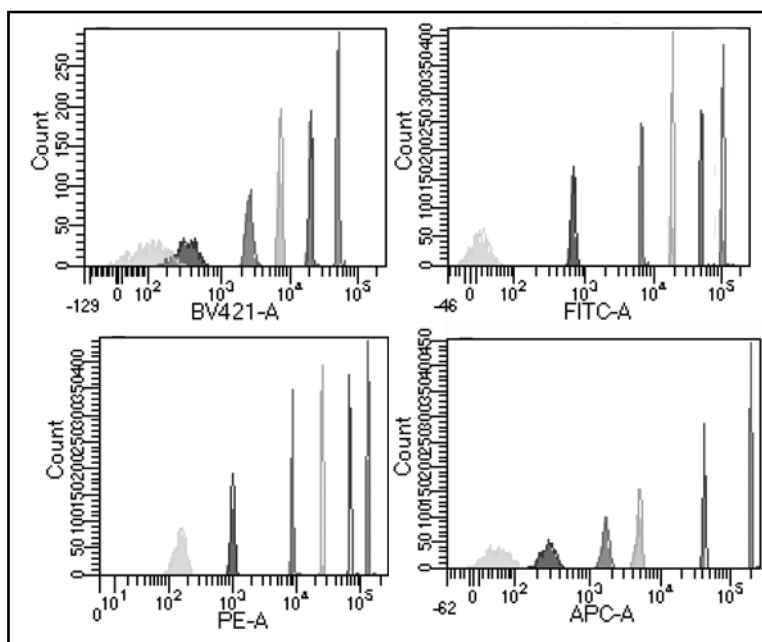


**SPHERO™ Ultra Rainbow Quantitative Particle Kit**

- Contains 6 intensities of Ultra Rainbow Fluorescent Beads with NIST assigned ERF (Equivalent Number of Reference Fluorophores) values based on a published procedure using NIST SRM 1934 and a calibrated laser-based CCD fluorimeter
- Provides microsphere reference standards for fluorescein isothiocyanate (FITC), phycoerythrin (PE), allophycocyanin (APC) and Pacific Blue (PB) fluorescent channels using four different NIST reference fluorophores; fluorescein, Nile Red, APC and Coumarin 30.
- Used during flow cytometry standardization and calibration measurements for the further advancement of biological and clinical applications.



Histogram of URQP-38-6K  
from a BD Bioscience LSRFortessa™ X-20

## Selected Reference:

- Wang, L. and Gaigalas, A., (2011). "Development of Multicolor Flow Cytometry Calibration Standard: Assignment of Equivalent Reference Fluorophores (ERF) Unit." *J. Res. Natl. Inst. Stand. Technol.* 116, 671-683
- Wang, L., Gaigalas, A., and DeRose, P., (2016). "Assignment of the Number of Equivalent Reference Fluorophores to Dyed Microspheres." *J. Res. Natl. Inst. Stand. Technol.*, 121, 264-281
- Wang, L., Degheidy, H., Abbasi, F., Mostowski, H., Marti, G., Bauer, S., Hoffman, R.A., and Gaigalas, A.K. 2016. Quantitative flow cytometry measurements in antibodies bound per cell based on a CD4 reference. *Curr. Protoc. Cytom.* 75:1.29.1-1.29.14. doi: 10.1002/10471142956.cy0129s75
- Wang, L., Stebbings, R., Gaigalas, A., et al, (2015). "Quantification of Cells with Specific Phenotypes II: Determination of CD4 Expression Level on Reconstituted Lyophilized Human PBMC Labelled with Anti-CD4 FITC Antibody." *Cytometry Part A* 87A, 254-261
- Wang, L., Gaigalas, A.K., Marti, G.E., Abbasi, F. and Hoffman, R.A. (2008) Toward Quantitative Fluorescence Measurements with Multicolor Flow Cytometry. *Cytometry Part A*, 73A, 279-288. <http://dx.doi.org/10.1002/cyto.a.20507>

Particle Type and Surface	Size, $\mu\text{m}$	Catalog No.	Unit
Ultra Rainbow Quantitative Particle Kit, 6 Intensities, 2E6/mL, (NIST Traceable ERF Flow Cytometry Standard)	3.5-3.9	URQP-38-6K	6x1mL

Designed to determine the accuracy, precision & sensitivity in the Pacific Blue, FITC, PE, & APC channels

**Accuracy**

- Provides a bead set to accurately measure comparable data from different types of instruments at different locations
- Determines the linearity of the digital output from the analog-to-digital converter

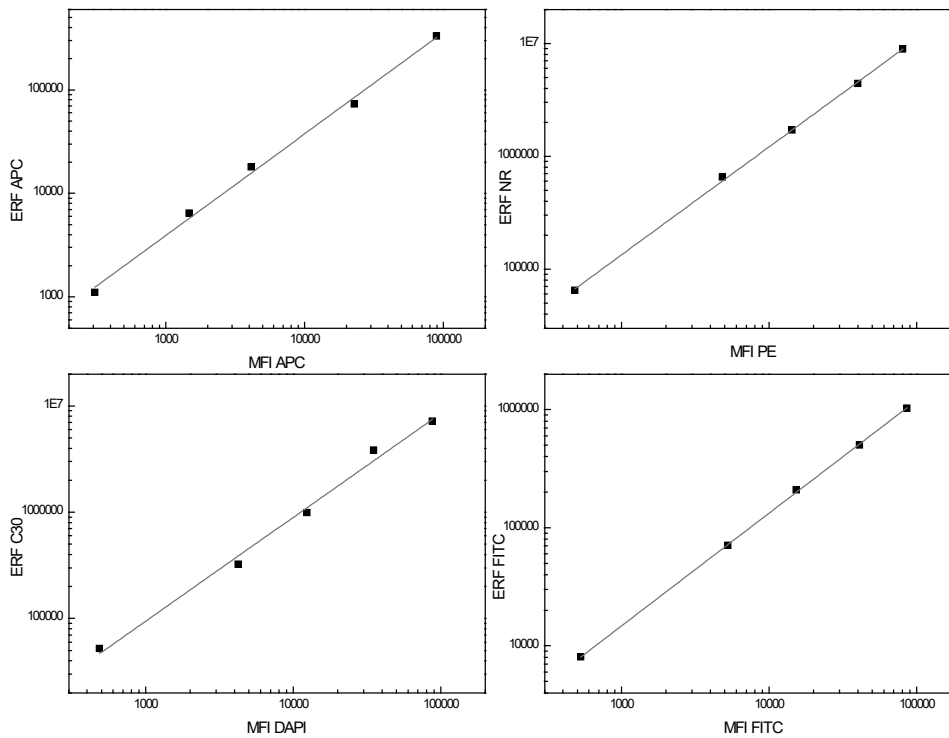
**Precision**

- Detects laser fluctuations, failed electronics, or obstructions in the flow cell

**Sensitivity**

- Determines background noise level and instrument efficiency
- Checks instrument's ability to distinguish dim peaks from blank beads
- Detects dye or light contamination

**URQP-38-6K MFI vs. ERF Value Assigned**



MFI FITC	ERF FITC	MFI PE	ERF NR	MFI APC	ERF APC	MFI DAPI	ERF C30
528	8020	483	64900	310	1110	487	52400
5268	71000	4842	653000	1475	6480	4250	323000
15255	209000	14354	1.71E6	4146	18000	12385	995000
41182	499000	40108	4.41E6	22942	73300	35058	3.83E6
86038	1.03E6	80739	8.93E6	89421	331000	88138	7.17E6

Flow Cytometry Particles -  
Linearity and Sensitivity