

# Luminometer Overview **2005**

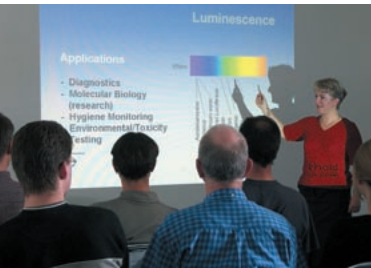
Your Partner for Luminescence Measurement





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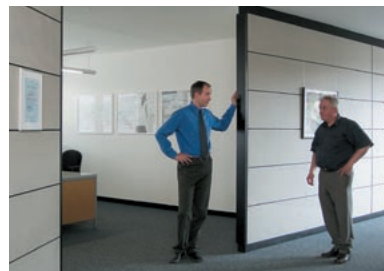
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# Company Information Introduction



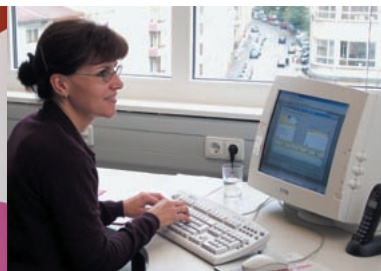
Berthold Detection Systems is specialized in the development, manufacturing and distribution of high performance instruments for the measurement of bio- and chemiluminescence. We provide high-quality, sensitive and easy-to-use luminometers for worldwide biomedical, pharmaceutical, biotechnological and fundamental research communities.



Berthold Detection Systems established a new generation of luminometers covering two innovative product lines which accommodate single sample formats and microplate formats. We offer comprehensive system solutions including stand-alone instruments, instruments for routine applications as well as sophisticated and flexible instruments which meet specific research needs. Flexible and intuitive software, specifically designed and developed for our products, provides user friendly operation.

Berthold Detection Systems implemented ISO 9001 compliant Quality Management System in 1997. In 2003, we were registered as an ISO 9001:2000 compliant company.

Committed to be your partner in luminescence measurement, we continue to expand our product line in order to meet the requirements of existing, as well as future applications based on luminescence technology.



# FB12 Single Tube Luminometer

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The FB12 single tube luminometer combines outstanding sensitivity with ease of use, and sample versatility.

Due to the unique design the FB12 does not have minimum sample volume limitation.

The sample is loaded into a retractable drawer with interchangeable sample adapters. The luminometer is equipped with a sensor, which will start the measurement cycle automatically upon complete closing of the drawer.



- Applications
- Reporter gene assays
  - ATP measurements
  - Toxicity assays
  - Cell culture contamination (mycoplasma)

Technical Data	<b>Detector</b>	Photon counting PMT, spectral range: 300–600 nm.
	<b>Sensitivity</b>	better than 1000 molecules of firefly luciferase.
	<b>Dynamic Range</b>	6 decades.
	<b>Sample Format</b>	12 mm diam. tubes, microfuge tubes, 35 mm culture dishes, liquid scintillation vials up to 20 ml.
	<b>On-board Software</b>	sets delay and measurement time in 0.1s increments, continuous measurement mode.
	<b>PC Software</b>	Quick Measurement Single Assay, Dual Assay, Kinetics, Cut-off assay.
	<b>Data Port</b>	RS-232 (serial interface).
	<b>Power Requirements</b>	12 V, 600 mA, supplied through AC/DC adapter (included).
	<b>Dimensions</b>	H: 9" (22 cm) x W: 9" (22cm) x D: 8" (20 cm).
	<b>Weight</b>	5.5 LB (2.5 kg).
<b>External Printer</b>	optional.	

Ordering Info	<b>110 101 02</b>	FB12 luminometer with basic PC software and accessories.
	<b>155 200 12</b>	Single Assay and Dual Assay Protocols.
	<b>155 200 13</b>	Single Kinetics and Multiple Kinetics Protocols.
	<b>155 200 14</b>	Cut-off Assay Protocol.

# Sirius Single Tube Luminometer

The Sirius is a high sensitivity single tube luminometer with built-in printer and on-board software. It is upgradeable with up to 2 injectors. The Sirius does not have a minimum sample volume requirement. The sample is loaded into a retractable drawer with interchangeable sample adapters. The luminometer is equipped with a sensor, which will initiate the measurement cycle automatically upon complete closing of the drawer. Another sensor will detect the sample to prevent injection in empty chamber.



- Applications
- Reporter gene assays
  - ATP assays
  - Ca<sup>++</sup> measurements
  - Toxicity assays

Technical Data	<b>Detector</b>	Photon counting PMT, spectral range: 300–600 nm.
	<b>Sensitivity</b>	better than 1000 molecules of firefly luciferase.
	<b>Dynamic Range</b>	6 decades.
	<b>Sample Format</b>	12 mm diam. tubes, microfuge tubes, 35 mm culture dishes, liquid scintillation vials up to 20 ml.
	<b>Injection Volume</b>	20–300 µl in increments of 10 µl.
	<b>Injection Precision</b>	100 µl < 0.5%.
	<b>On-board Software</b>	Raw Data Single Assay, Dual Assay, Cut-off Assay.
	<b>PC Software</b>	Quick Measurement Single Assay, Dual Assay, Kinetics, Cut-off Assay.
	<b>Data Port</b>	RS-232 (serial interface).
	<b>Printer</b>	Thermal matrix printer 40 characters per line.
	<b>Power Requirements</b>	12 V, 2.5 A supplied through AC/DC adapter (included).
	<b>Dimensions</b>	H: 9.8" (25 cm) x W: 11" (32cm) x D: 6.5" (20 cm).
<b>Weight</b>	8.6 LB (3.9 kg).	

Ordering Info	<b>110 400 10</b>	Sirius Single Tube Luminometer with built-in printer, injector-upgradeable.
	<b>110 400 11</b>	Sirius Single Tube Luminometer with one automatic reagent injector and built-in printer.
	<b>110 400 12</b>	Sirius Single Tube Luminometer with two automatic reagent injectors and built-in printer.
	<b>155 200 10</b>	PC Software: Protocol Manager and Quick Measurement Protocol.
	<b>155 200 12</b>	Single Assay and Dual Assay Protocols.
	<b>155 200 13</b>	Single Kinetics and Multiple Kinetics Protocols.
	<b>155 200 14</b>	Cut-off Assay Protocol.

# Smart Line TL Tube Luminometer for Routine Use

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The Smart Line TL is a stand-alone workstation designed to measure qualitative and quantitative immunoassays in luminescent format. It utilizes Assay Card technology that allows pre-programming of protocols on the smart card and then introduction of the ready to use protocol to the luminometer. The Smart Line TL can be equipped with up to two high precision, automatic injectors. A variety of algorithms for qualitative and quantitative data processing are supported.



- Applications
- Qualitative Luminescent Immunoassays
  - Competitive Luminescent Immunoassays (LIA) bound + free fraction
  - Immuno-Luminometric Assays (ILMA)
  - DNA/RNA probe assays

Technical Data	<b>Detector</b>	Photon counting PMT, spectral range: 300–600 nm.
	<b>Sensitivity</b>	better than 10 attomole ATP
	<b>Dynamic Range</b>	6 decades.
	<b>Sample Format</b>	12 mm diam. tubes, microfuge tubes, 35 mm culture dishes, liquid scintillation vials up to 20 ml.
	<b>Injection Volume</b>	20–300 µl in increments of 10 µl.
	<b>Injection Precision</b>	100 µl <0.5%.
	<b>Data Reduction</b>	Qualitative evaluation: Cut-off; Quantitative evaluation: regression, smoothed cubic spline, Four-Parameter Logistics (4PL).
	<b>Data Port</b>	RS-232 (serial interface).
	<b>Printer</b>	Thermal matrix printer 40 characters per line.
	<b>Power Requirements</b>	12 V, 2.5 A supplied through AC/DC adapter (included).
<b>Dimensions</b>	H: 9.8" (25 cm) x W: 11" (32cm) x D: 6.5" (20 cm).	
<b>Weight</b>	8.6 LB (3.9 kg).	

Ordering Info	<b>110 400 30</b>	Smart Line TL without injectors.
	<b>110 400 31</b>	Smart Line TL with one injector.
	<b>110 400 32</b>	Smart Line TL with two injectors.
	<b>110 491 10</b>	Smart Card Drive with PC software and 10 smart cards.



# FB14 Portable Single Tube Luminometer

The FB14 single tube luminometer is designed to be used as a stationary as well as a portable instrument for glow type luminescence measurements. The FB14 microprocessor embedded software allows complete sample documentation, including custom naming of sample sites and runs, during field use. The FB14 is capable of storing and later uploading to a PC of up to 680 readings, which can be transferred to Microsoft® Excel™ for further processing and storage. The built in software includes a Cut-off Assay protocol for on site data processing. In the stationary mode the FB14 can be operated via FB12 PC software program.



Applications

- Cut-off immunoassays
- Reporter gene
- ATP assays
- Toxicity assays

Technical Data

<b>Detector</b>	Photon counting PMT, spectral range: 300–600 nm.
<b>Sensitivity</b>	better than 30 attomoles ATP.
<b>Dynamic Range</b>	6 decades.
<b>Sample Format</b>	12 mm diam. tubes.
<b>Built-in Software</b>	sets delay and measurement time in 0.1s increments, continuous measurement mode, cut-off assay mode.
<b>PC Software</b>	Zylux Capture and Basic module of FB12 software.
<b>Data Port</b>	RS-232 (serial interface).
<b>Power Requirements</b>	Rechargeable NiCd Batteries; 7.5 V, 600 mA supplied through AC/DC adapter (included).
<b>Dimensions</b>	H: 5.2" (13 cm) x W: 7" (17 cm) x D: 4.4" (11 cm).
<b>Weight</b>	3 LB (1.3 kg).

Ordering Info

<b>210 300 20</b>	FB14 Luminometer.
<b>155 200 12</b>	Single Assay and Dual Assay Protocols.
<b>155 200 13</b>	Single Kinetics and Multiple Kinetics Protocols.
<b>155 200 14</b>	Cut-off Assay Protocol.

# MPL1 96-well Microplate Luminometer

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The MPL1 is a high quality microplate luminometer with basic functionality. It incorporates all important functions to perform glow-type luminescence measurements.



- Applications
- DNA probe assays
  - ATP assays
  - Cellular luminescence
  - Toxicity assays

Technical Data	<b>Sample Format</b>	96-well microplate, in solid or strip.
	<b>Detector</b>	Low noise PMT, spectral range 300–600 nm.
	<b>Sensitivity</b>	1 fmoles ATP.
	<b>Crosstalk</b>	less than $3 \times 10^{-5}$ .
	<b>Dynamic Range</b>	6 decades.
	<b>Measurement Time</b>	1 s per well.
	<b>Scan Pattern</b>	Random selectable single well.
	<b>Data Port</b>	RS-232 (serial interface).
	<b>PC Software</b>	Quick Measurement mode, Slow Kinetics mode (repeated measurements).
	<b>Power Requirements</b>	230 V, 50 Hz; 115 V, 60 Hz.
<b>Dimensions</b>	H: 5.6" (13.9 cm) x W: 16" (40 cm) x D: 20" (49 cm).	
<b>Weight</b>	38 LB (17 kg).	

- Ordering Info
- |                   |  |
|-------------------|--|
| <b>112 000 10</b> | MPL1 96-well microplate luminometer with PC software and accessories. 230 V 50 Hz. |
| <b>112 000 11</b> | MPL1 96-well microplate luminometer with PC software and accessories. 115 V 60 Hz. |

# MPL2 High Sensitivity Microplate Luminometer

The MPL2 is a high sensitivity photon counting microplate luminometer. It incorporates all important functions necessary to perform glow type luminescence measurements. The advanced PC software allows creation of a variety of customized protocols.



- Applications
- Reporter gene assays
  - ATP Assays
  - Immunoassays
  - DNA probe assays
  - PCR quantification assays

Technical Data	<b>Sample Format</b>	96-well microplate, in solid or strip.
	<b>Detector</b>	Photon counting low noise PMT, spectral range 300–600 nm.
	<b>Sensitivity</b>	100 attomole ATP (glow reagents)
	<b>Crosstalk</b>	less than $3 \times 10^{-5}$ .
	<b>Dynamic Range</b>	6 decades.
	<b>Measurement Time</b>	0.1s-99.9s per well.
	<b>Scan Pattern</b>	Random selectable single well.
	<b>Data Port</b>	RS-232 (serial interface).
	<b>PC Software</b>	Raw Data, Dual Assay, Single Kinetics, Batch protocol.
	<b>Power Requirements</b>	230 V, 50 Hz; 115 V, 60 Hz.
<b>Dimensions</b>	H: 5.6" (13.9 cm) x W: 16"(40 cm) x D: 20" (49 cm).	
<b>Weight</b>	40 LB (19.2 kg).	

- Ordering Info
- 112 200 10** MPL2 96-well microplate luminometer with PC software and accessories. 230 V 50 Hz.
  - 112 200 11** MPL2 96-well microplate luminometer with PC software and accessories. 115 V 60 Hz.

# Orion II High Sensitivity Microplate Luminometer

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The Orion II is the next step in luminescence detection. It combines the highest performance with configuration flexibility and easy maintenance. The luminometer is designed to provide easy access to the injection system and detector assembly. Several interchangeable detector configurations are available. The Orion II can be easily upgraded with additional injectors. The PC software allows user to create virtually any measurement protocol. The built-in shaking mode and optional temperature control can be used for additional optimization of measurement protocol. The luminometer's plate carrier is designed for compatibility with microplate handling devices. The PC software can easily be interfaced with robotic systems.



Applications

- Reporter gene assays including dual-reporter assays
- ATP assays
- Kinase activity assays
- Cell proliferation, cytotoxicity and biomass assays, apoptosis assays
- Quantification of nucleic acids
- Ca<sup>2+</sup> measurements and Aequorin-based assays
- Luminescence immunoassays (LIA)
- Cellular luminescence
- Environmental toxicity and mutagenicity assays

Technical Data

<b>Sample Format</b>	96-well microplate, or 384-well microplate in solid or strip.
<b>Detector</b>	Photon counting low noise PMT, spectral range 300–600 nm.
<b>Sensitivity</b>	10 attomole ATP.
<b>Crosstalk</b>	less than $3 \times 10^{-5}$ .
<b>Dynamic Range</b>	6 decades.
<b>Measurement Time</b>	0.1–99.9 s per well.
<b>Scan Pattern</b>	Random selectable single well.
<b>Shaker</b>	Linear, orbital or cross shaking.
<b>Sample Incubation</b>	from RT+5°C to +50°C.
<b>Injectors</b>	maximum 4 injectors, two injectors in preposition, two in measurement position.
<b>Injection Volume</b>	10–150 µl in 1 µl increments.
<b>Data Port</b>	RS-232 (serial interface), USB.
<b>PC Software</b>	Raw Data, Dual Assay, Single Kinetics, Batch protocol.
<b>Power Requirements</b>	110–240 V; 50/60 Hz.
<b>Dimensions</b>	H: 10.2" (25.5 cm) x W: 15.4"(38.5 cm) x D: 16.4" (41.0 cm).
<b>Weight</b>	48.5 LB (22 kg).

Ordering Info

- 112 800 10** Orion II 96-well luminometer, no injectors, PC software and accessories.
- 112 800 20** Orion II 384-well luminometer, no injectors, PC software and accessories.
- 112 800 30** Orion II SI temperature controlled 96-well luminometer, no injectors, PC software and accessories.
- 112 800 40** Orion II SI temperature controlled 384-well luminometer, no injectors, PC software and accessories.
- 182 025 06** 384-well detector assembly.
- 182 025 04** 96-well detector assembly.
- 221 000 51** Injector for Orion II microplate luminometer.



Berthold  
DETECTION SYSTEMS  
Microplate Detector Unit  
# 0013  
Standard 96 wells

# Validation Tools for Luminometers

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The validation tools allow the user to conduct easy and reliable luminometer performance diagnostics. Both, the TestTube and the TestPlate can be used to verify instrument sensitivity, reproducibility and background signal. In addition, the Test Plate can provide information about the dynamic range and mechanical alignment of microplate luminometer.

All our validation tools include evaluation protocols and reports for Berthold Detection Systems luminometers.



Technical Data

## Luminescence TestTube

<b>Light Source</b>	< 100 kBq of Tritium in scintillator, housed in double-walled, sealed glass.
<b>Spectral Light Emission</b>	maximum emission at 455 nm.
<b>Dimensions</b>	11.6 mm diam. x 75.00 mm H.

## Luminescence TestPlate

<b>Light Source</b>	14 highly stable LED lights.
<b>Spectral Light Emission</b>	540–590 nm.
<b>Dynamic Range</b>	6 decades.
<b>Power Requirements</b>	Rechargeable Ni-metal-hydride Battery; 12 V, 50 mA supplied through AC/DC adapter (included).
<b>Dimensions</b>	127.4 mm x 85.2mm x 14.5 mm (standard 96-well dimensions and shape).

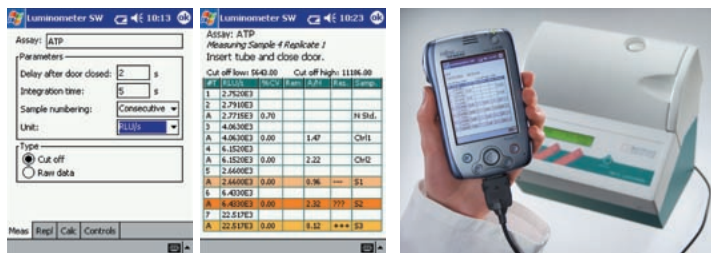
Ordering Info

<b>140 001 20</b>	Test Tube for validation tube luminometers. Accessories and MSDS included.
<b>140 001 10</b>	Test Plate for validation 96-well microplate luminometers with accessories.

# Software Additional Packages

## Pocket PC Luminometer software

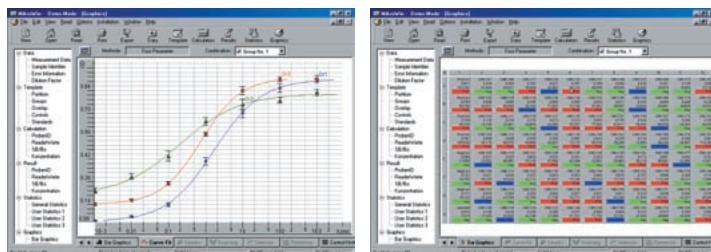
Works with FB12, Sirius, FB14 tube luminometers. Requires Pocket PC with serial port.



## MikroWin 2000

Quantitative and Qualitative Evaluation of all Routine Luminescent Assays.

Works with MPL1, MPL2 and Orion II microplate luminometers.



# Applications and Sources for Reagents

Applications and Sources

### Application\*

Luciferase Reporter Assay (Photinus pyralis)

### Reagent Source\*

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

Dual Luciferase™ Assay (photinus/renilla)

[www.promega.com](http://www.promega.com)  
[www.appliedbiosystems.com](http://www.appliedbiosystems.com)

Dual Light® Reporter Assay (photinus/β-gal)

[www.appliedbiosystems.com](http://www.appliedbiosystems.com)  
[www.cambrex.com](http://www.cambrex.com)

Kinase Assays

[www.promega.com](http://www.promega.com)  
[www.cambrex.com](http://www.cambrex.com)

β-Glucuronidase Reporter Assay

[www.appliedbiosystems.com](http://www.appliedbiosystems.com)

ATP Detection

[www.biothema.se](http://www.biothema.se)

Cell Culture Contamination (Mycoplasma)

[www.cambrex.com](http://www.cambrex.com)

Apoptosis Detection

[www.cambrex.com](http://www.cambrex.com)

Growth Factor Immunoassay

[www.assaydesigns.com](http://www.assaydesigns.com)

Environmental Toxicity

[www.aboatox.com](http://www.aboatox.com)

Toxicity Assays

[www.mltr.co.uk](http://www.mltr.co.uk)

Diabetes Immunoassays

[www.mltr.co.uk](http://www.mltr.co.uk)

Cell Proliferation Assay

[www.cambrex.com](http://www.cambrex.com)  
[www.dcs-diagnostics.de](http://www.dcs-diagnostics.de)

Tumor Chemosensitivity Assay

[www.pronics.ch](http://www.pronics.ch)

Veterinary Immunoassays (Prion Diseases)

[www.brahms.de](http://www.brahms.de)

Thyroid Immunoassays

[www.ibl-hamburg.com](http://www.ibl-hamburg.com)

Steroid Immunoassay detection from saliva

\*This is not a complete list of applications and reagent suppliers.

# Overview & Feature Comparison

Products



Features

	FB12	Sirius	Smart Line TL	FB14	MPL1	MPL2	Orion II
12 mm Tube	Y	Y	Y	Y			
Various Formats	Y	Y					
96-well Microplates					Y	Y	Y
384-well Microplate							Y
Injectors (max.)		2	2				4
Stand-alone Operation	Y	Y	Y	Y			
PC-Operation	Y	Y		Y	Y	Y	Y
Pocket-PC Operation	Y	Y		Y			
Sensitivity	++++	++++	++++	+++	+	+++	+++
Temperature Control							Y
Shaking							Y
DLReady	Y	Y					Y
Validation Tool	Y	Y	Y	Y	Y	Y	Y

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