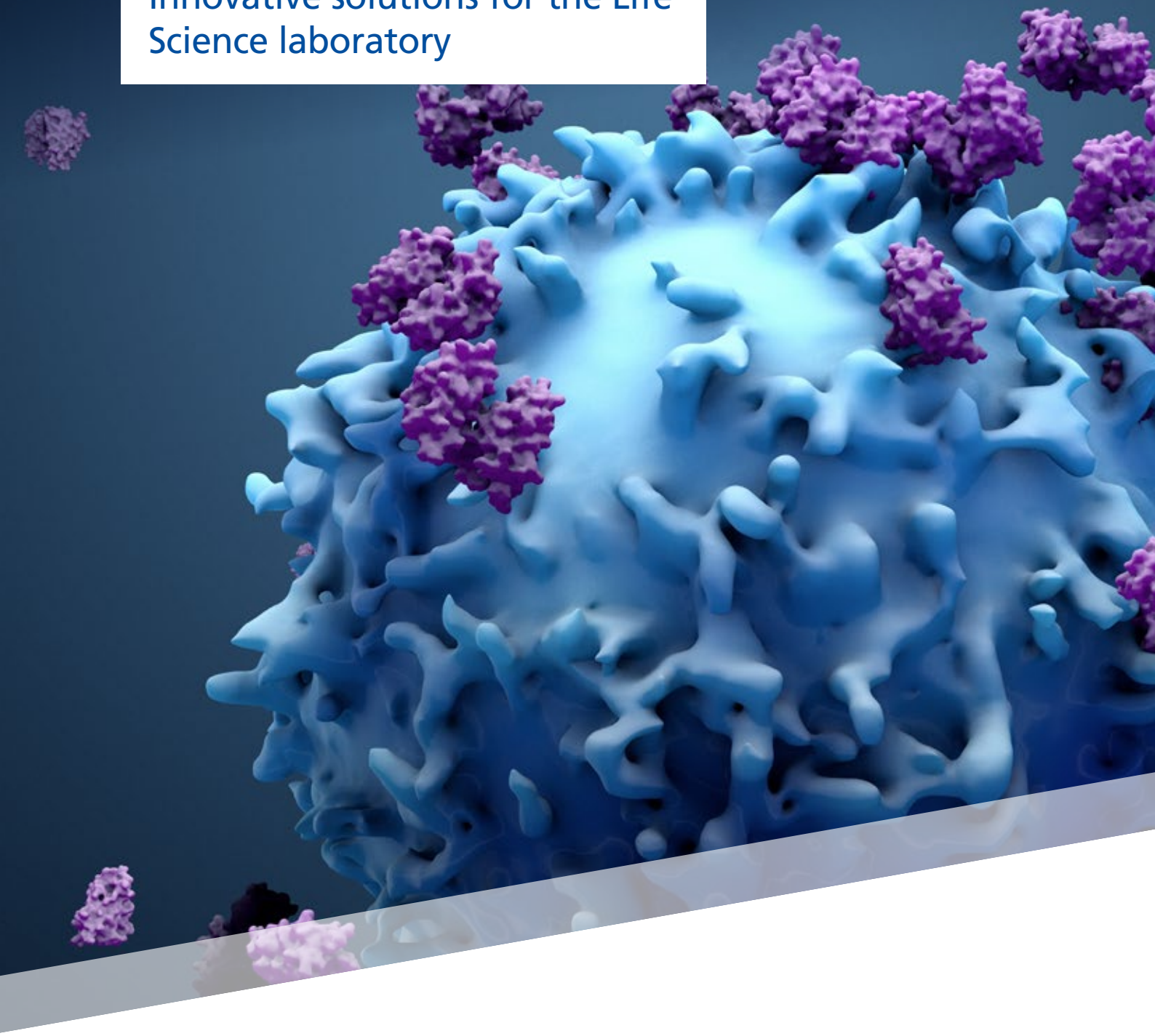
BIOANALYTICS PRODUCT OVERVIEW

Innovative solutions for the Life Science laboratory



BERTHOLD

PERFORMANCE YOU CAN COUNT ON

Reliable life science solutions from Berthold

From clinical labs to pharmaceutical companies, from biotechs to academia, and from the food industry to federal agencies, life science laboratories around the globe have their own unique workflow requirements.

Maybe your workflow requires simple but yet powerful automation to help you optimise your productivity? Perhaps you´re looking for flexible microplate reading technologies providing a whole host of assay technologies, including ELISA, luminescence, fluorescence and many more? Or perhaps you need a reliable radio HPLC measurement solution for your quality control on a tight budget?

Our complete range of versatile measurement solutions for the life science laboratory offers the sensitivity, dynamic range, throughput and reliability you need to meet your diverse workflow requirements.
For over 70 years, Berthold Technologies has been supporting companies and organisations worldwide with an extensive portfolio of reliable and durable measurement solutions that meet these diverse workflow requirements.

In addition, our expert scientific staff, field applications scientists, and highly skilled service engineers are available to help you advance your science and protect your investment. Rest assured, our relationship doesn't end when you purchase an instrument.

SYSTEM SOLUTIONS FOR THE LIFE SCIENCE LABORATORY

MICROPLATE READERS

Whatever you need, there is a Berthold reader to fit your scientific needs

Every lab is unique. That's why you deserve a microplate reader that fits your needs. Maybe your research requires maximum application flexibility, or high throughput. Perhaps you are looking for an ELISA reader, delivering reliable results. Whatever you need, there is a Berthold Technologies reader to fit your scientific needs.

	LB 942 Tristar 3	LB 942 Tristar 5	LB 963 Centro	LB 917 Apollo
Detection Technology				
Detectors	Low-noise photomultiplier tube in dual mode Photodiode for absorbance	Up to 2 low-noise photomultiplier tubes in dual mode Photodiode for absorbance	Low-noise photomultiplier tube in photon counting mode	Photodiode, 8 channel + 1 reference channel
Absorbance (VIS)	•	•		•
Absorbance (UV)	•	•		•
Luminescence	•	•	•	
BRET/BRET2	•	•		
NanoBRET™	•	•	•	
Fluorescence	•	•		
TRF		•		
FP		•		
AlphaScreen®		•		
TR-FRET		•		
HTRF®		•		

MULTIMODE MICROPLATE READERS

The Tristar family of modular multimode plate readers

Our multimode microplate readers enable you to move from application to application with ease. Equipped with various reading technologies, detection modes, filters or monochromators, these versatile plate readers enable you to move from ELISA to fluorescence, luminescence or absorbance-based applications, on a single platform.

Tristar 3 Multimode Reader

Filter-based high sensitivity reader for all levels of experience

- High performance filter system for optimal sensitivity
- ONE-4-ALL Optics for uncompromised performance of all detection modes
- JET injector technology (optional) for highest accuracy, speed and cell-friendliness
- Broad wavelength range selection from UV through the visible range
- BRET/BRET2 and NanoBRET™ upgradeable

Tristar 5 Multimode Reader*

Reader offering maximum flexibility with options including both, monochromators and filters

- Independent, user-selectable filters and monochromators on both, the excitation and emission side for any measurement – when flexibility counts
- ONE-4-ALL Optics for uncompromised performance of all detection modes
- JET injector technology (optional) for highest accuracy, speed and cell-friendliness
- Broad wavelength range selection from UV through the visible range
- FP, TRF, TR-FRET, HTRF®, BRET/BRET2, NanoBRET™, LanthaScreen® and AlphaScreen® upgradeable (configuration dependent)

*Not available in the U.S. Please contact our sales team for more information.

MICROPLATE LUMINOMETERS

The Centro Microplate Luminometer – ultra-sensitive luminescence detection

The Centro is a high-performance, easy to use 96-well microplate luminometer for both, flash and glow luminescence applications.

The optimised optical system provides lowest background and negligible crosstalk (10^{-6}), resulting in superior sensitivity (< 1.8 zmol firefly luciferase) and wide dynamic range (> 6 orders of magnitude).

- **Have confidence in your results:** ultrasensitive design, excellent crosstalk reduction (10^{-6}) and broad dynamic range (> 6 orders of magnitude) for superior performance.
- **Designed to support your research:** a built-in shaker, JET-injectors and temperature control (model-dependent) in combination with an ergonomic design and automation compatibility for maximum flexibility.
- **Robot compatibility:** optional robot integration module for easy integration into your lab automation workflow.

ELISA AND ABSORBANCE READERS

The Apollo ELISA Reader - reliable ELISA & absorbance analysis in just 6 seconds

The Apollo ELISA Reader is an intuitive and reliable filter-based microplate reader that can be used for a wide variety of research and routine applications.

The system combines fast measurement of 96-well plates in just 6 seconds with intuitive 7-inch colour touchscreen stand-alone operation.

- **Rapid results:** read your samples in < 6 seconds
- **Intuitive operation:** intuitive PC-free, 7˝ colour touchscreen operation
- **Results you can trust:** accuracy of ± 1 % or ± 0.005 OD (0-3 OD) whichever is greater (@405 nm)
- **Wide variety of applications:** with its wavelength range from 340 to 750 nm it is ideal for ELISA, cytotoxicity assays, protein colorimetric assays, nucleic acid quantification (DISCHE assay), endotoxin assays and more

MICROPLATE WASHERS & DISPENSERS

96- and 384-well automated washers & dispensers

Berthold Technologies provides high-end 96-channel microplate washers for 96- and 384-well plates. They are equipped with automated microplate loading by built-in stackers enabling high-throughput applications. Combined with the highly efficient dispense module, our microplate washers transform into an efficient washer-dispenser system.

Zoom HT Microplate Washer

The fastest microplate washer available on the market

- Fastest plate washer available: just 17 seconds for a triple wash of a 96-well plate
- A single wash head for both, 96-well and 384-well plates
- Very low residual wash volume fluids of <1 µL/well
- Self-emptying liquid discharge system enabling uninterrupted processing of large plate batches
- Gentle processing for cell-based assays

Zoom HT Plate Coating System

Reliable liquid handling for your plate coating applications

- Fastest plate washer available: just 17 seconds for a triple wash of a 96-well plate
- A single wash head for both, 96-well and 384-well plates
- Very low residual wash volume fluids of <1 µL/well
- Self-emptying liquid discharge system enabling uninterrupted processing of large plate batches
- Gentle processing for cell-based assays
- 2-channel dispense module
- Low dead volume dispensing saving e. g. expensive antibody conjugate

AUTOMATED ELISA SYSTEMS

Unattended automated ELISA operation for low-throughput laboratories

Most devices on the market that offer ELISA automation are bulky and require frequent and expensive maintenance. In contrast, our workstations are compact systems (not much bigger than an ELISA reader) that save valuable space on your lab bench. They are very easy to set up and maintain, but offer all the features you need to automate most assays in 96-well microplates.

With the optional 3Q package, validation is made easy: just perform Installation Qualification, Operation Qualification and Performance Qualification steps according to the detailed instructions provided with the package.

Crocodile 4-in-one Assay miniWorkstation

Automates your washing, dispensing, incubation & shaking steps

- **Ultra-compact footprint:** with its compact width of only 26.5 cm, the system fits into any laboratory environment.
- **Plug & play setup:** the system is preinstalled and ready to start within minutes.
- **Open system software:** the user-friendly software easily adapts to any 96-well assay.

Crocodile 5-in-one ELISA miniWorkstation

All-in-one single plate ELISA automation from sample to result

- **All-in-one ELISA automation:** truly unattended ELISA operation
- **Wavelength flexibility:** in addition to the preinstalled filters for ELISA (405, 450, 492 and 620 nm), 4 positions are available for custom filters.
- **Ultra-compact footprint:** with its compact width of only 26.5 cm, the system fits into any laboratory environment.
- **Plug & play setup:** the system is preinstalled and ready to start within minutes.
- **Open system software:** the user-friendly software easily adapts to any 96-well assay.

MICROVOLUME SPECTROPHOTOMETERS

COLIBRI+ MICROVOLUME SPECTROPHOTOMETER

Accurate DNA, RNA & protein quantification in less than 3 seconds

The Colibri+ has been designed to help you accelerate your research combining ultra-fast measurement of DNA, RNA and protein samples in less than 3 seconds with intuitive 7-inch touchscreen stand-alone operation.

Get confidence in the quality of your sample with reliable UV/VIS spectroscopy from as low as 1 µL of sample.

- **Reliable results:** CV of absorbance < 1 %.
- **Broad detection range:** 2 – 20,000 ng/µL for ds DNA and 0.06 – 600 mg/mL for BSA, saving you precious time by avoiding manual dilution errors.
- **Stand-alone operation:** 32 GB onboard memory, no computer required.
- **Intuitive operation:** 7" colour touchscreen and a wide variety of preprogrammed protocols simplify operation of the system.
- **Easy pipetting of samples:** Sample Guide Light enables accurate pipetting, even in poor light conditions.
- **Integrated cuvette option:** Colibri+ C version with integrated microvolume UV/VIS measurements and cuvette option in a single device.

TUBE LUMINOMETERS

Versatile and highly sensitive tube luminometers

State-of-the-art tube luminometers "Made in Germany" by Berthold Technologies guarantee high quality measurements in a wide range of glow and flash luminescent applications. Our luminometers are characterised by an outstanding sensitivity combined with unmatched flexibility in configuration and sample formats, to offer the ideal choice for every application.

	Sirius 2	Lumat	Junior
Detection Technology			
Detectors	Low-noise photomultiplier tube in single photon counting mode	Low-noise photomultiplier tube in single photon counting mode	Low-noise photomultiplier tube in single photon counting mode
Type	Benchtop	Benchtop	Portable
Operation	Computer or touchscreen (configuration-dependent)	Computer	Keypad for mobile usage
Measurement modes	Endpoint Kinetics Multiple Kinetics	Endpoint Kinetics	Endpoint
Spectral range	380 – 600 nm	380 – 630 nm	380 – 630 nm
Sensitivity	<1 amol ATP/tube (ATP HS assay)	Standard model: <5 amol ATP/tube High-sensitivity model: <1 amol ATP/tube	Standard model: <1 fmol ATP/tube High-sensitivity model: <50 amol ATP/tube
Dynamic range	6 orders of magnitude	>6 orders of magnitude	>6 orders of magnitude
Injectors	Up to 2 syringe injectors	Up to 2 JET injectors	None
Sample formats	Luminescence tubes, 12 x 55 mm Luminescence tubes, 12 x 75 mm Microcentrifuge tubes, 1.5 and 2 mL	Luminescence tubes, 12 x 47 mm Luminescence tubes, 12 x 55 mm Luminescence tubes, 12 x 75 mm Microcentrifuge tubes, 1, 1.5 and 2 mL	Luminescence tubes, 12 x 47 mm Luminescence tubes, 12 x 55 mm Luminescence tubes, 12 x 75 mm Microcentrifuge tubes, 1, 1.5 and 2 mL Capped vials, 4 mL (14 x 54 mm)

SIRIUS 2 SINGLE-TUBE LUMINOMETER

High-performance luminescence at your fingertips

The Sirius 2 Single Tube Luminometer is a high-performance benchtop system available in two distinct configurations, the Sirius 2 Touch (stand-alone configuration) and the Sirius 2 PC (PC-controlled configuration).

The system is the perfect choice for all luminescent flash and glow applications, for example reporter gene assays, dual-reporter assays, ATP assays, cell proliferation, cytotoxicity and biomass assays.

- **Advanced touchscreen operation:** the intuitive touch-screen interface of the Sirius 2 Touch allows easy editing of experimental conditions, handling of replicates, dual assay calculations, and display of graphics.
- **Results you can trust:** the Sirius 2 is equipped with a high-sensitivity detector that can detect less than 0.5 zmol firefly luciferase.
- **Quick-start functions:** closing the sample drawer automatically initiates the measurement with no need to press any key.

LUMAT TUBE LUMINOMETER

Flexible. Reliable. Ultra-sensitive.

The Lumat is a high-performance, easy to use tube luminometer for both, flash and glow luminescence applications.

The optimised optical system provides true single photon counting combined with a low-noise photomultiplier tube for up to 6 decades of linear dynamic range.

- **Have confidence in your results:** ultra-sensitive optical design (<1 amol ATP/tube high sensitivity model) and broad dynamic range (up to 6 orders of magnitude) for superior performance.
- **Designed to support your research:** the system provides the flexibility to use Lumi vials as well as Eppendorf tubes® and can be equipped with up to 2 JET injectors for reagent dispensing.
- **Convenient sample switching mechanism:** motor-driven revolving magazine mechanism based on a rotating chamber for two tubes, so you can prepare and insert the next sample while the previous one is still measuring.

JUNIOR PORTABLE TUBE LUMINOMETER

The mobile solution

The Junior is a small portable tube luminometer which can be used for all common applications using glow type bioluminescent and chemiluminescent reagents. Excellent performance, small size, low weight and battery-powered mode make it an ideal partner whenever mobility counts - in the laboratory, on site or outdoors.

The Junior can be used for a wide range of fields, including biomedical research, clinical testing, hygiene monitoring, process control in biotechnology, environmental monitoring (e. g. water quality) and others.

- **Research-level performance in a portable format:** performance similar to those of laboratory tube luminometers with < 50 amol ATP/tube and a dynamic range larger than 6 orders of magnitude.
- **Always up and running:** the Junior is equipped with rechargeable batteries; spare battery sets are available, so you can continue working for as long as you need.
- **Fully mobile:** With a weight of only 2 kg and its small size the Junior can be carried and taken to the sampling location for measurements on site. The optional metal transport case providing space for the Junior and accessories is an ideal solution for outdoor use.

RADIO HPLC SOLUTIONS

Monitoring of radio-labelled compounds with high-sensitivity and resolution

Monitoring of radio-labelled compounds separated by chromatographic techniques has been established as one of the most powerful tools in drug metabolism, ecotoxicology and environmental safety as well as pharmacokinetic studies. Supported by easy-to-use software to help you optimise your productivity and co-optimise your accessories, we provide a platform that fits your needs.

HERM RADIO HPLC MONITOR

The perfect solution for radio HPLC in quality control

The HERM is a dedicated radio HPLC monitor enabling direct positron measurement, as well as beta and gamma isotopes detection in high activities e. g. in nuclear medicine or PET laboratories. Providing flexibility, reproducibility and sensitivity, the HERM offers a safe and user-friendly solution for quality control laboratories.

The HERM can be connected to different detectors. The **HERM with fLumo Chemiluminescence detector** for HPLC systems uses a highly sensitive head-on photon counting detector with low background which is perfect for PET quality control, among other applications. Different measuring cells can be used to adapt for flow rates, activities and isotopes. For gamma and high energy beta isotopes, the **HERM with NaI detector** is available.

HERM LB 500 with fLumo detector

HERM LB 500 with NaI detector

Detectors	Low noise photon counting 1-inch PMT	NaI detector with compact 50 mm lead shielding
Applications	■ PET (FDG) Quality control ■ Gamma metabolite studies (mixed Gammas only)	■ I-125 Quality control ■ Gamma metabolite studies (all gamma isotopes)
Product features	■ Low noise photon counting 1-inch PMT ■ High-sensitivity luminescence monitoring ■ Compact design to fit into hot cell ■ Easy HPLC integration ■ Optional Chromeleon™ driver	■ Twin cell changer for easy operation ■ Flexible volume handling using regular tubing ■ Easy HPLC integration ■ Optional Chromeleon™ driver

FLOWSTAR² DETECTOR FOR RADIO HPLC

Maximum flexibility. Outstanding sensitivity.

The FlowStar² combines ultimate sensitivity with touch-screen technology for quick and easy operation. Designed for maximum ease of use, safety and flexibility, the FlowStar² sets the new standard for what a radio-HPLC flow detector should be like.

A wide range of available cells ensures optimal performance and supports full compatibility with both, routine and challenging applications. The convenient dual mode capability enables simple installation in different configurations and makes integration into existing systems easy.

- **Intuitive touchscreen operation:** The intuitive touch screen interface makes it easy to get started and keep going. Results are displayed in both, a graphical chromatogram and a numerical format, so you can start interpreting your results in real time while the run is still in progress.
- **Easy integration into your HPLC system:** the dual analog output enables convenient integration into existing HPLC data systems.
- **Safe and secure:** Automatic HV shutdown for system safety and built-in leak detection. The system will shut down automatically in the event of cell leakage. Password-based multi-user access control to protect instrument from unauthorised use.

LIQUID SCINTILLATOR PUMP LB 5037

Flexible. Reliable. Easy-to-use.

Liquid scintillation cells have the best signal-to-noise ratios and no stickiness issues, but they require a pump and a static mixer to continuously add the liquid scintillator and mix it with the column eluate.

The Liquid Scintillator Pump LB 5037 is reliable, flexible and easy to use and is a perfect match for the FlowStar² LB 514.

- **Safety:** the pump is separated from the main detector, eliminating the possibility of scintillator leaking into the detector and associated electronics.
- **Ease of use:** the pump is completely controlled by the FlowStar² LB 514 for automatic handling of flow rates and start/stop signals.
- **Flexibility:** the wide flow rate range (0.001 – 10 mL/min) enables many applications without the need to exchange the pump head.

IN VIVO IMAGING SYSTEMS

NIGHTSHADE EVO IN VIVO PLANT IMAGING SYSTEM

Visualise what plant biology has been hiding

The NightSHADE evo In Vivo Plant Imaging System is a modular, easy to use optical imaging system dedicated to in vivo analysis of plants. Equipped with an absolutely lighttight cabinet and a deeply cooled CCD camera it enables sensitive luminescence and fluorescence monitoring in tissues, seedlings and whole plants.
The camera can be attached either to the top or the side of the darkroom – the sample chamber – to enable imaging from above and from the side.

- **Smart imaging chamber – full compatibility for diverse applications:** Multi-position camera enabling both, top- and lateral-view images. Drawer-like base plate for easy exchange of samples and accessories (e.g. turntables).
- **Control of key environmental conditions:** The NightSHADE evo provides temperature control and daylight simulation via individually configurable LED panels. The system can be placed in an appropriate environmental chamber for humidity control.
- **Powerful software and useful accessories:** the user-friendly, IndiGO™ software controls the instrument and provides innovative image processing tools, e.g. a powerful multi-wavelength tool.

VALIDATION AND QC TOOLS

More productivity. Better reproducibility.

For many laboratories validation, qualification and ensuring compliance with a number of GMP and GLP requirements is essential. We offer a range of tools and services to help you ensure that your system runs at peak performance.

TEST PLATES & TEST TUBES

Easy diagnosis and instrument performance validation

We provide a comprehensive range of test plates and tubes to help you ensure optimal performance of your instrument. All our test plates and test tubes are supplied in a sturdy transport case. This is very convenient to safely transport the device if it is used to verify several instruments in different locations.

- **Absorbance test plate:** Check the optical path alignment as well as accuracy and precision of your absorbance plate reader. Wavelengths tested are 405, 450, 492, 550 and 620 nm.
- **Luminescence test plate:** Light emission is generated by state-of-the-art temperature-stabilized green LEDs. Diffusors are used to simulate the light emission characteristics of „real“ samples. Test plate can be used to verify crosstalk, in addition to detector function and stability as well as correct alignment.
- **Luminescence test tubes:** Check the performance of your tube luminometer. Light emission is generated by temperature-stabilized green LEDs. Diffusers are used to simulate the light emission properties of „real“ samples.

Test Plates & Test Tubes	Part number
LB 9515 Luminescence test plate for QC	40105-10
LB 9516 Test plate for absorbance check	50895-10
LB 9517 Luminescence test tube Lumat	55658-01
LB 9517 Luminescence test tube Junior	55658-02
LB 9517 Luminescence test tube Sirius	55658-03
LB 9517 Luminescence test tube Smart Line	55658-04

GAMMA TEST SOURCES

Tube type sources for NaI well-type detector QC

Our gamma test sources are designed to facilitate your QC and QM . We provide single-tube or 12-tube ^{129}I or ^{57}Co sources of 2 KBq/tube to help you calibrate and check the performance of your multi-well gamma counter.

Tube test source	Part number
Test source ^{129}I	08691
Test source ^{57}Co	23806
Multi-test source 12-fold ^{129}I	24831

QC TEST CELLS FOR RADIO HPLC

Flexible. Reliable. Ultra-sensitive.

Our QC test cells are used for regular monitoring of the performance of HPLC radio detectors. These cells have been developed to meet GLP/GMP requirements and ensure continuous system performance.

The activity is contained together with the scintillant in a sealed glass tube. QC test cells are easy to use and independent of the HPLC system.

- **Meeting your application needs:** test cells are available for ^{3}H, ^{14}C and background tests.
- **SmartChip-coded:** our cells are equipped with a SmartChip to automatically set the correct cell-specific system parameters for your HPLC Radio Detector.

CONSUMABLES

High-quality consumables supporting your application

We provide a range of selected high-quality consumables for improved results of your measurements, including microplates and tubes, but also liquid scintillation cocktails, injector cleaning solutions and more.

MICROPLATES

White and Black

We provide microplates optimised for luminescence, fluorescence and absorbance measurements. The microplate well is part of the optical system in plate reading. Therefore, the microplates used need to be of high quality and must support your measurement goals.

We provide the following types of microplates:

Plate Type	Colour	Part number	Application
24-well	white, clear bottom, cell culture-treated	41081	Luminescence
24-well	black, clear bottom, cell culture-treated	41082	Fluorescence, Absorbance
96-well	white, standard	23300	Luminescence, BRET, AlphaScreen®, TRF and HTRF®
96-well	white, clear bottom	60705	Luminescence, BRET and Absorbance
96-well	white, sterile, cell culture-treated	51838	Luminescence, BRET, AlphaScreen®, TRF and HTRF®
96-well	white, sterile, cell culture-treated, clear bottom	24910	Luminescence
96-well	black, standard	23302	Fluorescence, FRET, TRF and FP; suitable also for HTRF®
96-well	black, with white wells	55008	Luminescence and BRET; suitable also for TRF, AlphaScreen® and HTRF®
96-well	black, with clear bottom	60706	Absorbance; suitable also for Fluorescence, FRET and FP
96-well	black, sterile, cell culture-treated	51839	Fluorescence, FRET, TRF and FP; suitable also for HTRF®
96-well	black, sterile, cell culture-treated clear bottom	38840	Absorbance; suitable also for Fluorescence and FRET
384-well	white	32505	BRET, AlphaScreen® and HTRF®, and are also suitable for TRF

ADHESIVE FOILS

Optimised reading performance when using clear bottom plates

Clear-bottom plates are required for the microscopic observation of cultured cells. However, they may cause issues measuring luminescence and fluorescence. We offer adhesive foils to be placed on the bottom of clear-bottom microplates, that will reduce crosstalk and reflection and improve luminescence and fluorescence measurements in this type of plates.

Type of foil	Part number
White adhesive foils, for luminescence measurements in white clear-bottom microplates (50 pieces)	55590
Black adhesive foils, for fluorescence measurements in black clear-bottom microplates (50 pieces)	55591

TEST TUBES FOR LUMINESCENCE MEASUREMENT

For best luminescence test results.

We offer sample tubes for luminescence detection in different heights/volumes, which are suitable for measurements in tube luminometers. The tubes are made of polystyrene, have a diameter of 12 mm and fit all our tube luminometers.

Suitable for a wide volume range, from a few microlitres up to 5 mL (depending on tube height).

Test tube	Part number
Luminescence tubes, 5 mL, 12 x 75 mm (3000 pieces)	09778
Luminescence tubes, 3.5 mL, 12 x 55 mm (2000 pieces)	26152
Luminescence tubes, 3 mL, 12 x 47 mm, irradiated (1000 pieces)	09777

TRANSFORMING SCIENCE INTO SOLUTIONS

Berthold Technologies is a global technology leader in life sciences. Our extensive range of analytical system solutions made in Germany has been trusted by scientists since 1949. These range from small standalone readers, such as microvolume spectrophotometer and luminometers to various dedicated and multimode readers, microplate washers, microplate workstations and ELISA automation products to high-end imaging systems and HPLC radio detectors. It is our mission to create a healthier world, a safer environment and more efficient manufacturing processes.

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