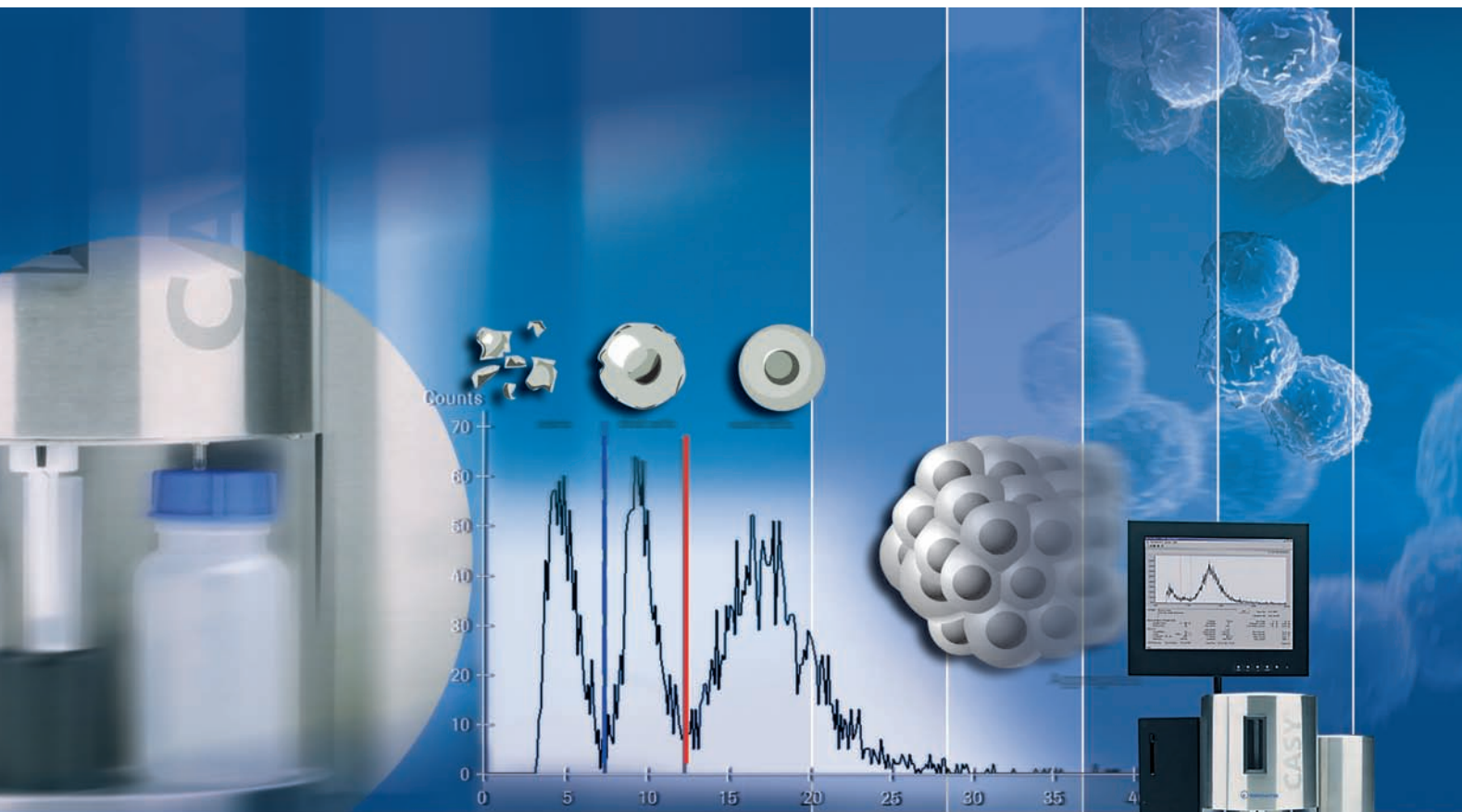


# CASY Model TTC - Cell Counter and Analyzer

*Label-Free Viability Control and Cell Sizing*





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## The CASY Model TTC

### *Label-Free Viability Control and Cell Sizing*

*Achieve total quality control of your cell cultures using the CASY Model TTC Cell Counter and Analyzer. Based on the non-invasive **Electrical Current Exclusion (ECE) principle**, the CASY System allows fast, high-precision quantification of:*

- Cell concentration
- Cell viability
- Cell volume
- Cell aggregation
- Cell debris

*Offering highly reproducible results, integrated data evaluation, and application flexibility, the CASY Model TTC is ideal for a variety of laboratory environments:*

#### *Research and Development*

*Measure all types of mammalian cells, as well as bacteria, yeast, algae, parasites, pollen, and sperm. The CASY System supports a broad range of applications, maximizing versatility with several precision measuring capillaries and cell-specific setups.*

#### *Process Development*

*Improve your cell culture processes using fast and accurate cell quality data. Distinguish cell debris (an important quality control parameter in process control) from viable cells, dead cells and cell clusters.*

#### *Production*

*Rely on complete standardization based on embedded system technology, factory-certified calibration, and a built-in quality control device. The CASY Model TTC meets all guidelines for GLP/GMP as well as 21 CFR Part 11, and is specifically recommended for the control of processes not bound to Trypan Blue.*

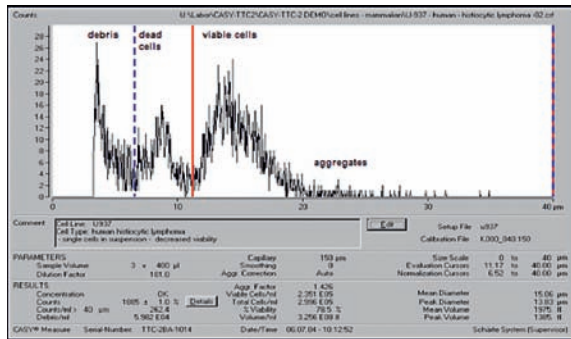


# The CASY Model TTC

## Features and Benefits

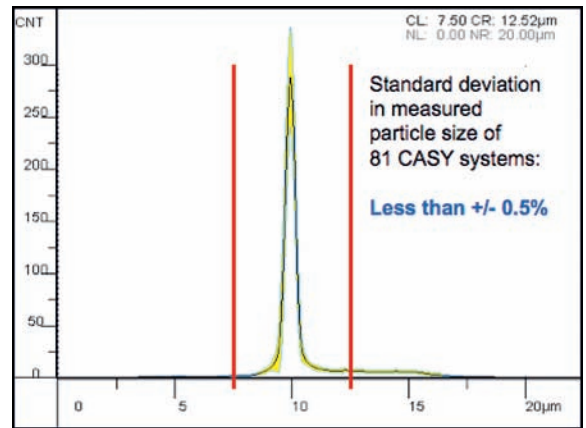
The CASY Model TTC acquires high-resolution data on cell status and size, providing a unique “fingerprint” of the state of your cell culture. The Electrical Current Exclusion (ECE) principle, central to the system’s design, is the standard for dye-free determination of cell viability. Combining short measurement time, high accuracy, and low sample volume, the versatile CASY System offers a complete feature set for the quality control of cell cultures.

- Simultaneously quantify small debris particles, dead cells, viable cells, and aggregates (see Figure 1).



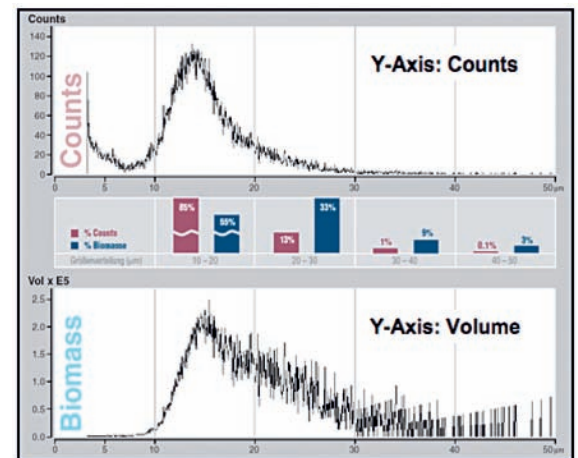
**Figure 1: Measurement Results. The CASY Model TTC provides a high resolution size distribution differentiating cell debris, dead cells, viable cells, and aggregates.**

- Obtain accurate and reproducible results which can be directly compared from user to user, day to day, and system to system, based on the factory certified calibration (see Figure 2).
- Avoid the cytotoxic side effects of dyes using a non-invasive assessment method.
- Measure cell volume with high precision.
- Correctly quantify even heavily aggregating cell samples (see Figure 3).
- Benefit from low measuring time (10 seconds) and minimal sample volume (5 – 100 μl).
- Use this fully-qualified system in clean room environments.



**Figure 2: Quality of Factory Certified Calibration. Standard deviation of size of 10 μm test beads across 81 CASY Systems is less than +/- 0.5%.**

- Save resources with low cost per sample and minimal maintenance requirements.
- Rely on calibration that is identical for all devices and stable for the system’s entire service life.
- Choose a system that is compliant with all quality control regulations, including GLP/GMP and 21 CFR 11.



**Figure 3: Comparison of Count and Volume Distribution of CHO Cells. The CASY System accurately quantifies a sample with an aggregation factor of 1.91.**

# The CASY Model TTC Technology

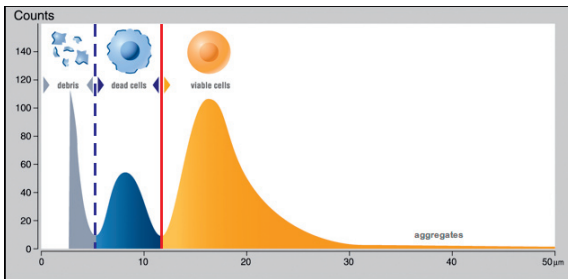


Figure 4: High-Resolution Size Distribution

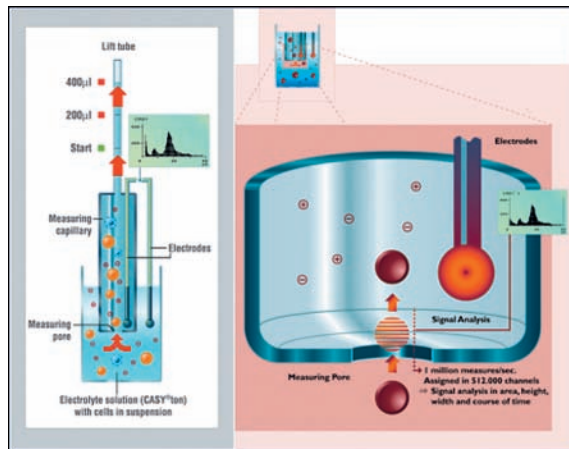


Figure 5: Pulse Area Analysis

The CASY Model TTC is based on ISO 13319, the international standard reference method for particle counting. In addition, the system features “Pulse Area Analysis”, an advanced approach to digital pulse processing. This technique is used to maximize the information gained from the created signals when a cell or a particle passes through the system’s high precision measuring pore in a low voltage field.

Each object is scanned with a frequency of one million measurements per second, resulting in up to several hundred multiple readings per cell (see Figure 5). Thus the complete time course of the signals is studied when analyzing samples. Pulse Area Analysis provides a high-resolution recording of cell size distribution, ensuring that the size and quality of every cell or particle passing through the measuring pore is accounted for.

## Technical Data

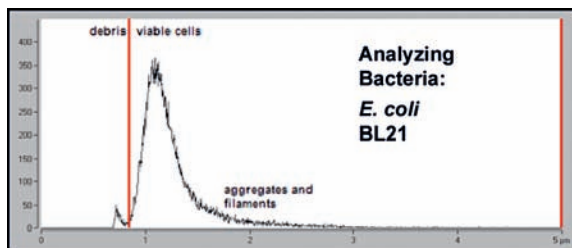
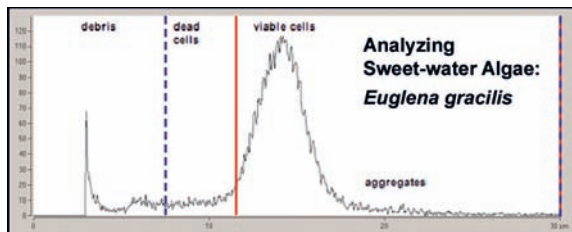
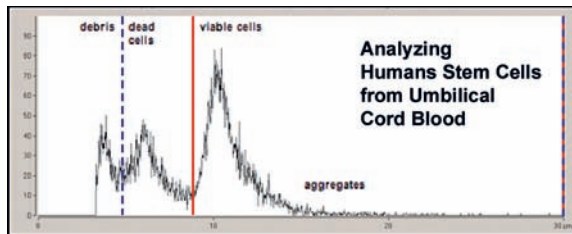
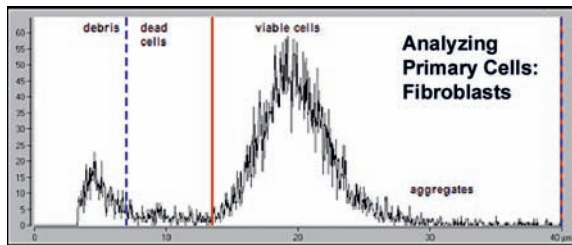
Measurement principle	Electronic pulse area analysis with 1 million measurements per second
Viability determination	Electrical Current Exclusion (ECE)
Dynamic range	in volume > 1:70,000 in diameter > 1:40
Measured size channels	512,000
Displayed size channels	1,024
Measurement range	0.7–160 µm
Resolution	1 in 512,000
Typical analysis time	10 seconds
Typical sample volume	5 – 100 µl
Interfaces	RS 232 (2xDB9), TCP/IP (RJ45), USB (3x), Compact flash memory card

# The CASY Model TTC

## Applications

Forget about limitations. The CASY Model TTC is adaptable to any cell type and application, making it ideal for quality control and long-term monitoring of multiple biological processes.

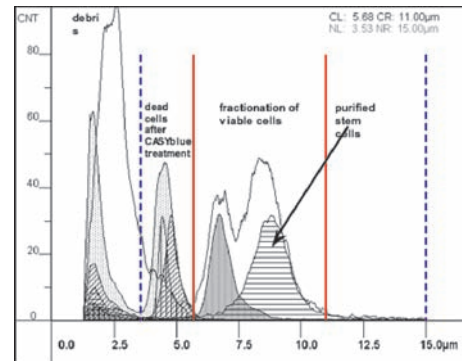
- Count cells from a wide range of cell types.



With a detection range of 0.7 to 160  $\mu\text{m}$ , the system can measure nearly all cell types, including bacteria,

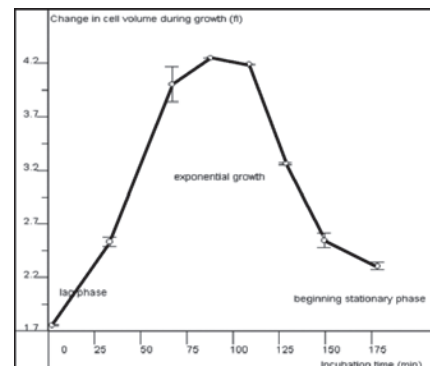
yeast, algae, protozoa, and all types of mammalian cells. In addition to counting cells, the CASY high-resolution size distribution also provides important information about the metabolic state of the cells.

- Perform quality control of cell fractionation.



After fractionation of cells using different techniques (such as centrifugation, magnetobeads, flow cytometry, or counterflow centrifugal elutriation), fractions need to be checked with respect to yield, purity, and state of the cells. The CASY Model TTC provides all parameters needed for quality control of the purified cell fractions.

- Measure changes in cell volume.



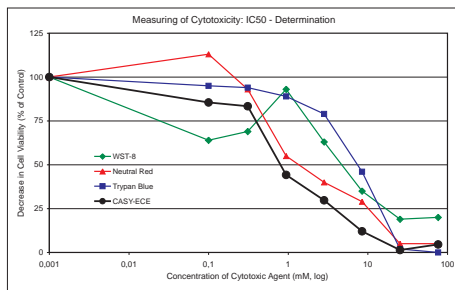


# The CASY Model TTC

## Applications

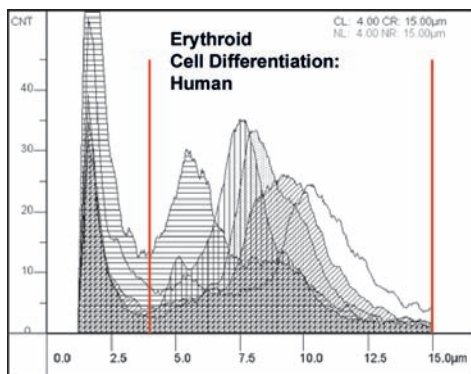
The CASY Model TTC provides precise information on changes in cell volume. Cell volume is a characteristic parameter that can be used to monitor the metabolic state of cells, control processes, and define the correct time point for harvesting.

- Determine cytotoxic effects on cells.



The sensitivity of any cytotoxicity assay depends on the efficiency of quantification of the reproductive integrity of cells (inhibition of cell proliferation) and the structural integrity of cells (cell death). The CASY System combines high-resolution size distribution with Electrical Current Exclusion to determine both effects independently.

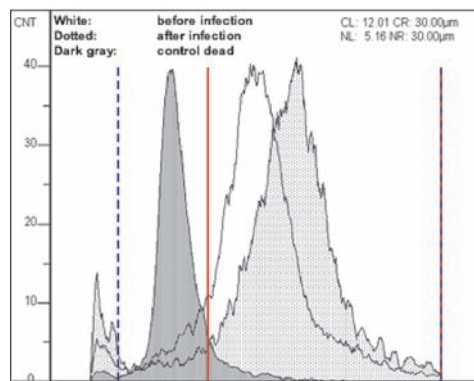
- Monitoring of cell differentiation.



Cell differentiation is generally accompanied by considerable changes in cell volume. The system's high-

resolution size distribution provides a “fingerprint” of the actual state of cell differentiation, providing a fast tool for following the differentiation process.

- Monitor viral infections of cells.



Baculovirus infections of insect cells are used to produce large amounts of protein in infected cells. During infections, cell volume increases dramatically. Precise volume determination allows the user to monitor the process and calculate the degree of infection (MOI).

### Application Support

Use our extensive application database to obtain answers to your cell culture questions, and to access our comprehensive library of measurement samples. Our highly trained team stands ready to assist you in establishing new applications and developing adapted data evaluation solutions.

# CASY Model TTC

## *Ordering Information*

Product	Catalog No.
CASY Model TTC 150 µm	05 651 719 001
CASY Model TTC 45, 60, 150 µm	05 651 727 001

Published by:

Roche Diagnostics GmbH  
Roche Applied Science  
Werk Penzberg  
82372 Penzberg  
Germany

[www.roche-applied-science.com](http://www.roche-applied-science.com)

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