

Virus Counter[®] 3100 Instrument

The Solution for Rapid,
Direct, Biologically Relevant
Virus Quantification



Features

- **Fast results**
Near real-time quantification of viruses for highly efficient manufacturing optimization
- **Biologically relevant readout**
Specific, direct, high affinity labeling systems
- **Versatility**
Broadly reactive reagents for use with a number of viruses
- **Ease of use**
Software-assisted system operation and data analysis (21 CFR Part 11 capabilities)

Product Information

The Virus Counter[®] 3100 platform is a powerful analytical tool that provides near real-time virus counts. The system can be used throughout virus growth and purification processes in a number of applications. The platform enables users to identify optimal harvesting times, validate processing steps, and define final formulations with speed and confidence. Viruses are first labeled with specific reagents, either using a direct dye approach or high affinity monoclonal antibodies. The samples are then subjected to precise and intense laser illumination. This approach allows rapid, direct and specific quantification of total virus particles in a sample. The different detection methods of the Virus Counter[®] platform offer the right solution for individual quantification needs.

Description

The Virus Counter® 3100 platform, that includes the instrument, software, consumables and reagents, was purpose-built to enumerate viruses and other small particles. In this system, viruses are first directly labeled with fluorescent dyes or fluorescently labeled antibody-based reagents. Within the instrument, virus samples are guided into a fluidic stream and focused to a small core of moving fluid. A laser is used to excite the fluorophores associated with the viruses as they pass through the laser area. The Virus Counter® instrument detects the emitted light and uses the signals together with the measured sample flow rate to calculate total particle concentration.

Applications

- Optimization of viral growth conditions to increase product yield
- Real-time insights into virus titers in bioreactors for the determination of optimal harvesting times
- Optimization of processing steps and tracking of virus titers through downstream purification steps
- More accurate characterization of final vector product for increased safety and efficiency
- Critical benefits in a number of industries:
 - Vaccine production
 - Protein expression
 - Viral therapeutics in gene and cell therapy
 - Antiviral development

System Operation

The operation of the Virus Counter® 3100 instrument is software guided. For instrument performance verification and sample analysis several consumables are used. Virotag® reagent kits contain all consumables needed for washing or performance verification of the instrument. Two consumables are directed specifically to verify instrument performance while three are washing solutions that ensure minimal crossover between samples. It is critical to use the individual consumables for instrument maintenance and washing steps to achieve optimal performance. All consumables are color coded for easy discrimination

Fluidics

Accurate quantification requires that the virus sample stream passes through a laser interrogation point and that the particles traverse that point temporally separated. Differential flow rates of the sheath and sample lead to accelerated laminar flow as the core stream passes in front of the laser spot and collection lens. This hydrodynamic focusing of the sample stream ensures that sample particles travel through the interrogation point at the peak of laser intensity.

Optics

As the laser illuminates the narrow sample stream within the flow cell, microscope optics are used to collect fluorescence from stained particles as they pass through the interrogation point. A dichroic mirror is used to separate the two fluorescence signals. Bandpass filters spectrally filter and isolate each channel's fluorescence. The fluorescence emissions are detected by photomultiplier tubes (PMTs).

Virus Signal Detection

Signals collected from the PMTs are processed in real time to convert the observed fluorescence information into a quantitative measure of virus particles per ml (vp/ml). For Virotag® DY reagent, a mixture of a protein and a nucleic acid dye, light of two different wavelengths is emitted upon laser excitation. Both detection channels record fluorescence events that exceed a predetermined amplitude threshold that identifies events above background. While all events are collected, only the events that occur simultaneously in both channels are used to indicate that a virus particle was present in the light path. Therefore, only simultaneous events for Virotag® DY reagent are included in the concentration determination. Virotag® AB (antibody-based) results represent fluorescence emission from a fluorochrome-conjugated antibody reagent in one channel. Instrument quantification limits are 5×10^5 to 1×10^9 virus particles/ml.

Data Analysis

Experimental data is automatically collected and stored within a SQL database installed on the Virus Counter® laptop. This data can be viewed and analyzed using the Virus Counter® Software data analysis feature. Alternatively, data can be exported as a .csv file and viewed using third party data analysis packages.

Service

Reliability and smooth operation of equipment are ensured through proper installation | configuration and regular maintenance by Sartorius Service experts.



Technical Data

Laser Product Classification	Class 1: Complies with EN 60825-1 and US 21 CFR 1040.10 Note: Internally, an enclosed Class 3B laser diode module is used per EN 60825-1.
Instrument Air Source	Industrial Grade Compressed Gas - Clean Dry Air (CDA) or Nitrogen: 12-15 psi (103 kPa)
Operating Environment	+18°C - +27°C (+65°F - +80°F), < 60% Relative Humidity
Indoor Outdoor Use Category	Indoor Use Only
Weight	13.5 kg, 29.8 lbs. (dry weight)
Dimensions (W × D × H)	43 cm × 43 cm × 28 cm (17" × 17" × 11")
Power Requirements - Computer	19.5 Vdc 2.3 A
Power Requirements - Instrument	12 Vdc 5 A
External Power Supply - Computer	Input: 100 - 240 V (+/-10%) ~50 - 60 Hz 150 VA, Inlet Plug IEC320/C6, mating cord IEC320/C5
External Power Supply - Instrument	Input: 100 - 240 V (+/-10%) ~50 - 60 Hz 1.5 VA, Inlet Plug IEC320/C14, mating cord IEC320/C13 Output: 12 Vdc 5 A
Data I/O Communications Port	USB 2.0
Ambient Pollution Degree	Pollution Degree 2 per EN 61010-1
Noise Level	<70 dB (A)
Enclosure Protection Class	Ordinary Protection Only (Not protected against harmful Ingress of Moisture). IP20, NEMA-1

Ordering Information

Instrument	Order Number
Virus Counter® 3100 Instrument	VIR-92341

Virus Counter® Reagents


Reagent	Target	Order Number	Quantity
Virotag® AAV2-3	Intact AAV2 and AAV3 capsids	VIR-92117	200 samples per kit
Virotag® BCVB	Budded Baculovirus	VIR-92108	200 samples per kit
Virotag® INVA	Influenza A Viruses (H1 and H3 subtype)	VIR-91151	200 samples per kit
Virotag® INVB	Influenza B viruses	VIR-91152	200 samples per kit
Virotag® VSVG	VSV-G Protein	VIR-92332	200 samples per kit
Virotag® DY ENV	Universal stain for enveloped viruses	VIR-92416	200 samples per kit

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