BD FACSDiva™ CS&T Research Beads

Catalog number	Number of tests
655050	50
655051	150

DESCRIPTION

BD FACSDiva™ CS&T research beads (CS&T research beads) are designed for use on BD™ flow cytometers running BD FACSDiva™ software (v7.0 or later). The beads allow the software to automatically characterize, track, and report measurements of supported BD digital flow cytometers.[1-6] CS&T research beads are dyed with fluorochromes which are excited by the cytometer's lasers. The beads emit fluorescence in detectors used for the fluorochromes listed in the following table.

Fluorochromes	Excitation laser	Emission range (nm)
FITC, PE, PE-Texas Red®, PerCP, PerCP-Cy™5.5, PE-Cy™7, BD Horizon™ PE-CF594	Blue	500–800
FITC, Alexa Fluor® 488	445 Blue	455–800
APC, APC-Cy7, APC-H7, Alexa Fluor® 700, Alexa Fluor® 680	Red	650–800
BD Horizon™ V450, BD Horizon™ V500, BD Horizon™ V500-C, Pacific Blue™, AmCyan, Qdot® 545, Qdot® 655, Qdot® 565, Qdot® 585, Qdot® 605, Qdot® 700, Qdot® 800, Alexa Fluor® 405, Brilliant Violet™ 421	Violet	420–700
Indo 1, DAPI, Hoechst	355 UV	400–550
Indo 1, DAPI, Hoechst	375 UV	390–800
PE, PE-Texas Red®, PerCP, PerCP-Cy5.5, PE-Cy7, PE-CF594	532 Green	550–800
PE, PE-Cy5.5, PE-Cy7, PE-Texas Red®, PI	561 Yellow-green	570–800

MATERIALS

CS&T research beads consist of equal quantities of 3-µm bright, 3-µm mid, and 2-µm dim polystyrene beads in phosphate buffered saline (PBS) with bovine serum albumin (BSA) and 0.1% sodium azide.

Reagents and materials provided

Contents are listed per kit.

- Catalog No. 655050 contains one 3-mL vial at 50 tests per vial.
- Catalog No. 655051 contains three 3-mL vials at 50 tests per vial for 150 tests per kit.

Materials required but not provided

- Disposable 12 x 75-mm BD Falcon™ capped polystyrene tubes (Catalog No. 352058) or others listed in your system's user's guide
- Multiwell plates
- BD FACSFlow™ solution, BD FACSFlow solution with surfactant, or PBS

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HANDLING AND STORAGE

Store vials at 2°C to 8°C and protect from light. Do not freeze. The beads are stable until the date shown on the vial label when stored as directed. Do not use after the expiration date. After dilution, the beads are stable for 24 hours at 2°C to 8°C or 8 hours at 15°C to 25°C when protected from light.

Chemical hazards

See the kit safety data sheet (SDS) for a complete list of chemical hazards.

WARNING Reagents contain sodium azide. Sodium azide is harmful if swallowed (R22). Do not breathe gas, fumes, vapor, or spray (S23). Wear suitable protective clothing (S36). This material and its container must be disposed of as hazardous waste (S60).[7]

SUPPORTED CYTOMETERS

BD FACSDiva CS&T research beads are supported on the BD FACSCanto™ (for research applications only), BD FACSAria™, and BD™ LSR digital flow cytometer platforms. The cytometer workstation must be equipped with BD FACSDiva software v7.0 or later. See your cytometer user's guide and the *BD Cytometer Setup and Tracking Application Guide* for more information.

PROCEDURE

Entering setup values for new lots

Before using a new lot of CS&T research beads, download the appropriate bead lot file. The information in the file is used by BD FACSDiva software.

To download the bead lot file:

1. Visit the BD FACSDiva webpage (bdbiosciences.com/facsdiva) and click the BD FACSDiva CS&T research beads link.
2. Download and import the appropriate bead lot file by following the instructions on the website.

   NOTE Ensure that the bead lot file you download is for CS&T research beads and not the BD™ Cytometer Setup and Tracking beads (for BD FACSDiva software v6.2 or earlier) and corresponds to your current lot of CS&T research beads. The lot number is found on the vial; it is not the same as the kit lot number.

Preparing CS&T research beads in tubes

To properly perform quality control and set up the cytometer, do not dilute CS&T research beads more than recommended.

To prepare the CS&T research beads for acquisition:

1. Label a 12 x 75-mm capped polystyrene tube according to Table 1 and the task you are performing.

   Table 1 CS&T research beads preparation in tubes

To...	Add...		To the tube labeled...
	Diluent (µL)	Beads (number of drops)	
Define the baseline	500	3	Setup beads
Run daily measurements	350	1	Setup beads
Reset the target values	500	3 (from current lot)	Current lot
	500	3 (from new lot)	New lot

2. Thoroughly mix the CS&T research beads vial.
3. Prepare the diluted beads according to Table 1 and the task you are performing.

   See the *BD Cytometer Setup and Tracking Application Guide* for instructions on how and when to run each task.

WARNING Protect the diluted beads from light. Some of the dyes used to manufacture the beads are very light sensitive. Fluorescence intensity levels can change if the beads are exposed to light.

4. If you will not be using the diluted beads right away, store the diluted beads at 2°C to 8°C in the dark. After dilution, the beads are stable for 24 hours at 2°C to 8°C or 8 hours at 15°C to 25°C when protected from light.
5. Vortex the tube immediately before use.

For acquisition and troubleshooting information, see your system's user's guide.

Preparing CS&T research beads in plates

To prepare CS&T research beads in plates:

1. Mix the CS&T research beads vial by gentle inversion or very gentle vortexing.
2. Prepare the diluted beads according to Table 2 and the task you are performing.

   See the *BD Cytometer Setup and Tracking Application Guide* for instructions on how and when to run each task.

Table 2 CS&T research beads preparation in plates

To...	Add...		To the wells labeled...
	Diluent (µL)	Beads (number of drops)	
Define the baseline	150	1	A1 to A4
Run daily measurements	150	1	A1
Reset the target values	150	1 (from current lot)	A1
	150	1 (from new lot)	A2

3. If you will not be using the diluted beads right away, store the diluted beads at 2°C to 8°C in the dark. After dilution, the beads are stable for 24 hours at 2°C to 8°C or 8 hours at 15°C to 25°C when protected from light.

CS&T RESEARCH BEAD DATA

For detailed instructions on establishing baseline values and running daily measurements using BD FACSDiva software v7.0 or later, see the *BD Cytometer Setup and Tracking Application Guide*.

The following figures show CS&T research bead data analyzed on a BD flow cytometer with laser excitation at 488 nm using BD FACSDiva software.

Figure 1 Dot plot showing CS&T research beads

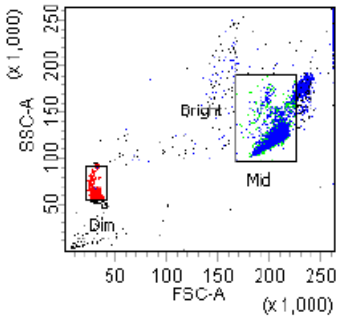
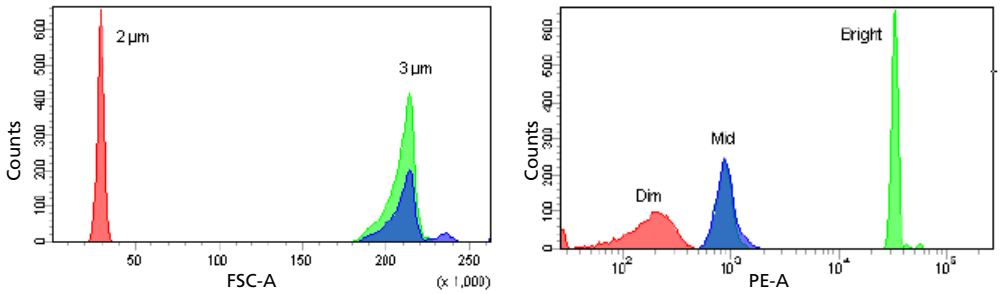


Figure 2 CS&T research bead histograms showing bead size and separation



LIMITATIONS

- Because some of the dyes used to manufacture the beads are very light sensitive, protect the beads from light. Fluorescence levels can change if beads are exposed to direct light more than 20 minutes.
- Bead performance might vary depending on laser and filter combinations.
- For consistent results, we recommend always using the same diluent and sample delivery device to run the beads.

TROUBLESHOOTING

See the *BD Cytometer Setup and Tracking Application Guide* for troubleshooting information.

WARNING

All biological specimens and materials coming in contact with them are considered biohazards. Handle as if capable of transmitting infection[8,9] and dispose of with proper precautions in accordance with federal, state, and local regulations. Never pipette by mouth. Wear suitable protective clothing, eyewear, and gloves.

WARRANTY

Unless otherwise indicated in any applicable BD general conditions of sale for non-US customers, the following warranty applies to the purchase of these products.

THE PRODUCTS SOLD HEREUNDER ARE WARRANTED ONLY TO CONFORM TO THE QUANTITY AND CONTENTS STATED ON THE LABEL OR IN THE PRODUCT LABELING AT THE TIME OF DELIVERY TO THE CUSTOMER. BD DISCLAIMS HEREBY ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR ANY PARTICULAR PURPOSE AND NONINFRINGEMENT. BD'S SOLE LIABILITY IS LIMITED TO EITHER REPLACEMENT OF THE PRODUCTS OR REFUND OF THE PURCHASE PRICE. BD IS NOT LIABLE FOR PROPERTY DAMAGE OR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING PERSONAL INJURY, OR ECONOMIC LOSS, CAUSED BY THE PRODUCT.

REFERENCES

1. Establishing optimum baseline PMT gains to maximize resolution on BD Biosciences digital flow cytometers. BD application note: 23-8359-00. 2005.
2. Steen HB. Noise, sensitivity, and resolution of flow cytometers. *Cytometry.* 1992;13:822-830.
3. Hoffman RA. Standardization, calibration, and control in flow cytometry. Revised. In: Robinson JP et al, eds. *Current Protocols in Cytometry.* New York, NY: John Wiley and Sons, Inc; 2005. Unit 1.3.
4. Wood JCS, Hoffman RA. Evaluating fluorescence sensitivity on flow cytometers: an overview. *Cytometry.* 1998;33:256-259.
5. Chase ES, Hoffman RA. Resolution of dimly fluorescent particles: a practical measure of fluorescence sensitivity. *Cytometry.* 1998;33:267-279.
6. Hoffman RA. Standardization and quantitation in flow cytometry. In: Darzynkiewicz Z, Crissman HA, Robinson JP, eds. *Methods Cell Biol.* 2001; 63:300-340.
7. Globally harmonized system of classification and labelling of chemicals (GHS). [United Nations Economic Commission for Europe web site.] 2009. Available at http://www.phmsa.dot.gov/hazmat/regs/international. Accessed September 13, 2010.
8. *Protection of Laboratory Workers from Occupationally Acquired Infections–Third Edition; Approved Guideline.* Wayne, PA: Clinical and Laboratory Standards Institute; 2005. M29-A3.

9. Centers for Disease Control. Update: universal precautions for prevention of transmission of human immunodeficiency virus, hepatitis B virus, and other bloodborne pathogens in health-care settings. *MMWR*. 1988;37:377-388.

PATENTS AND TRADEMARKS

APC-Cy7: US Patent Number 5,714,386

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