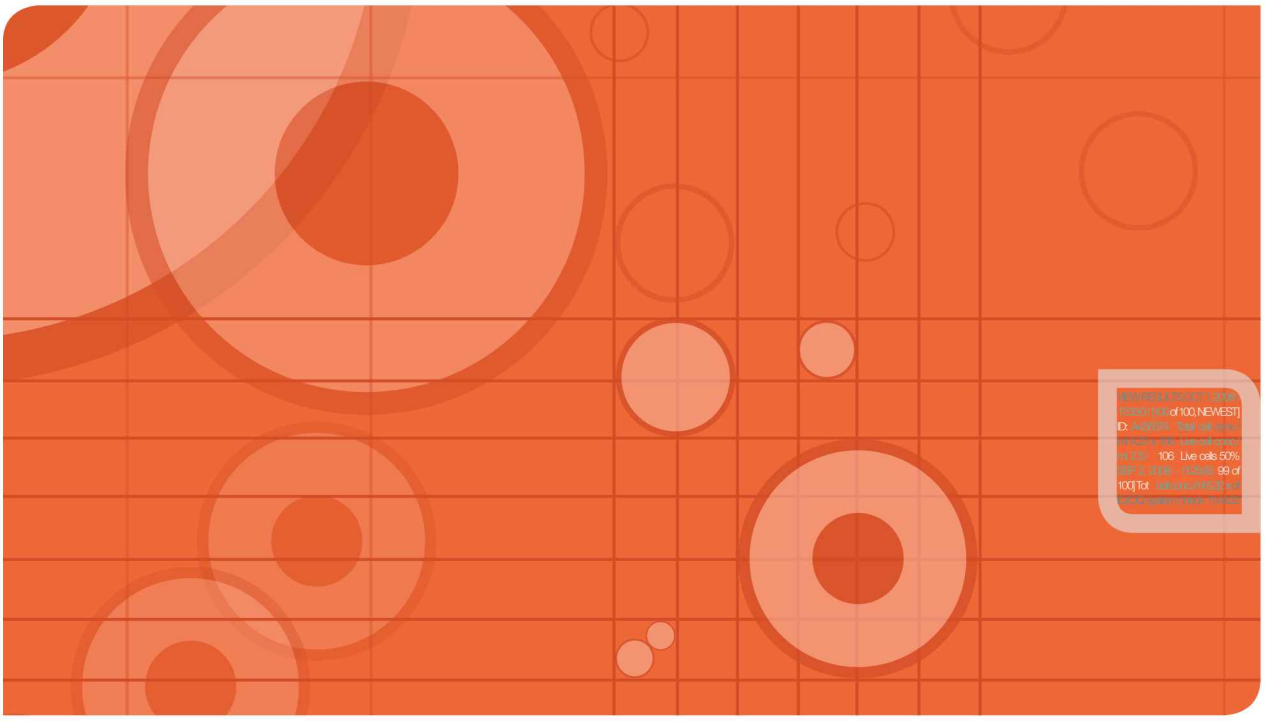


TC20™ Automated Cell Counter

BIO-RAD

Pictured at actual size

Key features and benefits include:

- **Compatible with a broad range of cell sizes and types** — counts cell lines, primary cells (from tissue or blood), and stem cells
- **Innovative auto-focus technology** — removes the variation associated with manual focusing and leads to precise cell counts in 30 seconds
- **Cell size gates** — user selects a population of interest in complex samples, such as primary cells, or lets the cell counting algorithm do all the work
- **Cell viability** — analyzes cells accurately using multifocal plane analysis
- **Easy to archive and analyze** — stores up to 100 counts in the onboard memory for access any time, or use the optional TC20 data analyzer software on your PC to further analyze exported cell images

The TC20 cell counter is an extremely compact, stand-alone instrument that does not require a computer to operate. With its small footprint, the TC20 counter conveniently fits any laboratory setting with limited benchspace. Its fast setup and intuitive operation let you quickly and easily start counting cells.

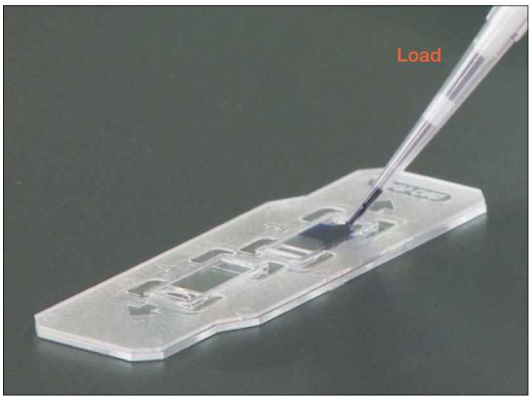
With its innovative auto-focus technology and sophisticated cell counting algorithm, the TC20 automated cell counter eliminates subjectivity while delivering reliable results in 30 seconds. Whether you work with cell lines or primary cells, the TC20 counter gives you accurate, highly reproducible mammalian cell counts. Depending on the complexity of your samples, you can let the cell counting algorithm do all the work or select a population of interest by adjusting cell size gates.

Avoid the tedium of manually counting cells and move on to other important tasks. It all adds up to a better workflow for your workday.

TC20 Automated Cell Counter

Reliably Accurate

Accelerate your research with automated cell counting. The TC20 cell counter performs automated counting of mammalian cells in one simple step, immediately initiating a count when you insert the slide. Its built-in auto-focus and sophisticated image analysis algorithm produce accurate, consistent cell counts within 30 seconds.



Load the sample onto a slide.

Insert the slide into the TC20 cel

Accurate and Reproducible Results

The TC20 automated cell counter uses microscopy with auto-focus that analyzes multiple focal planes to identify the best plane. Without requiring any user input, the sophisticated cell counting algorithm uses the image acquired from the best focal plane to identify cells and exclude debris, thereby calculating the total cell count. The auto-focus leads to highly reproducible cell counts with reduced user-to-user variability compared to a hemocytometer and cell counters with manual focus.

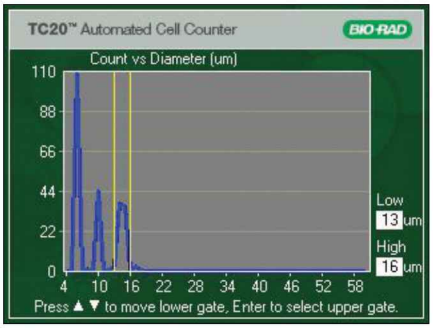
In less than 30 seconds, the TC20 cell counter provides accuracy comparable to results obtained with a hemocytometer. It can count cells with a 6–50 µm cell diameter and within a broad concentration range of 5 x 10^4–1 x 10^7 cells/ml, which eliminates the need to dilute cells, thus reducing the errors associated with sample dilutions prior to counting. In addition, the counting algorithm counts individual cells within clusters of up to five cells, providing accurate counts without the need to extensively declump cells prior to loading.

The TC20 counter uses a patent-pending counting slide designed to ensure an even distribution of cells throughout the counting chamber, regardless of the user's pipetting style, leading to accurate and consistent cell counts.

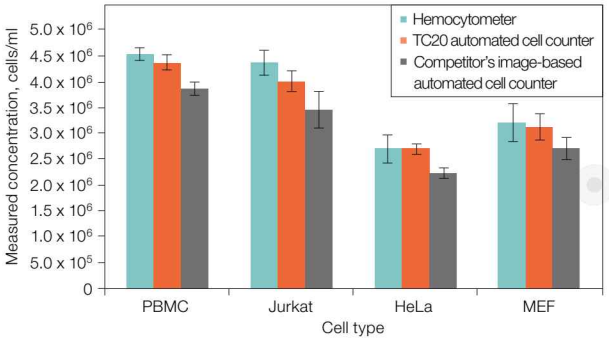
The accurate, consistent cell counts from the TC20 counter lead to more reproducible results with downstream processes and analysis, saving money and time by enabling successful experiments the first time.

Cell Size Gating

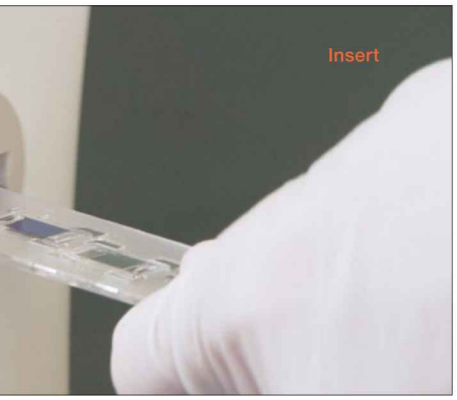
For complex samples composed of multiple cell populations, such as primary cells, users can adjust the cell size gates to define the population of interest that will be counted. When counting multiple sample replicates, the TC20 cell counter can save the positions of gates and apply them to subsequent counts.



When user-defined gates are enabled you can select a population of interest by adjusting the position of the cell size gates.



The TC20 cell counter demonstrates accurate cell counts across a range of cell sizes. Small (PBMC, Jurkat), medium (HeLa), and large (MEF) cells were counted with a hemocytometer, a TC20 automated cell counter, and a competitor's image-based automated cell counter. The TC20 counter and hemocytometer cell counts showed no statistically significant differences. Precision is indicated by the standard deviations; error bars represent average standard deviations. Cell counts on the TC20 counter were performed on one instrument with four sample replicates.



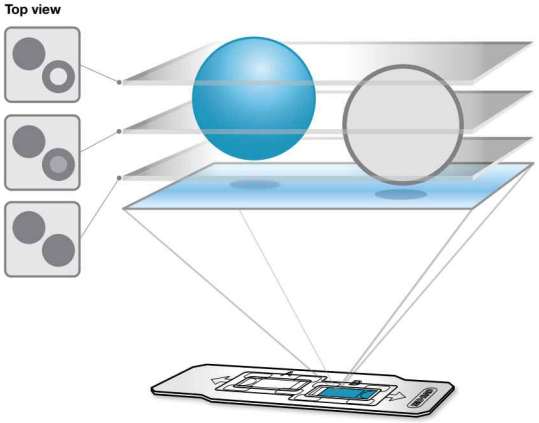
l counter; counting automatically begins.

Obtain a total cell count (without trypan blue) or total and live cell counts (with trypan blue) in 30 seconds.

TC20

Cell Viability

The TC20 cell counter can count samples with or without trypan blue. It auto-detects the presence of trypan blue in the sample to assess cell viability via trypan blue exclusion. Along with the total cell count, the TC20 counter assesses cell viability and provides a live cell count and percentage of live cells. The conventional method of analyzing viability using a single focal plane can lead to inaccurate conclusions because light scattering and the alignment of cells at different heights in a counting chamber can change the appearance of cells — live cells may appear to be dead and vice versa. To determine if cells are viable, the TC20 counter analyzes each cell using images acquired from multiple focal planes during the focusing step.

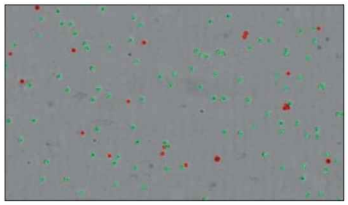


Multifocal plane analysis.

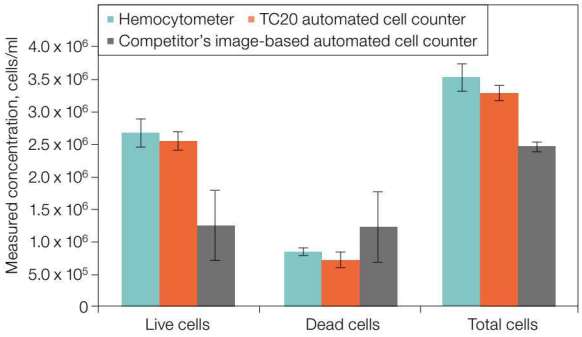
Effect of multifocal plane analysis on live/dead count accuracy for HeLa cells.

Viability Assessment	Live Cells, %	Dead Cells, %
Single best focal plane*	35	65
Multiple focal planes*	65	35

* On single focal plane, 30% of live cells were misidentified as dead cells.



Assessment of cell viability of Pan T cells via trypan blue exclusion. Annotated image is from a cell count exported from the TC20 counter and viewed as a JPEG image on a computer. Green circles, live cells; red circles, dead cells.



The TC20 cell counter demonstrates accurate counts of viable cells. Pan T cells mixed with trypan blue (1:1) were counted with a hemocytometer, a TC20 automated cell counter, and a competitor's image-based automated cell counter. The TC20 counter and hemocytometer cell counts showed no statistically significant differences. Precision is indicated by the standard deviations; error bars represent average standard deviations. Cell counts on the TC20 counter were performed on four different instruments with five sample replicates.

Typical Experiment Workflow

Bio-Rad offers powerful building blocks for your cellular research, providing the flexibility and reliability you need to accelerate discovery. The TC20 automated cell counter takes the guesswork out of cell counting, letting you have confidence in your results. Use it in combination with other analysis tools from Bio-Rad to streamline your experiments and get more reproducible results.

Grow cells

Count cells

Perform siRN

Analysis Options

After viewing cell count results an image of the counted cells can be viewed on the TC20 counter.

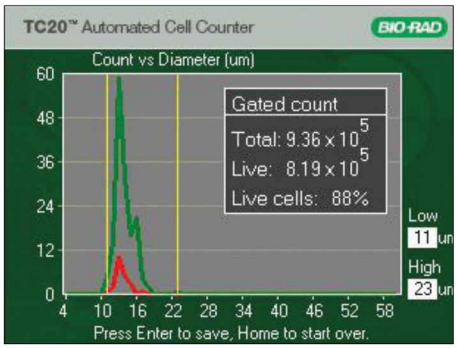
A JPEG file of the image containing a metatag of the count data is available for immediate export to a USB flash drive or, to save every image, automatic data export can be enabled. Use the TC20 data analyzer software to review single images, perform multi-file comparative analyses, and generate reports. To download the TC20 data analyzer software, go to **www.bio-rad.com/TC20dataanalyzer**.

Results from 100 previous counts are stored in the TC20 cell counter. Previous count results can be exported via the USB port and opened in a Microsoft Excel spreadsheet.

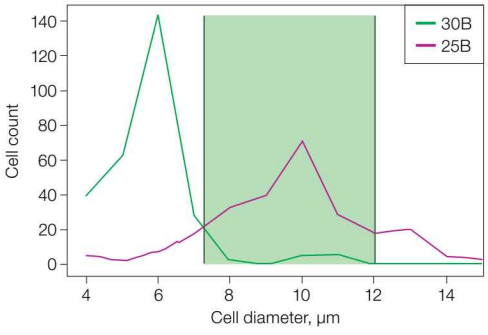
You can assign a name to each sample. To save time when working with multiple sample replicates, enable the automatic name serialization option to populate numerically serialized names.

The optional thermal label printer can be connected to the TC20 counter to print results onto labels that can be placed into a laboratory notebook for traceability of the count results.

Users can access the onboard dilution calculator to determine volume adjustments required to achieve the cell concentration needed for the next experiment.



Histogram of live and dead cell counts (sample with trypan blue) in the Current count screen.



Single image file analysis using the TC20 data analyzer software. Distribution of a total cell population is shown.

A transfection

Count cells

Check RNA quality

Use qPCR to quantitate effect of silencing

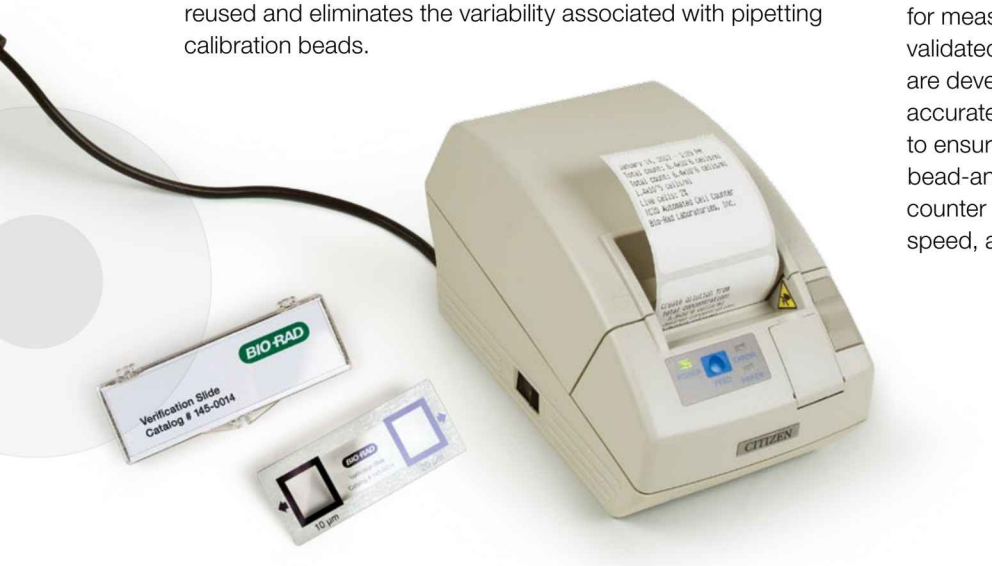
Counting Slides

The TC20 automated cell counter uses a patent-pending counting slide designed to ensure even distribution of cells throughout the counting chamber, regardless of the user's pipetting style, leading to accurate and consistent cell counts.

Disposable counting slides eliminate setup, cleaning, and maintenance steps, and also minimize exposure to biohazardous samples. The dual-chamber slide can provide counts for two separate samples or dilutions. Each chamber requires only 10 µl, saving precious cells.

Verification

The ready-to-use verification slide verifies the functionality of the TC20 cell counter. It also serves as a positive control for cell counting experiments. The verification slide can be reused and eliminates the variability associated with pipetting calibration beads.



Counting Bio-Plex® Magnetic or Polystyrene Beads

The Bio-Plex suspension array system is a powerful tool for measuring analyte concentration. While a variety of validated assays is currently available, many Bio-Plex users are developing custom assays for which it is essential to accurately and consistently determine bead concentration to ensure uniform quantities of antibody are used in the bead-antibody conjugation step. The TC20 automated cell counter is an excellent tool for bead counting and provides speed, accuracy, and ease of use.

Cell Lines Counted on the TC20 Automated Cell Counter*, **

Cell Name	Morphology	Organism	Source Organ/Disease	Growth Properties
CCD-1137Sk	Fibroblast	Human	Skin (foreskin)	Adherent
CHO	Epithelial	Chinese hamster	Ovary	Adherent
COS-7	Fibroblast	African green monkey	Kidney	Adherent
HeLa	Epithelial	Human	Cervix carcinoma	Adherent
Jurkat	Lymphoblast	Human	Acute T-cell leukemia	Suspension
K562	Lymphoblast	Human	Bone marrrow, chronic myelogenous leukemia	Suspension
MCF-7	Epithelial	Human	Mammary gland, adenocarcinoma	Adherent
MDCK	Epithelial	Dog	Kidney	Adherent
MEF	Fibroblast	Mouse	Embryo	Adherent
mESC	Stem cell	Mouse	Embryo, primary extraction	Adherent
NIH 3T3	Fibroblast	Mouse	Embryo	Adherent
Pan T	Lymphocyte precursor	Human	Blood	Suspension
PBMC	Mixture of different blood cells	Human	Blood, primary extraction	Suspension
PP034	Lymphoid	Human	B cell	Suspension

* The TC20 counter can count cells with a round shape after trypsinization.
** For a current list of cell lines, go to **www.bio-rad.com/TC20**.

Other Samples Counted on the TC20 Automated Cell Counter*

Sample Name	Organism
Amoeba species	Unicellular protozoa
Chlamydomonas	Unicellular flagellates
Entamoeba histolytica	Unicellular protozoan
Myxomycetes	Slime mold spores
Saccharomyces cerevisiae	Unicellular fungus

* Total cell count only.

Specifications

Counting time	30 sec
Cell concentration range	5 x 10^4–1 x 10^7 cells/ml
Cell diameter range	6–50 µm
Sample volume	10 µl
Data storage	100 counts
Data export	Via USB drive
Dimensions (W x D x H)	19 x 15 x 25.4 cm (7.5 x 6 x 10 in.)
Weight	2.2 kg (4.8 lb) without the external power supply

Ordering Information

Catalog # Description

TC20 Automated Cell Counter

145-0102 **TC20 Automated Cell Counter**, 120–240 V, includes instrument, power supply, USB flash drive, USB cable, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue

145-0103 **TC20 Automated Cell Counter with Thermal Label Printer**, 120–240 V, includes instrument, power supply, USB flash drive, USB cable, thermal label printer, 1 roll of 185 labels, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue

Kits and Reagents*

145-0003 **Counting Kit**, includes 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
145-0014 **System Test Kit**, includes verification slide, instructions
145-0021 **Trypan Blue**, 5 x 1.5 ml 0.4% trypan blue (750 counts), sterile filtered
145-0022 **Trypan Blue**, 10 x 1.5 ml 0.4% trypan blue (1,500 counts), sterile filtered

Accessories*

145-0005 **Thermal Label Printer**, 120–240 V, includes thermal label printer, USB cable, 1 roll of 185 labels
145-0007 **Thermal Printer Labels**, 1 roll of 185 labels, for thermal label printer
145-0015 **Counting Slides**, 150 dual-chamber counting slides (300 counts)
145-0016 **Counting Slides**, 300 dual-chamber counting slides (600 counts)
145-0017 **Counting Slides**, 600 dual-chamber counting slides (1,200 counts)
145-0018 **Counting Slides**, 900 dual-chamber counting slides (1,800 counts)
145-0019 **Counting Slides**, 1,200 dual-chamber counting slides (2,400 counts)
145-0020 **Counting Slides**, 2,400 dual-chamber counting slides (4,800 counts)

* TC20 kits, reagents, and accessories are compatible with the TC10™ automated cell counter.

To download the TC20 data analyzer software, go to bio-rad.com/TC20dataanalyzer

For more information, visit bio-rad.com/web/TC20more

BIO-RAD

Bio-Rad Laboratories, Inc.

Life Science Group

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