

Video Article

Orflo Moxi - ADVERTISEMENT

URL: <http://www.jove.com/video/5015>

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Abstract

Video Link

The video component of this article can be found at <http://www.jove.com/video/5015/>

Protocol

Visit: www.orflo.com for more information.

Application Notes:

Blood Cell Analysis

Moxi Population Index (MPI)

Moxi Z Comparison

Moxi Z Performance

Overview:

Improve downstream results with better quality control.

Moxi Z is the only automated cell counter that combines the Coulter Principle typically used in high-end cell counters with a patented thin-film sensor technology to allow for highly accurate (> 95%) and repeatable particle counting and sizing for a broad range of cell types - from mammalian cells to cells as small as wine yeast and more. Since today's workflows demand accurate quality control of samples, determining cell counts precisely has a significant impact on outcomes and downstream costs.

Produce repeatable cell counts with >95% accuracy in just 8 seconds.

This ultra-small instrument uses patented microfluidic thin-film cassettes that enable automatic load and measure operation. The resulting single cell volumetric measurements are completely technique-independent. It provides the ideal alternative to the tedious manual counting associated with cytometers, or the inaccurate results associated with image-based automated cell counters (typical accuracies of 75-80%).

Assess cell culture health without reagents or dyes.

Moxi Z also automatically reports a unique cell health assessment index - MPI (Moxi Population Index) - without the need for reagents or dyes. MPI is a ratio of the cell population of interest relative to the entire particle distribution in that sample, factoring in dead cells that have shrunk or broken apart as well as other debris and contaminants in the sample. For monodisperse mammalian cultures this is closely correlated to the overall health of the sample. In the case of mixed cell populations, it provides an assessment of the relative fraction of the largest sized population in the sample. Unlike staining-based viability methods that focus on the uptake by dead cells and do not account for contaminants and other debris, MPI provides insight on the primary population of interest (based on size) and its relationship to ALL other particles in the sample.

Measure the smallest cells at very high concentrations.

Using the new Type S cassette, you can now accurately measure the smallest cells of any automated cell counter (down to 3µm average diameter) at concentrations of up to 2.5e+6/ml. This means the new Type S cassette can measure Yeast (including wine yeast) and non-spherical particles down to 14 fL in volume.

Incredible performance in a small package.

- More accurate and repeatable than any other automated cell counter
- Results in just 8 seconds
- Ultra-small and ultra-easy to use (no manual counting, no focusing of any kind)
- Complete, high-resolution cell size/count histogram
- Handles "de-aggregation" and coincidence events
- Post-processing/analysis of count distributions with user-adjustable regions/gates
- Assess cell health (MPI) without the need for reagents like Trypan blue
- Complete data analysis and data portability (connectivity to PC, and MoxiChart software package)
- No maintenance required

Specs:

Resolution: 1200 histogram bins

Weight: 1lb 7 oz

Dimensions: 7.5" L x 4.25" W x 2.75" H

Battery: Lithium Ion 4500 mAh

Data storage: 500 samples

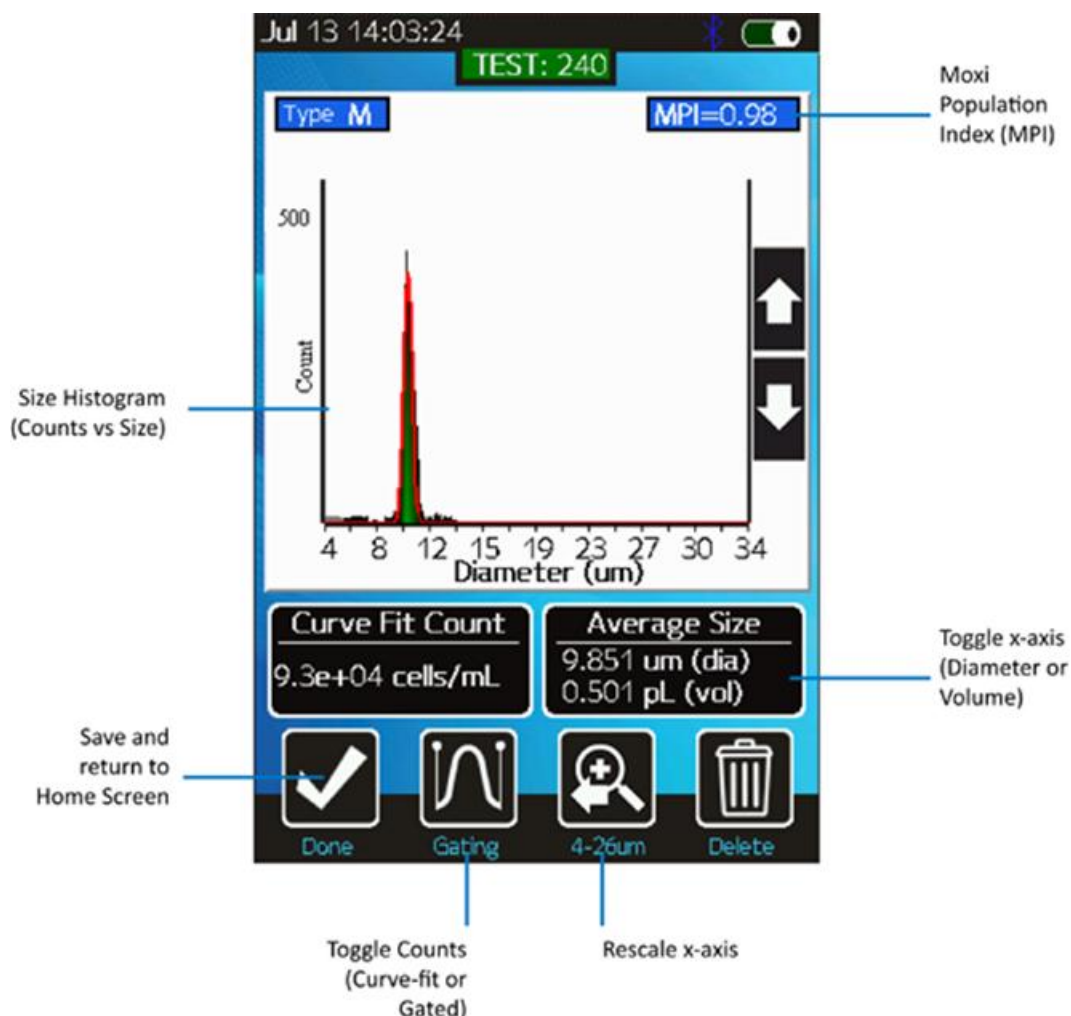
AC Power: 100-240V, 50/60 Hz, 0.2 Amps

Connectivity: Mac/PC (Bluetooth and USB on-the-go)

Data analysis: MoxiChart software package for Mac/PC

	Type M	Type S
Dynamic range (microns):	2 - 34	2 - 26
Cell volume (fL):	34 - 8180 (4 - 25 μm)	14 - 4200 (3-20 μm)
Culture Health Assessment for mammalian cultures:	MPI Health Ratio	MPI Health Ratio
Measurement time:	8 seconds	15 seconds
Concentration:	3,000 - 500,000 cells/ml	3,000 - 2,500,000 cells/ml
Resolution:	1200 histogram bins	1200 histogram bins
Cell Types:		
<i>Mamallian</i>	Yes	Yes
<i>Yeast</i>	Large only (i.e. <i>S. cerevisiae</i>)	Most
<i>Algae</i>	Large only	Some
<i>Protazoa</i>	Large only	Some

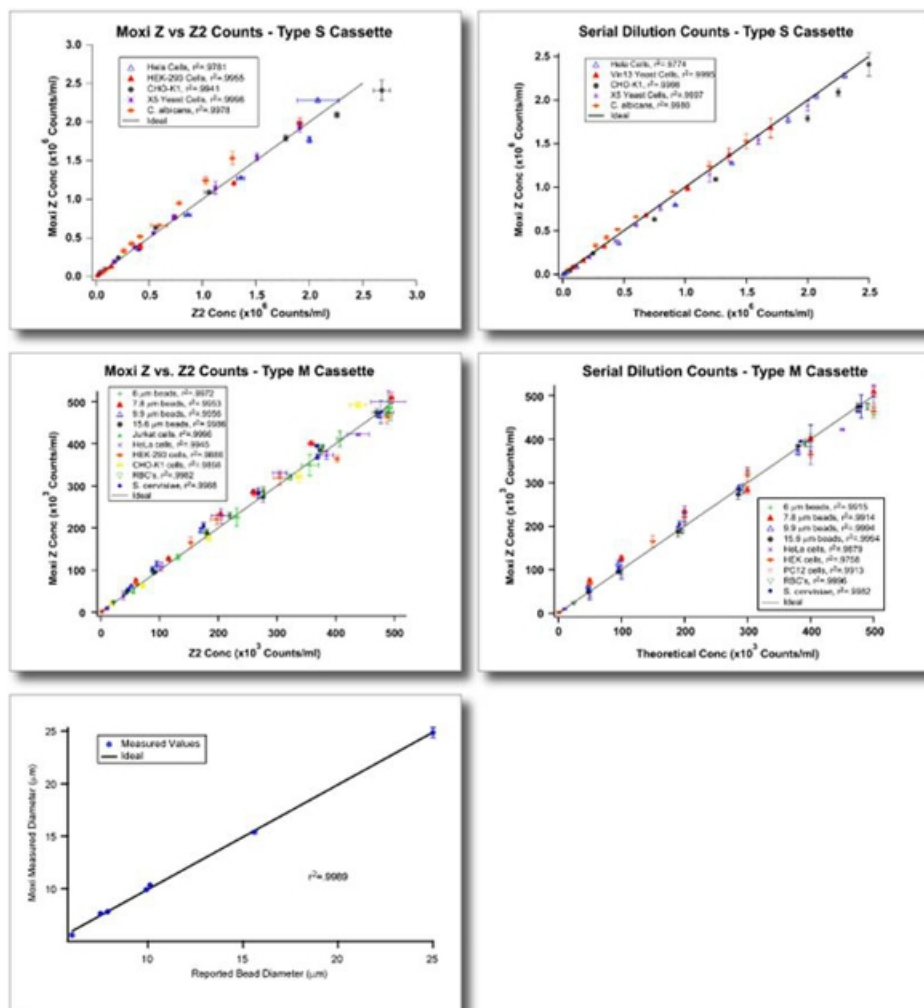
[Click here to view larger figure.](#)



Performance:

Count Precision and Accuracy Across a Broad Dynamic Range.

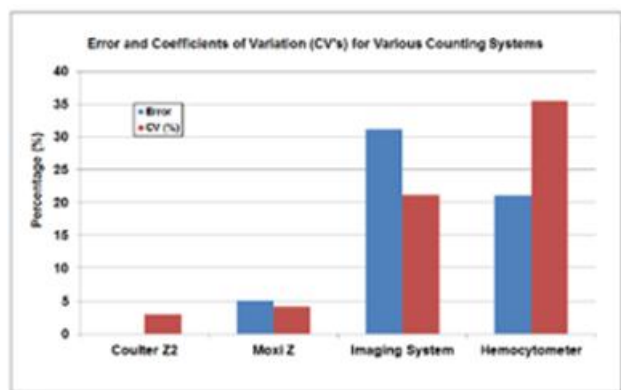
With its broad dynamic cell size range and patented technology, Moxi Z provides highly accurate cell counts for mammalian cells, yeast, algae, and other particles, without the risk of "missing" counts. In a comparison with a gold-standard counting method, as shown here, Moxi Z is shown to have equivalent results to the gold standard. As the data demonstrates, Moxi Z achieves this performance over a broad range of concentrations and particle types. Furthermore, because the Moxi Z makes a volumetric or 3-D measurement of cell size, it provides particle sizing information that is far more precise and accurate than that provided by the 2-D image-based systems.



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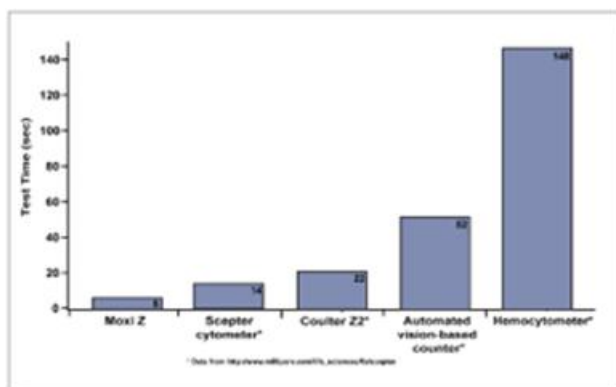
Count Accuracy - Low Errors and Coefficients of Variation.

Over the past 50 years, the Coulter technique of electronic cell counting has universally regarded as the gold-standard in cell counting technology due to its high level of precision. Moxi Z uses the same underlying technique to achieve, as this data shows, the same degree of accuracy (<5% error vs the high-end Coulter System). It accomplishes this with a precision that also matches the significantly more expensive Coulter systems (Moxi Z CV: 4% vs Z2 CV: 3%). As is shown in this chart, this low error and variability is far superior to that of imaging-based techniques.



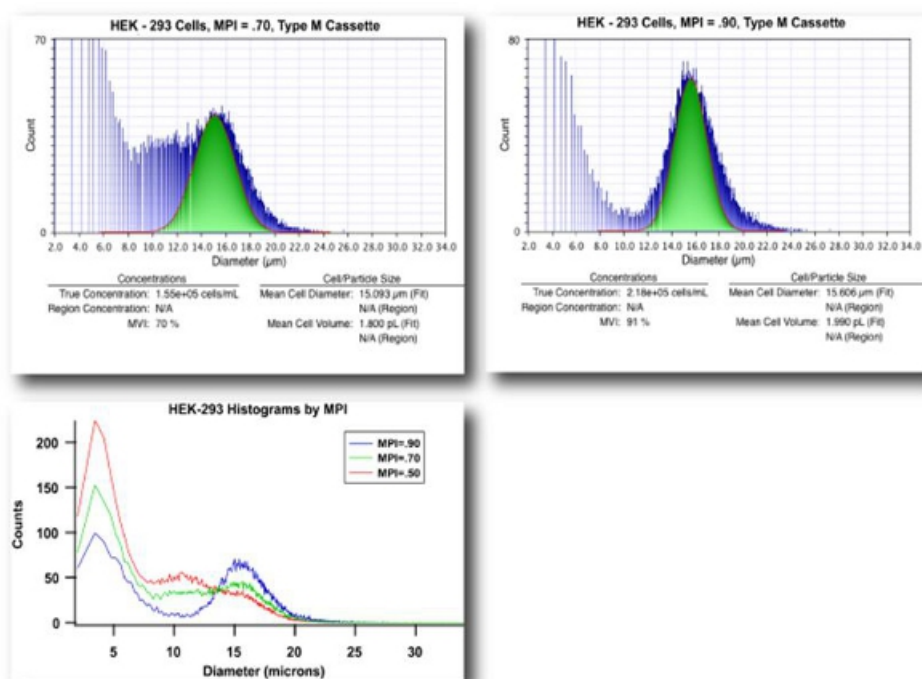
Count Speed.

With an average test time of a mere eight seconds, the Moxi Z yields the fastest cell counts of any available technique.



Reagent-Free Culture Health Assessment (MPI)

The Moxi Z leverages the curve fitting approach with a proprietary software algorithm to generate the MPI culture health assessment value. The MPI is generated by analyzing the culture/particle size distribution to identify the relative contributions of particle debris (created as cells break apart and through possible microbial contributions), shrunken necrotic cells, and the curve-fit monodisperse cell population of interest. Images shown here illustrate these changes in the culture size distribution as a function of the MPI. The MPI value thereby reflects ratiometric measure of the monodisperse population counts with respect to the overall particle population profile. Consequently, the MPI provides a valuable alternative view into the health of a cell culture than traditional staining approaches, particularly with respect to the debris and microbial contaminants. In this regard, the MPI provides a rapid, general assessment of cell culture health with every count measurement without the need for reagents.



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