters to identify impending problems.

Multitasking operating environment with color SVGA CRT monitor is mounted on a maneuverable support arm, and full alphanumeric keyboard installed in a pull-out drawer. System simultaneously converses, analyzes data, counts, reports, plots, changes samples, and performs display functions.

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Multi-user sample processing for 15 users includes automatic recall and summary printout of counting conditions and data reduction routines by Quick-Count protocol inserts (30 or 60 protocol options are available).

Direct DPM (Disintegrations Per Minute) for single label pure beta or beta/gamma nuclides provides single key DPM for the full range of beta nuclides, even heavily quenched ^3H . Does not require the user to store quench curves, and different nuclides may be counted in the same cassette.

Decay computations automatically calculate of decay-corrected DPM values for commonly used radionuclide standards.

Date and time output selection for each sample for printouts and data file storage ensures positive record of when samples are actually counted. Battery protected date and time clock also provides real time display of counting time and date.

Live SpectraView™ display provides high resolution color SVGA display and printer plot of sample spectra, with linear or log energy scale and expansion facilities.

Hard copy of CRT screen documents data and counting conditions, and aids diagnosis of sample interferences.

Printer plot of sample spectrum is available.

Automatic cycle control of sample batches is included, using cycle-trip flag that resets the cycle count at the beginning of automatic counting.

Output can be formatted with spreadsheet-type calculations for each of the user protocols.

Anti-jam recovery of transport and elevator mechanism is standard.

Automatic power-fail recovery automatically restarts counting when power is restored, beginning with the interrupted sample.

Dot matrix printer 80-column high speed bidirectional printer with IBM compatible parallel interface is available.

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¹³³Ba low energy external standard source and tSIE (transformed Spectral Index of External standard) calculations eliminate the effects of vial glow, volume variations, plastic wall and cocktail changes on the DPM results. The use of integral spectrum counts eliminates the need for repeat counting of the external standard and negates the effect of isotope half-life on quench monitoring accuracy and precision. The ¹³³Ba external standard is centered under the sample vial which eliminates the effects of volume variations and assures reproducible quench monitoring for the life of the instrument. AEC (Automatic Efficiency Control) compensates region settings for the effects of chemical and color quenching.

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, ¹⁴C and other low energy sample spectra over a very wide quench range.

SIS (Spectral Index of Sample) quench-indicating parameter determines counting efficiency of sample spectrum.

Electrostatic controller ionizing device helps neutralize static electricity on small and large vials.

Automatic data reduction includes averaging of repeat sample counts, replicate sample counting with averaging, percent C.V., low count rejection, result normalization, and results calculated per user-defined equations.

Preset time and preset error termination optimizes counting statistics.

Luminescence detection and reporting with percent luminescence is flagged on printout to alert user of possible sample problems.

Background subtraction for accurate counting of low activity samples, is based on counts of first vial or manually entered values.

Half-life correction is made to any specified date and time; single or dual label decay correction is made for short half-life radionuclides.

Options

Varisette™ sample changer enables intermixing and counting of both large and small sample vials without requiring special adapters. Option includes large vial (12-position) and small vial (18-position) cassettes.

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Hard disk with Tandem Processing™ option provides built-in data and spectrum storage, and enables automatic, data processing via the built-in computer.

Dynamic color-corrected single and dual label

DPM based on tSIE/AEC includes DPM based on SIS, constant quench DPM, and full spectrum DPM based on spectrum unfolding. Also includes factory stored quench curves for single and dual label 3H and 14C DPM calculations.

Luminescence detection and correction subtracts luminescence events from sample activity with spectral stripping and flags chemiluminescence or photoluminescence as a percent of total detected counts.

Heterogeneity monitor determines sample quality and flags non-homogeneous sample results.

Sample PrioStat™ interrupt mode allows special function priority counting of individual samples with manual control over counting conditions.

DataStore built-in 3.5 inch, 1.44 MB floppy disk drive for data storage stores data for subsequent off-line processing on an external computer. Provides completely automatic data and spectrum file storage by protocol and sample number. Unique data file extension naming prevents overwriting of previously recorded files.

Physical Data

Dimensions:

Height: 18.5 in. (47 cm)

Width: 40.5 in. (103 cm)

Depth: 32 in. (81 cm)

Weight

477 lb (217 kg)

Electrical Requirements:

117 Vac + 10%, 50/60 Hz, 20 amp protection

220 Vac + 10%, 50/60 Hz, 10 amp protection

3-prong grounded plug, 500 watts

Power consumption: <900 VA; 1150 VA with temperature control option

Environmental:

Operating ambient temperature 15 to 35°C (59 to 90°F)

Operating relative humidity 30% to 85%

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Typical Performance Data

(As measured in factory at Downers Grove, Illinois)

Energy Range: 0-2,000 keV

Efficiency, Normal Count Mode:

Minimum

Acceptable

3H 0-18.6 keV 60%

14C 0-156 keV 95%

Figure of Merit (E2/B), NCM (Normal Count Mode):

3H 1-18.6 keV 180

14C 4-156 keV 380

Observed Background, NCM:

Average

3H 0-18.6 keV 17.3 CPM

14C 0-156 keV 24.3 CPM