

Radiomatic 150TR Flow Scintillation Analyzer

Standard Features

The Radiomatic 150TR is a complete flow scintillation analyzer that is optimized for monitoring single or dual labeled radioisotopic samples separated by liquid chromatography. The Radiomatic 150TR heterogeneous system uses a flow cell with solid scintillating material. The system can be used as a stand alone detector with on-board chromatography data reduction or it can be connected to an HPLC chromatography workstation.

The Radiomatic 150TR detector platform uses state-of-the-art scintillation counting technology. Superior quantitative analysis is ensured by a multichannel analyzer with discrete counting windows, patented TR-LSC technology for reducing external background interference, and luminescence detection and correction to eliminate chemiluminescence interference. This flow scintillation analyzer features:

- **Patented Time-Resolved Liquid Scintillation Counting (TR-LSC)** technology for reducing external backgrounds by as much as 65% which will provide greater sensitivity, an improved minimum detectable activity (MDA), better resolution and more accurate results using unique afterpulse rejection technology.
- **Multichannel Analyzer (MCA)** for precise energy discrimination in keV units.
- **Spectrum Analysis** for optimizing energy window settings to provide better detector efficiency and sensitivity particularly for dual label applications. A hard copy printout provides a complete graphical representation of the radionuclide's energy distribution.
- **Dual matched two inch (5 cm) photomultiplier tubes** with coincidence circuitry for maximum efficiency and sensitivity.
- **Luminescence detection and correction** allows independent channel selection for the detection and correction of chemiluminescence interference. Chemiluminescence percentages are reported on hard copy printout.
- **Two independent radiochannels** for single or dual label separations with update times from 1 to 60 seconds.
- **Preset energy windows**, in keV for ^3H , ^{14}C , ^{35}S , ^{32}P , and ^{125}I .
- **Programmable event control** provides on/off control of the LS pump and flow diverter valve during a run.
- **Over-pressure alarm and eluate flow diverter** to protect against system damage due to blocked lines.
- **Instrument ready signal** for the coordination of sample injections.
- **80-character liquid crystal display** and 20-key touchpad for controlling the detector, setting run conditions, and viewing the run data in real time.
- **Digital interface logic** for fraction collectors, auto-injectors, and HPLC system controllers.
- **Four analog data outputs**, one fixed and one variable scale for each of two radioactive channels with a scaling range from 10 to 10,000,000. The output can be directed to chart recorders, integrators, "smart" fraction collectors, or chromatography workstations for further processing.
- **Menu-driven multi-user analysis software** with on-line storage and recall for five user protocols, three gradient quench curves, and ten sets of run data.
- **Peak integration software** with threshold smoothing, peak area reject, and results in your choice of counts, net counts, CPM, isocratic DPM, or gradient corrected DPM.
- **Continuous run acquisition** which when selected acquires and directs data via the analog output port to integrators or a chromatography data workstation.
- **Half-life correction** to any specified date and time performed in real time per update; single or dual label correction for short half-life radionuclides.
- **Quench curve** creation and editing for single or dual label applications.
- **Fraction collector control** with threshold and delay selection.
- **Internal lead shielding** for reduction of background counts.
- **Integrated liquid control tray** which directs liquids to a waste container.



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- **Instrument confidence tests** which provide pass/fail system diagnostics.
- **CSA approval** ensures compliance with the electrical and safety requirements as set by the Canadian Standards Association (CSA).
- **RS-232** serial data output interface for the output of processed or raw radiochromatography data.

Detection Systems

Homogeneous System Standard Features

- **Quick Change liquid flow cell (customer defined)** features HPLC-grade, near-zero dead volume finger-tight fittings for all of your radio-HPLC applications.
- **Digitally controlled liquid scintillator (LP) pump** for precise flow rates from 0.5 to 10 mL/minute.

Heterogeneous System Standard Features

- **Quick Change (customer defined)** features HPLC-grade, near zero dead volume finger-tight fittings for all your radio-HPLC applications.
- **Optional homogeneous system kit** includes digitally controlled scintillation pump, liquid flow cell, overpressure alarm, and an eluate flow diverter for applications that use a flow cell and liquid scintillation cocktail.

Options

- **Self-normalization and calibration (SNC)** recalibrates the high voltage and multichannel analyzer using a NIST traceable ¹⁴C sealed reference standard. SNC takes a proactive system maintenance role correcting problems associated with component aging in compliance with GLP procedures.
- **Homogeneous system kit** includes a digitally controlled scintillation pump, liquid TR-LSC flow cell, overpressure alarm, and an eluate flow diverter. This kit converts heterogeneous system to a homogeneous system.
- **Detector graphics printer** for real time printing of radiochromatography and UV data with a variable chart speed from 0.1 to 2.0 cm/minute. The reporting of peak integration summary or scaler data with your choice of CTS, NET, CPM, or isocratic or gradient DPM.
- **Internal electronic eluate stream splitter** with controlled split ratios from 0%, 2% to 98%, and 100%.
- **Auxiliary input channel** for mass detector signal processing and data presentation in parallel with the radiochromatogram. Includes signal delay, variable sampling time, background subtract, automatic integration, minimum peak area rejection.
- **Waste management controller** to separate waste into radioactive and nonradioactive containers, reducing waste disposal costs (Homogeneous system).
- **High performance heterogeneous flow cells** available in 200 µL and 400 µL volumes; cells withstand pressures greater than 3,000 psi. These flow cells offer replaceable cartridge and are ideal for high pressure and microvolume applications.

- **Quick Change liquid and solid scintillation flow cells** available with volumes ranging from 35 µL to 2,500 µL, and 5,000 µL.
- **Gamma flow cells** for high performance analysis of samples labeled with low and high energy gamma emitting nuclides. The Gamma-C Flow cell is best suited for gamma energies between 1 and 70 keV. The Gamma-B cell is best suited for energies between 70 and 2,000 keV.
- **PET flow cell** for analysis of radiolabeled pharmaceuticals in Positron Emission Tomography applications detecting positron emitters such as ¹¹C, ¹³N, ¹⁵O, and ¹⁸F.
- **Additional lead shielding** for extra low activity detection requirements.
- **Microbore scintillator/eluate mixer** with near zero dead volume for capillary applications with combined flows to 1.0 mL/minute.
- **Coincidence on/off circuitry** for bioluminescence, chemiluminescence, and single photon counting applications.

Physical Data

(Detector only)

Dimensions:

Height:	15 inches (35 cm)
Width:	10 inches (25 cm)
Depth:	21 inches (52 cm)

Shipping weights:

55 lb (25 kg)

Power requirements:

115 Vac +/- 10%, 2 amp, 50/60 Hz
220 Vac +/- 10%, 1 amp, 50/60 Hz

Operating temperature range:

15 to 35°C (59-95°F)

Humidity requirements:

30% to 85% humidity, non-condensing

Typical Performance Data

(as measured at factory in Downers Grove, Illinois)

	Liquid ^{1,2}	Solid ^{3,4}
Background		
TR-LSC Low:		
³ H	< 6 CPM ¹	< 10 CPM ³
¹⁴ C	< 8 CPM ¹	< 20 CPM ³
Efficiency		
³ H	> 50%	Up to 10%
¹⁴ C	> 90%	Up to 85%
Sensitivity		
TR-LSC Low:		
³ H	< 35 DPM ²	< 1,000 DPM ⁴
¹⁴ C	< 50 DPM ²	< 80 DPM ⁴
1500 µL liquid flow cell.	3200 µL solid flow cell.	
2,500 µL liquid flow cell.	4400 µL solid flow cell.	



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