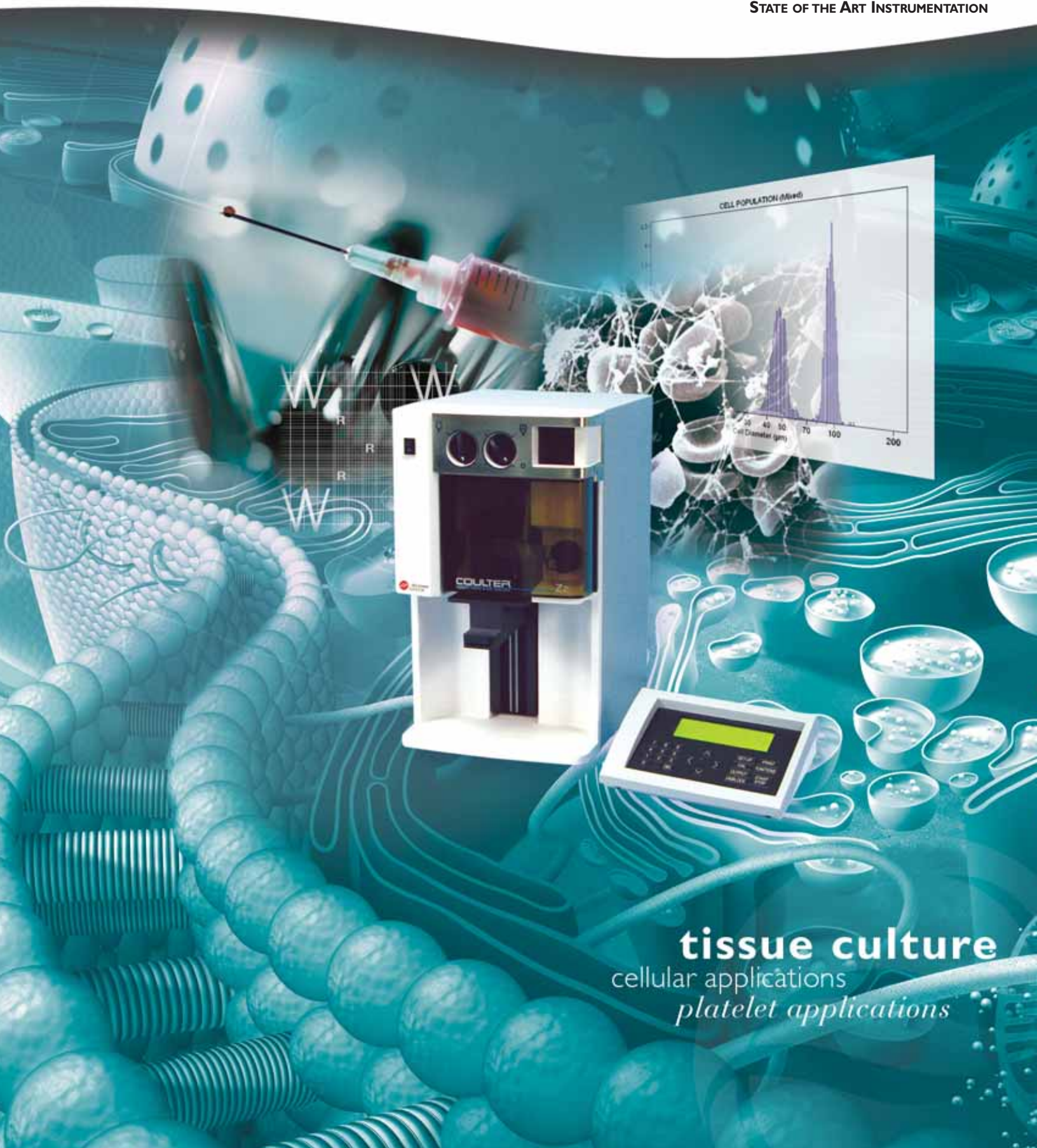




Cell *counting* and *sizing*.

**Z SERIES COULTER COUNTER<sup>®</sup>**  
STATE OF THE ART INSTRUMENTATION



**tissue culture**  
cellular applications  
*platelet applications*

# Introducing

**Z Series**  
**COULTER COUNTER®**

The Z Series consists of three models of analyzers; the Z1 Single Threshold, the Z1 Dual Threshold, and the Z2. Each model allows for variable, user selectable cell size settings and operates in the size range of 1-120 micron diameter. Thus, the instruments have the capability of analyzing practically all cell types and species variations.

The wide choice of Z Series models offer a solution to almost every cell counting and sizing application. Whether your analysis involves only a single cell type or a diverse cell population, the Z series analyzers are the instruments of choice for your cellular applications.

## **The History of Beckman Coulter Particle Characterization**

For over 40 years the Particle Characterization Group (PCG) of Beckman Coulter has provided answers and solutions to those involved in the testing and measurement of the physical properties of particles.

### **History of Innovation**

- Coulter Counters – 1954
- Pore Characterization Analyzers – 1975
- Photon Correlation Spectroscopy Analyzers – 1983
- Zeta Potential Analyzers – 1988
- Laser Diffraction Analyzers – 1989
- Surface Area/BET Analyzers – 1993
- Digital Pulse Processing – 1999
- Particle Image Analysis – 2000
- Cellular Imaging Solution – 2002

We are in a unique position to offer solutions for most particle analysis needs. World-class support, including being listed as an ASTM approved laboratory and with service only a company such as Beckman Coulter can provide. Purchasing an instrument from us will deliver performance, versatility and peace of mind.



The Beckman Coulter Technology Center

## The Coulter Principle

All Z Series models utilize the electrical sensing zone technology, often referred to as The Coulter Principle. This method of cell counting and sizing is based on measurable



changes in electrical resistance produced by cells suspended in an electrolyte such as phosphate buffered saline. The aperture, a small opening, between two electrodes, is the sensing zone through which suspended cells pass. Each cell displaces its own volume of electrolyte. Displaced volume is measured as a voltage pulse, the height of each pulse being proportional to the volume of the cell. The volume of cell suspension drawn through the aperture is precisely controlled, by the mercury-free metering system.

Thus, the technology provides unsurpassed accuracy, precision, speed, and versatility.

This technology is the accepted reference method for blood cell enumeration and size distribution measurements. <sup>1</sup>

- Constant current technology eliminates calibration drift due to electrolyte conductivity or temperature changes.
- The Mercury Free Metering System is environmentally friendly and inherently safe.
- Recessed sample platform allows sample vessels to be held safely in place during analyses.
- Small footprint for conservation of valuable laboratory space in today's busy laboratory.
- Automated calibration, using NIST traceable standards, for increased ease of use and instrument verification.
- Storage and automated recall of up to 5 user specified instrument settings (Profiles) for individual cell lines.
- Ability, using the Z2 model, to average up to 10 replicate assays for increased statistical confidence.
- Acquisition, via Windows based software, to the PC of both count and size distribution results. Available in the Z2 only.
- Self contained, disposable reagent paks enhance ease of instrument use and ensures convenient and safe biological waste management.



**Z Pak** is a reagent package containing instrument electrolyte solution and the waste container.

The system offers the Z user the convenience of simply discarding the empty container and connecting a new Pak. The integral waste container ensures isolation of hazardous materials.

<sup>1</sup> England, J.M., Rowan, R.M., et. al., The assignment of values to fresh blood used for calibrating automated blood cell counters. Clin. lab. Haemat., 1988, 10, 203-212.

# Solutions to meet your needs.

The following table shows the suggested model for your cellular application.

## Z1 Single Threshold

- Body Fluids
- Lamellar Bodies
- Lymphocytes
- Red Blood Cells
- Sterile Carp
- Tissue Culture
- White Blood Cells
- Yeast

## Z1 Dual Threshold

- Body Fluids
- Lamellar Bodies
- Lymphocytes
- Platelets
- Red Blood Cells
- Sterile Carp
- Tissue Culture
- White Blood Cells
- Yeast

### **The Model Z1 Single Threshold**

The Model Z1 Single Threshold counts all cells equal to or greater than the operator selected size. This model is ideal for rapid total cell counts or concentration in those laboratories analyzing one or two different cell types.

### **The Z1 Dual Threshold**

The Z1 Dual Threshold counts cells in three regions of the population,

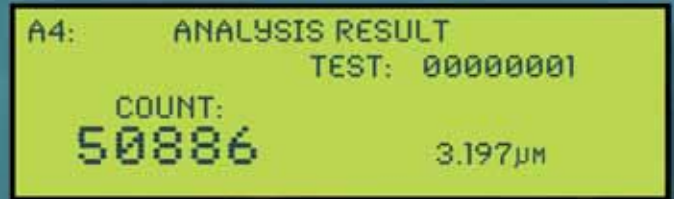
above the lower size, between the lower and upper thresholds, and above the upper size setting. This is the choice when more information on the cell population is desired, without additional analyses of the sample. The model is excellent for platelet applications and for use in those tissue culture laboratories working with a variety of cell types of different size.

### **The Z2 Dual Threshold**

The Z2 adds the capability of size distribution measurement of the cell population. The Z2 preserves the features of the Z1 Dual Threshold model and adds the enhanced dimension of providing accurate and precise population size distribution data. The Z2 has the ability to average counts and channelized data from a series of up to ten consecutive analyses. In addition,

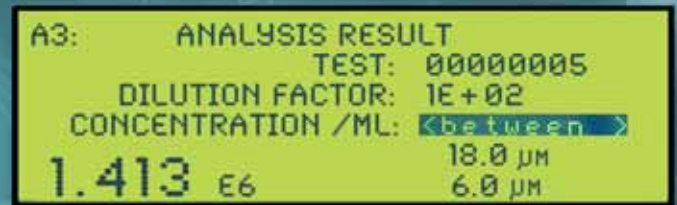
## Z2 Dual Threshold

- Bone Marrow
- Genomic and Proteomic Cell Studies
- Lamellar Bodies
- Myocytes
- Pharmaceutical Cell Cytotoxicity
- Platelets
- Spermatozoa
- Tissue Culture
- Tissue Engineering
- White Blood Cells



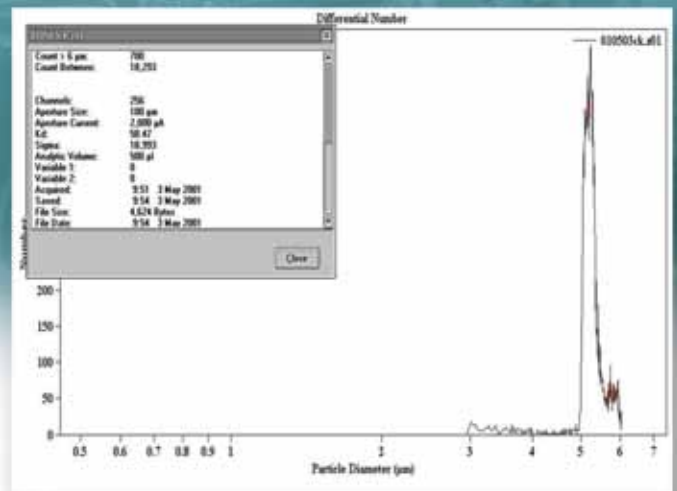
### Z1 Single Threshold

Enumerates cells equal to or greater than the user selected size setting.



### Z1 Dual Threshold

Allows the user to set two size thresholds as well as three count and size regions for a cell population.



## Z2

Offers all the capabilities of a Z1 Dual threshold with the addition of cell size distributions and data acquisitions via Windows based software.

using the Beckman Coulter Windows® based data acquisition software, data may be acquired to the PC. The added capabilities of the software package enables the user to conduct sophisticated time dependent studies, such as, the ability to monitor both number and size distribution changes over time for applications such as cell proliferation and cytotoxicity studies.

# Sample Analysis

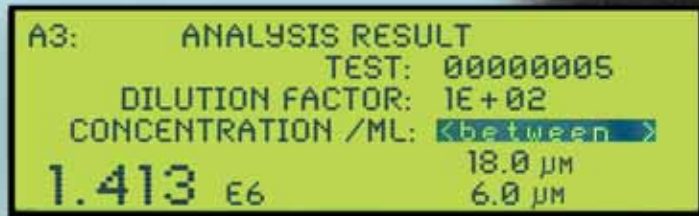
Has Never Been So Simple, It's as Easy as...

1

Load your prepared sample onto the instrument platform using the convenient Beckman Coulter Accuvettes.

2

Setup analyses settings or recall a stored profile.



A3: ANALYSIS RESULT  
TEST: 00000005  
DILUTION FACTOR: 1E+02  
CONCENTRATION /ML: <between >  
1.413 E6      18.0 µM  
                  6.0 µM

3

View your results.

*Quick, accurate  
and reproducible.*

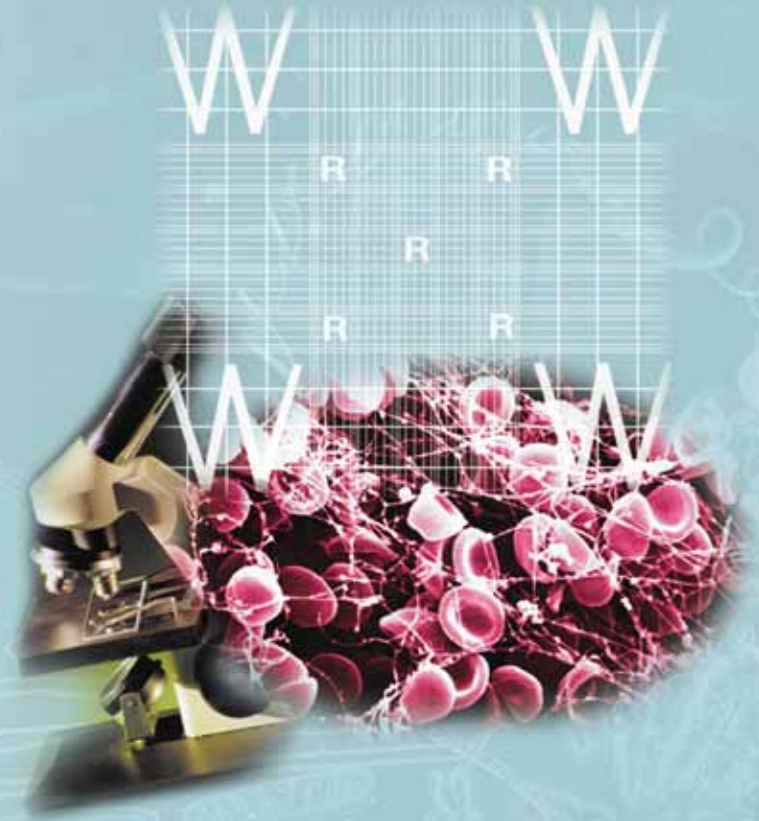
*The Z Series;  
delivering  
cellular  
solutions.*



## Benefits over the Manual Method (hemacytometer) for cell counting and sizing.

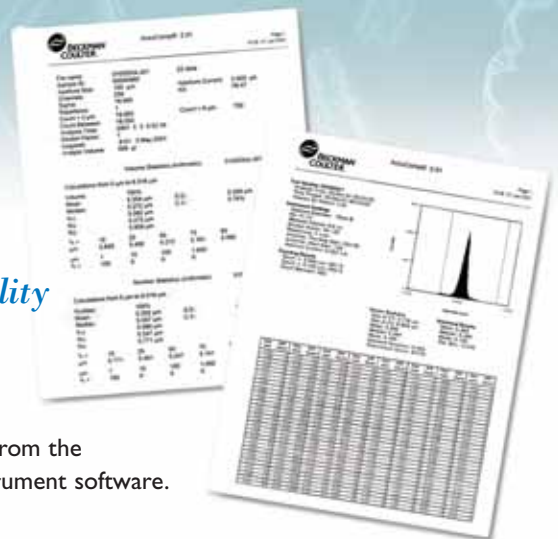
- The Z Series instruments analyze thousands of cells compared to the manual method. Thus, results are significantly more accurate and precise.
- The Z Series instruments offer rapid cell sample analyses compared to the time consuming manual technique.
- The operator error in filling of the hemacytometer chamber is eliminated.
- Significant differences in operator to operator results are obtained with the manual method. In addition, errors will occur with a single user performing replicate counts on the same cell sample; due to the subjective nature of the measurement.
- The imprecision and inaccuracy of manual cell analyses, using the hemacytometer, renders it unsuitable as a reference method.
- The electrical sensing zone technology of the Z instruments is the Reference Method for Red and White Blood Cell Counting and Sizing.<sup>1</sup>

<sup>1</sup> Rowan, RM., van Assendelft, OW., et al., Reference method for the enumeration of erythrocytes and leucocytes., Clin. lab. Haemat., 1994, 16, 131-138.



The Z Series software gives you the *flexibility* you need.

Print reports directly from the Z Series instrument software.



## TECHNICAL SPECIFICATIONS

<b>OVERALL ANALYSIS RANGE:</b> 1 µm to 120 µm diameter	<b>LINEARITY:</b> Linear response ±1% of pulse height over selected range	<b>AMPOULE INSERTABLE TUBES:</b> 50 70 100	<b>DIMENSIONS:</b> 46cm (18") height 27cm (10.6") width without keypad 36cm (14") depth
<b>DYNAMIC RANGE OF APERTURE:</b> Z1 Single and Dual Threshold 3:1 by diameter, 27:1 by volume	<b>TYPICAL COUNT PRECISION:</b> >1% CV	<b>NUMBER OF CHANNELS:</b> 64, 128 and 256 size distribution	<b>WEIGHT:</b> 13.6kg (30lb)
Z2 Dual Threshold up to 6.3:1 by diameter up to 256:1 by volume	<b>POWER CONSUMPTION:</b> Less than 55W	<b>PRINTER INTERFACE:</b> Centronics parallel, IBM compatible 25-pin connector	<b>OPERATING SYSTEM:</b> Windows® 95 Windows® 98 Windows® 2000 Windows® NT
<b>METERED VOLUMES:</b> 100ul, 500ul, 1000ul	<b>ORIFICE TUBE SIZES:</b> Aperture (µm) 50 70 100 140 200	<b>POWER REQUIREMENTS:</b> 100 -120V AC ± 10% 50/60 Hz 220 -240V AC ± 10% 50/60 Hz	
<b>RESOLUTION:</b> User selectable	Range (µm) 2-60% of aperture size		

PN	DESCRIPTION
6605700	Z2 Analyzer, includes 100 µm aperture
6605699	Z1 Dual Threshold Analyzer, includes 100 µm aperture
6605698	Z1 Single Threshold Analyzer, includes 100 µm aperture
383550	Z2 AccuComp Software
8320310	Z-Series Starter Kit: Tri-Pak, 200 Cuvettes, Sensors, Calibrator, Clenz, Dispenser
8320312	Z-Series Tri-Pak
8320592	Accuvettes (200/pack)
6602796	L10 Standard, nominal 10 µm, Latex Particle (NIST Traceable)
8546929	500 ml Coulter Clenz
177495	Aperture Concentration Control (1 x 15 mL)
9912784	Aperture Tube, 50 µm
9912785	Aperture Tube, 70 µm
9912786	Aperture Tube, 100 µm
9912787	Aperture Tube, 140 µm
9912788	Aperture Tube, 200 µm
9913155	Aperture Tube, 50 µm Ampoule
9913156	Aperture Tube, 70 µm Ampoule
9913157	Aperture Tube, 100 µm Ampoule
7546138	Zap-Oglobin II, 5 x 15 mL