



## Micro Flow Cytometer Technical Specifications

The Micro Flow Cytometer offers exceptional sensitivity for small particle applications (e.g. microbiology), while still maintaining good performance for conventional applications such as mammalian cells and other particles up to approximately 100um diameter.



Sensitivity:	Light scatter sensitivity: 110nm polystyrene beads / 180nm silica beads. Fluorescence sensitivity down to approximately 50 MESF FITC and 25 MESF PE. For any flow cytometer, the minimum measureable number of fluorescent molecules is heavily dependent on the sample (e.g. unbound dye), choice of laser, choice of photomultiplier detector, optical filter choice and instrument settings.
Resolution:	10nm (polystyrene beads – see data below) by light scatter
Configurations:	Up to 9 fluorescence color detectors Up to 3 light scatter detectors Up to 4 lasers Optional Autosampler (96 well plate format) Volumetric sample system gives absolute counts for every region of interest
Speed:	>100k events/sec Up to 45 samples per hour
Typical Applications:	Microbiology Extracellular vesicles (also consider Micro-PLUS model) Nanoparticles (also consider Micro-PLUS model) Plus conventional analytical applications...not limited to small particles
Size:	W32 x H50 x D48cm (W50 x H50 x D48cm with AutoSampler)
Weight:	Approx. 20 to 35kg depending on configuration
Power consumption:	Less than 250 Watts Requires two standard wall sockets rated for at least 5 Amperes
Operating conditions:	10 to 30 degrees Centigrade operating environment No external cooling requirements.
Sample Fluidics:	Volumetric sample injection Adjustable sample aspiration volume, 50-400µl (+ option for up to 900µl) Software selectable sample flow rate from 0.7 to 150µl/min Sample concentrations up to 10 <sup>9</sup> per ml



Sheath Fluidics: Closed loop ultra-pure sheath fluid system or refillable sheath fluid tank

Waste Fluidics: No special requirements.  
Bleach may be used in waste tank if desired  
Performance insensitive to waste tank height

#### Electronics & Data Management

Fast electronics with PCIe interface able to measure more than 100,000 events/sec  
Threshold software selectable on all channels with 'AND' or 'OR' logic  
Pulse height & area measurements on all channels  
Trigger width measurement  
Event time stamp for each particle  
22 bit data from a 26 bit data acquisition path  
Internal PC with Windows 10 64 bit O/S  
Optional external desktop or laptop PC (LAN connection)

#### Optics:

High numerical aperture immersion lens  
Up to 4 lasers: 375nm, 405nm, 488nm, 532nm, 552nm, 635nm (contact Apogee for more options). Up to three of the lasers may have spatially separate foci.  
High sensitivity photomultiplier detectors (choice of sensitivities available)  
Fluorescence filter blocks may be changed without realignment  
Custom optical filter blocks  
Fluorescence optics capable of detecting from 400 to 800nm  
Large (side) and small (forward) light scatter photomultiplier detectors  
  
Optional medium angle light scatter detector  
Optional deep red detector (#3491) to extend the fluorescence range up to 900nm  
Optional extra-high sensitivity photomultipliers for the highest possible fluorescence sensitivity

#### Software:

Apogee Histogram software with Work List sample management  
FCS 3 file format  
Histogram resolution software selectable from 32 to 65535 with zoom feature  
Display modes: linear and/or logarithmic for each parameter  
Unlimited number of histograms and cytograms  
Amorphous regions of interest (gates)  
Gating using AND, OR and NOT logic  
RATIO parameter configurable for any 2 detectors  
Autocycle module  
Gain and subtraction settings adjustable during and after acquisition  
Batch export of statistics and images from multiple files to Microsoft Excel  
Export of histogram data in '.csv' format  
Quick copy to clipboard feature for datagrams  
Overlaying histograms for easy data comparison  
Work List window for sample queuing and sample to sample data comparison  
Automatic fluidic shutdown option  
Automatic power off option



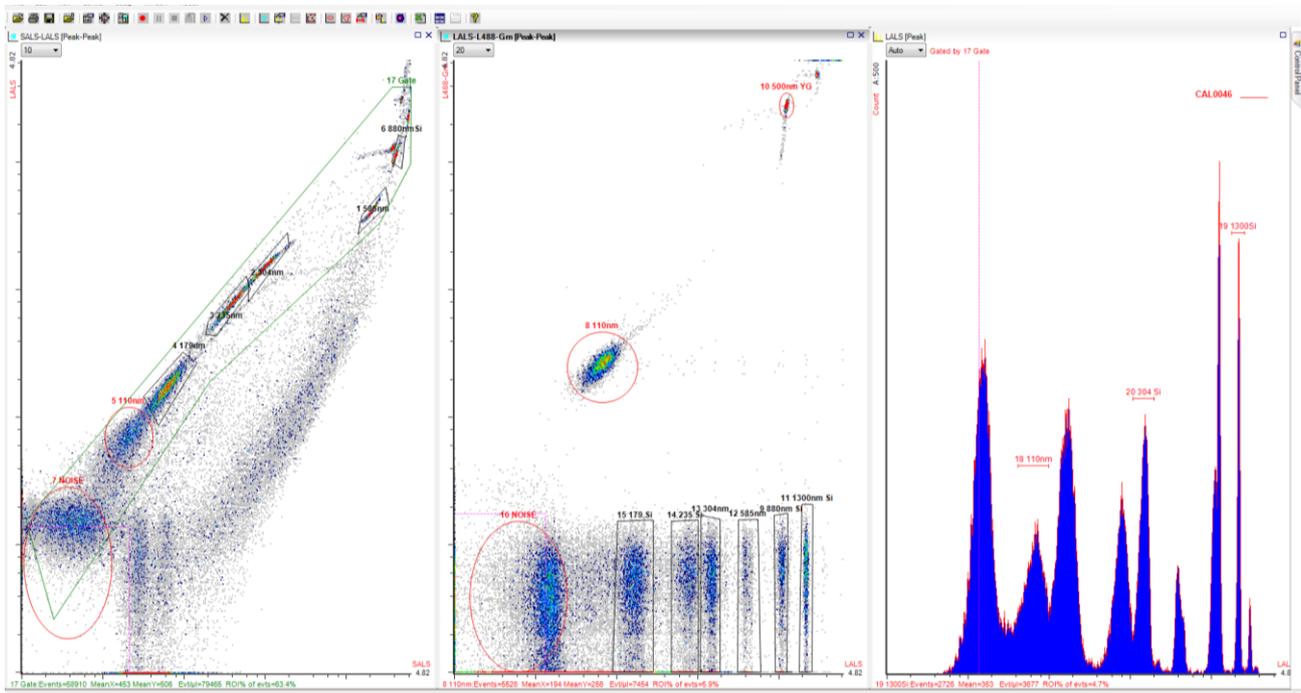
### Micro Performance: ApogeeMix Beads (Cat#1493)

The *ApogeeMix* (Cat#1493) contains 25ml of an aqueous mixture of spheres with diameters 180nm, 240nm, 300nm, 590nm, 880nm and 1300nm diameter with refractive index  $n=1.43$ , and 110nm and 500nm green fluorescent (blue laser) beads with refractive index  $n=1.59$  (polystyrene). The product is intended to be used to assess a flow cytometer's light scatter and fluorescence performance (both sensitivity and resolution).

Shown below are typical data from the *ApogeeMix* analyzed on an A50-Micro flow cytometer (FL1=Green fluorescence). The right hand histogram is gated to exclude the fluorescent latex beads so that the non-fluorescent beads can be seen more clearly.

The fluorescent latex beads may be used to assess the fluorescence sensitivity and to assess the performance of the flow cytometer's optics at a different refractive index.

Particle Size (nm)	Fluorescence from 488nm excitation
110	Green
180	None
240	None
300	None
500	Green
590	None
880	None
1300	None



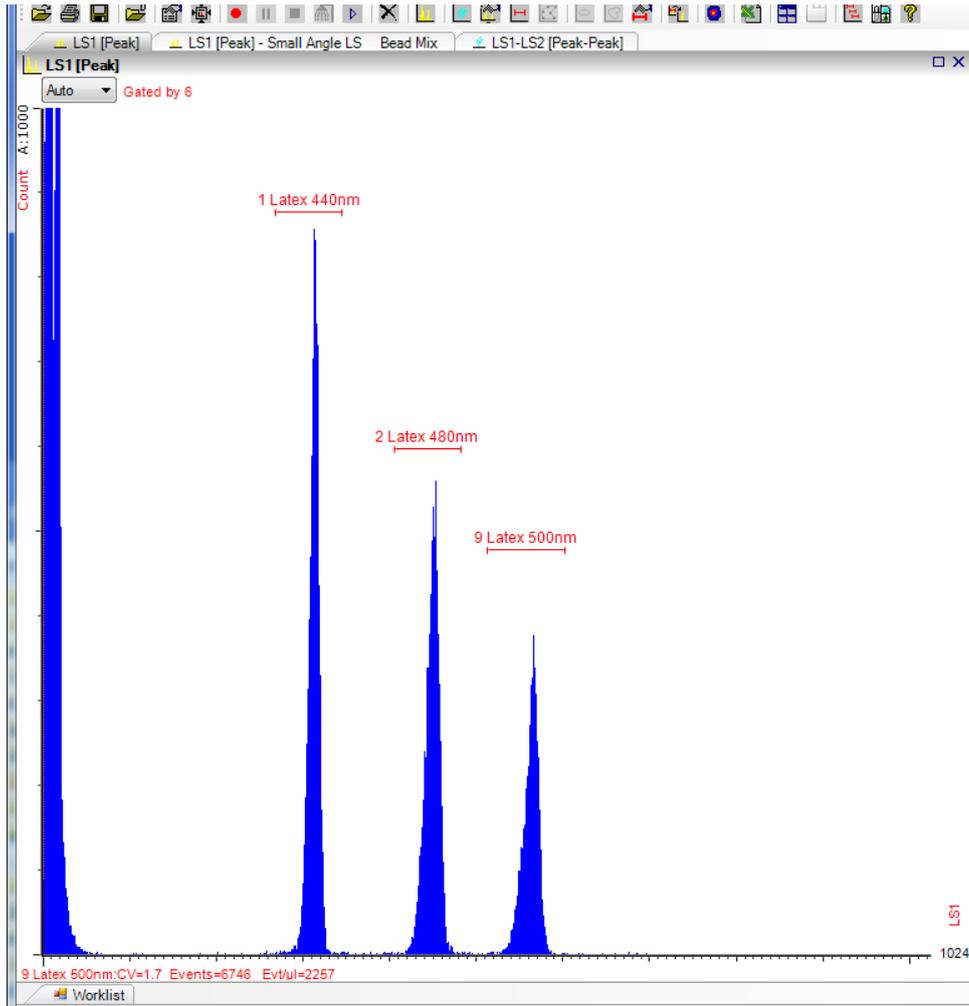
The resolution of the peaks indicates the flow cytometer's performance. Eight populations should be resolved from each other and resolved from instrument noise:

- 6 populations with refractive index 1.43 and
- 2 green fluorescent (488nm laser) populations (110nm and 500nm) with refractive index 1.59 (middle graph).



### Light Scatter Resolution

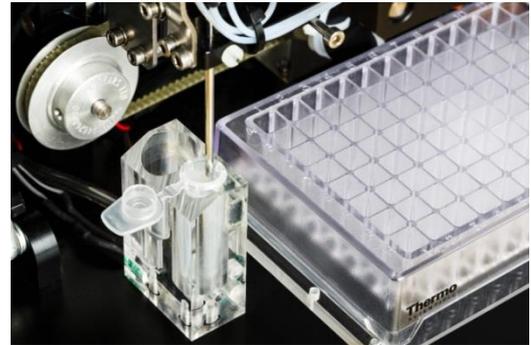
The Micro model is capable of exceptional resolution of particles of bacterial size and smaller. The histogram below shows resolution of 440nm, 480nm and 500nm polystyrene beads by light scatter which demonstrates the ability to resolve particle size differences much less than 20nm.





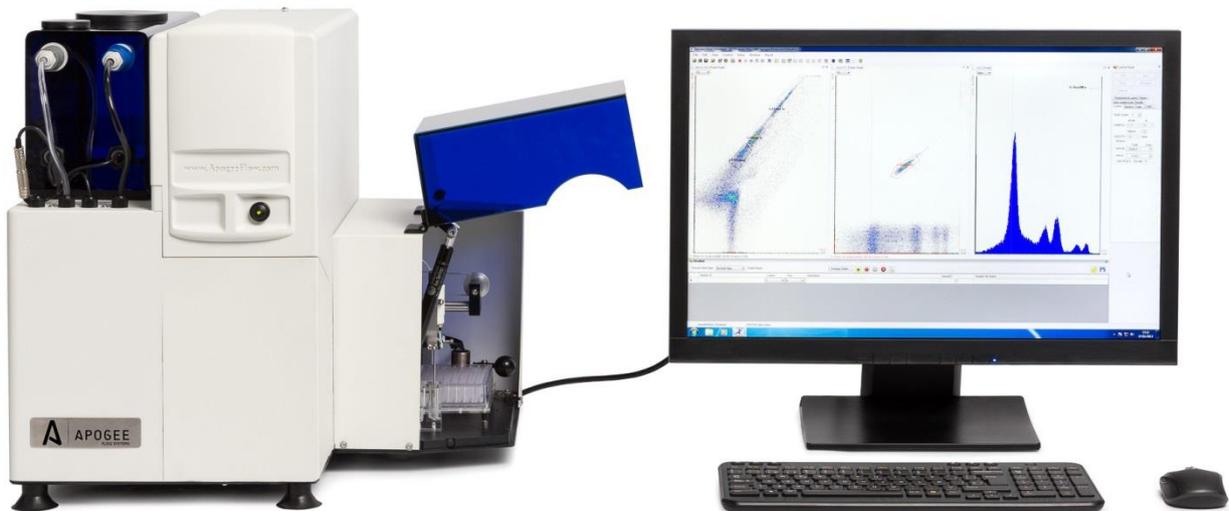
### Optional AutoSampler (Cat# 2259)

Apogee's flow cytometers can be fitted with an automatic sampling robot to sample from 96 well format plates or racks of tubes. It is compatible with deep well or standard (300ul) plates. Autosampler operation is managed via the Histogram Software's Work List. A separate holder for individual microcentrifuge tubes allows the operator to run individual samples as well as plates/racks.



#### Features:

- 'Suck & spit' capability to re-suspend samples before aspiration from the well/tube
- 'Plate shake' agitator to re-suspend samples before aspiration from the well/tube
- Email notification when the Work List is finished or to notify the operator of a fault condition (e.g. empty sheath fluid tank).
- Automatic fluidic shut-down and power off option when the Work List finishes
- Up to 50 samples per hour (2 hours per 96 well plate)



- The Histogram Software offers a 'Work List' to manage the samples. In addition to the sample location, sample identifier and description, statistics columns may be added so that a table of results can be easily compiled. Results are saved in csv format.

