# BD LSRFortessa Cell Analyzer
Technical Specifications

The BD LSRFortessa™ cell analyzer puts the power of the BD LSR platform into a compact footprint. It can easily fit on the benchtop for more cost-effective space utilization. The instrument delivers the optimal sensitivity and resolution required for multicolor applications. The BD LSRFortessa cell analyzer can be used to detect up to 18 colors simultaneously and supports up to 4 lasers, and a fifth laser available through the special order program. In addition to the reduced size, design innovations make filters and detectors more accessible, for easier setup of new experiments.

Through the BD special order program, customers can upgrade the BD LSRFortessa to support more lasers, choosing from 11 different wavelengths and a wide range of powers. This flexibility allows users to configure the instrument to meet their exact requirements for advanced assay development.

# Optics

## Excitation Optics

**Excitation Optical Platform**
The BD LSRFortessa optical layout allows for up to four[1] lasers.

**Laser Power**
355 nm: 20 mW
405 nm: 50 mW
488 nm: 50 mW
640 nm: 40 mW

**Optical Efficiency**
Power loss at flow cell: <20% of specified laser power

**Flow Cell Design**
Rectangular quartz cuvette:
Internal cross-section, 430 x 180 µm

External quartz cuvette surfaces are anti-reflective coated for optimal transmission of laser light.

Fixed optical assembly with spatially separated laser beams.

## Emission Optics

**Optical Coupling**
The quartz cuvette flow cell is gel-coupled by refractive index-matching optical gel to the fluorescence objective lens (1.2 NA) for optimal collection efficiency.

**Forward Scatter Detection**
Photodiode detector with a 488/10 bandpass filter

**Side Scatter Detector**
Photomultiplier tube (PMT) with a 488/10 bandpass filter

**Emission Optical Design**
Emitted light from the gel-coupled cuvette is delivered by fiber optics to the detector arrays. The BD LSRFortessa uses BD's patented octagon- and trigon-shaped optical pathways that use signal reflection to maximize signal detection. Please see the separate filter guide for information on dye and filter options.

# Performance

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

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

PE-Cy™5: 10 molecules of equivalent soluble fluorochrome (MESF-PE-Cy™5)

APC: 70 molecules of equivalent soluble fluorochrome (MESF-APC)

FITC and PE measurements performed using SPHERO™ Rainbow Calibration Particles (RCP-30-5A)

PE-Cy5 and APC measurements performed using SPHERO Ultra Rainbow Calibration Particles (URCP-38-2K)

**Fluorescence Resolution**
Coefficient of variation PI: Area of <3%, full $G_0/G_1$ peak for propidium iodide (PI)-stained chicken erythrocyte nuclei (CEN)

**Fluorescence Linearity**
Doublet/singlet ratio of 1.95–2.05 for CEN stained with PI and excited with the 488-nm blue laser

**Forward and Side Scatter Sensitivity**
Enables separation of fixed platelets from noise.

**Forward and Side Scatter Resolution**
Scatter performance is optimized for resolving lymphocytes, monocytes, and granulocytes.

**Side Scatter Resolution**
Enables separation of 0.5-µm beads from noise.

**Forward Scatter PMT Option**
A forward scatter PMT upgrade is available for small particle detection through the special order program.

**Data Acquisition Rate**
40,000 events/sec with beads.

# Fluidics

**Sample Flow Rates**
Front key panel provides three modes: RUN, STNDBY, and PRIME

Continuously adjustable flow rate, plus three preset flow rates:
LO: 12 µL/min
MED: 35 µL/min
HI: 60 µL/min

Minimum Sample volume: 275 µL for 1-minute data collection with a 60-µL/min flow rate (215-µL dead volume plus 60-µL sample volume).

**Standard Fluidic Reservoirs**
One 8-L sheath container and one 10-L waste container provided.

**Recommended Fluidics Option**
BD FACSFlow™ supply system: automated fluidics system, which includes a rolling cart and two 20-L Cubitainer® packages

*[1]An optional fifth laser is available through the special order program. New laser options are developed on a regular basis.*
*Please check with your local sales representative for the latest wavelength and power options.*

## Data Management

Software: BD FACSDiva™ v6.2 or later

## Workstation[2]

**Operating System**
Windows® XP Professional SP3

**Processor**
Intel® Core™2 Duo processor, 3.0 GHz

**RAM**
HP 2 GB (2 x 1 GB) DDR2-800 ECC

**Hard Drives**
HP 80 GB SATA/3 Gb/s 7200 rpm HD (1st slot)
HP 250 GB SATA/3 Gbs NCQ 7200 rpm HD (2nd slot)

**DVD Drive**
HP 16x DVD+/-RW, SuperMulti SATA

**Networking**
Integrated Broadcom Gigabit 10/100/1000 ethernet
Broadcom 5751 NetXtreme® Gigabit PCIE NIC Ethernet

## Options

**Monitor Options**
Two 19-in. LCDs, 2560 x 1024 resolution (standard)
One 22-in. LCD, 1680 x 1050 resolution (optional)
One 24-in. LCD, 1920 x 1200 resolution (optional)

**Printer Options**
Options vary by location. Please check with your local sales representative.

## High Throughput Option

The High Throughput Sampler (HTS) option is available to increase your lab productivity by acquiring samples from a 96- or 384-well microtiter plate.

The HTS can be front or side mounted on the BD LSRFortessa.

**HTS Throughput**
Acquisition: Less than 15 minutes per microtiter plate in high throughput mode using a 2-second acquisition, less than 44 minutes in standard mode using a 10-second acquisition

Carryover: Less than 1%

*[2]Minimum configuration listed. Workstation may include upgraded specifications.*

# Installation Requirements

**Dimensions (H x W x D)**
38 x 36 x 30 in.
(96.5 x 91.4 x 76.2 cm)

**Weight**
~440 lb (199.6 kg)

**Temperature Operating Range**
66–79°F (19–26°C)

**Humidity**
10% to 90% relative, non-condensing

**Heat Dissipation**
2353 BTUs per hour

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

Maximum power: 1,500 watts

**Noise**
<70 dB

**Air Supply**
None required

**Electrical Requirements**
BD requires one dedicated circuit for the cytometer and the computer system (including printer) with a dedicated AC source not shared with any other equipment. The instrument will be powered from the line conditioner supplied by BD Biosciences.

# Regulatory Status

BD Biosciences certifies that the BD LSRFortessa cell analyzer conforms to relevant directives to bear the CE mark. It also conforms to the UL and CAN/CSA general requirements (61010.1). The BD LSRFortessa flow cytometer is a Class I (1) laser product per CDRH regulations and EN/IEC 60825.

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