

# Flow Cytometry

## Instrument Quality Assurance / Quality Control Program

For confidence in test or assay results, a facility must employ a comprehensive QA program with a focus on routine instrument maintenance and QC, incorporating appropriate standards. The type of instrument and specific applications will determine the necessary standards and schedule of use.

Category	Purpose	Frequency	Products
Daily QC	General check of instrument stability/status	Daily	Quantum™ QC (multi-intensity, multicolor) Full Spectrum™ (multi) Fluorescence Reference Standards (single)
Daily QC	General check of instrument optical system	Daily	Quantum™ QC Full Spectrum™ (multi) Fluorescence Reference Standards (single)
Daily QC	Optical Alignment	Daily	Right Reference Standard™
Daily QC	Fluidics check	Daily	Surface-labeled fluorescent microspheres, e.g. Fluorescence Reference Standards Quantum™ MESF
Weekly QC	Optical System Sensitivity, Resolution for Linearity (for specific lasers/PMTs)	Weekly	Quantum™ QC Quantum™ MESF
Daily Set-Up	Standardized instrument set-up	Daily, or Between runs if settings are changed	Quantum™ QC
Daily Set-Up	Standardized compensation settings for multi-color analyses	Daily, or between runs if settings are changed	FITC / PE Compensation Standard Simply Cellular® Compensation Standard Quantum™ Simply Cellular®
Application	Fluorescence quantitation in cellular expression studies or bead-based assays	Daily when quantitative analyses are performed, or between different applications if fluorescence PMT or compensation settings are changed	Quantum™ MESF Quantum™ Simply Cellular®
Application	F:P Ratio determination for quantitative fluorescence analyses	As needed, i.e. with each new Lot of fluorochrome-conjugated antibody	Simply Cellular® (used in conjunction with Quantum™ MESF)
Application	Compensation for multi-color flow cytometry	Daily, or between different applications if fluorescence PMT or compensation settings are changed	FITC / PE Compensation Standard Simply Cellular® Compensation Standard Quantum™ Simply Cellular® Viability Dye Compensation Standard
Application	Cell Counting	As needed	Flow Cytometry Absolute Count Standard™
Application	Cell Size Estimation	As needed	Size Calibration Standards Kit Small Bead Calibration Kits
Application	Suspension Array	Platform for development of bead-based flow cytometric assays	QuantumPlex™ QuantumPlex™M

### Daily

The general status and stability of the cytometer must be checked daily. By plotting values over time, random and systematic errors may be identified and corrected. Manually aligned instruments must be aligned daily. If the data from multiple instruments and/or sites are to be compared, all instruments must be standardized daily, using the same standard beads. If multi-color analysis and/or quantitation is being performed, then the appropriate standards must be run on that same day.

### Weekly

If only qualitative analyses are being run, weekly checks of detection threshold, resolution, and linearity are sufficient to establish sensitivity. Some cytometers are fixed alignment instruments. For these, alignment may be verified weekly rather than established daily.

In addition to a regular QA/QC program, specific analyses may require other controls, such as count standards, size standards, or reference standards. Experiments and analyses must be critically evaluated for inclusion of the appropriate controls prior to instrumental analysis.



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