

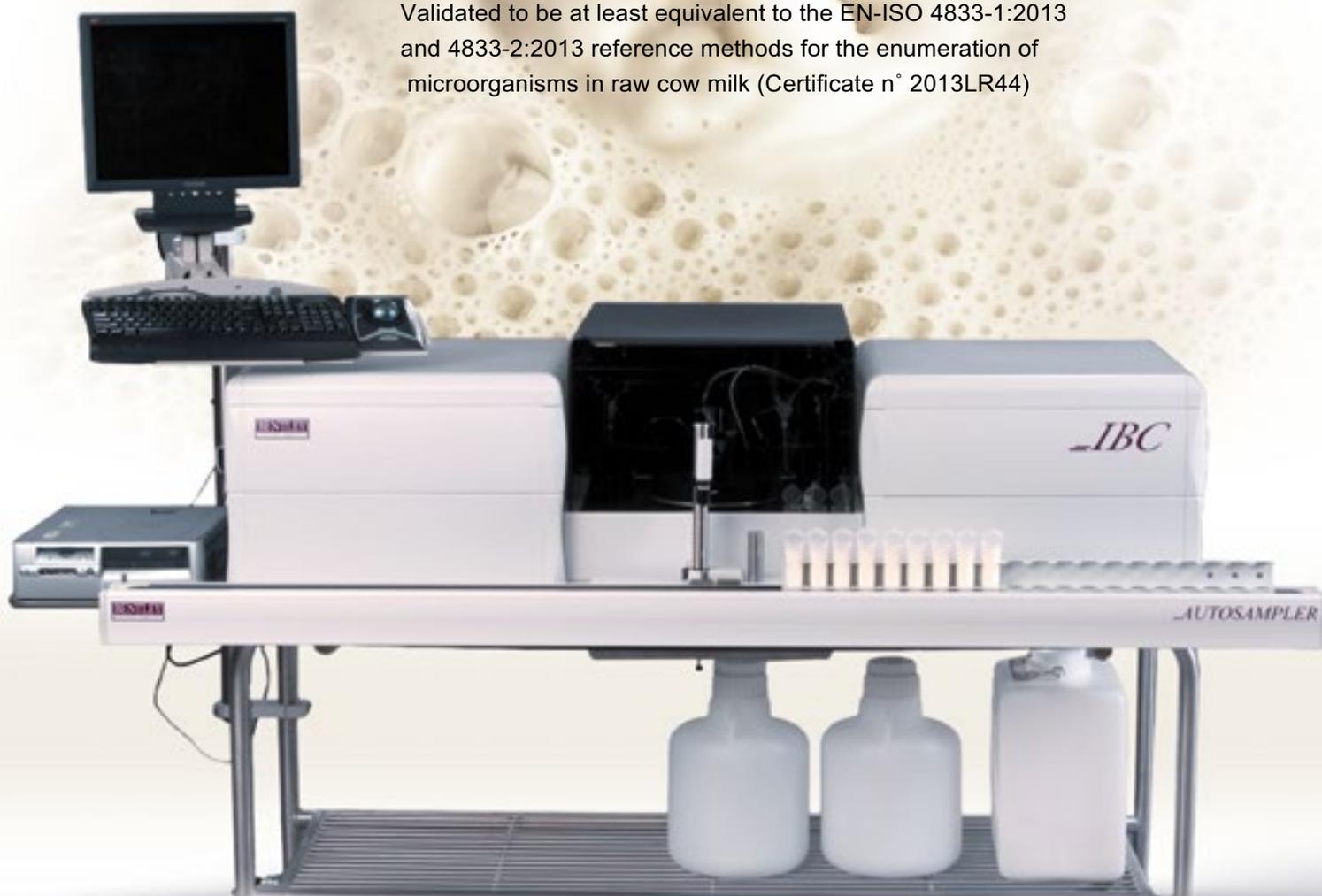
Highly Accurate, Reliable and Real-time Enumeration of Individual Bacteria for the Determination of Raw Milk Hygienic Quality

MICROVAL



European validation and certification organisation

Validated to be at least equivalent to the EN-ISO 4833-1:2013 and 4833-2:2013 reference methods for the enumeration of microorganisms in raw cow milk (Certificate n° 2013LR44)



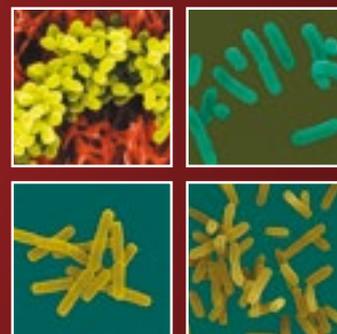
BactoCount IBC

THE MOST ACCURATE AND DEPENDABLE BACTERIA COUNTER IN THE WORLD

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

The BactoCount high processing speed (up to 150 samples/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 counting system.

ANALYTICAL INSTRUMENTS FOR THE DAIRY INDUSTRY



**BENTLEY
INSTRUMENTS**

Bentley BactoCount IBC Technology



◆ THE BACTOCOUNT IBC CONSISTS OF 5 MODULES:

COMPUTER

A powerful external 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. All the analytical data and peak distribution curves are saved in a database and can be recalled at anytime.

AUTOSAMPLER

The BactoCount uses a standard linear autosampler that can handle different types of racks and doesn't require any compressed air.



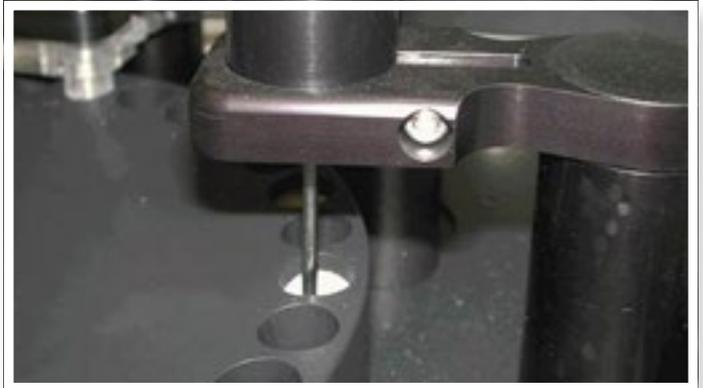
A stirrer mechanism, designed with the least possible carryover (a single point of contact) stirs and draws the sample to be tested. The autosampler is also equipped with a wash station to thoroughly clean the pipette (inside and out) with a cleaning solution after each sample. The carry-over typically around 0.25% fully complies with the ISO 16140 standard ($\ll 1\%$).

OPEN INCUBATOR/SONIC PROBES ASSEMBLY A UNIQUE CONCEPT

The incubator consists of a carousel equipped with 33 wells and thermostated at 50°C. The milk and a unique incubation solution are automatically dispensed into the wells and subjected to mechanical, chemical and heat treatment. During the incubation, the mixture is sonicated with two ultrasonic probes to remove potential interfering components and stain the bacteria DNA with a fluorescent marker.

The use of ultrasonic probes is an important feature of the application. The cavitation effect removes very effectively potential interfering components like 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 avoid any carry-over. The carousel can also be easily removed from the instrument for a more thorough cleaning if necessary.

INDUSTRIAL FLOW CYTOMETER

The flow cytometer (counting assembly) includes a powerful and highly stable solid state laser, flow cell, microscope, narrow band filter, and highly sensitive photomultiplier. The laser excites the fluorescent marker intercalated into the bacteria DNA and the fluorescence pulses are collected with optics, filtered with the narrow band filter, and detected with the photomultiplier. The intensity and width of the fluorescence pulses are recorded and used as gating parameters. The sorted pulses are then translated into an individual bacteria count (IBC) and to Colony Forming Unit (CFU) after applying a conversion equation. The flow cytometer is compact, completely closed and thermostated at 30°C to provide optimum stability.

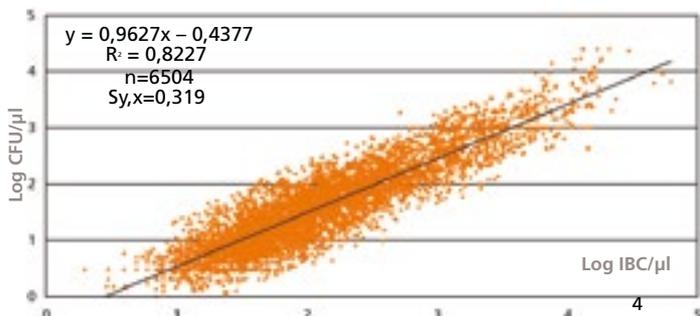
FLUID HANDLING

The fluid handling station is an enclosed module designed to filter and monitor in real time the level of the two reagents used by the instrument. Sensors are continuously monitored allowing the computer to warn the operator when fluid levels are low. This module also contains an easily accessible filtration station, which uses in-line filters to remove any possible outside contamination from the reagents.



➤ CONVERSION EQUATION DEVELOPED ACCORDING TO ISO 21187/IDF 196 STANDARD

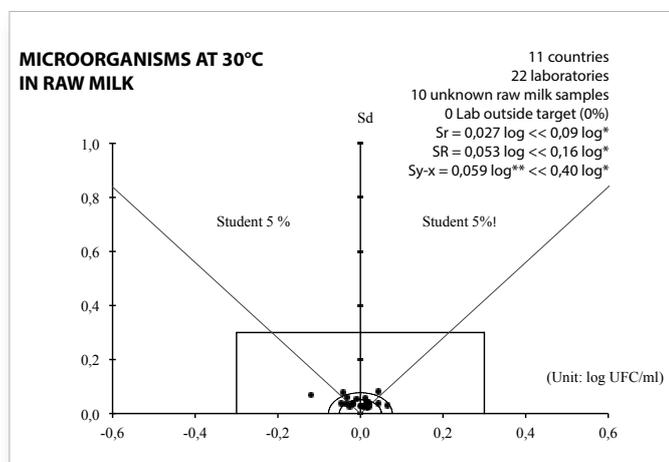
12 countries, 15 BactoCount, 9 years, 6504 samples



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

➤ RING TEST ISO 17043 ACCREDITED

To be able to standardize our instruments worldwide, we organize an independent international Proficiency Ring Test in collaboration with Cecalait (French Reference laboratory). The use of ISO 9001 certified quality systems, lyophilized bacteria control standards, fluorescent microsphere and a Proficiency Ring Test ISO 17043 accredited ensure an outstanding standardization of your system and a worldwide equivalence of your analytical results.



Ring Test ACCURACY Report - Evaluation of the individual performances

➤ SIMPLE REAGENT CONCEPT

The BactoCount IBC only uses two working solutions, i.e. an incubation solution and a cleaning solution. These two solutions can be easily, safely and readily prepared by the operators during the start-up of the instrument. The reagents are automatically filtrated by the instrument before the analysis to prevent any contamination that could interfere with the reliability of the results and secure the BactoCount sensitivity even in the lowest bacteria concentration range.

Bentley Instruments is certified ISO 9001 and all of its reagents are pharmaceutical-grade consumables and are supplied with quality certificate. All the certificates are also available on our web site.

➤ COMPREHENSIVE DIAGNOSTICS

Designed as an Internet appliance, the instrument supports a long line of diagnostic variables, providing lab managers with a level of insight into the operation of the instrument not previously available.

Equipped with the proper Internet connection, the instrument can even send an e-mail to a remote monitor, i.e., managers' home e-mails, cell phones, etc., or simply call home to the manufacturer.

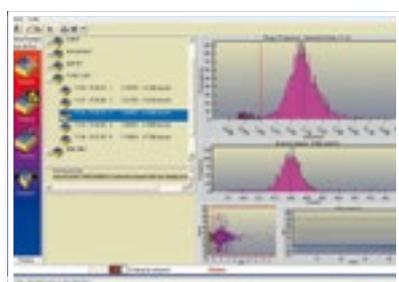
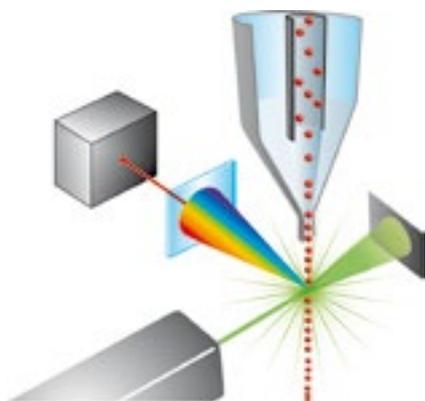
➤ EVALUATED BY THE AIA (IT), CECALAIT (FR) REFERENCE LABORATORIES AND THE MRI MAX RUBNER-INSTITUT (DE)

The BactoCount IBC is based on well-proven and worldwide-recognized technology, which has been approved as an alternative method to the ISO 4833/IDF 100B:1991 standards for the rapid and accurate determination of the hygienic quality of cow, sheep, and buffalo raw milk for payment purposes. **The BactoCount method is now a standard in the Dairy Industry with several hundred units used worldwide by milk payment laboratories, dairy plants and National Reference Laboratories.**



❶ BACTOCOUNT IBC TECHNICAL OVERVIEW & PRINCIPLE OF OPERATION

- An incubation reagent consisting of a clarification buffer, proteolytic enzyme, and 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 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.



IBC Standard Distribution

❷ BACTOCOUNT KEY FEATURES AND BENEFITS

• Worldwide Equivalence of Analytical Results

The BactoCount method is highly standardized and reproducible, thus allowing a worldwide equivalence of the results between laboratories and countries.

- The BactoCount is the only instrument implementing a highly accurate and robust universal and European conversion equation based on a very large and representative samples database
- Proprietary robust flow cytometer built on well-proven technology
- **Highly Accurate:** Can be used as an alternative method to the ISO 4833 and AOAC 986.33 standards
- Rapid: Results available in 10'
- Excellent instrument standardization and quality control with the IBC lyophilized bacteria standard
- Instrument pre-calibrated with a universal conversion equation
- Extensive Internet remote control capabilities
- Easy-to-use, low-maintenance design
- Low cost of ownership

❸ APPLICATIONS AND VALUE

- Milk payment, screening and routing
- Enables farmers and dairies to **comply with EU Commission Regulation (EC) n° 1662/2006** laying down specific hygiene rules for food of animal origin (total flora < 100 000 cfu/ml)
- Real-time detection of milk tanker contamination before unloading
- Real-time detection of milk silo contamination before processing
- Routing of the milk as a function of its quality
- Improve end-products consistency
- **FAST RETURN ON INVESTMENT**



IBC Standard



◆ BENTLEY BACTOCOUNT IBC TECHNICAL SPECIFICATIONS*

Type of Samples	Milk of typical composition (cow, sheep, goat and buffalo)
TOTAL BACTERIA APPLICATION	2000 to 10+ million individual bacteria/ml
Repeatability	Range (μL) & Specifications 10-50, Sr 0.07 log 51-100, Sr 0.06 log 101-300, Sr 0.05 log >300, Sr 0.03 log
The BactoCount repeatability fully complies with ISO 16140 standard with a Sr<0.09 log	
Reproducibility	10-50, Sr 0.14 log 51-100, Sr 0.12 log 101-300, Sr 0.10 log >300, Sr 0.06 log
The BactoCount Reproducibility fully complies with ISO 16140 standard with a Sr < 0.16 log	
Accuracy	Sy,x: 0.30 log (ISO 4833, IDF 100B:1991 or AOAC 986.33) Cow: Sy,x = 0.167 log Sheep: Sy,x = 0.245 log Buffalo: Sy,x = 0.201 log
The BactoCount IBC Accuracy fully complies with ISO 16140 standard with a Sy,x < 0.40 log	
Carry-over	Tc < 1% (typically < 0.5%)

Speed	50 samples/hour - IBC50 100 samples/hour - IBC100 150 samples/hour - IBC150
Power Supply	115/220 VAC
Dimensions	Width: 152.4 cm Height: 121.9 cm Depth: 61.0 cm Weight: 115.0 kg
Sample Temperature	4 – 42° C

* Specifications are subject to change without notice.



◆ WORLD-CLASS SERVICE AND SUPPORT

Delivering a superior level of customer support has always been a top priority at Bentley Instruments. We understand the importance of making sure your laboratory is producing results, 24 hours a day, seven days a week.

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.



BENTLEY INSTRUMENTS Inc.
4004 Peavey Road Chaska,
MN 55318 USA

Tel: 952-448-7600
Fax: 952-368-3355
E-mail: Sales@BentleyInstruments.com
www.BentleyInstruments.com

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