BD FACSDiscover™ A8 Cell Analyzer with BD SpectralFX™ Technology and BD CellView™ Image Technology

With BD SpectralFX™ Technology, BD CellView™ Image Technology, a high-performance integrated autoloader and an intuitive easy-to-use software to guide you at every step, your research just got more efficient and consistent. Experience the future of flow cytometry with the BD FACSDiscover™ A8 Cell Analyzer. Accelerate your research with advanced spectral flow cytometry and real-time imaging in one seamless workflow.

BD

Technical specifications

Technologies

BD SpectralFX™ Technology

This 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.

BD CellView™ Image Technology

This technology leverages an optical multiplexing and signal processing (camera-free) approach to image cells using the electrical and optical components in flow cytometers.

Optics

Lasers

Excitation optics

UV: 349 nm–30 mW
V: 405 nm–50 mW
B: 488 nm–100 mW
YG: 561 nm–50 mW
R: 637 nm–100 mW

Note: The 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.

No operator alignment required.

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 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 APD detectors paired with algorithmically optimized filter bandwidths covering the full spectrum:

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

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

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

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

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

Imaging

Imaging fluorescence detectors

Blue laser scatter detectors

FL1: 534/46
FL2: 600/60
FL3: 788/225

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

Imaging parameters/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

Note: All of these parameters are computed from all the imaging detectors with the exception of Correlation and Delta CoM, which is computed between pairs of imaging detectors

Fluidics

Flow cell

Quartz cuvette

Sample input

Integrated autoloader
Manual tube port

Sample acquisition rate

High-speed mode: 35,000 events/sec
Imaging mode: 12,500 events/sec

Sample Injection Tube (SIT) flush

Each SIT flush, when performed, cleans the inside and outside of the sample line tubing and sends flushed fluids to waste. It is performed after removal of the manual port tube or after each sample acquisition on the loader by default.

Manual port: additional SIT flushes available, controlled through the BD FACSChorus™ Software user interface.

Integrated autoloader: option to choose between 0, 1, 2, and 3 SIT flushes to be performed automatically.

Volumetric acquisition

Flow sensor in sample line path; detects sample flow rate 100 µL/min.

Sample acquisition volume

Minimum 2 µL

Nominal flow rate: High-speed mode

Low sample flow rate: 12 µL/min
High sample flow rate: 100 µL/min
Nominal sheath velocity: 5 m/sec

Nominal flow rate: Imaging mode

Low sample flow rate: 12 µL/min
High sample flow rate: 30 µL/min
Nominal sheath velocity: 1 m/sec

Dual mode flexibility

Switch between high-speed mode (spectral only) and imaging mode (spectral + imaging) experiments.

Aerosol containment

No aerosols or hazardous material exits the system during normal operation, as tested using established protocols.

Automated notifications

Automated clog alerts users when clogs are detected during run.

Automated empty well detection alerts when sample well is unfilled.

Fluidic reservoirs

One sheath tank (10-L) that contains sheath fluid (deionized water)

One waste tank (10-L) that collects waste from the cytometer

Performance

Fluorescence resolution

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

Scatter sensitivity

Side scatter sensitivity (V-SSC) enables separation of 160 nm 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.

Particle size range

Small particle detection: 160 nm using an SSC parameter

Large particle detection: up to 40 µm

Fluorescence sensitivity (MESF)

Fluorescence sensitivity was measured using BD Sphero™ Rainbow Calibration Particle according to the manufacturer's specifications:

FITC: <37 molecules of equivalent soluble fluorochrome (MESF-FITC)

PE (488 nm): <12 molecules of equivalent soluble fluorochrome (MESF-PE)

PE (561 nm): <7 molecules of equivalent soluble fluorochrome (MESF-PE)

APC : <13 molecules of equivalent soluble fluorochrome (MESF-APC)

Fluorescence linearity

Doublet/singlet ratio: PI-stained CEN: 2.00+/- 0.05

Integrated Autoloader

Fully integrated inside the instrument

Sample carryover

<0.01% with default SIT Flush*

Dead volume

Less than 1 µL for 96-well, round-bottom, standard and deep well plates and 12x75mm Falcon® Tubes

Less than 5 µL for 2 mL polypropylene, 96-well, round-bottom, deep well plates

Throughput

96-well plate in 28 mins**
40-tube rack in 12 mins**

Integrated sample cooling and heating

Temperature set points of 4°C, 20°C and 37°C

Sample carriers supported

Standard 96-well plates, deep well 96-well plates, 40-tube rack (12x75mm Falcon® Tubes)

Flexibility (programmable) to add wash wells in a plate

Window allows viewing of well progress; protective coating prevents exposure to ambient light.

Sample auto mixing

Orbital mixing (400–1700 rpm)
Customizable intensity (rpm), frequency (number of wells or tubes) and duration

Automated Daily QC

Automated daily single tube QC with BD FACSDiscover™ Setup Beads

Biweekly image calibration QC with BD CellView™ Calibration Beads

Installation Requirements

Dimensions (W x D x H)

Cell analyzer: 91.4 x 62.7 x 53.6 cm (36 x 24.7 x 21.1 in)

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

Weight

Cell analyzer: 81.65 kg (180 lb)
Electronics box: 45.35 kg (100 lb)

Power

Total power: 1000 W
VAC-Hz: 100–240 VAC (50/60 Hz)
Circuit breaker: 10 A

*Tested with Lyse washed whole blood
**2 µL, 0 SIT Flush, Serpentine, Lyse washed whole blood

Operating temperature range

Between 17.5°C and 27.5°C (63.5°F and 81.5°F) +/-2.5°C variation in the same day

Operating humidity

40–60% relative humidity (noncondensing)

Audible noise

<65dB

System/Software/ Support

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

64 GB RAM

Storage

OS Drive: 500 GB NVMe SSD
2nd Drive: 4.0 TB NVMe SSD

Software

BD FACSChorus™ Software

Easy-to-use acquisition and analysis software

Live spectral unmixing during sample acquisition with system-aware algorithm

Up to 78 multiple autofluorescence controls

Exported file types

FCS 3.2, CSV, CVW

Offline data analysis

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

BD flow cytometers are Class 1 Laser Products.

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

BD Life Sciences, Milpitas, CA 95035, U.S.

bdbiosciences.com