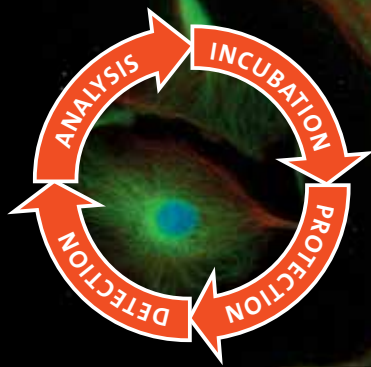




## Spark™ 10M multimode microplate reader

Ignite your laboratory's productivity with a high performance detection platform



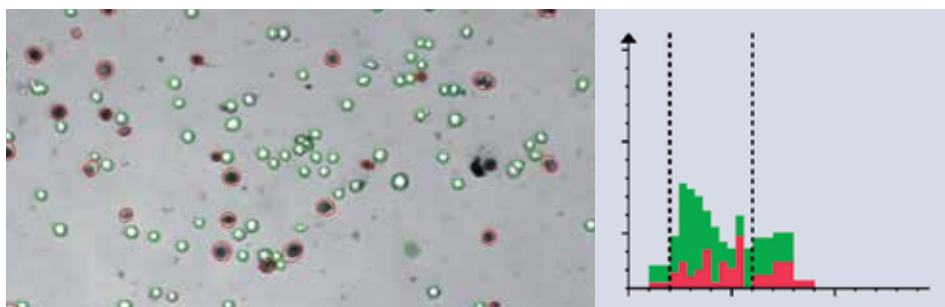
# Engineered with cellular assays in mind



## Capabilities

- Cell counting and viability analysis
- Cell incubation
- Evaporation protection
- Automated microplate lid handling
- Reagent dispensing with heating and stirring
- Absorbance
- DNA quantification
- Cuvette port
- Fluorescence intensity
- Time-resolved fluorescence (TRF)
- Fluorescence resonance energy transfer (FRET)
- Time-resolved fluorescence resonance energy transfer (TR-FRET)
- Fluorescence polarization
- Luminescence (flash and glow)
- Alpha Technology
- Luminescence scanning
- Multi-color luminescence (BRET, BRET<sup>2</sup>, BRET<sup>3</sup>, Chroma-Glo<sup>™</sup>)
- SparkControl<sup>™</sup> software
- SparkControl Magellan<sup>™</sup>

At Tecan, we understand the demands of cell-based applications and the challenges they pose every day. For optimum assay performance and reliable results, you need a plate reader that offers a range of specialized features and capabilities that ensure ideal cellular conditions. And that's exactly what you get with the Spark 10M.



*With a single click, SparkControl<sup>™</sup> gives you fast, accurate cell counts for live/dead analysis*

## Label-free cell counting and fast viability analysis

With its built-in cell counter, the Spark 10M can analyze a broad range of cell sizes and types, providing fully automated label-free cell counting and analysis in less than 30 seconds.

- Accurate, reproducible cell counting, with flexible area selection for greater sensitivity
- One-click analysis providing cell number, size distribution and viability
- Export cell images for visual confirmation
- High precision cell counting, even at low concentrations
- Automated replicate processing for multiple samples in disposable Cell Chips<sup>™</sup>



*Tecan's innovative Cell Chips minimize sample preparation, offering greater application flexibility and opening up new cell counting possibilities*



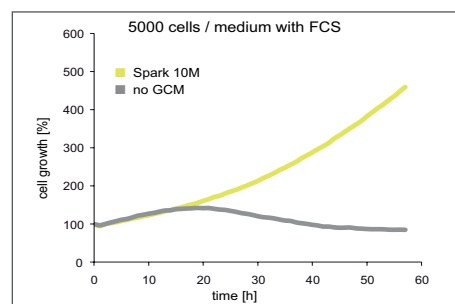
*Spark 10M lets you generate automatic mean value calculations of samples in multiple disposable Cell Chips*

No matter what your application, the Spark 10M multimode reader delivers the ideal combination of advanced capabilities and exceptional ease-of-use, enhancing productivity with a series of unique features and benefits.

#### Maintain stable culture conditions and improve cell growth

An integrated Gas Control Module (GCM™) features two independent gas inlets that allow automated control of CO<sub>2</sub> and O<sub>2</sub> concentrations inside the reader chamber for:

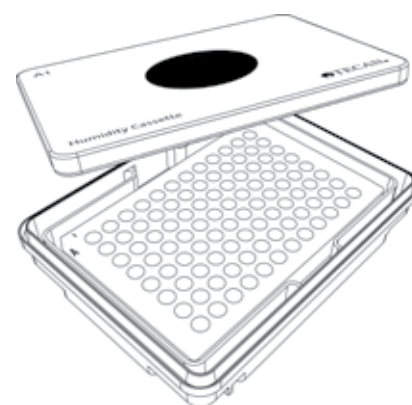
- Stable long-term cell culture environments
- Improved cell viability and extended experiment times without adversely affecting results
- Optimization of gas levels and mixtures with independent regulation of CO<sub>2</sub> and O<sub>2</sub> concentrations
- Software-controlled, automated adjustments for real-time modulation of gas concentrations during a run



Comparison of cell proliferation in the Spark 10M reader with integrated GCM and a standard microplate reader

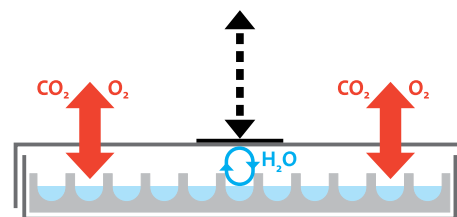
#### Evaporation protection to enhance cell viability

Built-in evaporation protection enhances live cell kinetic assays for better reproducibility and more reliable data. A patent-pending Humidity Cassette reduces evaporation in standard microplates, minimizing edge effects and enabling long-term live kinetic studies without the need to switch to dedicated and costly microplate types; simply use your current, already validated plates.



#### Minimize evaporation and contamination with automated microplate lid handling

The integrated microplate Lid Lifter™ simplifies applications such as absorbance and luminescence assays by automatically removing the lid for measurements. It gives you the flexibility to perform automated reagent additions during an experiment without manual intervention. This patent-pending feature optimizes CO<sub>2</sub> /O<sub>2</sub> exchange and minimizes evaporation, allowing walkaway automation for experiments such as long-term kinetic assays.



#### Reagent dispenser with heating and stirring enhances application flexibility

Integrated injectors help to generate consistent data by eliminating precipitation and salt formation. Independent heating and stirring capabilities increase the reliability and reproducibility of compound handling, as well as enabling automated dispensing of viable cells.

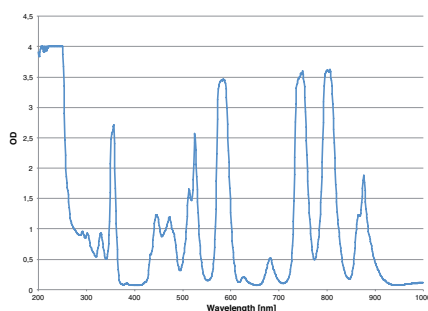


Designed for flexibility. Engineered for performance.



### Broaden your format flexibility

Spark 10M reads cuvettes, the low-volume NanoQuant Plate™, disposable Cell Chips, and is also compatible with all standard ANSI/SLAS microplate formats up to 384 wells.



Fast absorbance scan of a Didymium filter from 200-1000 nm with 1 nm resolution

### Absorbance – get a full spectrum quickly, with ultra-fast absorbance measurements

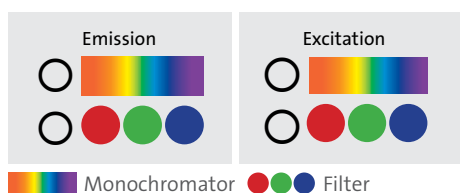
Spark 10M's patent-pending High-Speed Monochromator (HSM) delivers complete spectra – from 200 to 1,000 nm – in just five seconds. These ultra-fast measurements offer the speed of a diode array with the precision and flexibility of a monochromator for wide-ranging and detailed spectra.



### Ultra-fast DNA quantification

With its High-Speed absorbance Monochromator, the Spark 10M provides unparalleled wavelength accuracy for DNA and protein quantification:

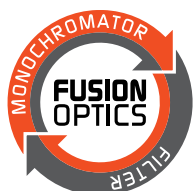
- Increased performance and dynamic range from UV to NIR
- Full spectrum data from 200-1,000 nm in less than five seconds
- High accuracy, especially in the deep UV range (230/260), for maximum confidence in your DNA sample QC
- An OD range from 0-4 for high linearity, requiring fewer dilutions and less manual pipetting



### Fluorescence – Fusion Optics deliver the best of both worlds

Spark 10M delivers unmatched performance by being the first instrument to offer independent, user-selectable filters and monochromators on both the excitation AND emission side for any measurement. So you don't have to choose between sensitivity OR flexibility – for the first time ever you can have both. Every well. Every assay. Every time. From both the top and bottom of your sample.

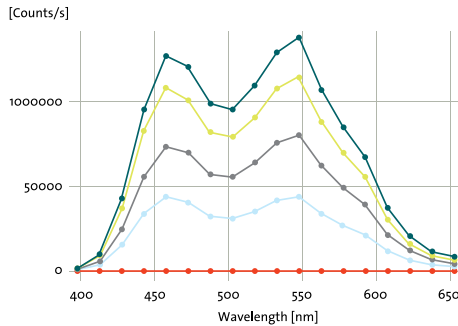
Fusion Optics:  
The easiest access to flexibility and sensitivity – always freely selectable in the SparkControl software



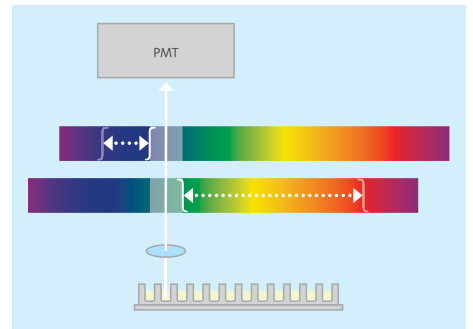


### Unparalleled flexibility for luminescence

Optimize your assays with Spark 10M's multi-color luminescence option. The system offers an excellent dynamic range of  $10^9$  using up to 3 OD attenuation, with 40 user-selectable filters to provide unprecedented freedom for virtually any luminescence measurements, including BRET<sub>1,2,3</sub> and Chroma-Glo.



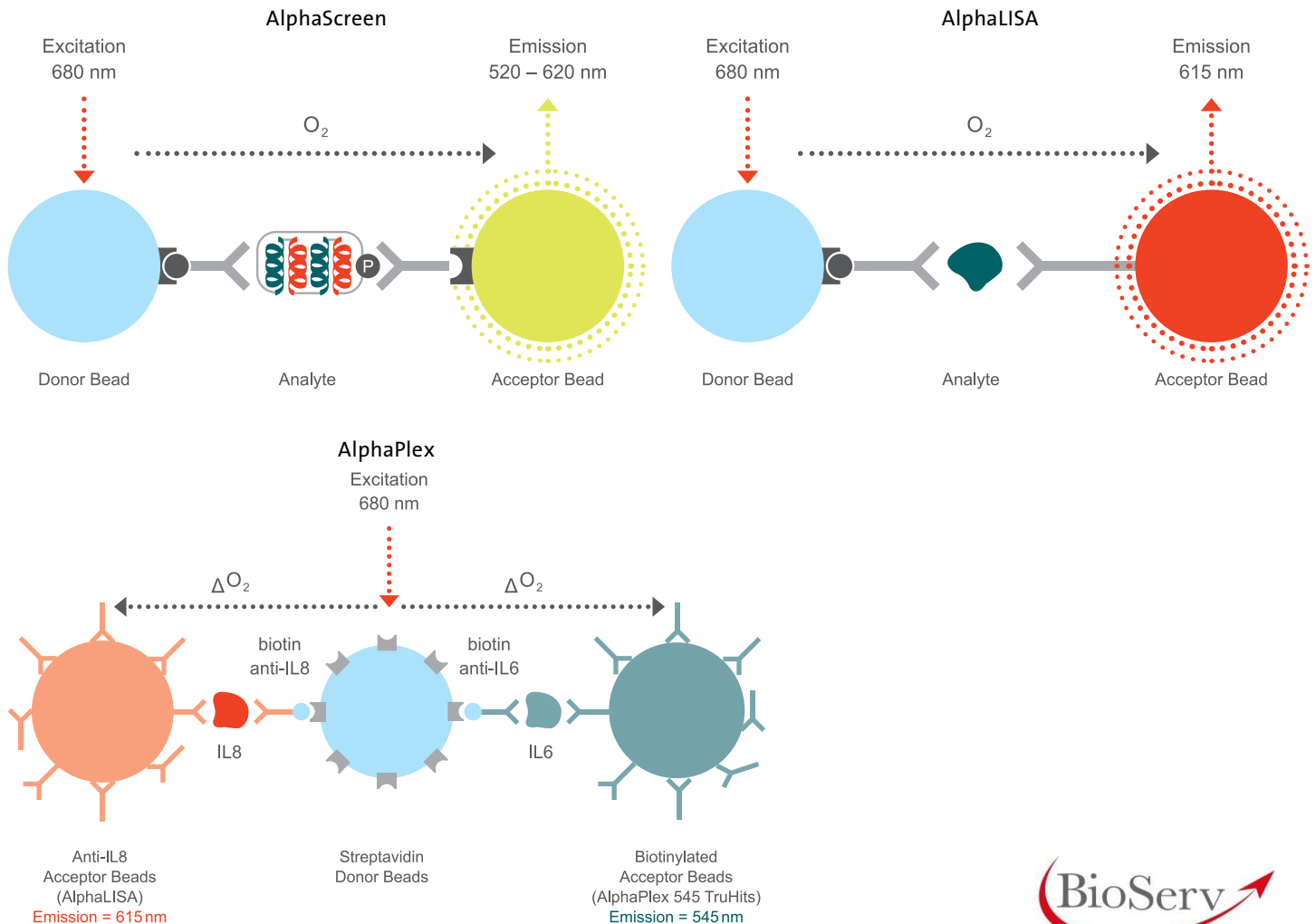
Enhance your assay performance and flexibility with multi-color luminescence and luminescence scanning.



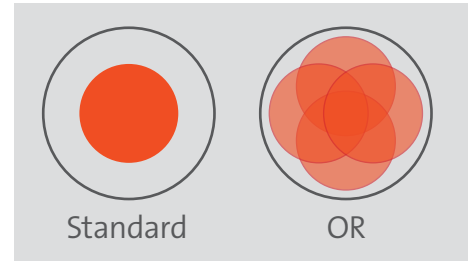
Schematic of the Spark 10M's enhanced luminescence module. Using a unique filter-based technique, the desired detection wavelength for multi-color luminescence measurements can be selected with only a few mouse clicks.

### High performance Alpha Technology

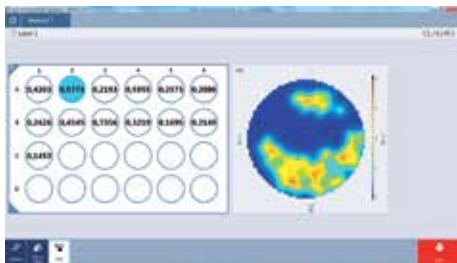
Alpha Technology comprises AlphaScreen<sup>®</sup>, AlphaLISA<sup>®</sup> and AlphaPlex<sup>™</sup>, and is a luminescent bead-based assay technology designed for the measurement of biological interactions. Spark 10M is equipped with a high performance laser light source for excitation and an IR sensor for well-by-well temperature correction. This results in better sensitivity, uniformity, and linearity for your Alpha assays. SparkControl also offers pre-selected filter settings for AlphaScreen, AlphaLISA and AlphaPlex, as well as user-selectable filter settings for future Alpha Technology applications.



Fast, simple instrument operation is at your fingertips with SparkControl's touch-optimized, intuitive interface. Engineered to simplify your daily laboratory tasks, SparkControl offers:



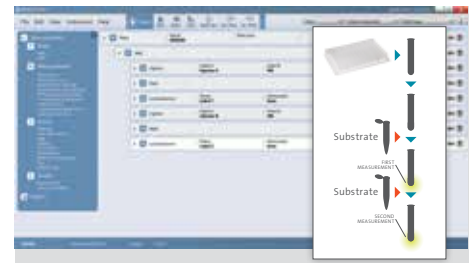
**Optimized fluorescence bottom-reading** with Tecan's unique Optimal Read (OR) function. OR ensures very low CVs by performing multiple measurements on spatially separated spots arrayed across each well.



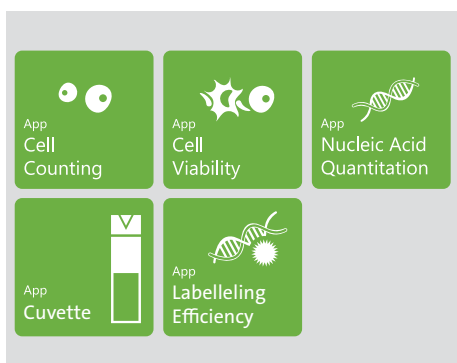
**High definition well scans** provide a complete picture of the cell population in each well for more accurate signals, even with inhomogeneous cell layers. The software also provides a qualitative image of the cell distribution.



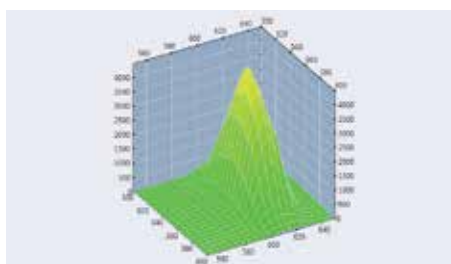
SparkControl makes it **easy to adjust parameters** during a run, including **environmental conditions** such as the CO<sub>2</sub> and O<sub>2</sub> levels inside the reader.



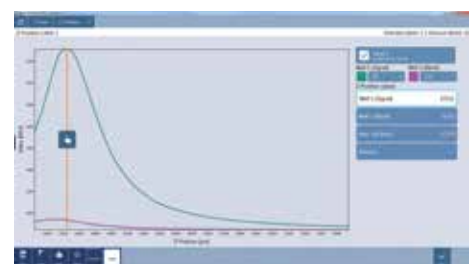
**Get instant access** to applications and enjoy easy operation with SparkControl's one-click, workflow-based interface. The software makes it easy and intuitive to translate your workflow into a saved protocol that can be run or edited at any time.



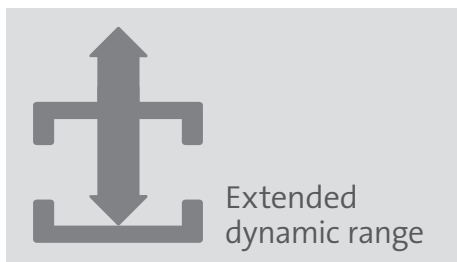
**One-click applications** streamline your workflows, getting you from sample to results faster than ever before.



**3D scanning** accelerates assay development by providing simultaneous excitation and emission scans. This can help to identify changes in the spectral properties of fluorescent probes or characterize unknown fluorescent samples more quickly and easily.



**Automated z-focus** adjustment enhances the sensitivity of top-reading fluorescence intensity and fluorescence polarization modes, significantly improving the quality of results. No matter what your plate volume, sample volume or well shape, this unique feature makes it easy to set up your reader for optimum performance with varying assay parameters.



Extended dynamic range

Detect even very low signals with the Spark 10M's **extended dynamic range**. This function automatically adjusts the gain settings during a measurement run, allowing the detection of very low signals without compromising on sensitivity. All results are automatically correlated and displayed within one single data set.



Kinetic assay protection

Safeguard your kinetic assays using automated gain regulation to avoid fluorescence measurements running into saturation. Measurements with different gain settings are then automatically correlated, allowing evaluation of the entire dataset.



Run your experiments from anywhere, anytime, using SparkControl's **remote instrument control** and remote access capabilities. Simply use any network-enabled computer or tablet to:

- Start any measurement or one-click application
- Monitor your measurements in real time
- Evaluate results instantly for greater efficiency and productivity
- Adjust instrument settings, such as temperature and CO<sub>2</sub>/O<sub>2</sub> levels

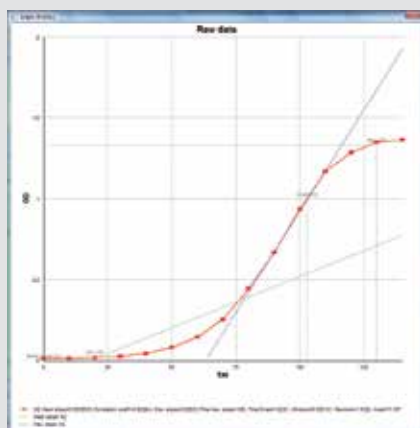
SparkControl Magellan™ is a data analysis package providing powerful data reduction tools for numerous detection modes.

SparkControl Magellan offers users an array of tools designed to enhance functionality, simplicity and security.

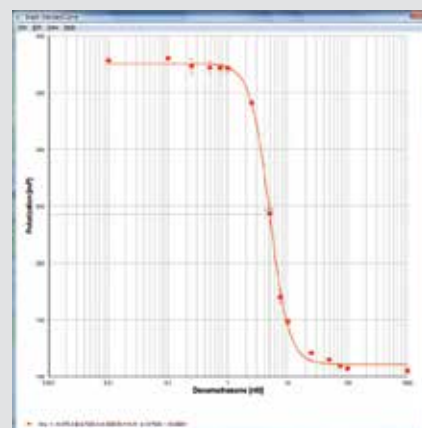
- Ideal for microplate-based applications such as ELISAs, end-point assays, kinetic assays, ratiometric measurements, multilabel measurements and 3D scanning.
- Rapidly perform everything from data reduction and curve fitting to the calculation of kinetic parameters, such as Michaelis-Menten constants.
- Video tutorials and example files simplify operation.
- Plate definition editor allows creation of customized plate geometry files.

The software provides a suite of sophisticated functions including:

- Full qualitative and quantitative EIA analysis.
- All major curve fittings, including point-to-point, linear regression, non-linear regression, polynomial, cubic spline, Akima, logit-log, four- and five-parameter fits.
- Convenient handling of dilution series and ICx calculations.
- General data import and export options, as well as automated import of sample ID lists.
- Kinetic data analysis with calculation of slopes, onsets and enzyme kinetics.
- Spectral calculations to provide rapid background correction, curve smoothing, wavelength selection, peak identification and 3D scanning.



SparkControl magellan makes it easy to perform complete kinetic data analyses including the calculation of slopes, onsets and enzyme kinetics.



Designed to simplify the user experience, SparkControl magellan conveniently handles all dilution series and ICx calculations.

SparkControl Magellan Tracker offers all the functionalities necessary for compliance with FDA regulation 21 CFR part 11 for electronic records and signatures, while still providing all the advantages of SparkControl Magellan Standard.



## Typical performance values\*

### Absorbance

Light source	Xenon flash lamp
Spectral range	200-1000 nm
OD range	0-4 OD
Scan speed (200-1,000 nm)	≤5 sec
Wavelength accuracy	≤0.8 nm
Wavelength reproducibility	≤0.5 nm
Wavelength ratio accuracy (260/230)	<0.08
Wavelength ratio accuracy (260/280)	<0.07
Precision @ 260 nm	≤0.2 %
Accuracy @ 260 nm	≤0.5 %
Limit of detection (nucleic acids)	<1 ng/μl

### Fluorescence intensity

Spectral range	Ex: 230-900 nm; Em: 280-900 nm
Wavelength accuracy	Ex: <1 nm; Em: <2 nm
Wavelength reproducibility	<1 nm
Well scanning	up to 100 x 100 data points

### Limit of detection<sup>1</sup>

Fusion F/F - top	≤0.25 pM (≤25 amol/well; 100 μl)
Fusion M/F - top	≤0.35 pM (≤35 amol/well; 100 μl)
Fusion F/M - top	≤0.35 pM (≤35 amol/well; 100 μl)
Fusion M/M - top	≤0.50 pM (≤50 amol/well; 100 μl)
Fusion F/F - bottom	≤2.5 pM (≤0.5 fmol/well; 200 μl)
Fusion M/F - bottom	≤3.5 pM (≤0.7 fmol/well; 200 μl)
Fusion F/M - bottom	≤3.5 pM (≤0.7 fmol/well; 200 μl)
Fusion M/M - bottom	≤4.0 pM (≤0.8 fmol/well; 200 μl)

### FP (Fluorescence polarization)<sup>2</sup>

Spectral range	300-850 nm
Limit of detection - Fusion F/F	≤1.5 mP
Limit of detection - Fusion F/M	≤2.5 mP
Limit of detection - Fusion M/F	≤2.5 mP
Limit of detection - Fusion M/M	≤3.0 mP

### TRF (Time-resolved fluorescence)<sup>3</sup>

Limit of detection - Fusion F/F	≤40 fM (≤4.0 amol/well; 100 μl)
Limit of detection - Fusion F/M	≤65 fM (≤6.5 amol/well; 100 μl)
Limit of detection - Fusion M/F	≤65 fM (≤6.5 amol/well; 100 μl)
Limit of detection - Fusion M/M	≤100 fM (≤10 amol/well; 100 μl)

### Luminescence

Spectral range	370-700 nm
Luminescence (glow)	
Limit of detection <sup>4</sup>	≤9 pM (≤250 amol/well; 25 μl)
Luminescence (flash)	
Limit of detection <sup>5</sup>	≤218 fM (≤12 amol/well; 55 μl)
Dynamic range	>9 orders of magnitude
Multi-color luminescence	38 spectral filters; OD <sub>1</sub> , OD <sub>2</sub> , OD <sub>3</sub> attenuation filters

### AlphaScreen

Limit of detection	≤100 amol/well bio-LCK-P <sup>6</sup> ; 20 μl ≤2.5 ng/ml Omnibeads <sup>7</sup> ; 20 μl
Uniformity	≤3.0 %
Z' value	≥0.9
Fastest read times <sup>8</sup>	≤2 min (384-well plate); ≤1 min (96-well plate)

### Cell counting

Size range	4-90 μm
Counting accuracy	+/-10 % (10-30 μm)
Counting reproducibility	<10 % (10-30 μm)
Cell concentration	1x10 <sup>4</sup> -1x10 <sup>7</sup> cells/ml
Imaging speed inc. data reduction	<30 sec/sample
Number of samples/run	≤8 samples

### Gas Control Module

Adjustable concentration range - CO <sub>2</sub>	0.04-10 % (vol.)
Adjustable concentration range - O <sub>2</sub>	0.1-21 % (vol.)
Concentration accuracy - CO <sub>2</sub>	<1 % (vol.)
Concentration accuracy - O <sub>2</sub>	<0.5 % (vol.)

### Reagent injectors

Syringe sizes	0.5 ml; 1 ml
Pump speed	100-300 μl/sec
Injection volume	5-1,000 μl; step size: 1 μl
Dead volume	≤100 μl
Injection accuracy and precision	≤0.5 % at 450 μl

### Temperature control

Ambient +4 °C (up to 42 °C)

### Uniformity

<0.5 °C

### Shaking

Linear, orbital, double-orbital; variable amplitudes and frequencies

### Plate formats

1-384 wells; NanoQuant Plate; Cell Chip; cuvettes

### Fastest read time

96 well plate (FI)	≤13 sec
384 well plate (FI)	≤30 sec

### For research use only. Not for use in diagnostic procedures.

\*Specifications are subject to change. Performance values represent the average observed factory tested values.

- 1) Detection limit for fluorescein; Fusion Optics: F-Filter; M-Monochromator;
  - 2) FP detection limit @ 1 nM fluorescein
  - 3) Detection limit for Europium
  - 4) Detection limit for ATP (144-041 ATP detection kit SL (BioThema))
  - 5) Detection limit for ATP (ENLITEN® Kit)
  - 6) (PE# 6760620; P-Tyr-100 assay kit)
  - 7) (PE# 6760626D; Omnibeads)
  - 8) Including temperature correction
- For product specifications refer to operators manual.



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