



**Lumat<sup>3</sup> LB 9508**  
Ultra-Sensitive Tube Luminometer\*

*detect and identify*



## Lumat<sup>3</sup> LB 9508

**Ultra-Sensitive Tube Luminometer\***

### **The Golden Standard of Tube Luminometers**

Already in its 3<sup>rd</sup> generation the Lumat<sup>3</sup> offers the functionality, versatility and superior performance you can expect from an instrument developed by Berthold Technologies. The tube luminometer Lumat<sup>3</sup> has all the key features needed for today's research applications.

On top, the Lumat<sup>3</sup> is available in configurations optimised for clinical diagnostics.

Based on the experience of developing and building luminometers for more than 30 years the Lumat<sup>3</sup> is a tube luminometer with state-of-the-art technology.



# Sensitivity

## Low level detection

True photon counting technology coupled with selected low noise photomultipliers and an optimised optical design is the only accepted way to achieve a low and stable background. This is a major parameter for high sensitivity in a luminescence measuring system enabling detection of extremely low amounts of analyte

- less than 1 amol ATP per tube
- less than 0.5 zmol firefly luciferase per tube

## Save reagents and money

The high sensitivity derived from the photon counting technology and the selected low noise photomultiplier tubes offers an additional benefit when detecting the lowest signal levels is not the key to an assay. In those cases the consumption of expensive reagents or valuable cells can be greatly reduced.

## Save time

In assays in which detecting lowest amounts of signal is not the driving force you can significantly reduce the reading time per sample in the Lumat<sup>3</sup> and save valuable total operation time. Again, this is achieved by the high sensitivity of the instrument.

# Dynamic Range

## Large by default

Photon counting technology is characterised by a large dynamic range defined at the lower end by the low noise of the selected photomultiplier. The upper end is defined by the ability of the counting electronics to record and differentiate single pulses out of an avalanche of pulses. The Lumat<sup>3</sup> is able to count up to 25 Mio pulses per second equivalent to a dynamic range spanning 7 orders of magnitude.

As no additional adjustments (such as gain and high voltage settings) are needed the Lumat<sup>3</sup> offers convenience and security for every measurement over the entire life of the instrument.

## Reliability & Precision

### Get the same from the same

Precise mechanics and the intrinsic stability of photon counting technology guarantee unrivalled repeatability of measurements. The instrument's performance is stable over years. Time-consuming daily calibration is thus unnecessary and you can concentrate on other and more important duties.

## Accuracy

### The real value counts

Like all Berthold Technologies instruments the Lumat<sup>3</sup> comes to your laboratory checked against a certified light source. With this reassurance you are able to work with accurate, traceable and comparable results.

## Robustness

### A companion for years

Berthold Technologies instruments are known for their quality and longevity providing a working life of decades. This is a feature gaining in importance with today's limited budgets and environmental awareness.

## Ease of use

### Intuitive handling and operation

Loading of the tubes is as easy and straightforward as defining a measurement protocol and as starting a measurement with the user-friendly ICE software. You will intuitively know your next click!





## Flexibility

### Lumi vials and Eppendorf tubes

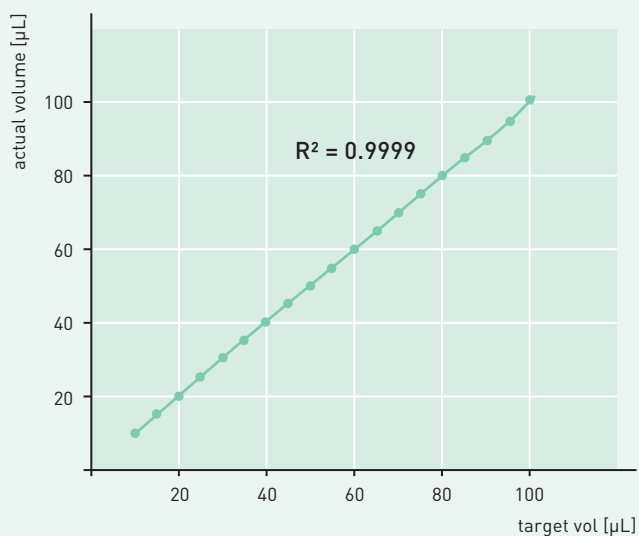
In addition to all types of 12 mm lumi vials the Lumat<sup>3</sup> accepts Eppendorf tubes in 1 mL to 2 mL sizes.

### Choice of reagent injectors

The instrument can be equipped according to needs with either no or 2 reagent injectors with variable volume. You have the choice between a 100  $\mu$ L and a 300  $\mu$ L size injector.

## JET injectors

Berthold JET injectors are based on a proprietary technology using Teflon bellows for accurate and fast injections guaranteeing most efficient mixing and ensure extreme longevity.



- **Accuracy and precision** of better than 98 % over the entire volume range
- **Frictionless** operation for extended life-time
- **Cell-friendly materials** and negligible shear forces enable injection of cell suspensions, e.g. in Aequorin-based Calcium assays
- **Sophisticated Prime mode** reduces reagent consumption while ensuring homogeneous filling

# ICE Software

## Wizard guidance

The Instrument Control and Evaluation software has been designed with the requirements of today's researchers in mind: The ease of use during protocol creation, measurement and data export has been achieved with the wizard-guided and clearly structured ICE software.

## Intuitive Dialogues and Displays

Starting a measurement, displaying results and exporting data is straight forward due to clearly structured screens and intuitive dialogues. During routine operation you simply select the required protocol, load the tube and start the measurement.

## Measurement Modes

The software supports single and dual endpoint measurements (e.g. DLR®) as well as kinetic measurements which are useful to monitor enzymatic reactions.

- Endpoint Single
- Endpoint Dual
- Kinetic Single

## Curve Fitting

Assays requiring the calculation of concentrations based on measured standards are created with the Immunoassay protocol wizard. Up to 10 standard concentrations can be used for a point-to-point interpolation.

For more sophisticated curve fitting the full immunoassay version offers additional features

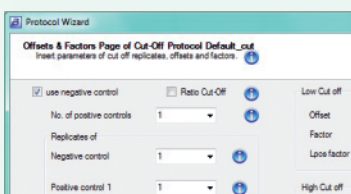
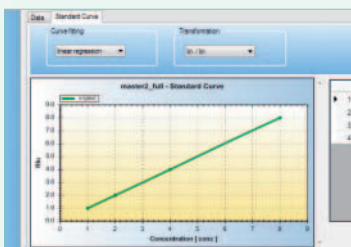
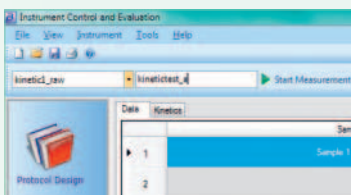
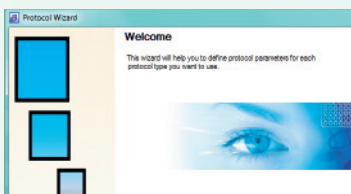
- cubic spline
- log/log
- master curve
- linear regression
- logit/log
- reference curve

## Cut-off measurements

This specific protocol wizard provides a step-by-step definition of settings for upper and lower limits. The results are flagged when the measured data are beyond the defined cut-off values.

## Report and Export

For documentation of results the powerful report function offers multiple selection options including the choice of saving the report in XLS, DOC, RTF or PDF file formats or simply printing a hardcopy.



# Applications

## Reporter Gene Assays

In basic research of gene regulation as well as in drug discovery the use of luciferases,  $\beta$ -glucuronidases,  $\beta$ -galactosidases and secreted alkaline phosphatases have become a standard tool offering the highest sensitivity. Especially dual luminescence type assays, e.g. Dual-Luciferase<sup>®</sup> Reporter Gene Assay, have become a favourite means as they provide an internal control for transfection efficiency or general expression level.

## Luminescent Immunoassays [1]

By replacing colorimetric substrates of horseradish peroxidase or phosphatases with luminescent labels an increase in sensitivity up to 100-fold can be achieved. ICE software and its curve fitting function add convenient and extensive data evaluation capabilities to the superb instrument performance.

## Caspase Assays [2]

Monitoring the activity of caspases – a group of cystein-aspartic acid peptidases – is a key method in apoptosis research. The assays are designed around specific peptide substrates for Caspase 3, 7, 8 and 9 respectively which will be cleaved when caspases are present indicating cells are in an apoptotic state. Assay technologies are available with luminescent readout through the release of luciferin which acts as the substrate for the subsequent light generating luciferase reaction.

## Kinase Assays

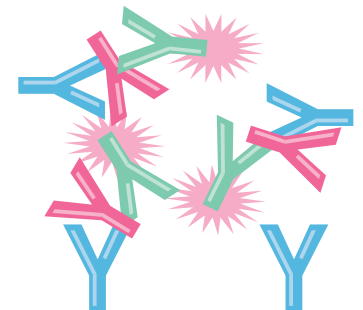
The luciferase reaction can be used as well for monitoring kinases. Kinases are modifying the activity of specific proteins and are extensively used to transmit signals and control complex processes in cells. Their enormous diversity and their role in signal transduction make them attractive targets for research and drug design.

## ATP determination [3]

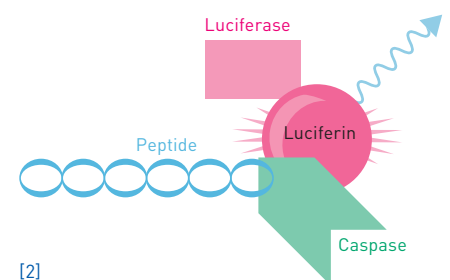
Assays for ATP determination – based on the light generating firefly reaction – can be measured with the Lumat<sup>3</sup>. Since all living cells contain ATP, cell proliferation assays or bacterial detection assays can be measured with the instrument, too.

## Toxicity and mutagenicity of water samples [4]

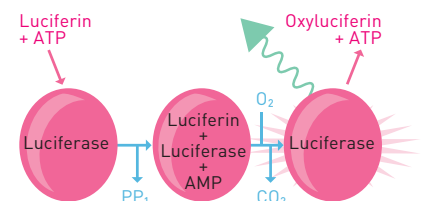
When luminescent bacteria, e.g. *Vibrio fischeri*, are inoculated in water samples containing toxic substances they lose their ability to luminesce dependent on the toxicity of the water sample.



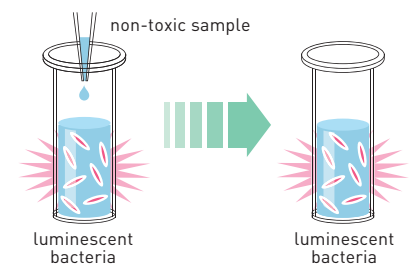
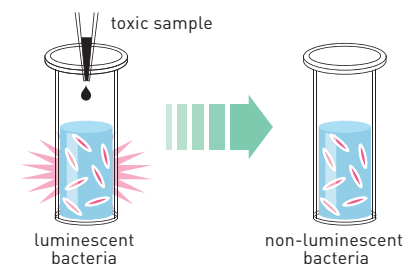
[1]



[2]



[3]



[4]

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## Technical Specification and Order Information

Detection unit	Low-noise photomultiplier tube in single photon counting mode; spectral range: 380 – 630 nm
Sensitivity	Standard models: 5 amol ATP; < 5 zmol firefly luciferase High sensitivity models: < 1 amol ATP; < 1 zmol firefly luciferase
Dynamic range	> 6 orders of magnitude
Injection Unit	Up to 2 (variable volume: 10 – 100 µL or 25 – 300 µL); JET injection technology; precision: >98 %; accuracy: >98 %
Measuring chamber	Motor driven rotating chamber for two tubes (one for measuring and one for loading/unloading)
Tube formats	Lumivials 12 x 47 mm (09777) Lumivials 12 x 55 mm (26152) Lumivials 12 x 75 mm (09778) Eppendorf tubes 1 mL, 1.5 mL and 2 mL
Interface	USB
PC operating system	WinXP, WinVista, Win7
PC requirements	Pentium processor, 500 MHz (or better), CD ROM drive, display 1024 x 768 (or better), USB
Power supply	110 – 240 V, 50/60 Hz, 30 VA External autoranging mains adaptor
Regulations	CE, UL
Temperature range	Storage: 0 – 40 °C Operation: 15 – 35 °C
Humidity	10 – 85 % non condensing
Dimensions	240 x 280 x 220 mm (W x D x H)
Weight	4 Kg

### Operation modes

Single measurement	0.1 to 600 s
Dual measurement	each 0.1 to 600 s
Delay	up to 600 s

### ICE Software

- Single endpoint measurements
- Definition of tube sequence and replicates
- Wizard support during parameter definition
- Full standardisation (up to 10 standards)

### Research version

- Dual endpoint measurements
- Kinetic measurements
- Ratio and subtraction calculations
- Point-to-point standard curve calculation
- Axis transformation: lin/lin
- Automatic data export in EXCEL format

### Immunoassay version

- Standard curve calculation: cubic spline, linear regression, point-to-point
- Selection of axis transformation: log/log, logit/log, lin/lin
- Immunometric (ILMA) and competitive (LIA) immunoassays
- Master curve (universal standard curve with calibrators)
- Reference curve (measured curve becomes master curve)
- Use of last curve
- Support of lot numbers of kits (GLP)
- Cut-off measurements
- Multiple options for report setup
- Export as EXCEL, PDF, RTF or DOC formats

### Order information

Order information	Order Number
Lumat <sup>3</sup> LB 9508 incl. ICE Research	54030-10
Lumat <sup>3</sup> Reporter Gene, 2 injectors (100 µL) incl. ICE Research	54030-20
Lumat <sup>3</sup> Immunoassay, 2 injectors (300 µL) incl. ICE Immunoassay	54030-30
Lumat <sup>3</sup> XS, 2 injectors (100 µL) incl. ICE Research	54030-21
ICE software upgrade (Research → Advanced)	53615-02
ICE software upgrade (Immunoassay → Advanced)	53615-01
Adapter lumi vials #1	56729-1
Adapter lumi vials #2	56729-2
Adapter Eppendorf #1	57064-1
Adapter Eppendorf #2	57064-2
Lumi vials 5 mL, 12 x 75 mm, 3000 pieces	09778
Lumi vials 3.5 mL, 12 x 55 mm, 2000 pieces	26152
Lumi vials 3 mL, 12 x 47 mm, irradiated, 1000 pieces	09777
Reagent filters, 5 pcs	43193
Luminescence test kit reagents	43345
Luminescence test kit label	43346
Cleanit Daily, injector cleaning solution	45218

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