



BD FACSMelody™ Cell Sorter

Technical specifications

High quality flow cytometry sorting that is easy to learn, use and maintain

- Built upon proven BD FACS™ technology with a consistent track record of reliability and quality
- BD FACSCorus™ software guides researchers throughout the entire cell sorting process
- Automated instrument setup eliminates or simplifies routine tasks
- High sensitivity and resolution to detect and sort dim cells and rare cells, and resolve adjacent populations such as low-antigen density cells, small particles and DNA cell cycles
- BD CS&T technology ensures consistent instrument performance and day-to-day and experiment-to-experiment reproducibility

The BD FACSMelody™ sorter offers a simplified and streamlined approach to cell sorting. With a combination of high quality BD hardware, software and reagents, the BD FACSMelody system allows for fast, reproducible results to be achieved regardless of operator skill level. A streamlined workflow helps improve lab efficiency and throughput.

With its high sensitivity and resolution, the BD FACSMelody sorter can identify and isolate target cells for up to nine colors, a significant extension of color capability compared to similar cell sorters. This extended multicolor capability allows for dim or rare subpopulations to be identified, and produces more data with less sample.

The automated software package, BD FACSCorus, is designed to regulate the sorting droplets and steer the sorted cells into collection devices. This intuitive software enables researchers at all skill levels to achieve high-purity sorting.

Instrument configurations have been optimized to use our brightest BD Horizon Brilliant™ reagents with minimal fluorochrome spillover, taking the guesswork out of panel design and thus lowering the barriers for beginners.

Reproducibility is achieved through the use of BD quality control beads for automatic checking of the cytometer's performance and adjustment of settings to ensure consistent values.



Optics

Excitation laser

The 488-nm laser is standard.

488-nm blue direct diode laser, output power: 20 mW, nominal power: 16 mW

640-nm red direct diode laser, output power: 40 mW, nominal power: 36 mW (optional)

405-nm violet direct diode laser, output power: 40 mW, nominal power: 36 mW (optional)

561-nm yellow-green optically pumped semiconductor laser, output power 50 mW, nominal power: 40 mW (optional)

Beam size

$9 \pm 3 \times 67 \pm 5 \mu\text{m}$

Laser beam alignment

Fixed and spatially separated alignment of all lasers with the cuvette flow cell

Optical coupling

The quartz cuvette flow cell is gel-coupled by refractive index-matching optical gel to the fluorescence objective lens for optimal light collection efficiency. Numerical aperture: 1.2.

Detection channels

Forward scatter (FSC), side scatter (SSC) and up to nine fluorescence. See the *BD FACSMelody Filter Guide* for laser and detection configurations and optical filter specifications.

Fluidics

Sample input

5.0-mL polystyrene or polypropylene tubes can be used.

Temperature control: adjustable through software: 4°C, 22°C, 37°C and 42°C or off

Sample agitation: adjustable through the software to keep the sample constantly suspended

Sample flow automatically stops when the sample input tube is empty.

Flow cell

Quartz cuvette

Nozzle

100- μm nozzle is removable and can be sonicated.

A registered key-fit position at the bottom of the cuvette provides fixed stream alignment.

Fluidic tanks

Autoclavable 10-L stainless steel sheath container

10-L polypropylene waste container

Performance

System operation

Time from system powerup to running sample, including powerup, fluidic startup, stream optimization and optional performance checks (instrument and drop delay QC): <20 minutes; excluding optional performance checks: <10 minutes

Sorting nozzle tip can be removed during operation, replaced and stream optimized: <3 minutes

Fluorescence sensitivity

Fluorescence sensitivity was measured using SPHERO™ Rainbow Calibration Particles according to the manufacturer's specifications:

FITC: 80 molecules of equivalent soluble fluorochrome (MESF-FITC)

PE: 30 molecules of equivalent soluble fluorochrome (MESF-PE)

Fluorescence detection efficiency

Qr is the relative fluorescence detection efficiency, used for describing the detection efficiency of a detector for a specific fluorochrome. The units for Qr are photoelectrons generated per assigned BD unit (ABD unit). One ABD unit, for a given fluorochrome, is defined as the fluorescence of one antibody (fluorochrome to protein 1:1) bound to a cell. The higher the Qr value, the better the relative fluorescence detection efficiency per molecule reference fluorochrome measured in that detector.

FITC Qr (x1000): 40 photoelectrons/ABD

PE Qr (x1000): 325 photoelectrons/ABD

CD4 FITC: 1,600 photoelectrons*

CD4 PE: 13,000 photoelectrons*

*CD4 antibodies bound = 40,000

Qr values from the same lot of beads were taken from one BD FACSMelody instrument. Qr values can vary between instruments and instrument configurations.

Fluorescence resolution

Full-peak coefficient of variation (FPCV): <3.0%, G0/G1 peak for propidium iodide (PI)-stained chicken erythrocyte nuclei (CEN)

Fluorescence linearity

Doublet/singlet ratio: PI-stained CEN: 1.95–2.05

Forward and side scatter sensitivity

Sensitivity enables separation of 0.5- μm beads from noise.

Forward and side scatter resolution

Scatter performance is optimized for resolving lymphocytes, monocytes and granulocytes.

Sort performance

Droplet sorting

34,000 drops per second

Automated setup, optimization and monitoring of droplet breakoff and sort streams

Automated drop-delay determination with BD FACS™ Accudrop beads

Automated clog detection and sort tube protection system using Sweet Spot technology

Purity and yield

At 23 psi and 34 kHz with an average of 10,000 events per second, a two-way sort of 5% target populations achieved a purity of 98% and a yield of >80% of Poisson's expected yield for both populations. No limitation is imposed on the event rate. However, yield decreases with higher event rates based on Poisson distribution principles.

Sort collection

Two-way sorting: 1.5-, 2.0- and 5.0-mL tubes

One-way sorting: 6-, 24-, 48-, 96- and 384-well plates, 96-well PCR tray, microscope slide (optional)

Temperature control: water recirculation unit to provide heating or cooling for collection into tube holders, multiwell plates and slides (optional)

Index Sorting

Correlation of flow cytometry parameters of sorted events with well location of a multiwell plate, tray or slide (standard feature enabled with optional plate sorting).

Signal processing

Pulse measurement

Height, area, width

Acquisition rate

The maximum throughput rate is 40,000 events per second, independent of the number of parameters.

Time

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

Channel threshold

Available for any single parameter from any laser

Data management

Software

BD FACSCorus version 1.0 or later

Data file format

FCS 3.1

Computer

Business PC with at minimum: Intel® 2.8G CPU Quad Core™ i7, Microsoft® Windows® 10 64-bit operating system

Monitor

23-inch LCD with a minimum 1920 x 1080 resolution

Memory

8 GB RAM

Storage

500-GB hard drive

Options

Lasers

- 640-nm red laser, output power: 40 mW, nominal power: 36 mW
- 405-nm violet laser, output power: 40 mW, nominal power: 36 mW
- 561-nm yellow-green laser, output power: 50 mW, nominal power: 40 mW

See the *BD FACSMelody Filter Guide* for laser and detector configuration and mirror options.

Plate sorting

Software controlled single or multiple cell deposition, one-way sorting:

- Plates: 6-, 24-, 48-, 96- and 384-well plates
- PCR tray: 96 well
- Microscope slide: 3 x 9 grid

Sample temperature control

Water recirculation unit and sort collection devices to provide heating or cooling of tubes, multiwell plates and slides during sorting

Class II Type A2 biological safety cabinet

Specially modified Baker SterilGARD® e3 Class II, Type A2 biological safety cabinet (BSC) verified to meet personnel and product protection standards for Class II Type A2 with a BD FACSMelody cell sorter installed in the work area.

Aerosol Management Option (AMO) for systems without the BSC

The BD FACSMelody sorter features an enclosed pathway from the sample injection chamber to the sort collection tubes. For an added level of aerosol management, the BD Aerosol Management Option evacuates the sort collection chamber and traps aerosolized particles during sorting. It is equipped

with a 0.01- μm size ultra-low penetrating air (ULPA) filter to trap aerosolized particles.

System table

Computer cart

Air compressor

Installation requirements

Dimensions (W x D x H)

Cell sorter: 49.5 x 55.9 x 48.3 cm (19.5 x 22 x 19 in.)

Electronics box: 50.8 x 55.9 x 48.3 cm (20 x 22 x 19 in.)

Weight

Cell sorter: 40.75 kg (89.8 lb)

Electronics box: 36.25 kg (79.9 lb)

Air supply

80–90 psi, regulated, filtered (<5 ppm), dry, oil free

An optional air compressor is available.

Power

Operation at 100/115/230 VAC and 50 or 60 Hz

Operating temperature range

Between 17.5°C (63.5°F) and 27.5°C (81.5°F)

Between 17.5°C (63.5°F) and 22.5°C (72.5°F) when installed in a BSC

$\pm 2.5^\circ\text{C}$ variation in the same day

Operating humidity

40–60% relative humidity (noncondensing)

Compliance with safety standards

UL 61010 (US)

IEC 61010 and IEC 60825 (Europe)

CAN/CSA – C22.2 No. 61010 (Canada)

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