



BD FACSDiscover™ S8 Cell Sorter

The BD FACSDiscover™ S8 Cell Sorter features BD CellView™ Image Technology and BD SpectralFX™ Technology to expand the power of cell analysis and sorting by combining flow cytometry data with spatial and morphological insights.

Built-in visual inspection capabilities, more flexible panel design and automated features are combined in the BD FACSDiscover™ S8 Cell Sorter to streamline your workflow while maximizing sample utilization.



Technical specifications

Technologies

BD CellView™ Image Technology

By implementing orthogonal frequency domain multiplexing, BD CellView™ Image Technology images cells with the electronic and optical components used in flow cytometers. This unique technology makes it possible to produce images without a camera, enabling real-time imaging for analysis and sorting.

BD SpectralFX™ Technology

BD SpectralFX™ Technology combines full spectrum optics, next gen QC and system-aware spectral unmixing that manages spread by adapting to instrument performance and sample conditions in real time.

Optics

Lasers

Excitation optics

349 nm - nominal 30 mW;
output power: >27 mW

405 nm - nominal 50 mW;
output power: >45 mW

488 nm - nominal 100 mW;
output power: >95 mW

561 nm - nominal 50 mW;
output power: >45 mW

637 nm - nominal 100 mW;
output power: >90 mW

*488-nm laser is optically divided to support signal detection with BD CellView™ Image Technology

Optical platform

Fixed optical assembly with the capacity to be configured with up to five spatially separated laser beams and six beam spots. Laser delays are automatically adjusted during instrument QC.

Flow cell

The quartz cuvette flow cell is coupled to the fluorescence objective lens by a refractive index-matching gel for optimal light collection

Beam geometry

Flat top laser beam profile

Emission optics

Optical coupling

Emitted light from the gel-coupled cuvette is delivered by fiber optics to the detector arrays. The optical pathways use signal reflection to maximize signal detection.

Scatter detectors

Blue laser: Forward side scatter (FSC), Side scatter (SSC), Axial light loss (ALL)

Violet laser: Axial light loss (ALL), Side scatter (SSC)

Fluorescence detectors for spectral flow cytometry

Fluorescence detectors

Spectral arrays – 78 fluorescence APD detectors paired with algorithmically optimized filter bandwidths covering the full spectrum:

UV 349-nm laser – 22 UV detectors, covering 365–860 nm

Violet 405-nm laser – 20 Violet detectors, covering 410–860 nm

Blue 488-nm laser – 16 Blue detectors, covering 495–860 nm

Y/G 561-nm laser – 12 Yellow-green detectors, covering 570–860 nm

Red 637-nm laser – 8 Red detectors, covering 645–860nm

Imaging optics

Image-enabled detectors

Blue laser scatter detectors

Forward scatter (FSC), Side scatter (SSC), Axial light loss (ALL)

Fluorescence detectors for imaging (PMTs):

FL1: LP505: 534/46

FL2: LP570: 600/60

FL3: LP675: 788/225

Imaging features

Center of mass X
Center of mass Y
Correlation
Delta center of mass
Diffusivity
Eccentricity
Max intensity
Moment (long)
Moment (short)
Radial moment
Size
Total intensity

Fluidics

Sample input

1.5- and 2.0-mL tubes
12x75-mm (5.0-mL) tubes

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

Sample temperature control: Adjustable through software: 4 °C, 22 °C, 37 °C and 42 °C or off

Nozzle

85-µm nozzle, 100-µm nozzle and 130-µm nozzle that are removable and can be sonicated.

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

Bubble detector

An in-line bubble detector detects air bubbles in the sample line. When air is detected the sample line is pinched to prevent air from reaching the nozzle.

Fluidic reservoirs

Autoclavable 10-L sheath tank that contains sheath fluid

11.5-L waste tank that collects waste from the cell sorter

Three 1.2-L cleaning bottles (DI water, bleach and ethanol)

Sort

Nozzles, pressure and frequency

85- μ m nozzle: 35 psi, 57 KHz

100- μ m nozzle: 20 psi, 34 KHz

130- μ m nozzle: 7 psi, 15 KHz

85- μ m nozzle – up to 6-way sorting

100- μ m nozzle – up to 4-way sorting

130- μ m nozzle – up to 2-way sorting

Sort collection devices

Tube sorting: 1.5-mL microtubes, 2.0-mL tubes and 5.0-mL 12x75-mm tubes

Plate sorting: 6-, 24-, 48-, 96- and 384-well plates, microscope slide (optional)

Index sorting

Correlation of imaging features and traditional spectral flow cytometry parameters of sorted events with well location of a multi-well plate.

System – Automation and monitoring

Automated setup, optimization and monitoring of droplet break-off and sort streams

Automated drop-delay determination with BD FACS™ Accudrop Beads

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

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

Performance

Fluorescence sensitivity (MESF)

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

FITC: <65 molecules of equivalent soluble fluorochrome (MESF-FITC)

PE (488 nm): <25 molecules of equivalent soluble fluorochrome (MESF-PE)

PE (561 nm): <20 molecules of equivalent soluble fluorochrome (MESF-PE)

APC : <15 molecules of equivalent soluble fluorochrome (MESF-APC)

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: 2.00 +/- 0.05

Forward and side scatter sensitivity

Sensitivity enables separation of 0.16- μ m polystyrene beads from noise.

Forward and side scatter resolution

Resolves lymphocytes, monocytes and granulocytes in lysed whole blood using FSC or Violet Axial light loss (ALL) vs SSC parameters with less than 10% contamination amongst cell populations.

Image resolution

Resolves and provides image of 0.2- μ m polystyrene particles from noise using at least one SSC parameter.

Sort performance

Sort purity

Using an 85- μ m nozzle with an average of 10,000 events per second, a 6-way sort of sample with 3–7% target populations achieved a purity of >96% for all six populations.

Yield is based on various conditions such as event rate, sample type, sort modes, etc.

Sort viability

Jurkat cells were sorted using a 100- μ m nozzle at 20 psi, resulting in >80% viability based on proliferation 3 days post sort.

Plate sorting

Deposit a single event into each well of a 96-well plate in less than 80 seconds using optimal sample setup.

Options

Sample temperature control

This option can be used for sort tube and plate temperature regulation during a sort and includes a coolant/liquid recirculation unit with specifically designed collection tube holders with ports for coolant circulation for heating or cooling tubes or multi-well plates during sorting.

Class II Type A2 biological safety cabinet (BSC)

BD FACSDiscover™ S8 Cell Sorter can be equipped either at the time of purchase or as field upgrade with a fully integrated custom-tailored BSC designed in collaboration with the Baker Company.

Aerosol Management Option (AMO) for systems without the BSC

BD FACSDiscover™ S8 Cell 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 (AMO) evacuates the sort collection chamber and traps aerosolized particles during sorting. It is equipped with a 0.01- μ m size ultra-low penetrating air (ULPA) filter to trap aerosolized particles.

Instrument table (W x D x H)

Instrument table designed to accommodate cell sorter, collection device temperature control, computer, monitor and keyboard. 190.5 x 83.8 x 83.8 cm (75 x 33 x 33 in)

Installation requirements

Dimensions (W x D x H)

Cell sorter: 91.2 x 52.1 x 55.9 cm
(35.9 x 20.5 x 22.0 in)

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

Fluid storage cart: 49.4 x 65.9 x 53.1 cm
(19.5 x 25.95 x 20.91 in)

Biosafety cabinet: 135.6 x 91.18 x 204.0
cm (53.37 x 34.6 x 80.3 in)

Weight

Cell sorter: 88.45 kg (195 lb)

Electronics box: 45.35 kg (100 lb)

Air supply

5.5–5.9 bar (80–85 psi), regulated. The source of the compressed air must deliver clean (<5 ppm) dry-filtered (oil-free) air at stable pressures (+/-0.1 psi). The worst-case air consumption, based on 100 tubes per hour, is approximately 0.5 m³/h standard cubic meters per hour (SCMH).

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

±2.5 °C variation in the same day

Operating humidity

40–60% relative humidity
(noncondensing)

System/Software/ Support

Workstation

HP Z2 G9 Workstation Desktop PC

CPU: Intel® Core™ i7-12700 Chipset

Operating system

Microsoft® Windows™ 10 IoT Enterprise
LTSC (Long-term Servicing Channel)
Version 21H2

Monitor

32-in with 3840 x 2160
resolution (4K UHD)

Memory

32 GB RAM

Storage

OS Drive: 500 GB NVMe SSD

2nd Drive: 4.0 TB NVMe SSD

Software

BD FACSCorus™ Software guides
researchers throughout the entire cell
sorting process.

Exported file types

FCS 3.2; CSV, TIFF, CVW image files

Remote technical service support

BD Assurity Linc™ Software is designed
to log instrument and software
diagnostic data from compatible
BD flow cytometers so that they can
be accessed remotely by BD technical
support personnel.

Offline data analysis

Supported by FlowJo™ Software with
the BD CellView™ Lens Plugin, which
enables offline analysis of image and
flow parameters.

Class 1 Laser Product.

For Research Use Only. Not for use in diagnostic or therapeutic procedures.

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BD-81309 (v2.0) 0523

