



# BD FACSymphony™ S6 Cell Sorter

Special Order Research Product



# Technical Specifications

## Optics

### Excitation optics

#### Optical platform

Fixed optical alignment of all Class 3B and 4 lasers with the cuvette flow cell. Beam shaping: elliptical

Air-launched and focused on the cuvette flow cell

Support for up to 9 lasers

### Emission optics

#### Optical coupling

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

Numerical aperture: 1.2

#### Forward scatter detector and filters

Photodiode with 488/10 bandpass filter for the 488-nm laser.

#### Side scatter detector

Photomultiplier with a 488/10 bandpass filter for the 488-nm laser.

#### Fluorescence detectors and filters

Flexible detector array technology enables user-defined detection configurations with up to 20 detectors per laser line. Filters and mirrors are user changeable.

## Fluidics

### General operation

Sheath and cleaning fluid tanks, as well as waste collection, are located in an easy-to-reach drawer at the base of the system. An auxiliary air input is designed to connect the cytometer to a lab's air filtration and drying system. If needed, a third-party compressor is available as an option.

Sheath pressure is adjustable from 5 to 75 psi.

#### Fluidic reservoirs

Autoclavable 10-L sheath and waste containers and 5-L cleaning reservoirs are provided.

#### Sample flow rates

Adjustable dynamic range of sample flow rates

#### Fluidic cleaning modes included (software)

Automated startup and shutdown  
Clean flow cell  
Prepare for aseptic sort

### Nozzles

70, 85, and 100 standard. 130- $\mu$ m optional. All nozzles are removable and can be sonicated.

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

### Bubble detector

A bubble detector in the sample line detects air bubbles from the sample tube and stops sample flow when the sample tube is empty, to avoid air bubbles from reaching the nozzle. The bubbles are then purged when unloading the sample tube.

### Automatic cell deposition unit

Sorts into slides and 6, 24, 48, 96 and 384-well plates. Index sorting can be enabled when sorting single cells. This capability indexes the cell surface phenotype to the well containing that cell.

## Performance

### Fluorescence sensitivity

Measurements performed at 70 psi and 90 kHz using SPHERO™ Rainbow Calibration Particles (RCP-30-5A) on three systems.\*

\*MESF can vary lot-to-lot.

**FITC<sup>†</sup>:** <89 molecules of equivalent soluble fluorochrome (MESF-FITC) using a 525/50 filter and 150 mW 488 nm laser.

**PE<sup>†</sup>:** <29 molecules of equivalent soluble fluorochrome (MESF-PE) using a 586/15 filter and a 150 mW 561 nm laser.

### Fluorescence resolution

Coefficient of variation (CV)

PI: Area, <3.0%, full G0/G1 peak for PI-stained chicken erythrocyte nuclei (CEN)

Hoechst: Area, <3.5%, full G0/G1 peak for Hoechst-stained CEN

### Fluorescence linearity

Doublet/singlet ratio

CEN stained with PI: 1.95–2.05

(488-nm laser) or

Hoechst: 1.95–2.05 (405-nm laser)

### Forward and side scatter sensitivity

Sensitivity enables separation of fixed platelets from noise, identification of bacteria.

### Forward and side scatter resolution

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

### Drop drive frequency

Range 1–100,000 Hz

### Purity and yield

At 70 psi and 87 kHz with an average threshold rate of 25,000 events per second, a four-way sort achieved a purity of >98% and a yield >80% of Poisson's expected yield. Higher threshold rates up to 70,000 events per second can be achieved without affecting purity. However, yield will decrease based on Poisson's statistics

At 70 psi and 87 kHz with an average threshold rate of 25,000 events per second, a six-way sort achieved a purity of >98% and a yield >80% of Poisson's expected yield. Higher threshold rates up to 70,000 events per second can be achieved without affecting purity. However, yield will decrease based on Poisson's statistics.

### Sort collection devices

Two-way sorting: 12 x 75-mm and 15-mL tubes

Four-way sorting: 1.5-mL microtubes, 15-mL tubes, and 12 x 75-mm tubes

Six-way sorting: 12 x 75-mm tubes

### Sort collection cooling/heating

Water recirculator for refrigeration or heating (optional) compatible with collection into tubes, multiwell plates or slides.

### BD FACS™ Accudrop

Red diode laser provided for fully automated drop-delay determination

Automated drop breakoff monitoring

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

## Signal processing

### Converter

Pulse sampling is precisely matched to the particle flow rate in the cuvette. Particles travel slower compared to conventional stream-in-air sorters. This increases the light collected, resulting in better sensitivity. High-speed sorting is achieved by accelerating the stream through the nozzle, achieving drop rates comparable to

stream-in-air sorters. The flow cell design and electronics are matched to maximize signal while maintaining maximum sort speed, purity and yield.

### Data acquisition channels

Up to 60 parameters (58 fluorescent and 2 scatter)

### Fluorescent compensation

No limit to inter- and intra-beam compensation

### Pulse processing

Height, area and width measurements available for any parameter. Ratio measurements are also available.

### Time

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

### Channel threshold

Available for any parameter from any laser, with the ability to use multiple thresholds from different lasers simultaneously.

## Loading

### Sample input sizes

Microtubes, 12 x 75-mm and 15-mL tubes. Polystyrene or polypropylene tubes can be used.

### Sample input agitation

Adjustable through the software to keep the sample constantly suspended

### Temperature control

Sample input: 4°C, 20°C, 37°C and 42°C (adjusted in the software)

## Data management

### Data file structure

Flow Cytometry Standard (FCS) 3.1, 3.0 or 2.0

### Software

BD FACSDiva™ Software v9.1.2 or later  
Compatible with FACSDiva Experiment Import and Export in FlowJo™ Software v10.6.2 or greater

## Installation requirements

### Instrument Dimensions (H x W x D)

BD FACSsymphony S6 without BSC:  
142 x 128 x 87 cm  
(56 x 50 x 34 in.)

Weight: 475 kg (1,047 lb)  
BD FACSsymphony S6 with BSC:  
220 x 128 x 89 cm  
(87 x 50 x 35 in.)

Weight: 726 kg (1,600 lb)

See Site Preparation Guide for space and clearance requirement.

### Temperature operating range

Without BSC: 17.5°C–25.5°C  
(63.5°F–81.5°F)  
With BSC: 17.5°C–22.5°C (63.5°F–72.5°F)  
Less than +/- 2.5 degree variation from the alignment temperature

### Workspace table (optional)

81.3 x 92.7 x 83.8 cm  
(32 x 36.5 x 33 in.)

### Heat dissipation

Without BSC: 1,965 BTU/hour (maximum, depends on the choice and number of lasers)  
With BSC: 5122.5 BTU/hour (5-laser system)

### Power

Using power conditioner operation at 100/115/230 VAC and 50 or 60 Hz  
Maximum power consumption: 1,500 watts (5-laser system) without BSC  
3225 W (5-laser system) with BSC

### Water supply

None required

### Air supply

95–100 psi, regulated air, clean (<5 ppm) and free of oil  
Approximately 0.52 standard cubic meters

## Options

### Integrated biosafety cabinet (BSC) option

The BD FACSsymphony S6 Cell Sorter can be equipped either at the time of purchase or as a 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 option

The BD FACSsymphony S6 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-µm size ultra-low penetrating air (ULPA) filter to trap aerosolized particles.

### Temperature control option

This option can be used for both sort tube and plate temperature regulation during a sort and includes:

Recirculating water bath

Specially designed collection tube holders with ports for recirculating water

## Compliance with safety standards

IEC 61010-01 and IEC 60825-01  
Class 1 Laser Product EN/IEC 60825-01

Class 1 Laser Product.

For Research Use Only. Not for use in diagnostic or therapeutic procedures.  
23-21490-01

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