BD FACSDiscover™ A7 Cell Analyzer with BD SpectralFX™ Technology and FACSTruQ™ Technology

Unlock new possibilities in flow cytometry with the BD FACSDiscover™ A7 Cell Analyzer. Designed to make advanced spectral experiments more accessible and reproducible, the BD FACSDiscover™ A7 Cell Analyzer combines exceptional spectral performance, industry-leading standardization capabilities, and automated workflows to help you generate high-quality insights. Thanks to consistent results across users, instruments and sites, spend less time managing complexity and more time advancing your science with greater ease.

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.

FACSTruQ™ Technology

This technology enables instrument standardization on the BD FACSDiscover™ Platform, delivering next-generation setup and QC through unique, comprehensive, and automated system calibration.

Optics

Lasers

Excitation optics

UV: 349 nm – 30 mW
V: 405 nm – 100 mW
B: 488 nm –100 mW
YG: 561 nm – 100 mW
R: 638 nm – 100 mW

Optical platform

Fixed optical assembly configured up to 5 lasers.

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. Cuvette coupled to lens with high numerical aperture (NA).

Scatter detectors

Blue laser: Forward scatter (FSC), Side scatter (SSC-blue).

Violet laser: Side scatter (SSC-violet)

Fluorescence detectors for spectral flow cytometry

Fluorescence detectors

Spectral arrays – 78 APD detectors paired with algorithmically optimized filter bandwidths covering 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 638 nm laser – 8 Red detectors, covering 645 nm – 860 nm

Common QC

Automated daily single tube QC with BD FACSDiscover™ Setup Beads

Fluidics

Flow cell

Quartz cuvette

Sample input

Manual port or integrated autoloader

Sample acquisition rate

Up to 35K events/sec

Sample Injection Tube (SIT) flush

Each SIT flush cleans both the inside and outside of the sample line tip and sends flushed fluids to waste. This process occurs by default after a tube is removed from the manual port and following each sample acquisition via the integrated autoloader.

Customization:

Manual port: additional SIT flushes through the FACSChorus™ Software UI.

Loader: option to choose between 0–6 SIT flushes to be performed automatically.

Carryover*

0.01%

Dead volume*

Less than 1 µL for 12x75mm Falcon® Tubes.

Flow rate

Low sample flow rate:
12 +/- 4 uL/min

Medium sample flow rate:
50µl/min ±10ul/min

High sample flow rate:
100 +/- 10 uL/min

Volumetric acquisition

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

Sample acquisition volume

Minimum 2 µL

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 (distilled 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

Violet side scatter (V-SSC) sensitivity enables separation of 90 nm polystyrene beads from background noise, corresponding to a limit of detection (LOD) of 90 nm.

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: V-SSC sensitivity enables detection and separation of 90 nm polystyrene beads from background noise.

Large particle detection: up to 40 µm

Fluorescence sensitivity (MESF)

Fluorescence sensitivity was measured using Bangs Laboratories Quantum™ MESF kits. Sensitivity was derived at optimized detector settings with sensitivity metrics derived from the opto-electronic noise floor. Molecules of equivalent soluble fluorophore (MESF) were converted to antibody binding capacity (ABC) units using average antibody fluorophore to protein ratios:

FITC: ≥25 MESF (≥6 ABC)

PE (488 nm): ≥2 MESF (≥2 ABC)

APC: ≥7 MESF (≥7 ABC)

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, roundbottom, 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 20 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, Standard flat-bottom 384-well plate, 40-tube rack (12x75mm Falcon® Tubes).
Thermally conductive custom 40-tube rack.

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 (400–2400 rpm)
Customizable intensity (rpm), frequency (number of wells or tubes) and duration

Automated cleaning and shutdown

Programmed cleaning, power off and software log out after completion of sample acquisition from plates and/or tube racks on integrated autoloader or upon demand.

Automated Daily QC

Automated daily single tube QC with BD FACSDiscover™ Setup Beads

Installation Requirements

Dimensions (W x D x H)

91.4 x 63.5 x 66 cm
36 in W x 25 in D x 26 in H

Weight

<90 kg

Power

Total power: <1250 W
VAC-Hz: 100–240 VAC (50/60 Hz)
Circuit breaker: 10 A

Operating temperature range

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

Operating humidity

40–60% relative humidity (non-condensing)

Audible noise

<65dB

*Tested with Lyse washed whole blood

**On average using 2 µL, 0 SIT Flush, Serpentine, Lyse washed whole blood. A variation of +/- 10% is observed depending on the Software version.

System/Software

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: 1 TB
2nd Drive: 1 TB

Software

Software tools that support 21 CFR Part 11 compliance.

Live spectral unmixing during sample acquisition with system-aware algorithm.

Up to 78 multiple autofluorescence controls.

Supported by FlowJo™ Software, with seamless data integration from FACSChorus™ Software.

Exported file types

FCS 3.2, CSV

BD flow cytometers are Class 1 Laser Products.

BD FACSDiscover™ A7 Cell Analyzer has not yet been CE marked and cannot be made available until CE marking has been completed.

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

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