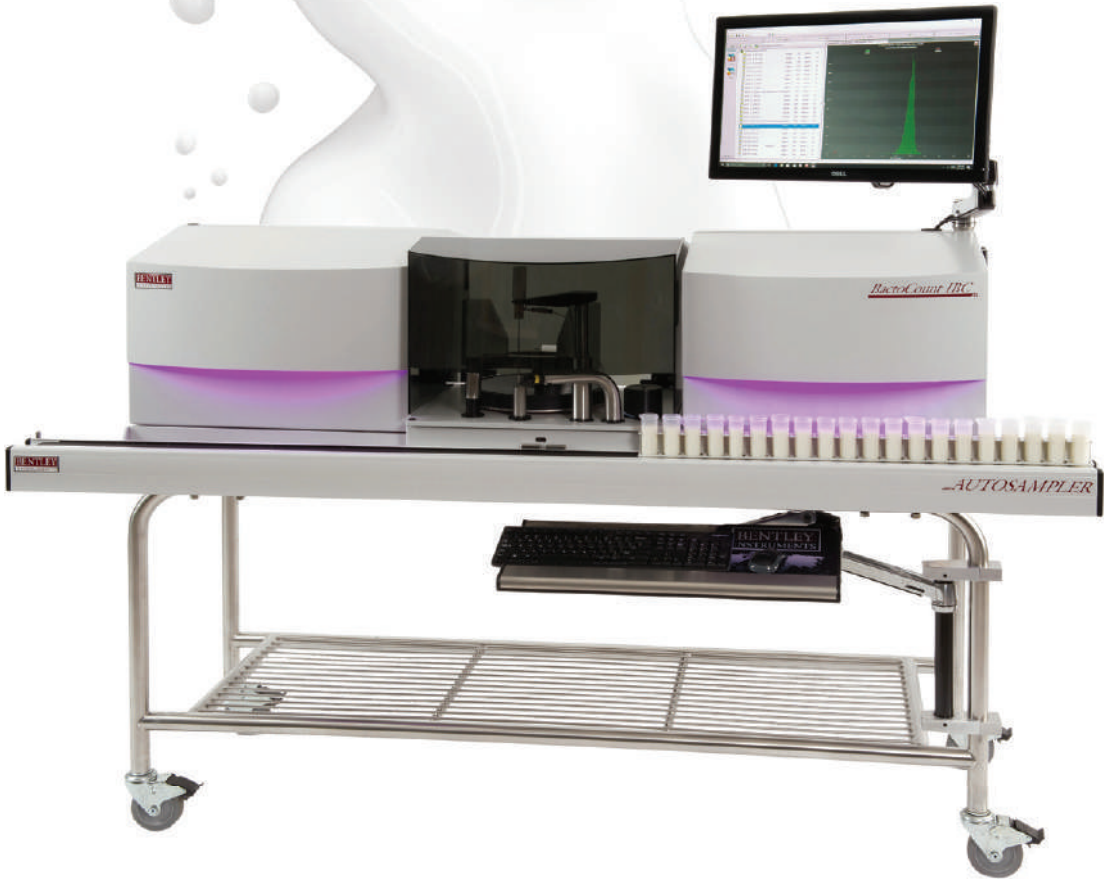
BENTLEY INSTRUMENTS

BACTOCOUNT IBC 3.0

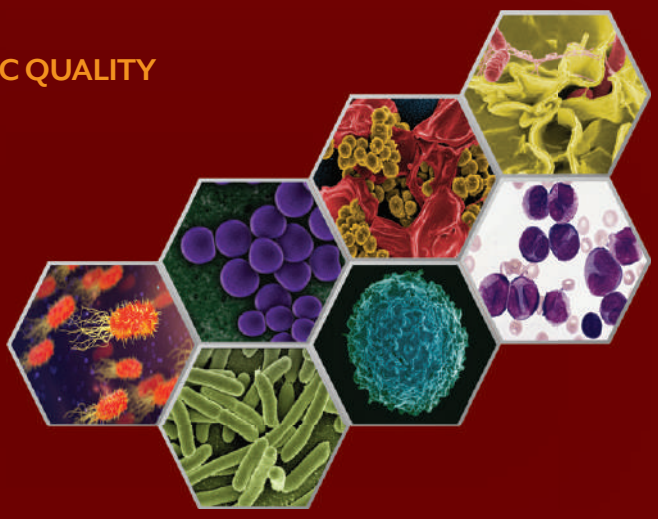
HIGHLY ACCURATE, RELIABLE AND REAL-TIME ENUMERATION OF **INDIVIDUAL BACTERIA & SOMATIC CELLS** IN **RAW MILK**



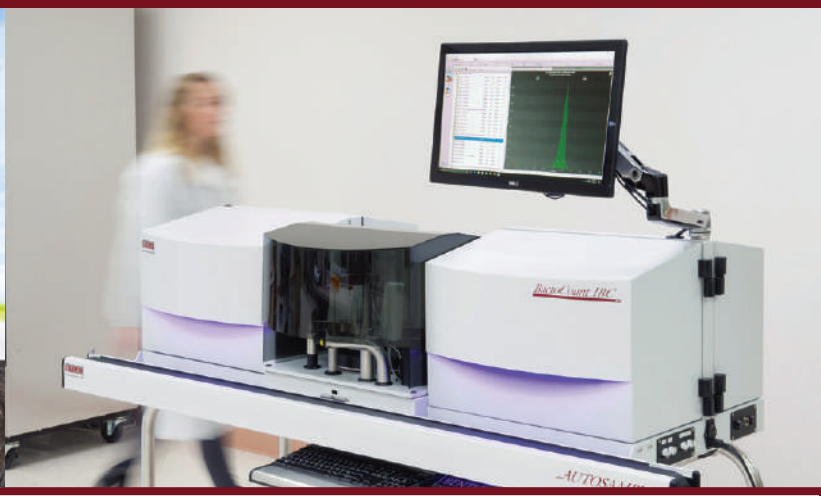
THE UNIQUE POWERFUL MULTIPLEX PLATFORM FOR THE FAST & IN-DEPTH SCRUTINY OF RAW MILK HYGIENIC QUALITY

The BactoCount IBC 3.0 is a fully automated instrument that uses a proprietary process based on flow cytometry for the rapid, highly accurate, reliable and multiplex enumeration of individual bacteria and somatic cells in raw milk.

The BactoCount high processing speed (up to 200 analysis/hour) makes it the ideal solution for mid- to large size laboratories that need a highly accurate, easy-to-maintain, exceptionally fast and reliable bacteria and somatic cells counting system.



INNOVATIVE ANALYTICAL & AUTOMATION SOLUTIONS FOR THE DAIRY INDUSTRY



BactoCount IBC 3.0

What's New?

30 years ago **Bentley Instruments** was the first to implement **Flow Cytometry for bacteria** and **somatic cells testing in raw milk**. Since then, we have continued to innovate and improve our know-how in order to provide a unique solution able to **characterize completely** the **hygienic quality** of **raw milk**.

The new **BactoCount IBC 3.0 Multiplex** platform completely opens up the field of applications for the **in-depth scrutiny of milk bacteriological and somatic cells composition** to **improve the early diagnosis of mastitis**, **milk quality** and **safety monitoring**.

We have completely redesigned the instrument from scratch to provide a unique, completely **open** and **adaptable platform** for a **wide range of potential applications**. The new **BactoCount IBC 3.0** offers **simultaneous real-time analysis of total flora** and **somatic cells in raw milk** at a speed up to **200 analysis/hour**.

Inside the instrument, **multiplex applications** are made possible thanks to a **second optional laser** (**16 wavelengths available**) and **four detectors** (for fluorescence and scatter signals). Up to three applications can be run simultaneously on a given sample.

What does it mean for you?

Analytical advantages

- Real-time and highly accurate determination of raw milk hygienic quality in compliance with ISO 16140 standard,
- Unique high speed solution for multiplex automated testing,
- Highly standardized and reproducible method guaranteeing worldwide equivalence of results across laboratories and countries,
- Highly accurate and robust universal conversion equation based on a very large and representative samples database,
- Excellent instrument standardization and quality control with our long shelf life lyophilized standards (IBC and SCC) and microspheres working solution.

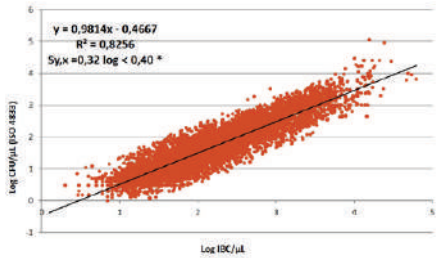
- Modular Design
- Up to 2 Lasers (16 λ ≠)
- Up to 4 Detectors
- Up to 200 analysis/hour
- Real time analysis IBC | SCC

Hardware & Software advantages

- Proprietary robust flow cytometer built on well-proven technology,
- Easy-to-use, low-maintenance design,
- Extensive Internet remote control capabilities,
- Low cost of ownership,
- Customizable interface depending on your applications.

BactoCount vs. ISO 4833
Universal Conversion Equation (ISO 21187)

9735 raw milk samples analyzed over 11 years, 22 BactoCount



Brazil, Czech Republic, Denmark, Estonia, France, Germany, Poland, Finland, Ireland, Italy, Japan, Lithuania, Switzerland, Turkey, USA

• Fast • Easy • Accurate • Garanteed ROI •

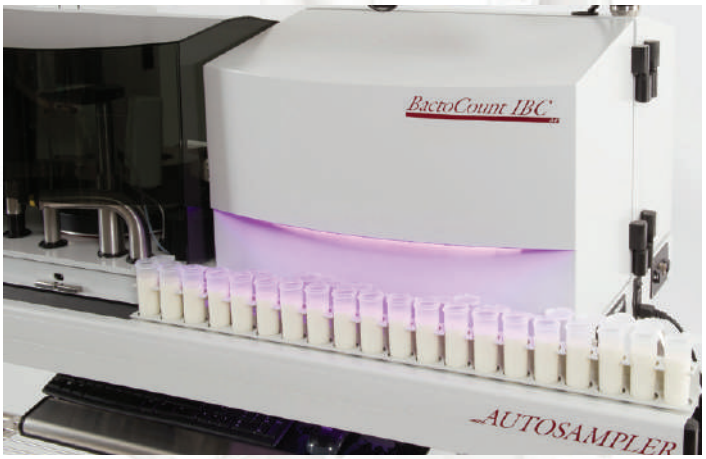
BactoCount's 5 Module System

1 Computer

A powerful industrial computer allows the IBC to run and monitor the instrument at all times. Diagnostic features have been integrated in the software to warn the operator if the instrument is not functioning properly. In addition, all of the analytical data and raw detector output are saved in a database and can be recalled at any time either for retroactive data analysis or recalculating data after calibration.

2 Autosampler

The BactoCount uses a standard linear auto sampler that can handle different types of racks and doesn't require any compressed air. A stirrer mechanism, designed with the least possible carryover (a single point of contact) stirs and draws the sample to be tested. The autosampler is equipped with a wash station to thoroughly clean the pipette inside and out with a cleaning solution after each sample. The carry-over is typically around 0.25% which fully complies with the ISO 16140 standard (<< 1%).

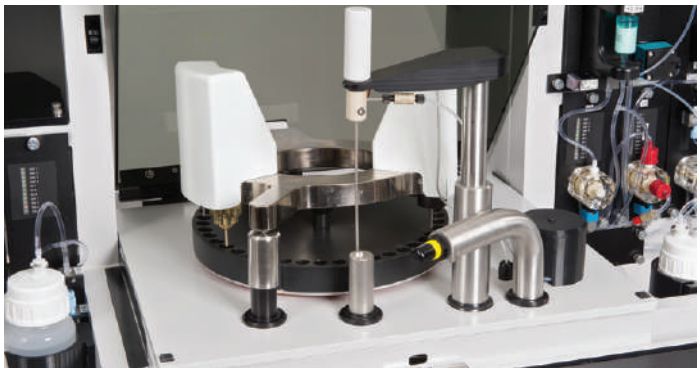


3 Fluid Handling

The fluid handling station is an enclosed module designed to filter and monitor the level of the reagents used by the instrument in real-time. Sensors are continuously monitored by the computer, allowing it to warn the operator when fluid levels are low. This module also contains an easily accessible filtration station, which uses in-line filters (0.1 µm), well below the accepted standard for sterile filtering, to remove any possible outside contamination from all reagents.

4 Open Incubator/Sonic probes

The incubator consists of a carousel equipped with 44 wells held at 50°C. The milk and a proprietary incubation reagent are automatically dispensed into the wells and may be subjected to mechanical, chemical and heat treatment. During the incubation, the mixture can be sonicated with two ultrasonic probes to remove potential interfering components and stain the bacteria DNA and/or RNA with a fluorescent marker.



The use of ultrasonic probes is an important feature for bacteria counting applications. The cavitation effect removes potential interfering components such as somatic cells and gives the method its high sensitivity and Signal-to-Noise ratio. The carousel is automatically cleaned before and after each analysis to eliminate carry-over. The carousel can also be easily removed from the instrument for a more thorough cleaning if necessary.

5 Industrial Flow Cytometer

The flow cytometer, also known as the counting assembly, includes the flow cell, microscope, narrow band filter, and one or two powerful and highly stable solid-state laser(s) and highly sensitive photomultiplier(s). The laser excites the fluorescent marker that is intercalated into the DNA and/or RNA. The fluorescence output is then collected with optics, filtered with the narrow band filter, and detected with the photomultiplier(s). The intensity and width of the fluorescence pulses are recorded and used as gating parameters. A calibration or conversion equation can be applied to convert instruments' gated pulses into relevant reference method official unit. The flow cytometer is compact, completely closed and temperature regulated to provide optimum stability.

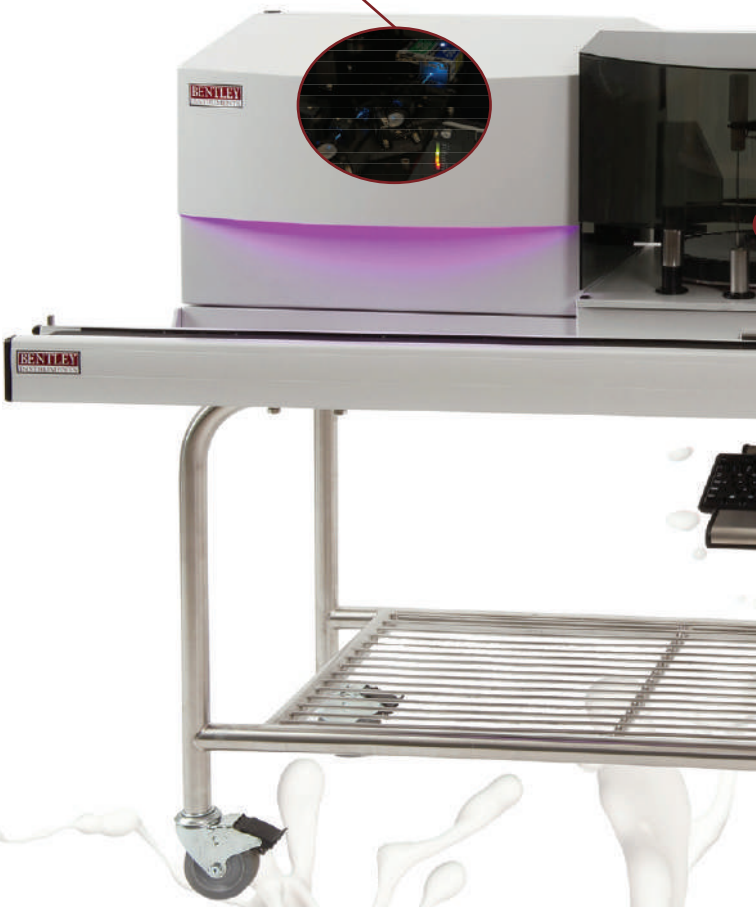
BactoCount IBC

3.0

High-powered, long-life time, solid-state lasers for fluorescence excitations.

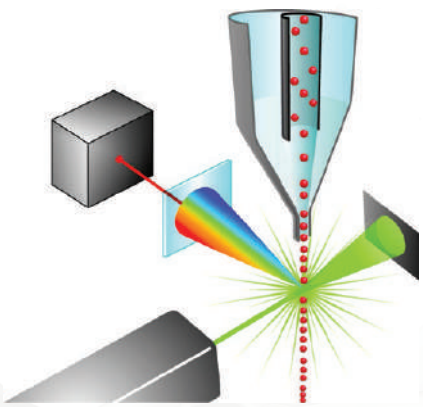
This third generation IBC can be equipped with **two lasers** with superior power stability (**16 wavelengths available**) and **four detectors** for **multiplex testing**.

Kinetic, self aligned mounted flow cell for **easy access** and **maintenance**



BactoCount IBC Technical Principle of Operation for Total flora analysis

- An incubation reagent consisting of a clarification buffer, a proteolytic enzyme, and a fluorescent marker is added to the milk in order to lyse the somatic cells, solubilize the fat globules and proteins, permeabilize the bacteria and stain their DNA.
- The fluorescent marker intercalates rapidly and selectively into all the bacteria double-stranded nucleic acid.
- The mixture is sonicated during the incubation period to help the chemical breakdown of the interfering particles, disrupt the remaining bacteria colonies to improve the detection of individual bacteria, and reduce the background fluorescence.
- After the incubation period, a portion of the incubation mixture is transferred to the flow cytometer where the bacteria are aligned and exposed to an intense laser beam and fluoresce.
- The fluorescent signal is collected by the optics, filtered, and detected with a photomultiplier.
- The intensity and height of the fluorescent pulses are recorded and used as gating parameters.
- The sorted pulses (IBC) are then converted into Colony-Forming Units (CFU) after the application of a conversion equation.



Ergonomic touchscreen interface monitor is easily adjustable to individual operators.

Powerful Windows-based software integrates simultaneous control, data collection, analysis, archiving, and report generation.

Laser-drilled sample pipette filter.

Front panel LEDs provides immediate visual feedback to the operator on overall instrument status and operation.

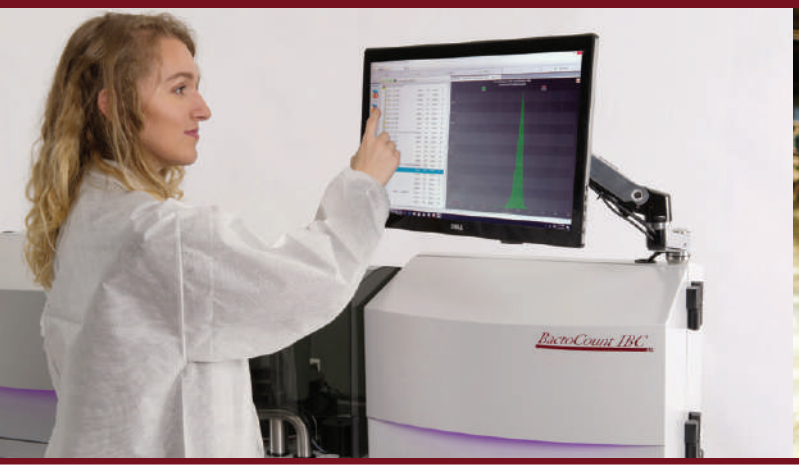
Noncontact optical sensors are used to control the rack position and movement.

Samples are automatically placed under the pipette station, identified (barcode or RFID), stirred, aliquoted and dispensed into the carousel at a maximum speed of 200 analysis/hour.

All standard rack configurations and vial sizes are supported.

Optional, adjustable keyboard.

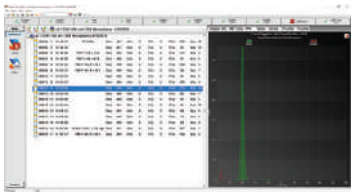
Compatible with new ILAS 4000 for a total automation and standardization of the analytical chain.

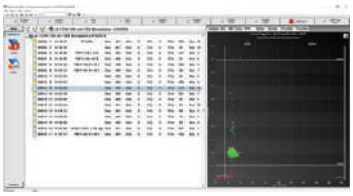


BactoCount Global Standardization

SRM Microspheres Working Solution

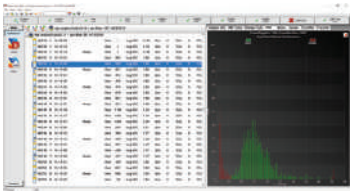
Our Secondary Reference Material (SRM) of microspheres working solution is use to control the flow cell alignment, good mechanical performance and optimal standardization of the flow cytometer.

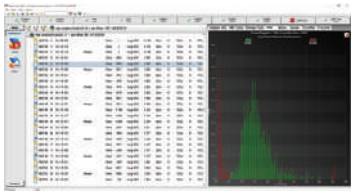


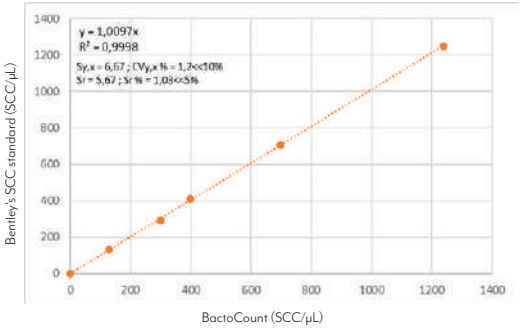


SRM Bacteria (IBC)

Consisting of bacteria present in raw milk, our long shelf life SRM can be quickly reconstituted to control the chemistry, sonication treatment and optimal standardization of the instrument.





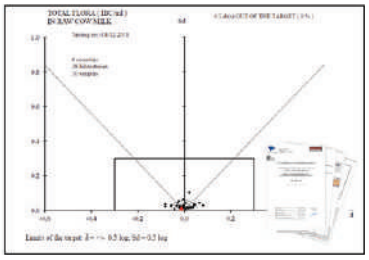


SRM Somatic Cells (SCC)

Made up of 5 long shelf life SRM, our calibration range can be quickly reconstituted to control the chemistry and optimal standardization of the instrument.

Proficiency Testing Total Bacteria ISO 17043 (IBC)

Our international monthly Total Bacteria (IBC) ISO 17043 certified Proficiency Testing (PT), organized in collaboration with Actalia-Cecalait (French reference laboratory), is the optimal way to control the BactoCount standardization and to guarantee IBC and CFU results global equivalence after application of our universal conversion equation.



New ILAS 4000
Automation system

The new **ILAS 4000 robot** is an unique solution to **automate** and **standardize sample preparation** for **bacteria counters** in a **refrigerated environment**.

Samples Preparation & Method Standardization

The ILAS 4000 is easy to operate and takes over all monotonous tasks. **A single operator** can easily **manage up to 3 BactoCount**. **Training is fast** and **simple**. The robot follows a strict procedure which **standardizes completely the analytical chain**.

Automated Functions

The ILAS 4000 automates a series of samples handling tasks. It ensures that samples are:

- Mapped from trays and grabbed by the robot,
- Identified by RFID scanner (or barcode reader),
- Mixed by inversion to ensure a homogenous sub-sample
- De-capped,
- Placed in the carousel,
- Positioned under the BactoCount pipette,
- Re-capped and placed back in its original tray position after testing.

Quality Assurance

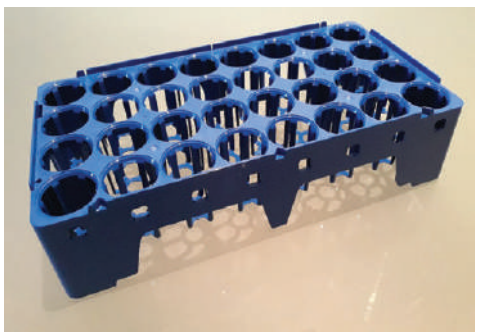
The ILAS 4000 is **refrigerated at 4°C** to **maintain samples integrity** and **inhibits bacterial growth**. An acrylic case seals the robot off to insulate and protect the operator. The general operating procedure greatly **reduces** the **risk of cross-contamination**.

Productivity Increase

Up to four trays can be loaded into the robot at once. Throughput is maximized with the ILAS 4000 as it handles multiple samples simultaneously at a speed of up to **200 samples/hour**.

Standardized Tray (4x8) for Laboratory Automation

The Bentley Instruments tray is made of **high-resistance ABS plastic** (-18°C / +80°C) and identifiable by HF/LF RFID chips or barcode. It lets circulate water in a water bath, is stackable with fall blocking system and positions from 1 to 32 are indicated. Usable with ILAS robots, it is also **compatible with most vials (84 mm height max - diameter 36 mm max)**.



BactoCount IBC 3.0 - ID card*

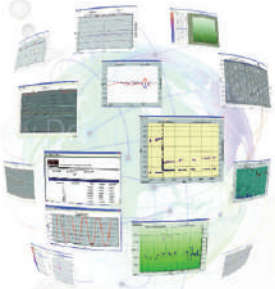
Raw milk type	Cow, goat, sheep, buffalo, ...		
Carry-over	≤ 1% (typically ≤ 0.5%)		
Total Bacteria	at least equivalent to BactoCount IBC & ISO 4833 standard 2 - 10,000 IBC/µL		
Repeatability & Reproducibility	Range (IBC/µL)	Specifications	
	10 - 50	Sr ≤ 0,07 log	S_R ≤ 0.14 log
	51 - 100	Sr ≤ 0,06 log	S_R ≤ 0.12 log
	101 - 300	Sr ≤ 0,05 log	S_R ≤ 0.10 log
	> 300	Sr ≤ 0,03 log	S_R ≤ 0.06 log
Accuracy	Sy, x ≤ 0.3 log (ISO 4833)		
Somatic cells	0 - 10,000 cells (SCC)/µL		
Accuracy	≤ 10% (ISO 13366-1)		
Repeatability	Range (SCC/µL)	Specifications	
	100 - 300	Cv ≤ 5%	
	300 - 500	Cv ≤ 3%	
	> 500	Cv ≤ 2%	
Technical specifications			
Undiluted Work Factor	100 - 200		
Speed	100 analysis/hour 200 analysis/hour		
Power supply	115/220 V ; 50/60 Hz		
Dimensions (WxHxD)	152.4 x 121.9 x 61.0 cm		
Weight	115.0 kg		
Connected to the local database and remotely accessible			

* Specifications subject to change without any prior notice.

World Class Service & Support

Delivering a rapid and superior level of customer support is a top priority at Bentley Instruments.

Our experienced team provides on site installation, training and service as well as phone and internet support to help you maintain the highest level of productivity.



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