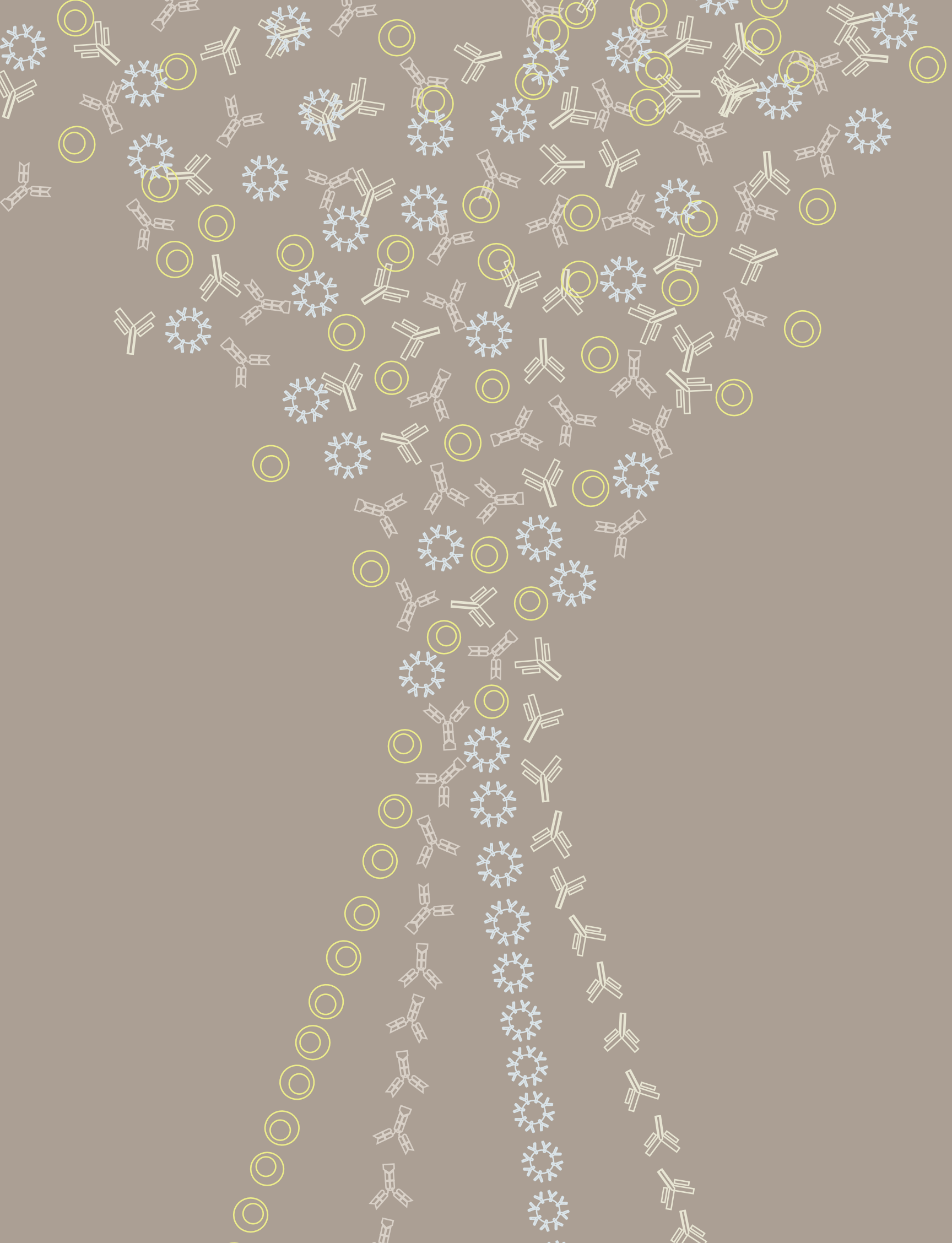


BD Influx



Helping all people
live healthy lives

Flow cytometry that adapts
to your way of thinking



The BD Influx Cell Sorter Adapts to Your Way of Thinking

The BD Influx™ cell sorter is a flexible flow cytometry platform that easily adapts to a researcher's application or environmental requirements. A modular architecture and a powerful combination of detection capabilities, hands-on controls, and high performance allows researchers to configure the BD Influx system to site and application needs.

The BD Influx system was originally designed as a tool for the Human Genome Project. Speed and accuracy continue to be essential requirements. In addition to speed, the platform offers flexibility. The optical system offers a choice of up to five lasers, and exchangeable detector options support a range of emission needs.

A unique fluidics design protects cells and addresses contamination. The nozzle assembly is designed to produce high droplet frequencies at relatively low pressures, enabling high-speed sorting while maintaining cell viability and functionality. To support aseptic sorting, exchangeable fluidics allow researchers to replace a sample line or the complete fluidics path, from sheath tank to nozzle tip.

Collection of sorted cells is highly configurable using the Computerized Cell Deposition Unit (CCDU). New sort modes, such as proportional or positional sorting, expand sorting possibilities into the areas of genomics and proteomics.

The HEPA-filtered enclosure offers control over the sorting environment and adapts it to application or regulatory requirements.

As part of BD Biosciences ongoing commitment to bringing innovative tools to life scientists and emerging areas of cell-based research, the BD Influx system can be fully optimized for routine tasks or emerging new applications. The high level of choice and control allows researchers to combine the array of options available to configure the BD Influx platform to meet their needs for a multipurpose instrument or an application-specific device. A full array of BD technical and application support comes standard to help support and streamline research.

Innovative Fluidics Design

Designed with a Clear Goal:
Control Cross Contamination

Optimal cellular viability is achieved through a unique nozzle assembly design, and support for aseptic sorting is implemented through a completely exchangeable fluidics path.



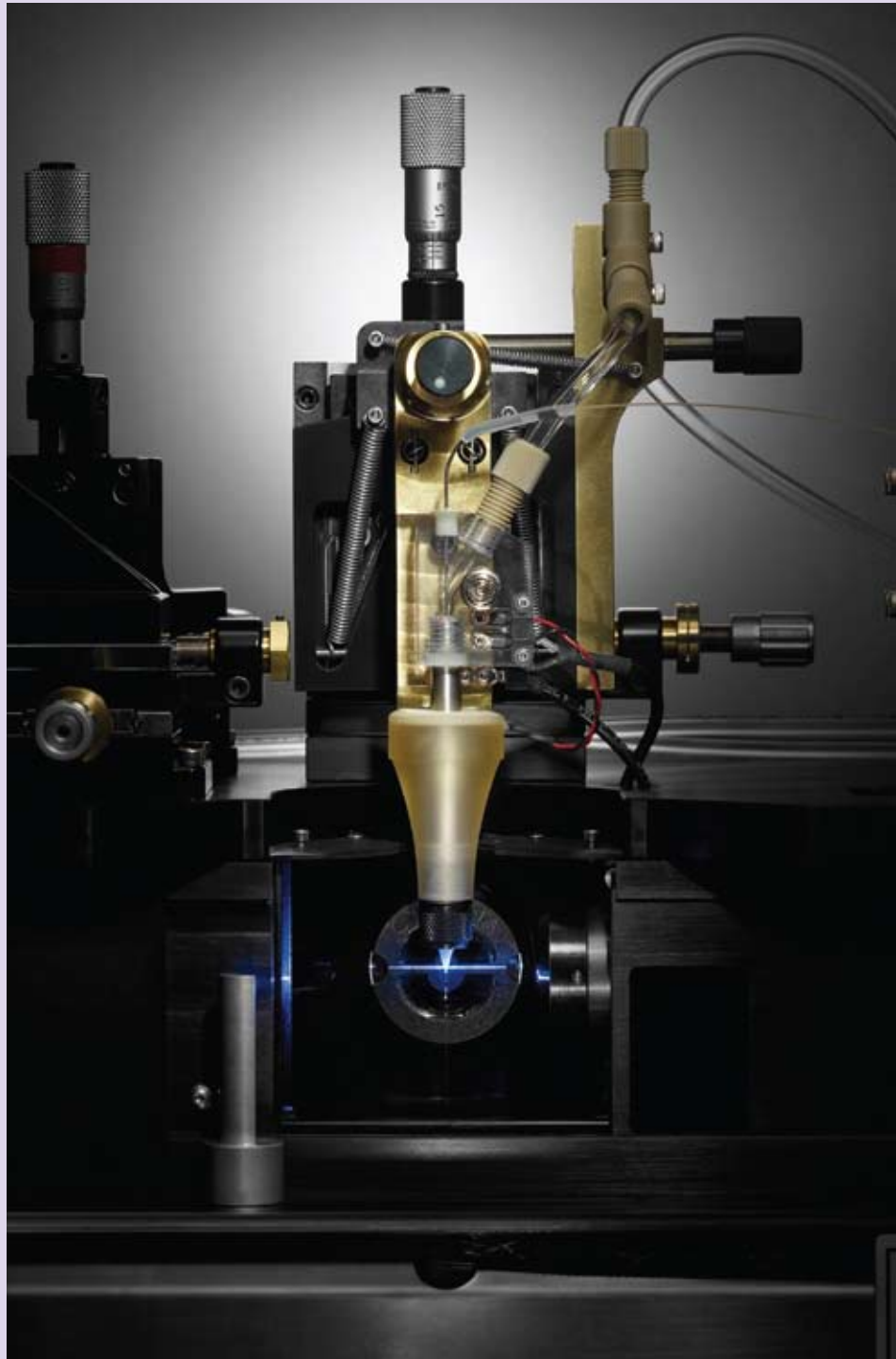
Pressurized stainless steel sheath tanks

Nozzle Assembly and Nozzle Sizes

The core of the BD Influx system is the nozzle assembly that features an optimized acoustical coupling, enabling the lowest available stream signal-to-noise droplet formation. This unique design minimizes noise from the droplet formation process and results in high droplet formation rates at relatively low sheath pressures. In addition, the form of the nozzle assembly enables cells to accelerate smoothly to the laser intercept, increasing the viability and functionality of even the most fragile cells.

A variety of nozzle sizes are available to allow researchers to easily adapt the system to different cell or particle types.

The use of stainless steel pressurized tanks allows the user to adapt cleaning procedures to match application needs.



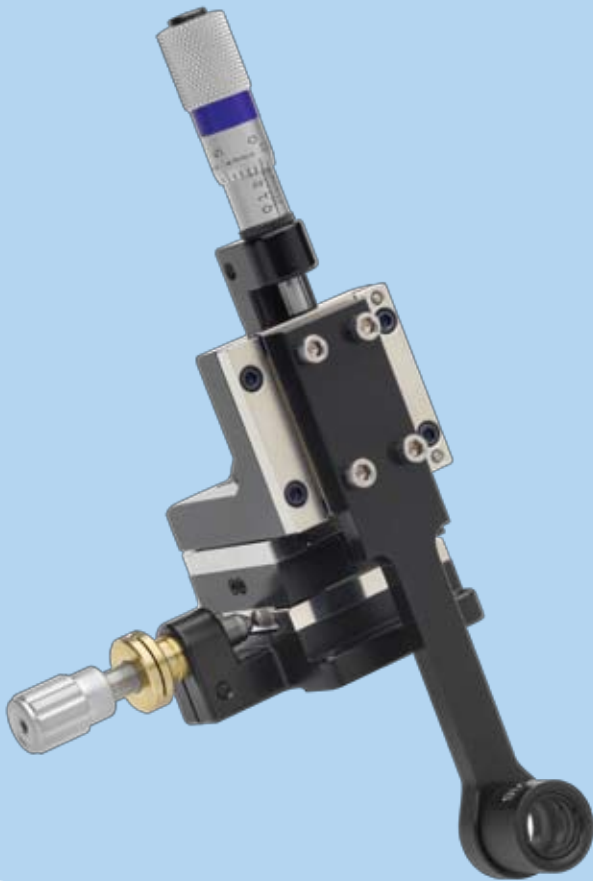
Exchangeable Fluidics

An important concern in cell sorting is cross contamination, be it between samples or with foreign substances such as bacteria, viruses, or DNA. To minimize the risks of cross contamination, researchers can replace the sample line in a matter of minutes. The sample line extends into the nozzle tip to minimize contact between cells and non-replaceable parts. For rigorous control, the complete fluidics system, from sheath tank to nozzle tip, can be exchanged. The unique design of the BD Influx fluidics system allows for rapid exchange of all parts that potentially contact cells, eliminating cross contamination concerns.



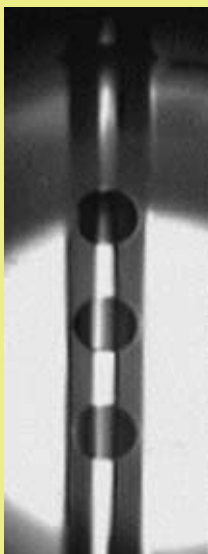
A Quick and Intuitive Alignment Procedure

Intuitive Alignment

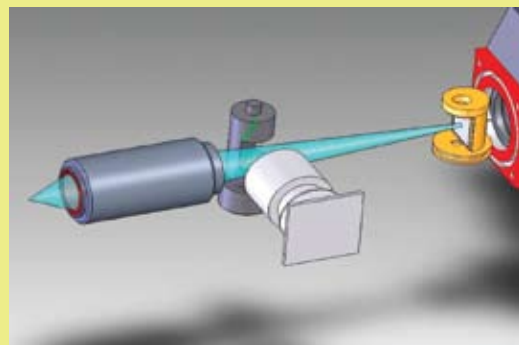


Final focus lens assembly

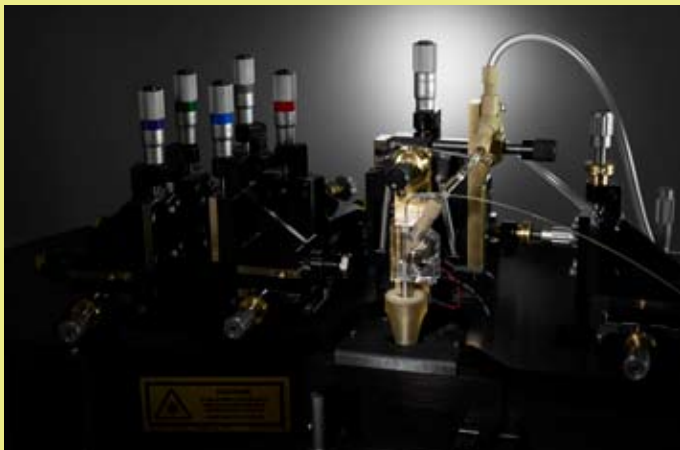
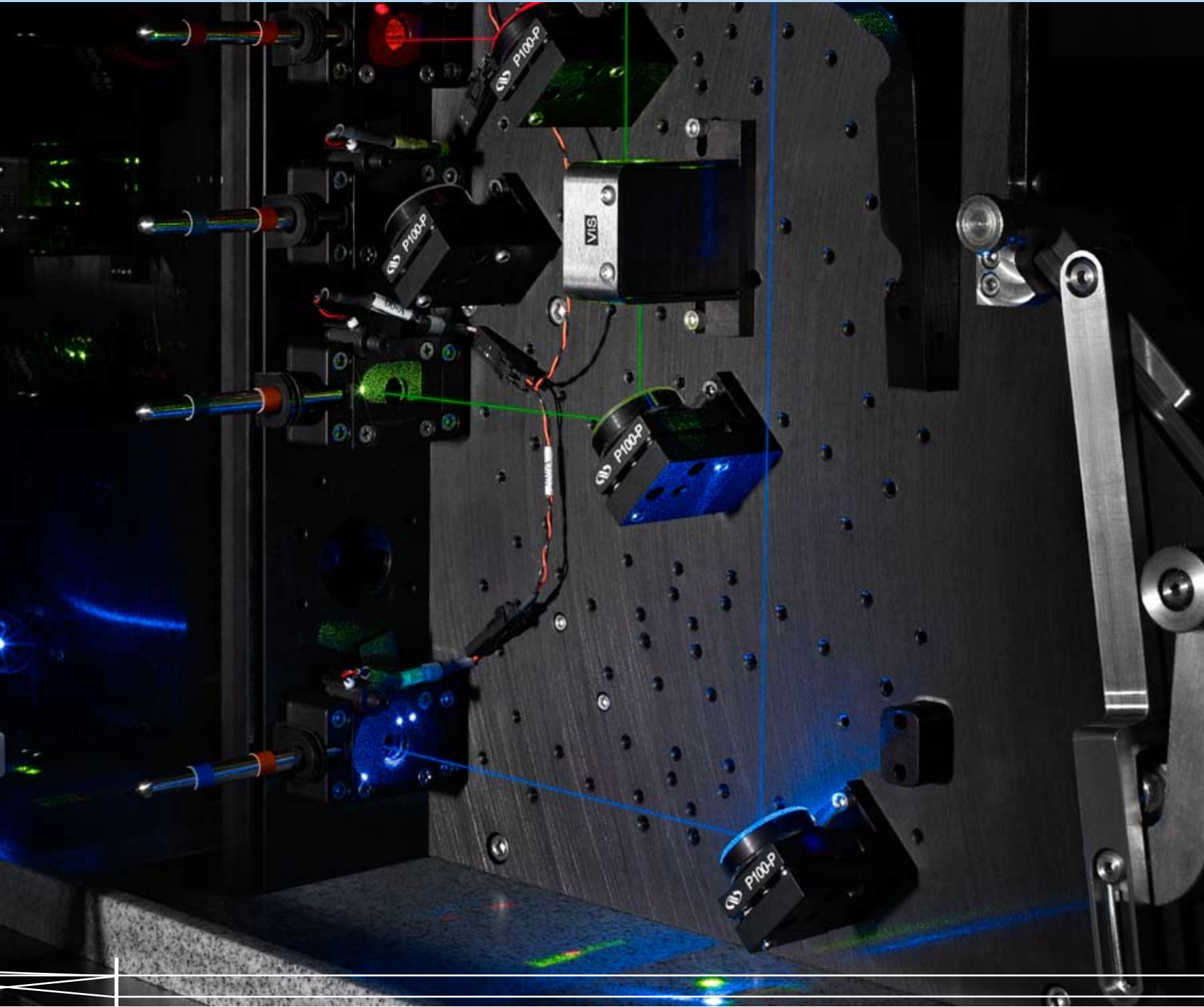
The optical system that directs lasers to the interrogation point is easy to use, intuitive, and adaptable. Up to five laser paths can be configured and independently aligned. For each laser, light is shaped by individual optics, and final alignment and focusing is achieved via a dedicated lens that steers light to the stream at different angles. Fluorescence is collected through a 20 x 0.6 NA lens and focused on individual mirrored pinholes. This design, combined with a special pinhole camera, allows researchers to image the stream and the pinholes simultaneously, which simplifies optical alignment and reduces cross talk between lasers. With the help of the pinhole camera, near-optimal alignment can be achieved within seconds, without using beads.

**Pinhole Camera View**

Simultaneous view of pinholes and fluid stream, enabling fast initial alignment



Schematic representation of collection lens, pinhole camera, and mirrored pinholes



Individual Laser Positioners

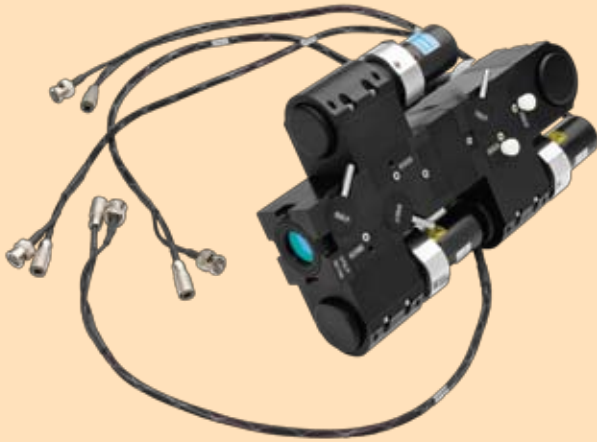
Independent laser beam alignment and video control of laser intercepts and pinholes allow for fast and intuitive alignment of multiple lasers.

Adaptable Detection

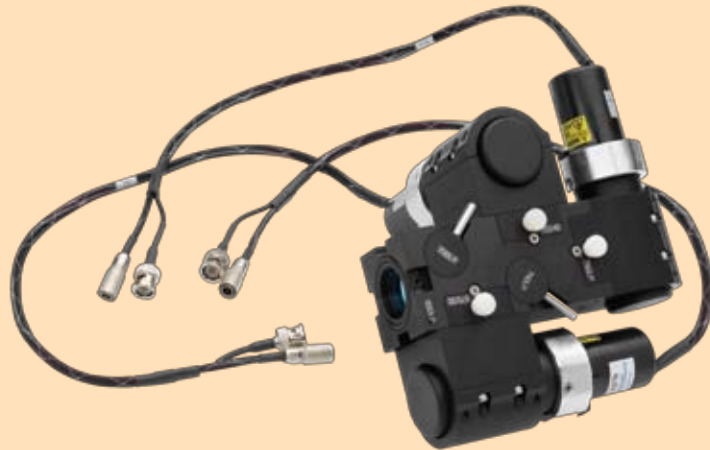
A Range of Detectors for Application Specific Configurations

A range of standard detection modules is available to configure the system based on application needs.

Optional, exchangeable detector modules allow for the measurement of small particles, the polarization state of scatter or fluorescence signals, or the spectral properties of a fluorochrome. This flexibility allows the user to adapt the system to the needs of routine or emerging applications.



Detection module (4 PMTs)



Detection module (3 PMTs)

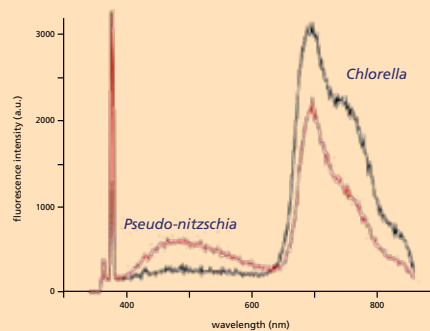


Polarization

The BD Influx system can be equipped with polarization-sensitive detectors. A unique polarization design uses two detectors mounted under Brewster angles to measure changes in parallel and perpendicular light for both scatter or fluorescence. Changes in polarization can help differentiate between organisms containing highly reflective inclusions such as diatoms or discriminate among different populations of granulocytes.

Spectral Analyzer Option

The BD Influx Spectral Analyzer Option is useful in determining the emission spectrum of a specific fluorochrome to help discriminate homogenous populations. Installed on any photomultiplier port, the analyzer's spectral grating rotates at a user-defined preset angle while cells pass through the laser. The transmitted signal intensity and grating angle are documented in the list-mode file. The spectral properties of different clusters in the sample are extracted using analytical software. The short interrogation time in a flow cytometer makes it difficult to do a full spectrum analysis on a single cell. However, the Spectral Analyzer Option allows the flow cytometer to function as a fluorometer. These capabilities are used in marine biology applications and could be used to measure fluorescence energy transfer in fluorescent protein pairs.



Spectral Analyzer Option

Spectral differences between *Pseudo-nitzschia* and *Chlorella* upon UV excitation.

Small Particle Option

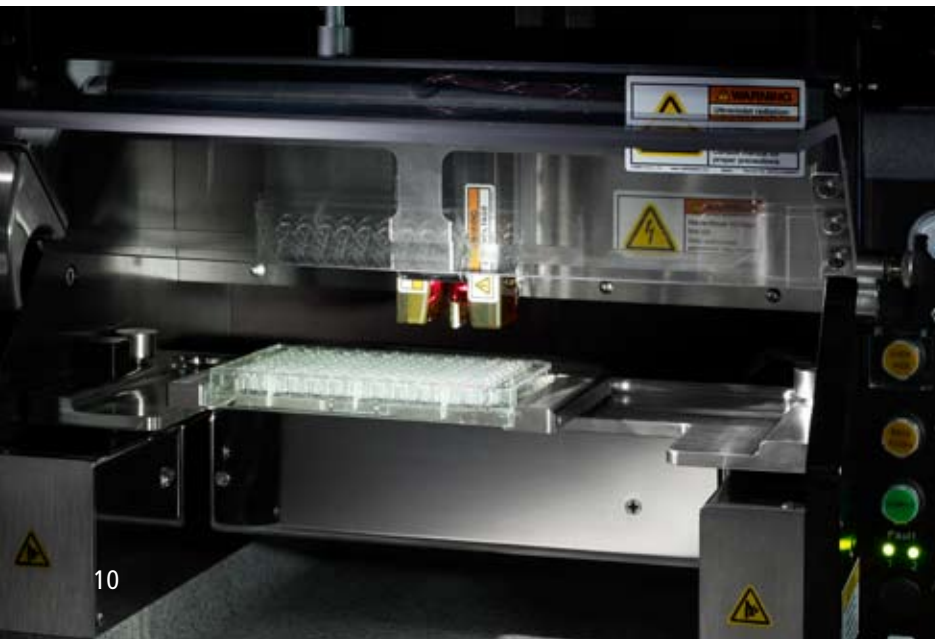
The Small Particle Option on the BD Influx system improves forward scatter detection. This option lowers the threshold on size measurements using a special detector with a high NA microscope lens, a pinhole, and a photomultiplier tube (PMT). The pinhole reduces the amount of stray light reaching the detector and prevents saturation of the PMT. Optimized sheath fluid (0.1-micron filtered) lowers the intrinsic noise level, which allows measurements of particles as small as 200 nm.

This resolution makes the Small Particle Option particularly valuable for applications in marine biology, microbiology, and environmental biology. The Small Particle Option also allows researchers to detect fluorescence in the forward direction. This capability is used in applications such as chlorophyll detection and analysis of sperm cells.

Flexible Sorting

Unique Sort Modes Allow for Proportional or Positional Sorting

The BD Influx system features special sort modes that can be optimized for applications in genomics or proteomics. Proportional sorting allows deflection of cells in proportion to one of the measured signals. For instance, cells can be deflected according to their DNA content to arrange them by the phase in the cell cycle. mRNA hybridization to the stripe of cells of increasing DNA content might serve to study differential gene expression during the cell cycle. Positional sorting positions cells in a 2-dimensional pattern that exactly mimics the pattern on a bivariate dot plot. This sort mode can be used to identify subsets in increasingly complex mixtures.



Computerized Cell Deposition Unit

A wide range of collection options allows the researchers to choose the best fit for application requirements. Tube holders include sizes from micro tubes, to 12 x 75-mm tubes, and 15-mL tubes. Adapters that enable sorting directly into micro-titer plates using the Computerized Cell Deposition Unit (CCDU) are also available. For precise sorting, the mechanics and speed of the XY table in the CCDU allows sorting into plates or other custom devices such as slides or Petri dishes. Single-cell cloning or sorting for single-cell PCR or single-cell imaging techniques is possible with the standard CCDU.

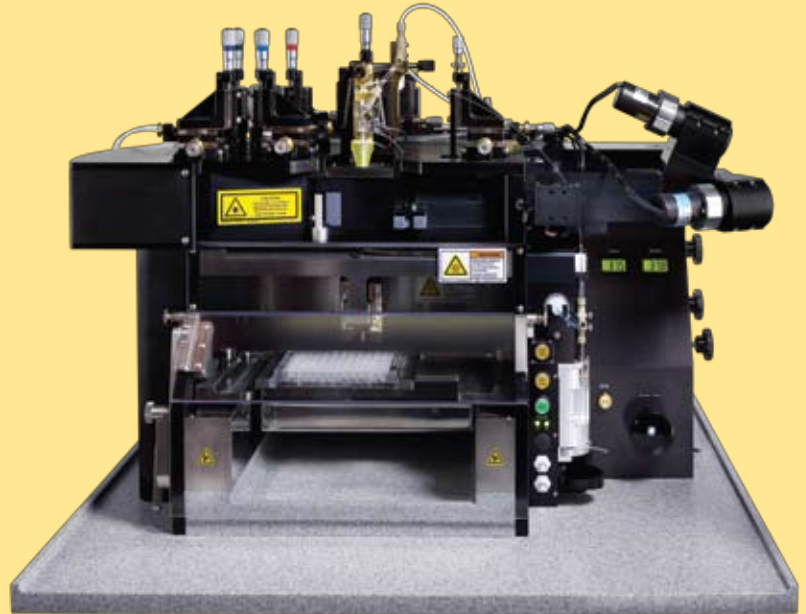
Electronics

The BD Influx system uses parallel electronics to reach a throughput rate of 200,000 events per second, independent of the number of parameters. Peak and hold circuitry collects the pulses from the photomultipliers, and the peak value is extracted and digitized through a 16-bit ADC. Up to 8 analog signals can be simultaneously processed through an integrator circuitry, extracting area and width measurements. A separate digital subsystem calculates compensation of up to 16 colors in real time and feeds the results back to the system bus.

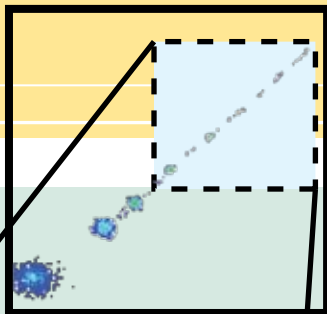
To sort cells, researchers can select subpopulations through the creation of up to 32 sort regions. A variety of sort modes, optimized to favor purity, yield, or count accuracy, are standard. A custom mode allows researchers to optimize those settings for a specific application.

If purity is of no concern, theoretically, sort speed is as fast as the throughput rate. In this case cells are sorted independently and the target population is enriched.

In most sorts, however, purity is a major concern and factors such as droplet formation rate, event rate, and sample quality play a deciding role. When these factors are taken into account, the yield can be calculated by using Poisson's statistics. The BD Influx system will reach >80% of Poisson's expected yield with properly prepared samples.

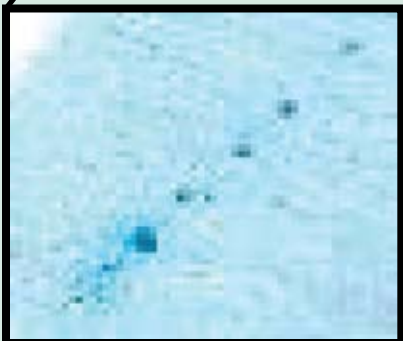


BD Influx sort unit



Positional Sorting

An exact copy of the bivariate distribution of differentially stained beads is sorted using changes in droplet deflection as well as movements of the XY table.



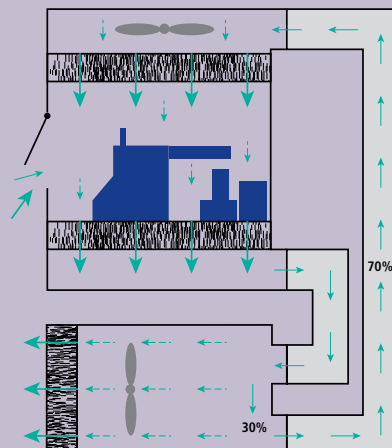
Environmental Control

Multiple Levels of Control to Match Application and Environmental Needs

The BD Influx aerosol management system draws air away from the operator through a HEPA filter, reducing the amount of aerosols in the sort chamber. Additionally, the BD Influx system can be equipped with a HEPA-filtered enclosure.

This customized unit allows researchers to control the HEPA filtered air flow for product and operator safety requirements. The unit's design is optimized to allow it to be adjusted and validated for regional, regulatory, and application-specific requirements.

The BD Influx system can adapt to virtually any environment. A small footprint allows the instrument to fit into tight spaces, and a modular component design allows the instrument to be easily configured to tailored needs. Footprint and modularity have made the BD Influx cell sorter the instrument of choice for marine biology applications. The BD Influx Mariner version also features special brackets that easily mount the instrument shipboard.



Controlled airflow in the BD Influx HEPA-filtered enclosure



Service and Support

BD Biosciences instruments and reagents are backed by a world-class service and support organization with unmatched flow cytometry experience.

For over 25 years BD has actively worked with researchers to develop tools that help improve workflow, ease of use and performance. With in-depth knowledge and experience, BD delivers comprehensive training, application expertise, excellent technical support and world-class field service.

Training

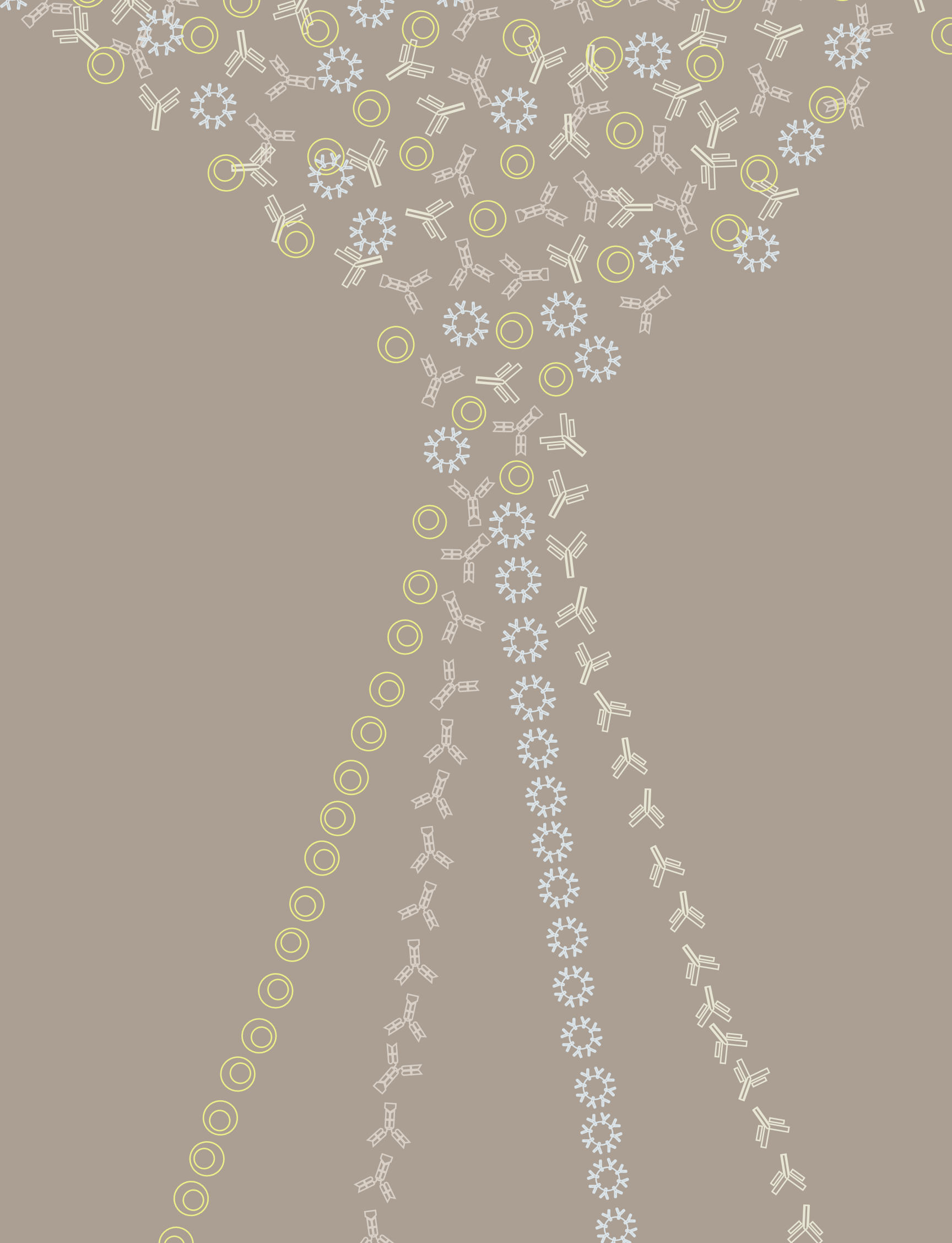
Held at BD training centers worldwide, BD Biosciences flow cytometry training courses combine theory and hands-on practice to provide participants with the skills and experience they need to take full advantage of the capabilities of their instruments.

Technical Applications Support

BD Biosciences technical applications support specialists are available to provide field- or phone-based assistance and advice. Expert in a diverse array of topics, BD technical application specialists are well equipped to address customer needs in both instrument and application support.

Field Service Engineers

BD Biosciences field service engineers are located across the world. When instrument installation or service is required, a BD Biosciences Technical Field Service Engineer can be dispatched to the customer site. On-site service and maintenance agreements are available to provide long-term support.



BD flow cytometers are Class I (1) laser products.

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