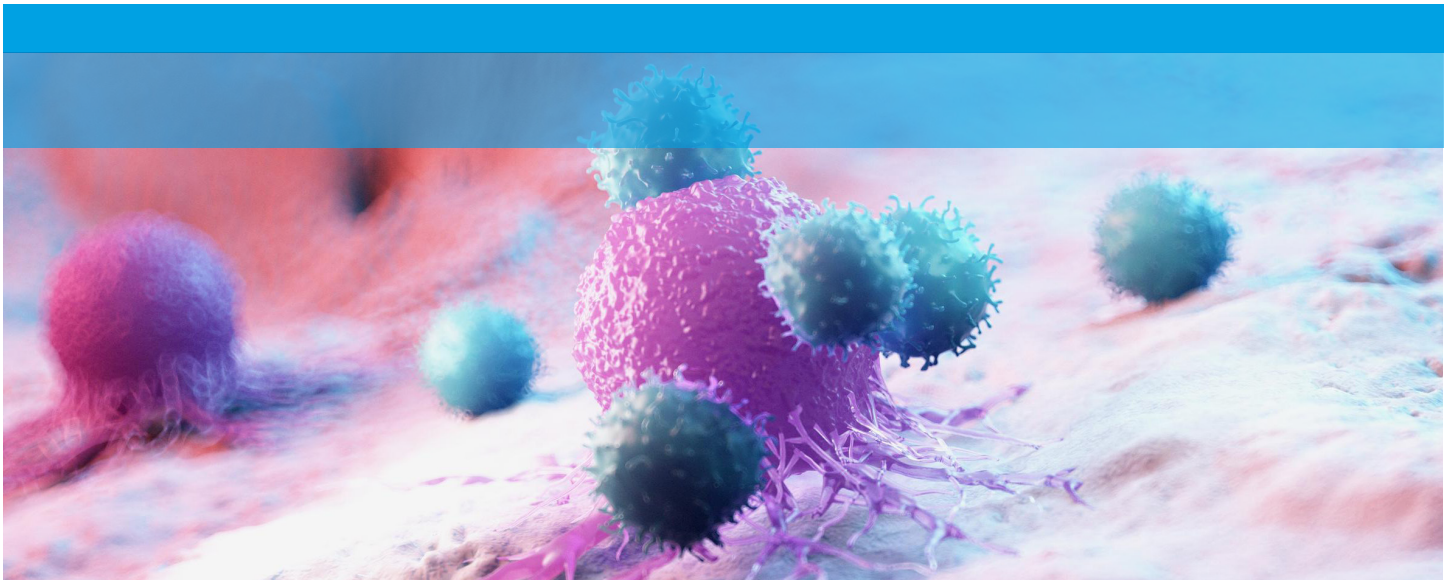
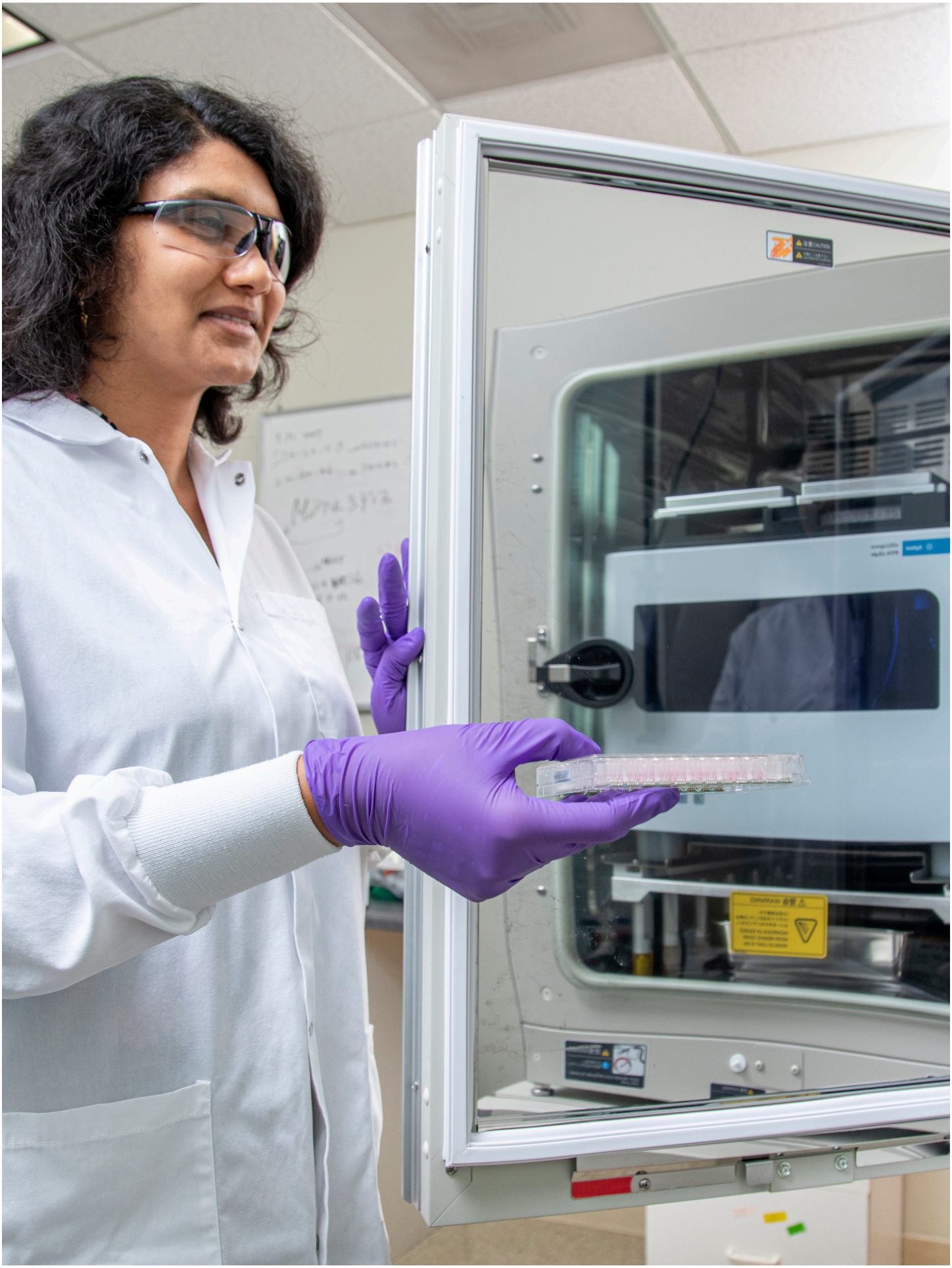
Agilent

Trusted Answers

xCELLigence Real-Time Cell Analysis Instruments

Continuously monitor cell health, behavior, and function with noninvasive, live cell impedance and imaging assays





Are You Still Using Endpoint Assays?

The Agilent real-time cell analysis (RTCA) instruments provide a powerful yet simple solution for live cell analysis.

Why xCELLigence RTCA?

- Label-free: Impedance based biosensor technology does not require markers or dyes.
- Real-time kinetic readouts: Obtain data continuously over assay windows that stretch from seconds to days.
- Fast: Read a 96-well plate in just 7 seconds. Simultaneously monitor up to six plates, without scheduling conflicts.
- Easy workflow: Simply plate cells and begin monitoring. With the eSight, combine the label-free xCELLigence technology with live cell imaging in one experiment.
- Broad applications: Suitable for many different cellular analysis applications with excellent accuracy and reproducibility.

Agilent Real-Time Cell Analysis Instruments – Discover What You've Been Missing Between Endpoints.

RTCA S16

- 1 × 16-well format is suited for assay development and optimization.
- Compatible with E-Plate 16, E-Plate VIEW 16, and E-Plate 16 PET.
- RTCA Software Lite is designed for RTCA S16 and provides predefined assay templates for easy experimental setup.

RTCA DP (dual purpose)

- 3 × 16-well format: Run up to three 16-well plates simultaneously or independently to maximize productivity.
- Cell invasion and migration: Measures cell number, size, morphology, and attachment properties, with the ability to perform kinetic analysis of cell invasion/migration (CIM).
- Versatile: Choose from three types of 16-well plates: E-Plate 16, E-Plate VIEW 16, or CIM-plate 16.

RTCA SP (single plate)

- 1 × 96-well format
- Rapid measurement: Average read time is approximately 7 seconds for a 96-well plate.
- Compact design: Station fits conveniently in regular cell culture incubator.
- Intuitive software: Set up and customize assay protocols quickly and easily.

RTCA MP (multiple plates)

- 6 × 96-well format: Run up to six 96-well plates simultaneously or independently to maximize productivity.
- Integrated data analysis tools facilitate processing large amounts of real-time data. These include diverse plot types and the calculation of parameters, such as IC50 or KT50.

Assays	RTCA S16	RTCA DP	RTCA SP	RTCA MP
Cell characterization/QC	✓	✓	✓	✓
Immunotherapy/cell killing	✓	✓	✓	✓
Adhesion	✓	✓	✓	✓
Receptor signaling	✓	✓	✓	✓
Cell invasion/migration		✓		
Cardiotoxicity				
Extracellular recording				
Live cell imaging				

Specs				
Format	1 × 16 wells	3 × 16 wells	1 × 96 wells	6 × 96 wells
Maximum throughput	16 wells	48 wells	96 wells	576 wells

RTCA HT (high throughput)

- 384-well format: Up to four instruments can be integrated and controlled by a single control unit, a total of 1536 wells.
- Automated screening: Automate your high-throughput workflow using a liquid handler for fully automated screening applications.

RTCA Cardio

- Cardiomyocyte contractility and viability: Monitor cardiomyocyte beating in real-time for cardiotoxicity assessment.
- Physiologically relevant: No labels are needed for studying stem cell-derived, induced pluripotent stem cell (iPSC)-derived, or primary cardiomyocytes.

RTCA CardioECR

- Cardiomyocyte contractility, viability, field potential, and pacing: All the functionalities of the RTCA Cardio instrument are present with the added capacity to measure extracellular field potential and perform cardiomyocyte pacing. Pacing protocols can be used to functionally mature cardiomyocytes, a useful tool when screening inotropic compounds.
- Versatile: Monitor cells over both short and long durations, allowing for assessment of structural cardiotoxicity.

RTCA eSight

- 3 × 96-well format with impedance, 5 × 96-well format with imaging.
- Rapid measurement: Read a 96-well plate in 15 seconds with the xCELLigence biosensor technology, and image an entire 96-well plate in 6 minutes.
- Imaging platform supports three fluorescence channels, a plethora of well plate formats, an array of reporter reagents, and flexible user-defined schedules.

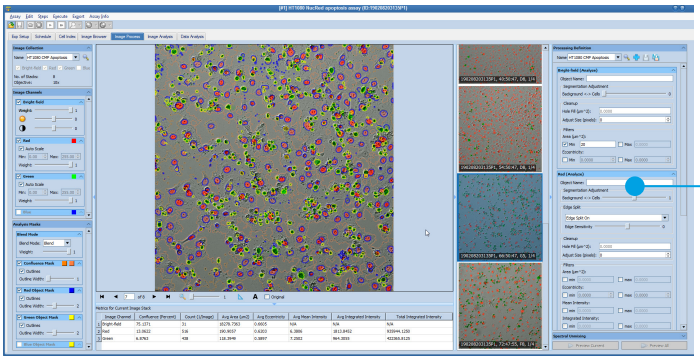
Assays	RTCA HT	RTCA Cardio	RTCA CardioECR	RTCA eSight
Cell characterization/QC	✓	✓	✓	✓
Immunotherapy/cell killing	✓	✓	✓	✓
Adhesion	✓	✓	✓	✓
Receptor signaling	✓	✓	✓	✓
Cell invasion/migration				
Cardiotoxicity		✓	✓	
Extracellular recording			✓	
Live cell imaging				✓

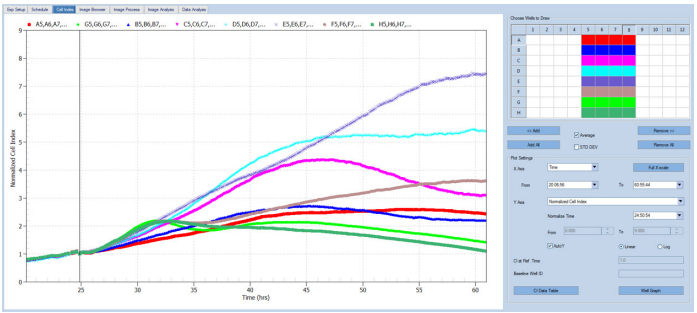
Specs				
Format	1 × 384 wells	1 × 96 wells	1 × 48 wells	3 x 96 wells impedance 5 x 96 wells imaging
Maximum throughput	384 wells	96 wells	48 wells	288 wells impedance up to 480 wells total for imaging

Technology Behind xCELLigence RTCA

Noninvasive and label-free cell monitoring

The xCELLigence technology uses proprietary microplates (E-Plates) embedded with gold biosensors at the bottom of each well, which noninvasively quantify cell behavior. Over the course of an experiment, the biosensors monitor cell metrics such as proliferation, adhesion, morphology, migration, differentiation and more through the electric impedance measurement.





Single setup for dual measurements with the eSight

Live cell imaging and real-time biosensor measurements are performed on the same cell populations to provide rich information about cell behavior. Place the plates in the incubator, set up real-time data acquisition and analysis parameters, then let the xCELLigence do the work.

Compatible with a wide range of cell based assays

Dynamic changes in cell number, cell size, cell barrier function, and cell-substrate attachment quality are influenced by a large number of biochemical pathways. Agilent xCELLigence can be used for dozens of different applications, including:

- Immune cell killing
- Cell invasion and migration
- Cardiotoxicity testing
- Drug discovery/development
- Receptor signaling
- Virus cytopathic effects
- Biofilm dynamics
- Cell-cell interactions

E-Plates for xCELLigence

E-Plate

Gold biosensors enable dynamic monitoring in a label-free manner

E-Plates are single use, disposable devices used for performing cell-based assays on the xCELLigence instruments. Plate dimensions and well spacing are similar to industry standards. As seen Figure 1, the gold biosensors cover approximately 80% of the well bottom. This design enables large populations of cells to be monitored simultaneously, providing sensitivity to dynamic changes in the physical properties of the cells.

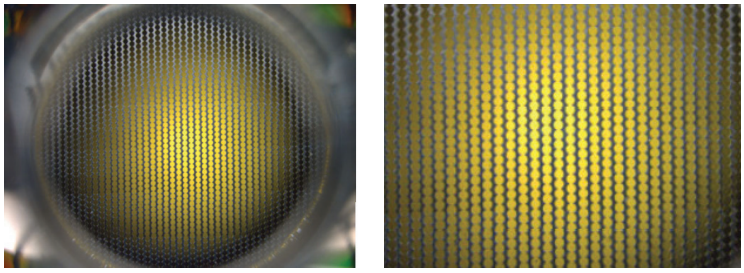


Figure 1. Left: View looking down into an E-Plate well. Right: Zoomed in view of E-Plate biosensors.

E-Plate VIEW

Visualize cellular changes

Combine biosensor-based monitoring of cell behavior with visual inspection in a single plate. The sensor-free window makes it possible to correlate the biosensor signal with changes in physical parameters, such as cell number or size.

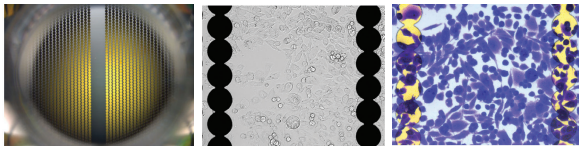


Figure 2. Left: View looking down into an E-Plate VIEW well. Center and right: Views of cells within the biosensor-free region.

E-Plate PET

Same performance, lower cost

In standard E-Plates, the gold biosensors are integrated into glass-bottomed wells. As an alternative to glass, polyethylene terephthalate (PET) plates are also available. While cell adhesion to, and proliferation on, PET is similar to glass (see Figure 3), some cell types display a preference for one substrate over the other. The availability of both plate types enables optimization during xCELLigence assay development.

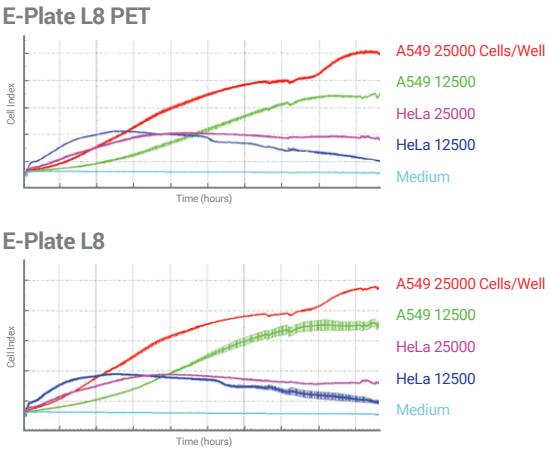


Figure 3. Cell proliferation in standard glass vs. PET E-Plates.

CIM-plates

Monitor cell invasion and migration in real time

Cell Invasion and Migration plates (CIM-plate; used exclusively with the xCELLigence RTCA DP system) contain electronically integrated Boyden chambers that provide quantitative kinetic data for migration and invasion. The data is delivered in real time without the use of labels, and requires minimal hands-on time from the researcher.

As cells move from the upper chamber towards chemoattractant in the lower chamber, they pass through a membrane containing 8 µm pores and adhere to gold biosensors. The resulting change in signal perfectly correlates with the number of cells attached to these electrodes, enabling easy collection of highly reproducible data over time.

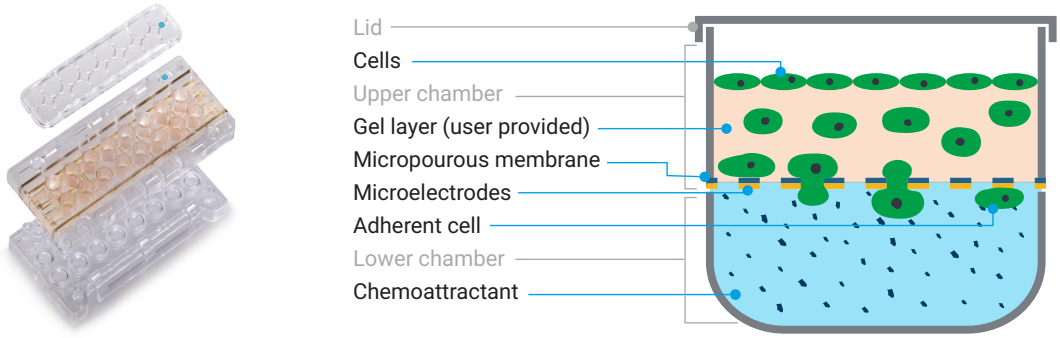


Figure 4. Left: Components of the CIM-plate. Right: Schematic of an invasion assay.

E-Plate inserts

Coculture to easily measure indirect interactions between cells

The E-Plate Insert enables investigation of specific cell-cell interactions in real time, while maintaining the cells in separate compartments. Coculture different cell types under physiological conditions for a broad range of applications.

- Easily add compounds or replace media during an experiment using an access port in the E-Plate Insert.
- Perform real-time coculture experiments under physiological conditions.
- The 16-well E-Plate Insert is compatible with multiple E-Plate formats.

Table 1. Instrument bundle (complete system) includes an analyzer, station, and control unit for each product line.

Instruments - System Bundle	Part No.
Bundle - SP	00380601030
Bundle - MP	00380601040
Bundle - DP	00380601050
Bundle - HT	00380601070
Bundle - Cardio	00380601060
Bundle - CardioECR	00380601210
Bundle - eSight	00380601600

Table 2. xCELLigence E-Plates and accessories

Consumables	Part No.
E-Plate 16 (1 × 6 plates)	05469830001
E-Plate 16 (6 × 6 plates)	05469813001
E-Plate VIEW 16 (1 × 6 plates)	06324738001
E-Plate VIEW 16 (6 × 6 plates)	06324746001
E-Plate VIEW 16 PET (1 × 6 plates)	00300600890
E-Plate VIEW 16 PET (6 × 6 plates)	00300600880
E-Plate Insert 16 (6 × 16 well inserts)	06465382001
E-Plate 96 (1 × 6 plates)	05232368001
E-Plate 96 (6 × 6 plates)	05232376001
E-Plate VIEW 96 (1 × 6 plates)	06472451001
E-Plate VIEW 96 (6 × 6 plates)	06472460001
E-Plate VIEW 96 PET (1 × 6 plates)	00300600910
E-Plate VIEW 96 PET (6 × 6 plates)	00300600900
E-Plate insert 96 (36 × 16 well inserts)	06465412001
E-Plate insert 96 accessories (6 receiver plates and lids)	06465455001
E-Plate 384 (2 × 5 plates)	05867681001
E-Plate 384 (8 × 5 plates)	05867673001
RTCA CIM-plate 16 (1 × 6 plates)	05665817001
RTCA CIM-plate 16 (6 × 6 plates)	05665825001
E-Plate Cardio 96 (1 × 6 plates)	06417051001
E-Plate Cardio 96 (6 × 6 plates)	06417035001
E-Plate CardioECR 48 (1 × 6 plates)	00300600940
E-Plate CardioECR 48 (6 × 6 plates)	00300600950

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Published in the USA, November 1, 2019
5994-1596EN
DE.561087963

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