



BD FACSCalibur Flow Cytometry System

Technical Specifications

The BD FACSCalibur™ system is an automated benchtop flow cytometry system that offers three or four-color capability and can perform both cellular analysis and optional cell sorting.* Designed specifically to support a wide range of applications, the BD FACSCalibur system offers easy to use software, multi-sample loading options, and intuitive instrument and fluidics

control, to improve laboratory productivity. The BD FACSCalibur system is fully modular so it can be upgraded to meet future needs. For more information about the BD FACSCalibur system and other flow cytometry products from BD Biosciences, visit bdbiosciences.com.

Optics

Excitation Optics

Optical platform

Fixed optical assembly

Lasers

Air-cooled argon-ion laser, 15 milliwatt, 488 nm; life expectancy >5,000 hours. Optional second laser: nominally 635 nm.

Beam geometry

Prismatic expander and achromatic spherical lens providing 22 x 66- μ m elliptical beam for argon-ion laser. Nominally 15 x 61- μ m elliptical beam for red-diode laser.

Emission Optics

Optical coupling

Quartz cuvette coupled to emission lens by refractive index matching optical gel for optimum collection efficiency.

Background rejection

Obscuration blade and slit for minimizing unwanted laser radiation at the detector.

Forward scatter detector and filter

High-performance solid state silicon detector with 488-nm bandpass filter for clear signal detection and red-diode (635-nm) laser signal rejection.

Side scatter detector

High-performance photomultiplier using Brewster-angle beam splitter in the emission optical train.

Fluorescence detectors and filters

Up to four high-performance, high dynamic range photomultipliers with bandpass filters: 530 nm (FITC), 585 nm (PE/PI), and >670 nm (PerCP) with base unit, and optional 661 nm (APC) with FL4 option.

Performance

Fluorescence

Fluorescence Sensitivity

Estimated detection limit: 750 molecules of equivalent soluble fluorescein.

Fluorescence resolution

Coefficient of variation in FL2-Area of <3%, full peak for propidium iodide-stained chicken erythrocyte nuclei.

Forward and Side Scatter

Forward and side scatter sensitivity

Separation of fixed platelets from noise.

Forward and side scatter resolution

Optimized scatter performance for resolving lymphocytes, monocytes, and granulocytes.

Signal Processing

Workstation resolution

1,024 channels on all parameters.

Dynamic range

Logarithmic amplifiers for SSC, FL1, FL2, FL3, and FL4 (with FL4 option), providing four log decade range.

Fluorescence compensation networks

Compensation for fluorescence spectral overlap between FL1 and FL2, between FL2 and FL3, and between FL3 and FL4 channels (with FL4 option).

Pulse processing

Width and area measurements for discriminating doublets; available for all fluorescence parameters.

Time

Time available correlated to any parameter for kinetic experiments or other applications.

Fluidics

General operation

Front key panel control in three modes: RUN, STANDBY, and PRIME; automatic standby mode for conserving sheath fluid by stopping sheath flow when no sample tube is installed.

Fluid reservoirs

Easily accessible 4-L capacity sheath and waste containers housed in a convenient pull-out drawer; level detectors for automatically indicating low levels of sheath or high levels of waste.

Sample flow rates

Three selectable flow rates of 60 μ L/min, 35 μ L/min, and 12 μ L/min; regulated and monitored pressure difference between sheath and sample; particle velocity in flow cell: approximately 6 meters/second.

Quartz cuvette

Internal cross-section: rectangular 430 x 180 μ m; antireflection coated external surfaces for maximum transmission of laser light.

Sample concentration

Single-cell suspension of 10^5 to 2×10^7 particles/mL recommended range.

Data Management

Workstation

BD FACStation™ Mac Pro computer

Processor

2.8-GHz Quad-Core Intel® Xeon® processor

Memory

2 GB RAM

Level 2 cache

4 MB per processor

Data storage

320-GB 7200-rpm Serial ATA, 3Gb/s

Networking

On-board Ethernet, built-in AppleTalk® Networking, and Apple® File Sharing

Optical drive

16x SuperDrive

Monitor

17-inch LCD monitor (optional)

Data file structure

Flow Cytometry Standard (FCS) 2.0/3.0
ASCII results file for data export

Sample Loading

Sample delivery

Tube-lifter design with multiple sensors that verify rack identification and tube position with optional BD FACSTM Loader.

Rack capacity

40 (12 x 75-mm) tubes per rack.

Rack support

Up to 16 racks per BD FACS Loader.

Data entry

Sample information, reagent panels, and rack information can be defined for up to 640 tubes (40 tubes x 16 racks) at a time.

Loader manager

Automated control through BD™ Worklist Manager software.

Barcode scanner (optional)

Automates data entry for Codabar, Code 39, Interleaved 2 of 5, Code 2 of 5, and Code 128.

Mixing mode

Adjustable high-energy and low-energy mix.

Options

Sorting Option*

Sorting purity

>95%

Capture rate

300 cells/second

Sort modes

Three modes (all aerosol free): single cell, exclusion, and recovery.

Recovery

Depending upon sample and sorting conditions, >50%.

Sterile sorting

System design allows for aerosol-free sterile sorting.

HTS Option

Plate/tube compatibility

The HTS option allows quick conversion between tubes and plates

384-well plates (flat bottom)

96-well plates (U, V, and flat bottom)

Sampling modes

High-throughput (HT)

Standard (STD)

Sampling volume (range)

2–10 µL in HT mode

2–200 µL in STD mode

Total aspirated volume

22 µL (HT mode)

Excess aspiration volume

20 µL (STD mode)

Clean cycles

Automated daily and monthly cleaning protocols

Installation Requirements

Dimensions (W x D x H)

Sensor module

91.4 x 61.5 x 67.3 cm

(36 x 24.2 x 26.5 in)

Height with cover option:

124.5 cm (49 in)

Computer

48 x 41 x 58 cm (19 x 16 x 23 in)

Printer

48 x 41 x 58 cm (19 x 16 x 23 in)

Weight

Sensor module: 109.1 kg (~240 lb)

Computer: varies with configuration

Power

US: 120 VAC $\pm 10\%$, 50/60 Hz ± 2 Hz,

Current: 20 amp maximum outside

US. External transformer needed for

100 VAC $\pm 10\%$, 50/60 Hz ± 2 Hz, and

220/240 VAC $\pm 10\%$, 50/60 Hz ± 2 Hz.

BD recommends two dedicated circuits for instruments configured with any of the sorting options listed on the previous page.

Water supply

None required

Air supply

None required

Heat dissipation

BD FACSCalibur system with all options

6,500 BTU/h

Temperature

16–29°C (60–85°F)

Humidity

10% to 90% relative non-condensing

Air filtering

No excessive dust and smoke

Lighting

Optics and detectors shielded from room lighting

Regulatory Status

BD flow cytometers are Class I (1) laser products.

Unless otherwise noted, BD FACSCalibur is for In Vitro Diagnostic Use.



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