Automated cell counting at your fingertips

Countess™ Automated Cell Counter

Consistent. Fast. Easy. The Countess™ Automated Cell Counter takes the subjectivity and tedium out of one of the fundamental steps of cell culture—counting live and dead cells. The Countess™ Automated Cell Counter reduces user error and speeds up cell counting with less sample, less hassle, and at a lower cost than any automated cell counter on the market.

invitrogen™

Why use the Countess™ Automated Cell Counter?

With the Countess™ Automated Cell Counter, producing quality reproducible data is fast and easy. It is also inexpensive and small, and can easily fit into a lab's budget and workspace.

→ **Accurate**—eliminate the subjectivity of manual cell counting; no guessing, no user-to-user variability

→ **Fast**—counts live and dead cells, measures viability and average cell size in 30 seconds with just 10 µL of sample

→ **Convenient**—no setup, cleaning, or service required

The small footprint (27 cm (w) x 20 cm (d) x 19 cm (h)), and data archiving function of the Countess™ Automated Cell Counter make sharing between labs and users easy. In addition, the disposable cell counting chamber slides minimize exposure of biohazardous samples to users.

The Countess™ Automated Cell Counter is ideal for research labs such as:

→ Cell culture labs

→ Flow cytometry core facilities

→ HTS labs

→ HIV and other infectious disease labs

The Countess™ Automated Cell Counter is easy to use (Figure 1); simply pipet the sample into the counting slide (A), insert the slide into the Countess™ Automated Cell Counter (B), then press "Count cells" (C); results are displayed in 30 seconds (D).

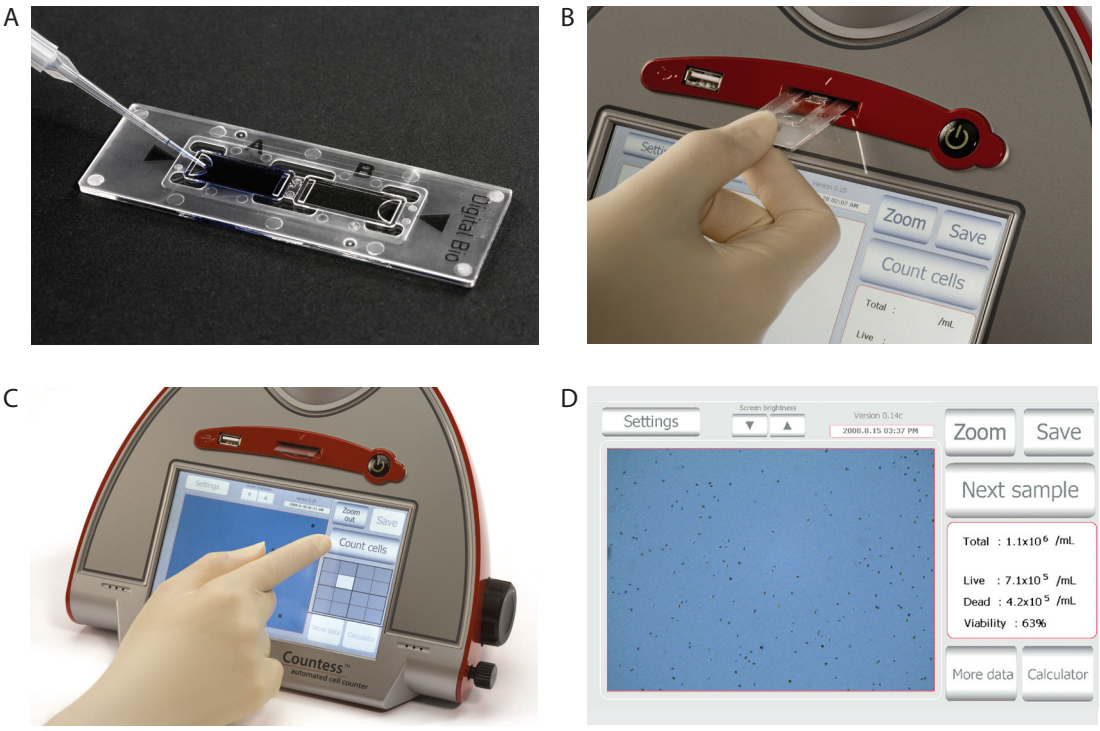

Figure 1. The Countess™ Automated Cell Counter workflow. Pipet the sample into the counting slide (A); insert the slide into the Countess™ Automated Cell Counter (B); press "Count cells" (C); results are displayed in 30 seconds (D).

How does the Countess™ Automated Cell Counter work?

The Countess™ Automated Cell Counter uses trypan blue staining combined with a sophisticated image analysis algorithm to produce accurate cell and viability counts in just 30 seconds.

The algorithm also measures the average size of live, dead, and total cells, to give you all the data you need to proceed with your experiments. The measurement range extends from 1 x 10^4 to 1 x 10^7 cells/mL, with an optimal range from 1 x 10^5 to 4 x 10^6 cells/mL, broader than that of a hemocytometer (Figure 2). The optimal cell size is between 5 µm and 60 µm.

For accurate viability count results, ensure the counting area is covered with cell suspension and count cells within 2 minutes of mixing the cells with trypan blue solution. We highly recommend that you use the default setting to begin with your cell counting, unless you know the default setting does not count well. For best data with biological samples, we recommend counting at least two samples and taking an average. A handy dilution calculator helps you determine how to prepare your sample for your next passage or experiment.

Adjust the focus knob to optimize the image for analysis as follows (Figure 3):

→ Live cells have bright centers and dark edges

→ Dead cells have a uniform blue color throughout the cell with no bright centers

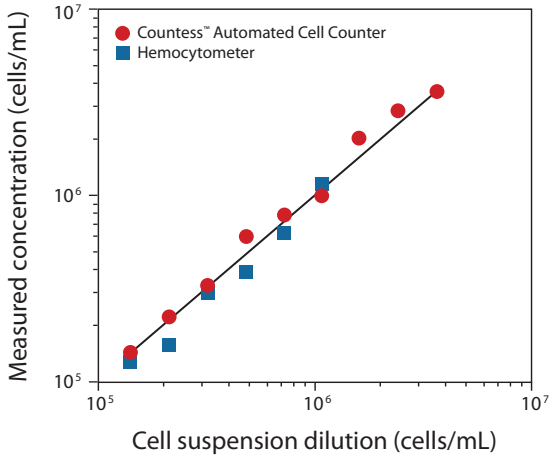

Figure 2. Data from the Countess™ Automated Cell Counter extend further along the high concentration range than hemocytometer readings.

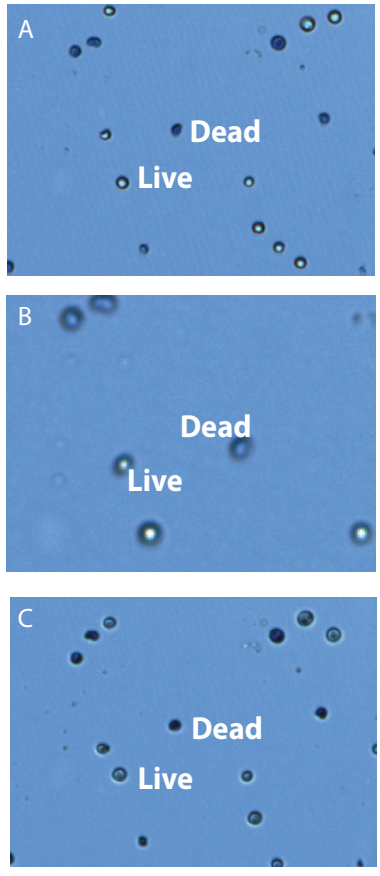

Figure 3. Correct and incorrect images. (A) Correct image—live cells have bright centers and dark edges. (B) Incorrect image—dead cells have bright, blue centers and are counted as live. (C) Incorrect image—live cells have dark centers and are counted as dead.

How accurate is the Countess™ Automated Cell Counter?

The Countess™ Automated Cell Counter was compared with the hemocytometer and Coulter Counter® methods (Table 1, Figures 4 and 5). Download the complete technical notes at www.invitrogen.com/countessdata. More comparison data will be available in the future.

Table 1. Comparison between the Countess™ Automated Cell Counter and Coulter Counter® method of cell counting.

Feature	Countess™ Automated Cell Counter	Coulter Counter®
Viability data	Provided	None provided
Cell size data	Provided	None provided
Visualize results	Provided	None provided
Setup	Easy	Difficult
Calibration/maintenance	None required	Required daily/monthly

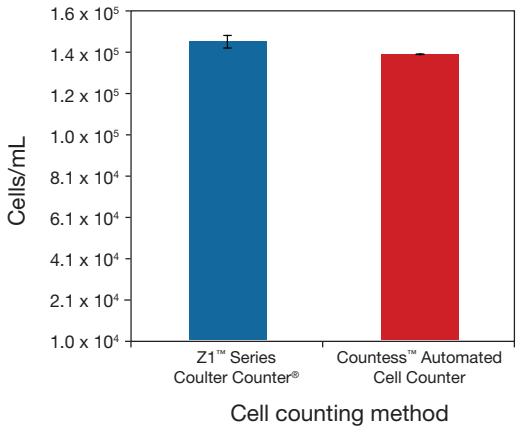

Figure 4. Equivalent results between Countess™ Automated Cell Counter and Coulter Counter® methods of cell counting. K562 cells were counted using the Z1™ Series Coulter Counter® Cell and Particle Counter, and the Countess™ Automated Cell Counter. Cell counts from replicate samples were obtained on the Countess™ Automated Cell Counter according to the manufacturer's instructions. Replicate samples were prepared for analysis on the Coulter Counter® instrument by diluting 100 µL of K562 cells into 10 mL of Isoton® II Diluent.

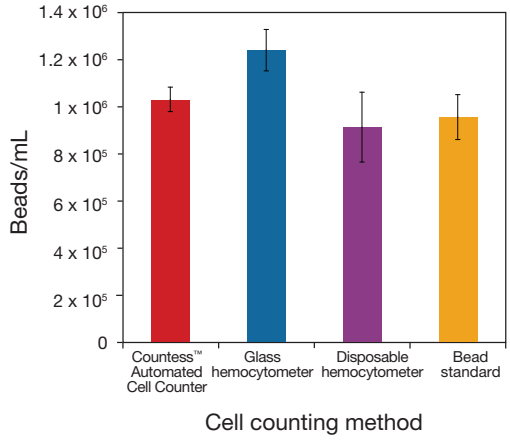

Figure 5. Accuracy and precision of the Countess™ Automated Cell Counter compared to glass and disposable hemocytometer methods. A standard bead solution of known concentration (9.57 x 10^5 beads/mL, Beckman Coulter) was used as the starting material for counting measurements using the Countess™ Automated Cell Counter, Bright-Line glass hemocytometer (Hausser Scientific), and C-Chip disposable hemocytometer (Digital Bio). The beads were mixed 1:1 with 0.4% trypan blue, and triplicate samples were measured according to each manufacturer's instructions. Accuracy was evaluated by comparing the mean cells/mL measured by each method to the expected concentration of the standardized bead solution (last bar: 9.57 x 10^5 ± 10% beads/mL). Precision is indicated by the standard deviations; error bars represent one standard deviation. Accuracy and precision are comparable between the Countess™ Automated Cell Counter and the disposable hemocytometer. The glass hemocytometer is significantly less accurate.

What can be counted with Countess™ Automated Cell Counter?

Table 2 lists cell lines validated on the Countess™ Automated Cell Counter. Some other counting capabilities include:

- **Counting white blood cells.** The Countess™ Automated Cell Counter is able to count white blood cells from lysed whole blood and Ficoll cell preparations.
- **Counting whole blood cells containing non-lysed cells.** You should dilute the blood sample by approximately 1:10,000 and count in "bead" mode. The Countess™ Automated Cell Counter cannot assess the viability of cells in a whole blood sample.
- **Counting PBMCs (peripheral blood mononuclear cells).** The Countess™ Automated Cell Counter can count PBMCs. However, it cannot differentiate white blood cell types.
- **Counting RBCs (red blood cells).** The Countess™ Automated Cell Counter can count RBCs. Dilute the blood sample by approximately 1:10,000 and count in "bead" mode. The instrument cannot assess the viability of red blood cells. In addition, the instrument cannot distinguish red blood cells from white blood cells.

Read how to count blood cells and download this application note at www.invitrogen.com/countessdata. Bookmark this page as additional application notes are added regularly.

The Countess™ Automated Cell Counter can accurately count clumps of cells. In some cases, the actual numbers of cells in the clump will be underestimated, and the cell size will sometimes be overestimated. However, we have found that the Countess™ Automated Cell Counter provides data at least as accurate as counting with a hemocytometer.

Counting yeast cells. We have successfully counted Saccharomyces cerevisiae (Fleischmann's baker's yeast), a consumer product. However the instrument cannot distinguish yeast viability.

Counting plant cells. Plant cells have not been tested. If the plant cells fall within the optimal size range for the instrument and are not extremely clumpy, the instrument should be able to count plant cells.

Counting elongated cells. We have not tested very irregular or elongated cells. If the cells are very irregular or elongated, try the "Parameters" function under the "Settings" menu to vary the circularity. This function alters the way that the image analysis software recognizes cells. You may need to experiment with several circularity settings until you find the one that is perfect for your cell type.

Counting bacterial cells. Bacteria are too small to be distinguished from non-cell debris in the Countess™ Automated Cell Counter.

Counting sperm and other fast-moving cells. It is difficult to count cells that are moving quickly. The Countess™ Automated Cell Counter does not count live sperm and fast-moving protozoa.

Counting hepatocytes. The instrument is able to calculate total concentration, but cannot provide viability information on the cells. Set the instrument to bead mode, then you can perform the cell counting.

Table 2. Cell lines validated on the Countess™ Automated Cell Counter. For more information on our findings, visit www.invitrogen.com/countessdata.

Cell type	Vendor	Cat. No.	Animal	Organ
HEK-293	ATCC	CRL-1573	Human	Kidney
A431	ATCC	CRL-2592	Human	Skin
CHO-M1WT2	ATCC	CRL-1984	Chinese hamster	Ovary
CHSE	ATCC	CRL-1681	Chinook salmon	Embryo
COLO-205	ATCC	CCL-243	Human	Colon
COS-7	ATCC	CRK-1651	African monkey	Kidney
HeLa	ATCC	CCL-2	Human	Cervix
HepG2	ATCC	CRL-10741	Human	Liver
HL-60	ATCC	CCL-240	Human	Blood
J774A.1	ATCC	TIB-67	Mouse	Blood
Jurkat	ATCC	TIB-152	Human	Blood
MCF7	ATCC	HTB-22	Human	Breast
MRC-5	ATCC	CCL-171	Human	Lung
NIH/3T3	ATCC	CRL-1658	Mouse	Embryo
PC-12	ATCC	CRL-1721	Rat	Adrenal gland
SF-21	Invitrogen	12682-019	Insect	Ovary
U266	ATCC	TIB-196	Human	Blood
U-2 OS	ATCC	HTB-96	Human	Bone
K562	ATCC	CCL-243	Human	Bone marrow
Adipocytes	Invitrogen	R7788-110	Human	Adipose-derived stem cells
Human aortic smooth muscle cells	Invitrogen	C-007-5C	Human	Smooth muscle
Human pulmonary artery endothelial cells	Invitrogen	C-008-5C	Human	Blood vessel
Human pulmonary artery smooth muscle cells	Invitrogen	C-009-5C	Human	Smooth muscle
Human umbilical vein endothelial cells	Invitrogen	C-015-5C	Human	Blood vessel
Whole lysed blood	Donor	NA	Human	Blood

What's the warranty term and return policy?

If the Countess™ Automated Cell Counter does not conform to its descriptions, specifications in the product insert sheet, and/or does not meet the needs for your application, we will refund the purchase price, credit your account, or exchange the product.

To return the product, you must first obtain a return goods authorization (RGA) number and fill out a decontamination form.

Please contact Technical Support for processing instructions at 800 955 6288. Units used in HIV or other infectious disease labs cannot be accepted. You must contact Technical Support first. The complete warranty statement is located on the reverse side of Invitrogen invoices or packing lists.

Is Technical Support available?

Yes. You can reach Technical Support by dialing 800 955 6288 or via email at techsupport@invitrogen.com. Please indicate "Countess" in the email subject line.

How do I get more information?

Go to www.invitrogen.com/countess for product, ordering, and pricing information, as well as technical data and frequently asked questions.

Ordering information

Description	Quantity	Cat. No.
Countess™ Automated Cell Counter	1 each	C10227
Countess™ Automated Cell Counter Starter Kit *(includes 1 cell counter and 11 boxes of slides)*	1 kit	C10310
Countess™ Automated Cell Counter Lab Starter Kit *(includes 1 cell counter and 101 boxes of slides)*	1 kit	C10311
Countess™ Cell Counting Chamber Slides	50 slides (100 counts)	C10228
	500 slides (1,000 counts)	C10312
	1,250 slides (2,500 counts)	C10313
	2,500 slides (5,000 counts)	C10314
	5,000 slides (10,000 counts)	C10315

What do our customers have to say about the Countess™ Automated Cell Counter?

"The Countess™ Automated Cell Counter makes tissue culture work much easier and more productive. I wish I had one years ago!"
John McGrath, Dana-Farber Cancer Institute

"I am using the Countess™ Automated Cell Counter to verify cell count and viability following cell sorting by flow cytometry. I have found the output to be very useful as verification of a successful sort. Users have found the output to be a time-saving tool as they prepare their cells for downstream processing."
S. Schloemann, Washington University

"The Countess™ Automated Cell Counter is very easy to set up and use. Great cell counting instrument for a small lab or a large group of users. No mess left behind when counting is done, unlike Coulter Counter® where you have to blank after each use."
Alexandra Lin, National Institutes of Health

"The Countess™ Automated Cell Counter has worked out well for our lab. The Countess™ instrument cell counts agree with our manual cell counts, and the Countess™ Automated Cell Counter is much faster."
Danielle Krebs, UBC Life Sciences Centre

"We found the Countess™ Automated Cell Counter very helpful for our migration assays. Instead of spending hours counting cells to get results, we are able to quickly quantify our data! A definite time-saver and well worth the cost!"
Holly, University of Rochester

"The Countess™ Automated Cell Counter has proven to be a huge time-saver. It increases productivity at all levels."
John Coburn, Massachusetts General Hospital

"The Countess™ Automated Cell Counter saves us hours of time during experimentally intense workdays. We also appreciate the consistency of counts even with different users."
Sarah, University of Illinois

"My experiences thus far have been pleasant. The Countess™ Automated Cell Counter rivals the precision of my Coulter Counter®."
Peter, Louisiana State University

Read more customer commentary at www.invitrogen.com/countessfeedback.

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