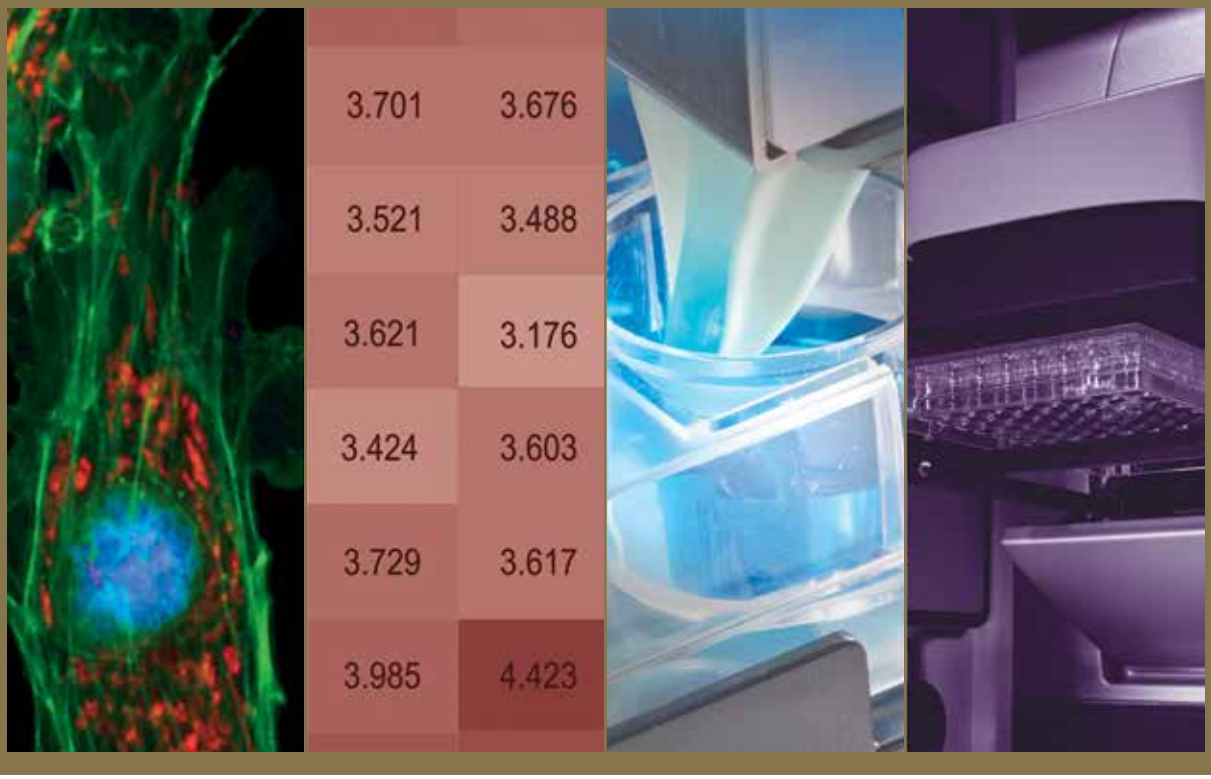
CELEBRATING 50 YEARS OF PASSION AND INNOVATION

CATALOG | 2017 2018



Life Science Instrumentation

Imaging & Microscopy

Detection

Liquid Handling

Robotics

Think Possible

BioTek®

As we celebrate our 50th anniversary, we would like to thank our customers. It's because of you that we can play a part in the advancement of life science research by creating new solutions to help you move the discovery process forward.

BioTek Instruments, Inc., headquartered in Winooski, VT, USA, is a worldwide leader in the design, manufacture, and sale of innovative life science instrumentation and software. For 50 years, our products have been designed and manufactured in the U.S.A. BioTek's instrumentation is used to aid in the advancement of life science research, facilitate the drug discovery process, provide rapid and cost-effective analysis and to enable sensitive and accurate quantification of a wide range of molecules across diverse applications.

Our company-wide commitment to quality and value is backed by superior customer care, technical service centers, scientific application experts, and a knowledgeable sales force. Additionally, our many sustainability initiatives reflect our passion towards using clean, renewable energy and creating a greener tomorrow. These resolutions combine to ensure an efficient and successful process for our customers, and a cleaner environment around the world.

This catalog provides an overview of our complete line of life science instrumentation including imaging, detection, washing, dispensing and robotic products.

For more detailed information and up-to-date product specifications, visit our web site at www.biotek.com.

BioTek is ISO13485 Certified, an FDA Registered Medical Device Manufacturer, and has appropriate products in compliance with the EU In Vitro Diagnostic Directive (IVD). Regulatory compliance is ensured with both validation (IQ/OQ/PQ) and FDA 21 CFR Part 11 tools.

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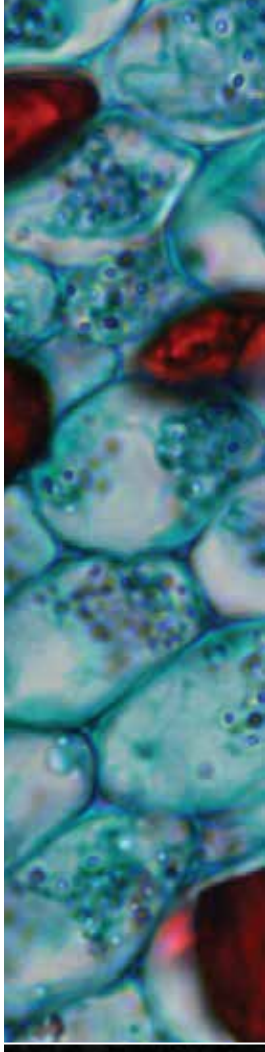
Imaging & Microscopy

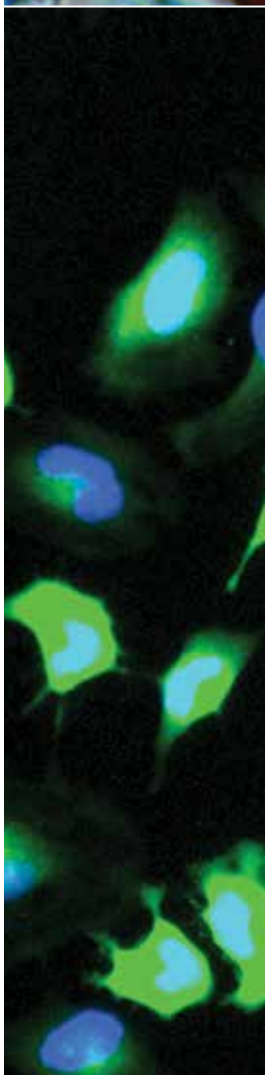
With the launch of the new Cytation™ 1 Cell Imaging Multi-Mode Reader and the creation of the BioSpa™ Live Cell Imaging System, BioTek expands its range of imaging and microscopy instrumentation to reach more applications and more budgets. Cytation 1 offers affordable microscopy and adds further value by incorporating conventional multi-mode detection in its modular design. The BioSpa System combines BioSpa 8 Automated Incubator with Cytation to automate complex kinetic live cell imaging workflows – adding a liquid handler to the system makes a complete, sample prep-to-image analysis workstation.

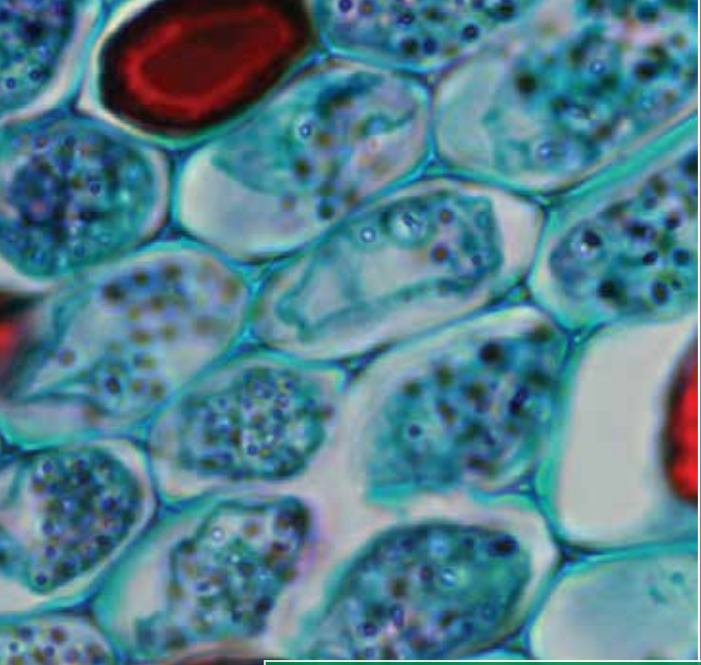
Lionheart™ FX Automated Microscope is optimized with environmental controls that are crucial for successful short- and long-term live cell imaging applications. This compact system is a powerhouse of imaging features, including up to 100x oil immersion magnification, automated XY stage and label-free cell counting.

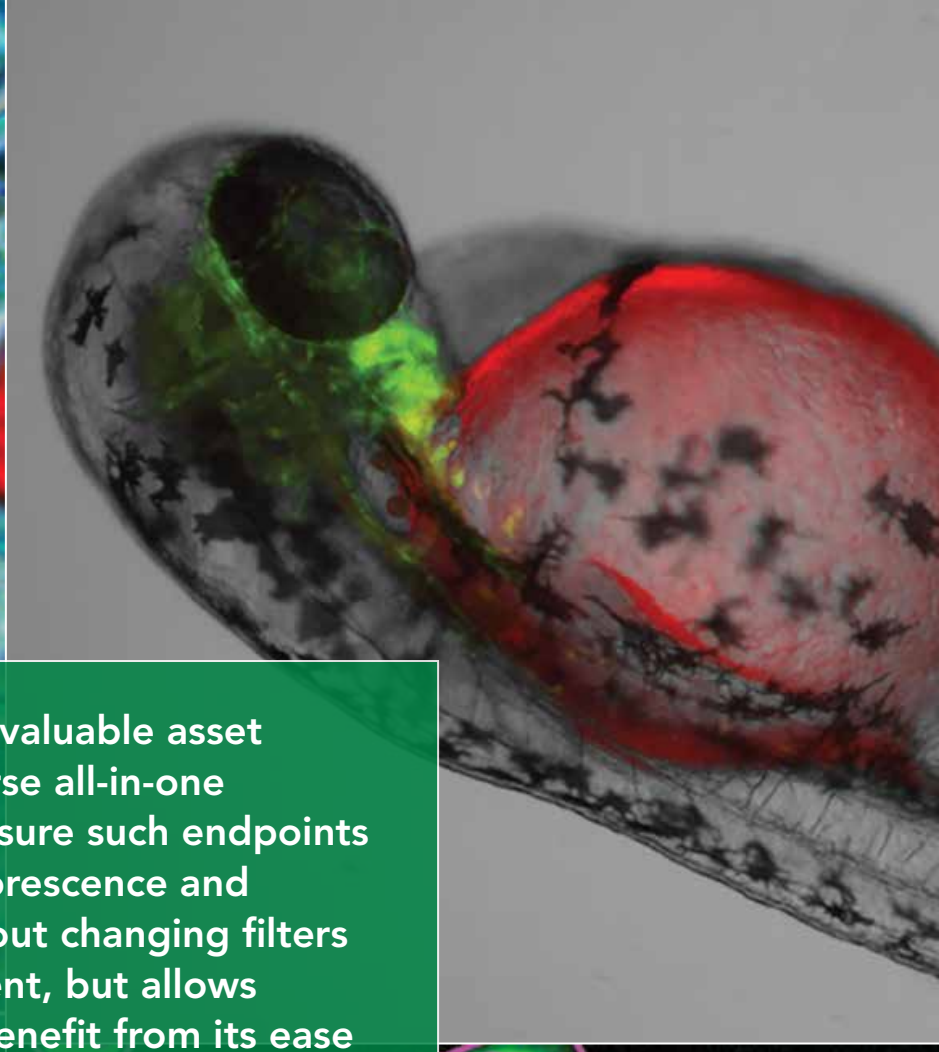
Cytation 5 Cell Imaging Multi-Mode Reader offers important imaging capabilities usually reserved for much more expensive systems. Cytation 5 is modular, enabling a wide range of multi-mode detection functionality.

Gen5™ Software controls BioTek's imaging and microscopy systems with Augmented Microscopy™, automating the steps of a typical microscopy workflow: Image capture, processing, analysis and preparation of publication-ready data.

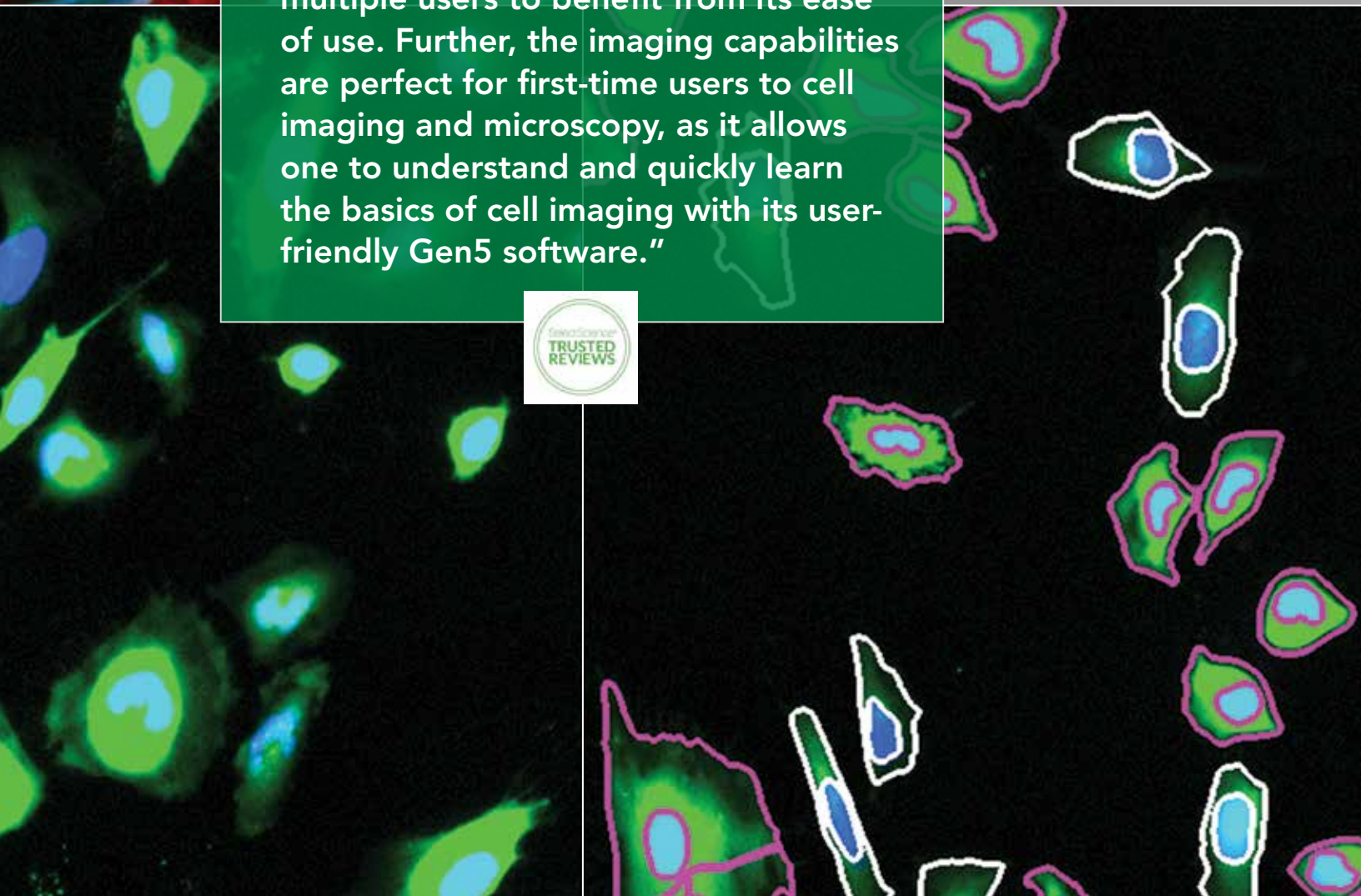








"Cytation 5 is an invaluable asset to our lab. Its diverse all-in-one capabilities to measure such endpoints as absorbance, fluorescence and luminescence without changing filters is not just convenient, but allows multiple users to benefit from its ease of use. Further, the imaging capabilities are perfect for first-time users to cell imaging and microscopy, as it allows one to understand and quickly learn the basics of cell imaging with its user-friendly Gen5 software."



LIONHEART FX

automated microscope

Lionheart™ FX Automated Live Cell Imager is a digital microscope that automates image capture and analysis, with a combined power and ease of use that dramatically sets it apart from traditional microscopes. Lionheart FX and Gen5™ Software capture and produce detailed information from live cell assays in real time, providing valuable qualitative and quantitative data quickly and easily. Augmented Microscopy™ is the collection of all of these features in one compact system. With Lionheart FX, you can capture, analyze, annotate images and produce videos with ease.

Whole Organism to Subcellular Imaging

Lionheart FX offers fluorescence, brightfield, color brightfield and phase contrast imaging modes to cover a broad range of applications. With four channels and more than 15 color cubes available, Lionheart FX is compatible with a wide range of fluorophores for multi-color imaging. With 1.25x to 100x oil immersion magnification and new tools in Gen5 Image Prime Software, image capture and analysis rivals that of very expensive custom microscopy systems. The automated 6-position objective turret provides quick selection of optimal imaging magnification.

Kinetic Live Cell Assay Support

With Lionheart FX, live cell assays can be measured over seconds, minutes, hours or days. The environmental control cover ensures the required temperature and gas circulation, and provides a darkroom-like environment for fluorescence imaging. A humidity chamber offers added protection for cells during long-term measurement. The dual reagent injectors provide rapid sequential dispensing and imaging to capture rapidly changing cellular activities.

Augmented Microscopy

Lionheart FX offers a combination of hardware and software features that provide unequaled automation for image capture, analysis, annotation and movie-making in a single integrated platform.

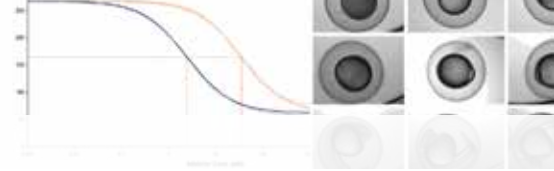
Image and laser-based autofocus, auto exposure and auto LED intensity aid in easy capturing of images in real time.

From single sample imaging to long-term live cell kinetics on multiple samples, Gen5 analyzes each image quickly, easily and automatically. During capture, image cellular analysis is automatically updated. Gen5 offers an on-screen tool for real time annotation of single and sequential images. Easily make kinetic image sequences into .MP4 or .WMV files – no need to export to third-party software.

Lionheart FX comes with a compact, custom controller designed for simple, out-of-the-box integration and control via Gen5 software for all of your imaging requirements.

TYPICAL APPLICATIONS

- 2D and 3D cell imaging and analysis
- Cell growth and death dynamics
- Label-free cell counting
- Cell viability / toxicity
- Drug discovery
- Phenotypic assays
- Subpopulation analysis
- Translocation assays
- Cell migration/invasion assays
- Wound healing



SPECIFICATIONS

General	
Microplate types	6- to 1536-well plates
Other labware	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25, T75), counting chambers (hemocytometers), chamber slides Support for labware up to 1.5" tall
Temperature control	Incubation to 40 °C with optional environmental control cover
Software	Gen5 Microplate Reader and Imager Software included Gen5 Image+ and Image Prime Software available for advanced image analysis (option)
CO_2 and O_2 control	0 - 20% CO_2 control and 1 - 19% O_2 control, with optional Gas Controller
Environmental control cover	Top cover for light tight imaging and incubation control (option)
X/Y Stage resolution	Lead screw driven stage with 0.1 µm resolution
Humidity control	Humidity chamber with rapid gas recharge (option)
Controller	Custom computer configured for BioTek's imaging systems. Includes Microsoft Windows 10, 24" LED monitor, keyboard and mouse
Imaging System	
Imaging modes	Fluorescence, brightfield, color brightfield, phase contrast
Imaging method	Single color, multi-color, montage, time lapse, z-stacking, burst mode
Light source	High power LEDs; wavelengths from 365 nm to 740 nm available
Camera	16-bit gray scale, Sony CCD, 1.25 megapixel
Camera binning	Optional 2x2 binning for focus and/or image capture
Camera exposure range	5 milliseconds to 4 seconds
Image outputs available	Raw Images: 16-bit TIFF Saved Images: TIF, JPG, BMP, PNG, EMF, GIF Movies: MP4, WMV
Objective capacity	6 onboard, user-replaceable objectives
Objectives available	Fluorescence: Air: 1.25x, NA .04; 2.5x (2.25x eff), NA: .07; 2.5x (2.75x eff), NA: .12; 4x, NA: .13; 10x, NA: .30; 20x, NA: .45; 40x, NA.60; 60x, NA .70 Oil: 60x, NA: 1.42; 100x, NA: 1.40 Phase objectives available: 4x, NA: .13; 10x, NA: .30; 20x, NA: .45; 40x, NA .60
Image filter cube capacity	4 fluorescence cubes plus brightfield channel; more than 15 colors available
Automated functions	Autofocus, auto exposure, auto LED intensity, auto exposure
Autofocus method	Image-based autofocus User-trained autofocus Laser autofocus (option)
Image collection rate	Single well fastest frame rate capture: Full Resolution: up to 10 frames per second for single color images 2x2 Binning: up to 20 frames per second for single color images
Microscope stage control	Gen5 Software control Optional joystick controller
Reagent Injectors	
Number	2 syringe pumps
Supported labware	6- to 384-well microplates, Petri and cell culture dishes, chamber slides
Dead volume	<1.65 mL with back flush
Dispense tip options	Aligned tip - aligned with optical path for dispensing for fast kinetic assays Offset tip - dispensing is offset from the optical path
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µL or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	250 W max
Dimensions	With cover closed or without cover: 18.3" D, 17.9" W, 14.1" H (46.5 cm x 45.5 cm x 35.8 cm) With cover fully open: 18.3" D, 17.9" W, 27.5" H (46.5 cm x 45.5 cm x 69.8 cm)
Weight	Without environmental control cover: 51 lbs (23.1 kg) With environmental control cover: 58 lbs (26.3 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

CYTATION 5

cell imaging multi-mode reader

Cytation™ 5 is a uniquely integrated, configurable system that combines automated digital widefield microscopy with conventional multi-mode microplate detection to provide phenotypic cellular information and well-based quantitative data. With up to 60x magnification, the microscopy module provides high-quality cellular and sub-cellular visualization. The multi-mode detection module provides high quality quantitative and qualitative data in all detection modes. All controlled with Gen5™ Software, specifically designed for uncomplicated processing of even the most complex assays.

Powerful Automated Digital Microscopy

Cytation 5 is available in multiple upgradable configurations; from basic microscopy to complex image collection and analysis in fluorescence, brightfield, color brightfield and phase contrast. Cytation 5 offers critical methods like single- and multi-color, time lapse, montage and z-stacking. Available laser autofocus and image-based autofocus ensure fast and accurate image aquisition with minimal phototoxicity across a broad application range. Powerful image processing like image stitching, z-projection and digital phase contrast are all available in this cost effective system.

Live Cell Assays

To create the ideal environment for live cell assays, Cytation 5 includes 4-Zone™ incubation up to 65 °C and a gas controller to monitor and control CO_2 and O_2 levels in the system. Linear, orbital and double orbital shaking help to keep cells gently agitated or well suspended to optimize many cell-based assay protocols. To fully automate live cell assay workflows, integrate with BioSpa™ 8 Automated Incubator. From sample prep to image analysis, BioSpa 8 offers walkaway automation.

Hybrid Technology

BioTek's patented Hybrid Technology, available with the multi-mode detection modules, combines high performance filters with variable bandwidth monochromators for convenience, versatility and excellent performance. Fluorescence, luminescence, UV-Vis absorbance, time-resolved fluorescence, fluorescence polarization and Alpha detection modes greatly increase the application range of the system.

TYPICAL APPLICATIONS

Imaging

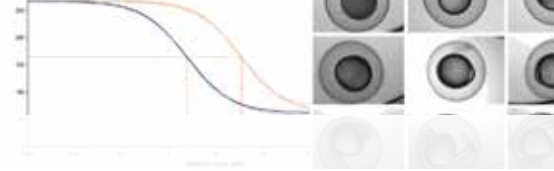
- 2D and 3D cell imaging and analysis
- Cell proliferation studies
- Label-free cell counting
- Cytotoxicity
- Biomarker quantification

Multi-Mode Detection

- Drug discovery
- Genetic analysis
- Drug absorption and metabolism
- Biologics drug discovery and development
- Environmental testing
- Food safety
- Nucleic acid quantification
- Protein quantification

PATENTED HYBRID OPTICS

Take3 Compatible



SPECIFICATIONS

General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence Alpha detection
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	Monochromator: 6- to 384-well plates Filters: 6- to 1536-well plates Imaging: 6- to 1536-well plates
Other labware	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometer) Take3™ Micro-Volume Plates
Temperature control	4-Zone incubation to 65 °C with Condensation Control
Shaking	Linear, orbital, double orbital
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
CO_2 and O_2 control	0 - 20% CO_2 control and 1 - 19% O_2 control, with optional Gas Controller
Light source	Fluorescence and absorbance: Xenon flash lamps Alpha detection: 100 mW 680 nm laser Imaging: High power LEDs
Detector	Fluorescence and luminescence: PMTs (one for monochromator, one for filter system) Absorbance: photodiode
Imaging System	
Imaging modes	Fluorescence, brightfield, color brightfield, phase contrast
Imaging method	Single color, multi-color, montage, time lapse, z-stacking
Image processing	Z-projection, digital phase contrast, stitching
Camera	16-bit gray scale, Sony CCD
Objective capacity	6 user-replaceable objectives
Objectives available	1.25x, 2.5x, 4x, 10x, 20x, 40x, 60x
Phase objectives available	4x, 10x, 20x, 40x
Imaging filter cubes/capacity	4 user-replaceable fluorescence cubes plus brightfield channel
Imaging filter cubes available	DAPI, CFP, GFP, YFP, RFP, Texas Red, CY5, CY7, Acridine Orange, CFP -YFP CY7, CFP -YFP FRET, propidium iodide, chlorophyll, phycoerythrin, CY5.5, TagBFP, Alexa568, Ex377 / Em647
Imaging LED cubes available	365 nm, 390 nm, 465 nm, 505 nm, 523 nm, 590 nm, 623 nm, 655 nm, 740 nm
Automated functions	Autofocus, auto LED intensity, auto exposure
Autofocus method	Image-based autofocus User-trained autofocus Laser autofocus (option)
Positional controls	Gen5 Software control Optional joystick controller
Image collection rate	Image-based autofocus: 96 wells, 1 color (DAPI), 4x, 6 minutes Laser autofocus: 96 wells, 1 color (DAPI), 4x, <3 minutes Burst Mode: 10 fps, single well, single color at ≤ 50ms integration time
Image analysis software option	Gen5 Image+: Advanced image analysis Gen5 Image Prime: Advanced image analysis
Absorbance	
Wavelength selection	Monochromator
Wavelength range	230 - 999 nm, 1 nm increment
Monochromator bandwidth	4 nm (230 - 285 nm), 8 nm (>285 nm)
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Wavelength accuracy	±2 nm
Wavelength repeatability	±0.2 nm
Optical density	Accuracy: <1% at 2.0 OD; <3% at 3.0 OD Linearity: <1% from 0 to 3.0 OD Repeatability: <0.5% at 2.0 OD Stray light: 0.03% at 230 nm
Reading speed (kinetic)	96 wells: 11 seconds, 384 wells: 22 seconds
Sensitivity	Filters: Fluorescein 0.25 pM (0.025 fmol/well, 384-well plate) Quad Monochromator: Fluorescein 2.5 pM (0.25 fmol/well, 384-well plate) - top Fluorescein 4 pM (0.4 fmol/well, 384-well plate) - bottom
Reading speed	96 wells: 11 seconds, 384 wells: 22 seconds
Fluorescence Intensity	
Wavelength selection	Quad monochromators (top/bottom); filters (top)
Wavelength range	Monochromators: 250 - 700 nm (850 nm option) Filters: 200 - 700 nm (850 nm option)
Monochromator bandwidth	Variable; 9 - 50 nm, in 1 nm increments
Dynamic range	7 decades
Sensitivity	Filters: Fluorescein 0.25 pM (0.025 fmol/well, 384-well plate) Quad Monochromator: Fluorescein 2.5 pM (0.25 fmol/well, 384-well plate) - top Fluorescein 4 pM (0.4 fmol/well, 384-well plate) - bottom
Reading speed	96 wells: 11 seconds, 384 wells: 22 seconds
Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	> 6 decades
Sensitivity	Monos: 20 amol ATP (flash) Filters: 10 amol ATP (flash), 100 amol (glow)
Fluorescence Polarization	
Wavelength selection	Filters
Wavelength range	280 - 700 nm (850 nm option)
Sensitivity	1.2 mP standard deviation at 1 nm fluorescein
Time Resolved Fluorescence	
Wavelength selection	Quad monochromators (secondary mode) Filters (top)
Wavelength range	Filters: 200 - 700 nm (850 nm option)
Sensitivity	Filters: Europium 40 fM (4 amol/well, 384-well plate) Monos: Europium 1200 fM (120 amol/well, 384-well plate)
Alpha Detection	
Wavelength selection	Filters (top)
Sensitivity	100 amol LCK peptide (384-well low volume plate)
Reagent Injectors	
Supported detection modes	All modes
Number	2 syringe pumps
Supported labware	6- to 384-well plates, Petri and cell culture dishes
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µl or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	250 W max
Dimensions	16.5" W x 20" D x 17.5" H (41.9 x 50.8 x 44.5 cm)
Weight	80 lbs (36.3 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS Compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

CYTATION|1

cell imaging multi-mode reader

Cytation™ 1 Cell Imaging Multi-Mode Reader combines fluorescence and high contrast brightfield imaging with conventional multi-mode detection in an upgradable, affordable platform. This patented design enables applications from cell proliferation studies to micro-volume nucleic acid quantification without requiring additional hardware. Gen5 Software provides powerful image and data analysis in an easy-to-use interface.

Quantitative Image Analysis

The microscopy module in Cytation 1 offers 1.25x to 60x magnification to capture large regions of interest or intracellular details in slides, microplates, cell culture dishes and other labware. Four color channels, plus the unique high contrast brightfield mode enable fixed and live cell imaging applications, including label-free cell counting, 3D cell culture and phenotypic assays. Temperature and CO_2/ O_2 control support kinetic live cell imaging.

Augmented Microscopy™

With Cytation 1 and Gen5 Software, typical microscopy steps are integrated and automated: Image capture, processing, and analysis steps help to create publication-ready images and data. Augmented Microscopy facilitates these workflows in Gen5, efficiently guiding scientists through the entire process, without requiring extensive training.

Affordable Automation

The automated XY stage positioning, autofocus, auto exposure and auto LED intensity bring efficiency to common microscopy tasks for fixed and live cell assays. Cytation 1 integrates with BioSpa 8 Automated Incubator to automate long-term kinetic live cell imaging workflows for up to 8 microplates or other labware. For high throughput workflows, BioStack Microplate Stacker can process up to 50 lidded or unlidded plates at a time for imaging or multi-mode detection processes.

Multi-Mode Versatility

Cytation 1 uses filter/dichroic based optics for excellent sensitivity in luminescence, fluorescence intensity, polarization and time-resolved measurements. The monochromator-based absorbance optics offer a 200 – 999 nm wavelength range to enable applications from nucleic acid and protein quantification to turbidimetric measurements. Temperature control, shaking and dual reagent injectors expand applications to kinetics and fast inject/read protocols.

TYPICAL APPLICATIONS

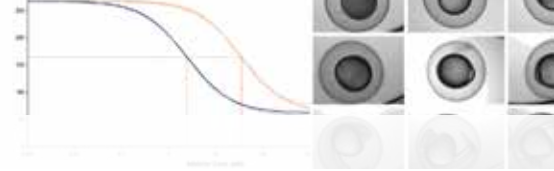
Imaging

- 2D and 3D cell imaging and analysis
- Cell proliferation studies
- Label-free cell counting
- Cytotoxicity
- Biomarker quantification

Multi-Mode Detection

- Drug discovery
- Genetic analysis
- Drug absorption and metabolism
- Biologics drug discovery and development
- Environmental testing
- Food safety
- Nucleic acid quantification
- Protein quantification

Take3 Compatible



SPECIFICATIONS

General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	Monochromator: 6- to 384-well plates Filters: 6- to 1536-well plates Imaging: 6- to 1536-well plates
Other labware	Microscope slides, Petri and cell culture dishes, cell culture flasks (T25), counting chambers (hemocytometer) Take3 Micro-Volume Plates
Temperature control	4-Zone incubation to 45 °C with Condensation Control
Shaking	Linear, orbital, double orbital
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
CO_2 and O_2 control	0 - 20% CO_2 control and 1 - 19% O_2 control, with optional Gas Controller
Light source	Fluorescence and absorbance: Xenon flash lamps Imaging: High power LEDs
Detector	Fluorescence and luminescence: PMTs Absorbance: photodiode
Imaging System	
Imaging modes	Fluorescence High contrast brightfield (2.5x, 4x, 10x, 20x, 40x and 60x)
Imaging method	Single color, multi-color, montage, time lapse, z-stacking
Image processing	Z-projection, image stitching
Camera	16-bit gray scale, Sony CCD
Objective capacity	2 user-replaceable objectives
Objectives available	1.25x, 2.5x, 4x, 10x, 20x, 40x, 60x
Imaging filter cubes/capacity	4 user-replaceable fluorescence cubes plus brightfield channel
Imaging filter cubes available	DAPI, CFP, GFP, YFP, RFP, Texas Red, CY5, CY7, Acridine Orange, CFP -YFP CY7, CFP -YFP FRET, propidium iodide, chlorophyll, phycoerythrin, CY5.5, TagBFP, Alexa568, Ex377 / Em647
Imaging LED cubes available	365 nm, 390 nm, 465 nm, 505 nm, 523 nm, 590 nm, 623 nm, 655 nm, 740 nm
Automated functions	Autofocus, auto LED intensity, auto exposure
Autofocus method	Image-based autofocus User-trained autofocus Laser autofocus (option)
Positional controls	Gen5 Software control
Image collection rate	Image-based autofocus: 96 wells, 1 color (DAPI), 4x, 6 minutes Laser autofocus: 96 wells, 1 color (DAPI), 4x, <3 minutes Burst Mode: 10 fps, single well, single color at ≤ 50ms integration time
Image analysis software option	Gen5 Image+: Advanced image analysis Gen5 Image Prime: Advanced image analysis
Absorbance	
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	2.4 nm
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Wavelength accuracy	±2 nm
Wavelength repeatability	±0.2 nm
Optical density	Accuracy: <1% at 2.0 OD; <3% at 3.0 OD Linearity: <1% from 0 to 3.0 OD Repeatability: <0.5% at 2.0 OD Stay light: 0.03% at 230 nm
Reading speed (kinetic)	96 wells: 11 seconds, 384 wells: 22 seconds
Fluorescence Intensity	
Wavelength selection	Deep blocking band pass filters / dichroic mirrors
Wavelength range	Filters: 200 - 700 nm (850 nm option)
Dynamic range	7 decades
Sensitivity	Fluorescein: 0.25 pM (0.025 fmol/well, 384-well plate)
Reading speed	96 wells: 11 seconds, 384 wells: 22 seconds
Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	> 6 decades
Sensitivity	10 amol ATP (flash) 100 amol (glow)
Fluorescence Polarization	
Wavelength selection	Filters
Wavelength range	400 nm - 700 nm
Sensitivity	1.2 mP standard deviation at 1 nm fluorescein
Time Resolved Fluorescence	
Wavelength selection	Filters
Sensitivity	Europium 40 fM (4 amol/well, 384-well plate)
Reagent Injectors	
Supported detection modes	All modes
Number	2 syringe pumps
Supported labware	6- to 384-well plates, Petri and cell culture dishes
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µl or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	130 W max
Dimensions	16.5" W x 20" D x 17.5" H (41.9 x 50.8 x 44.5 cm)
Weight	65 lbs (29 kg)
Regulatory	
Regulatory	CE and TUV marked. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

BIOSPA

live cell imaging system

The BioSpa™ Live Cell Imaging System integrates the BioSpa8 Automated Incubator and Cytation™ Cell Imaging Multi-Mode Reader to fully automate kinetic live cell imaging and analysis.

Unattended Workflow Automation

The BioSpa System offers complete workflow automation for live cell kinetic assays running up to two weeks at a time, in up to 8 microplates, cell culture dishes, flasks and slides. Program complete methods in the BioSpa Software session mode or use the simple, but powerful BioSpa OnDemand mode. OnDemand mode allows multiple users to run separate protocols, plus add and remove plates without interrupting programs already in process.

Environmental Controls for Live Cell Processes

Temperature and CO_2/O_2 control, plus humidity monitoring ensure the best environment for live cells without requiring a separate incubator. BioSpa's built-in control and monitoring features allow you to focus on other tasks, and avoid manual plate handling. BioSpa software can send text or email alerts throughout a run, so you can walk away with confidence.

Powerful Image Capture Tools

BioSpa 8 integration with Cytation 5 brings remarkable image collection and analysis tools to the automated workflow. With six positions for objectives ranging from 1.25x to 60x, four channels plus brightfield, and more than 15 colors available, the BioSpa System fits the requirements of many long-term live cell imaging processes.

Advanced Cell-level Analysis

Gen5™ Software is available in several editions to meet the imaging and analysis requirements of many applications. From basic automated cell counting to advance capabilities including dual masks for nucleus and cytoplasm identification, Gen5 offers powerful quantitative data analysis in an uncomplicated interface.

Washing and Media Replacement

The BioSpa System can incorporate BioTek's MultiFlo™ FX Multi-Mode Dispenser and EL406™ Washer Dispenser for plate washing and media exchange. Adding liquid handling to the integrated system provides complete, walkaway automated processing from sample prep through image analysis.

TYPICAL APPLICATIONS

- 3D and 2D cell imaging and analysis
- Cell growth and death dynamics
- Label-free cell counting
- Cell migration and invasion
- Phenotypic assays

BioSpa 8 integrated with Cytation and MultiFlo FX

For BioSpa features and performance specifications, turn to page 64; for Cytation 5 features and performance specs, see page 8.

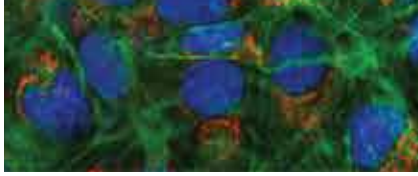
IMAGING & MICROSCOPY COMPARISON CHART

	Lionheart FX	*Cytation 5*	*Cytation 1*	*BioSpa System***
General				
Microplate types	6- to 1536-well plates			
Other labware	Slides, cell culture dishes & flasks, hemocytometers, chamber slides			Cell culture dishes & flasks (T25)
Labware capacity	1	1	1	8
Incubation	to 40 °C	to 65 °C	to 45 °C	to 45 °C
Humidity control	•			•
Joystick controller	•	•		•
Automation compatible		•	•	•
Multi-mode detection		•	•	•
Objectives				
Capacity	6	6	2	6
Air objectives	1.25x, 2.5x, 4x, 10x, 20x, 40x, 60x			
Phase objectives	4x, 10x, 20x, 40x			
Oil immersion objectives	60x, 100x			
Imaging Modes & Methods				
Fluorescence	•	•	•	•
Brightfield	•	•	•	•
High contrast brightfield	•	•	•	•
Color brightfield	•	•		•
Phase contrast	•	•		•
Processing & Analysis				
Z-stacking	•	•	•	•
Montage	•	•	•	•
Cell counting	•	•	•	•
Z-projection*	•	•	•	•
Digital phase contrast*	•	•	•	•
Image stitching*	•	•	•	•
Advanced image analysis*	•	•	•	•

*with Gen5 Image+ or Image Prime Software
**BioSpa System consists of BioSpa Automated Incubator and Cytation Cell Imaging Multi-Mode Reader

Gen5™

imaging & microscopy software



With Gen5™ and BioTek's Lionheart™ FX or Cytation™ imaging systems, you can acquire high quality images across a broad range of fixed and live biologies for applications in life science, drug discovery and clinical laboratories. Augmented Microscopy™ automates all the steps of a typical microscopy workflow, making image capture, processing, and analysis easy and powerful, to produce publication-ready images and data.

Image Capture

Gen5 captures images from fixed and live cell assays, tissues, whole biology and more. From large regions of interest to subcellular and intracellular details, Gen5 captures images in a batch, endpoint, time lapse sequence and z-stacks. Fluorescence, brightfield, color brightfield or phase contrast modes enable diverse applications.

Process

Brightness and contrast adjustments, background flattening and deconvolution are a few of the many image pre-processing steps available in Gen5. Z-stacks can automatically be z-projected and digital phase contrast improves the appearance of challenging images. Gen5's processing steps allow you to work within one software package, without requiring extensive training.

Analyze

Gen5 analyzes cellular features such as intensity, or morphology (size, perimeter, circularity), enabling applications such as transfection efficiency, nuclear translocation or cell cycle assays where multiple cell subpopulations are present in the samples. Label-free confluence and cell counts are accomplished with the unique high contrast brightfield mode. The add-on spot counting module enables detailed analysis of intracellular activity.

Publish

During or after image analysis, Gen5's integrated tools enable convenient annotation of important information in each image without having to export to a third-party software package. Gen5's built in movie-maker turns time lapse images into movies with a click of the mouse. Not only does Gen5 provide amazing visualization of your samples, it provides quantitative data and results from the entire experiment. Heat maps, dose response curves and multi-mode and image-based quantitative data can be combined to rapidly obtain, analyze and acquire both phenotypic and quantitative results.

KEY FEATURES

Powerful instrument control

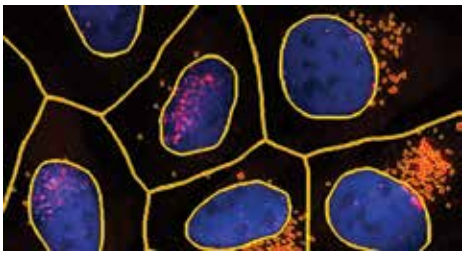
- User-trained autofocus, image-based and laser autofocus
- Automatic camera gain, exposure and LED intensity settings
- Endpoint, montage, z-stack and time-lapse read modes

Image pre-processing tools

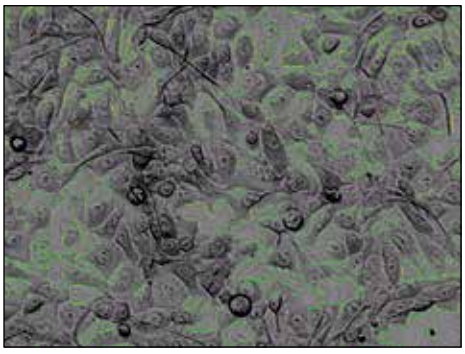
- Image deconvolution for improved visualization
- Built-in hot-pixel correction
- Automated image pre-processing (flattening smoothing, background correction)
- Image stitching, z-projection
- Digital phase contrast algorithm

Image and data analysis tools

- Automatic cell-counting and confluence
- Label-free cell counting
- Spot counting for intracellular detail analysis
- Primary mask for nucleus and secondary mask for cytoplasm or whole cell
- Powerful subpopulation analysis
- Image statistics
- Full data analysis software (EC_{50}, standard curves, kinetic analysis and more)

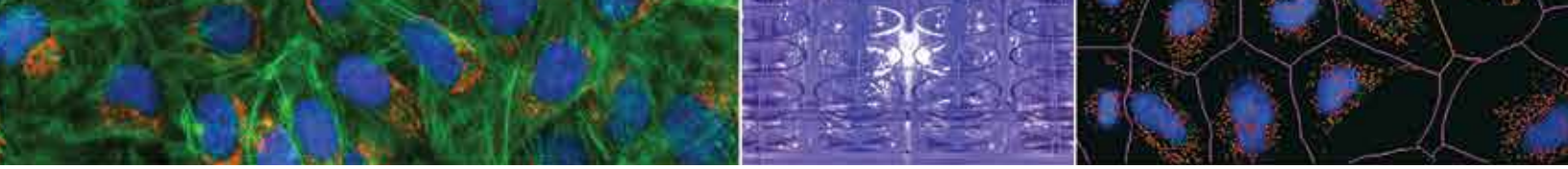


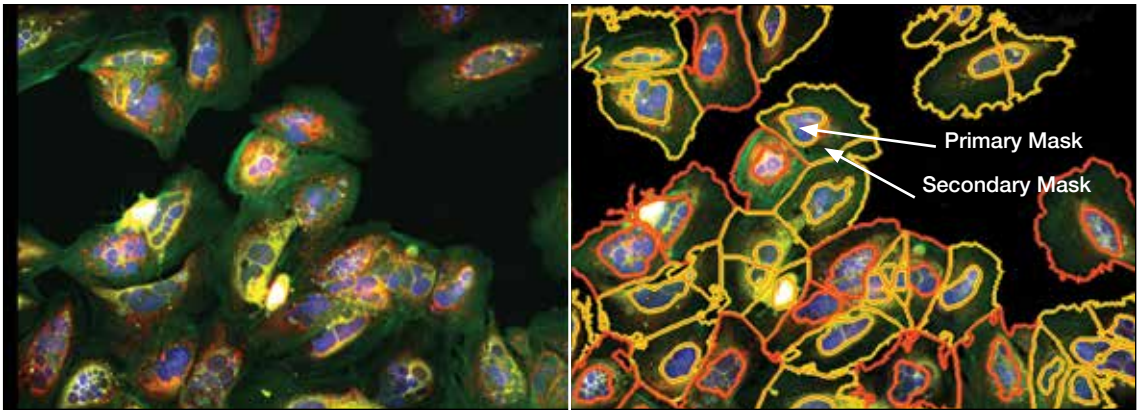
Spot counting: Intracellular details



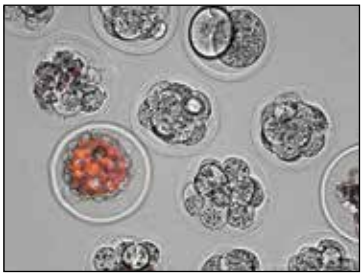
Confluence determination: High contrast brightfield

Gen5 is available in several editions for image processing and analysis. See page 39 for a comparison chart.

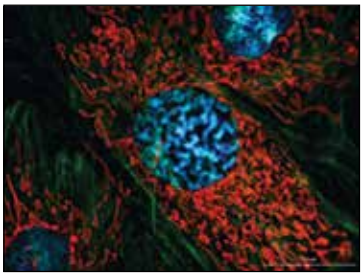




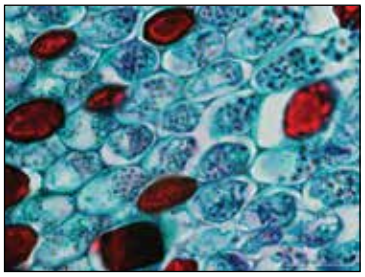
Cells treated with 0.3 µM Taxol; nuclear fragmentation visible (cells highlighted)



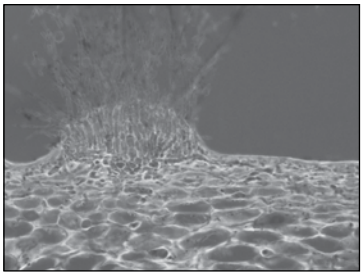
Bovine embryos at 20x; propidium iodide & brightfield



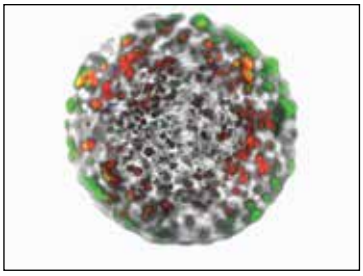
BPAE cells at 100x



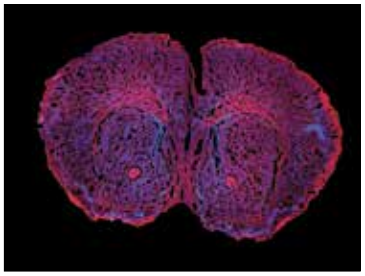
Nymphea of Aquisto stem cross section at 60x; color brightfield



Penicillin at 20x; phase contrast

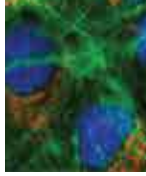


HT29 Human tumor spheroid at 2.5x; stitched montage, Hoechst, Propidium iodide & Calcein AM



Mouse brain section at 2.5x; stitched montage, DAPI & Texas Red

Imaging & Microscopy Accessories



BioTek offers a range of accessories designed to optimize imaging applications and enhance and automate throughput for many fixed and live cell imaging applications. Several accessories are featured here – see the complete list of imaging and microscopy accessories on our web site.

Objectives

From 1.25x to 100x air and oil immersion, BioTek offers the highest quality Olympus and Zeiss objectives to suit a wide range of applications.

Humidity Chamber

The unique humidity chamber for Lionheart FX offers both humidity control and a rapid gas re-charge port to help maintain the ideal environment for live cell imaging.

Labware Adapters and Inserts

Lionheart FX™ and Cytation™ can image cells in microplates and a wide variety of labware, from slides to cell culture flasks. Labware is properly positioned for optimal imaging with our labware adapters and stage inserts.

Filter / LED Cubes

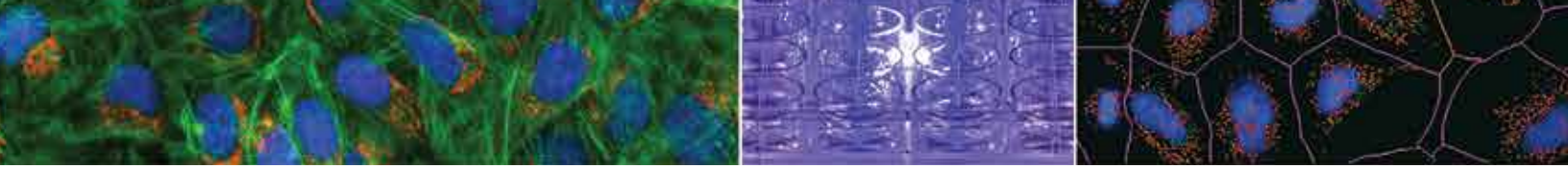
To cover the broadest range of fluorescent dyes and applications, BioTek offers more than 15 color filter cubes with high powered LEDs.

Gas Controller

The Gas Controllers for Lionheart FX and Cytation allow full control over CO_2 and O_2 concentrations to modulate the environment for live cell assays.

Dual Reagent Injector Module

Dual reagent injectors allow rapid injection/ image functions during live cell imaging with Cytation and Lionheart FX.



BioStack™ Microplate Stacker

Automate routine Cytation imaging or multi-mode detection processes with the compact BioStack. Plate de-lidding and re-lidding is available with BioStack 4. Learn more about BioStack on page 66.

Perfusion Stages

Lionheart FX can automate perfusion studies when integrated with the MilliporeSigma CellASIC® ONIX2 Microfluidic System. Specialized stages are available from BioTek to complete the system for both heated and unheated processes.

BioSpa™ 8 Automated Incubator

Cytation Cell Imaging Multi-Mode readers can be integrated with BioSpa 8 Automated Incubator and BioTek washers and dispensers for complete live cell assay workflow automation of up to 8 microplates or other labware. See more about BioSpa 8 on page 64.

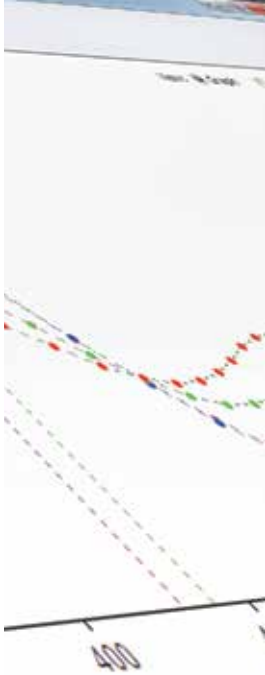
Joystick Controller

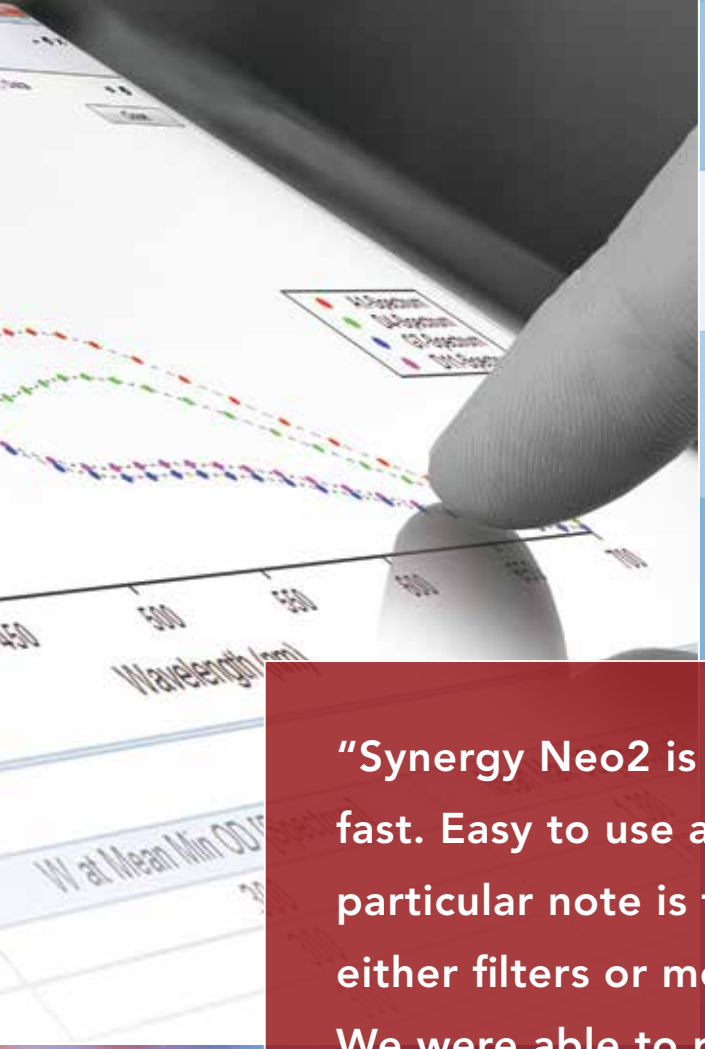
BioTek's joystick controller is available for use with Cytation 5 or Lionheart FX for precise stage XY control and focusing.

Detection

BioTek offers an extensive range of microplate readers, from the Synergy™ Neo2 Hybrid Multi-Mode Microplate Reader to the new 800™ TS Microplate Reader, packed with easy-to-use features for today's busy research and clinical laboratories. Included in the BioTek reader product range are Hybrid readers, multi-mode readers, fluorometers, luminometers and a variety of both monochromator-based spectrophotometers and filter-based absorbance readers.

For assays like nucleic acid and protein quantification, where very small sample size is critical, BioTek's Take3™ Micro-Volume Plate offers the ability to measure multiple samples as small as 2 µL in monochromator-based multi-mode and absorbance readers. BioTek's microplate readers come with powerful Gen5™ Software and many are compatible with BioStack™ and third-party automation products to provide increased throughput and unattended operation. To automate assay workflows, several readers are compatible with the BioSpa™ 8 Automated Incubator.





3.659	3.701	3.676	3.815
2.901	3.521	3.488	4.082
3.564	3.621	3.176	3.908
3.910	3.424	3.603	4.135
		3.617	3.966
		4.423	3.864

"Synergy Neo2 is sensitive and fast. Easy to use and flexible, of particular note is the ability to use either filters or monochromator. We were able to purchase the configuration we currently use, but can upgrade with additional functionality as needed."

TRUSTED REVIEWS

SYNERGY|neo2

hybrid multi-mode reader

Synergy™ Neo2 Hybrid Multi-Mode Microplate Reader is the most advanced, high performance multi-mode microplate reader available today. The outstanding features of Synergy Neo2 allow complex applications including both biochemical and cell-based assays to be performed rapidly, efficiently and with uncompromised performance, in all detection modes.

Patented Hybrid Technology™

Some workflows benefit from the flexibility of monochromator-based optical systems; there's no need to purchase multiple filters, and when a fluorophore's spectral peaks are unknown, monochromators can scan to find the ideal excitation and emission peaks. Other assays require the high sensitivity found in filter-based optical systems. BioTek's patented Hybrid Technology offers both major benefits in a single platform, so there's no compromise of performance or flexibility.

Variable Bandwidth Quad Monochromators

Synergy Neo2's monochromators have variable bandwidths for excitation and emission. Selectable from 3 - 50 nm in 1 nm increments, these continuously variable bandwidths help optimize detection of some fluorophores. Detection parameters for complex multiplexed assays like FRET and SNPs can be fine-tuned for the highest signal with the lowest crosstalk – and the results you expect.

Ultra-fast Plate Processing Speeds with Multiple PMT Detectors

High throughput isn't just about fast plate reading – a high throughput multi-mode reader should handle common and complex assays with equally high performance, even in 1536-well plates. Synergy Neo2 has dual PMTs for top measurement, so FP, FRET, TR-FRET and other ratiometric measurements are processed quickly and with excellent results. Up to four PMTs are available in Synergy Neo2, for the greatest speed and flexibility.

Controlled Environment for Live Cell Assays

Along with incubation to 65 °C and shaking, Synergy Neo2 can be equipped with a CO_2/O_2 controller to provide the ideal environment for robust live cell assays. Direct bottom detection provides ultra sensitivity for measuring cell-based fluorescence intensity. To automate live cell workflows, Synergy Neo2 integrates with BioSpa™ 8 Automated Incubator.

TYPICAL APPLICATIONS

- HTS screening
- Drug absorption and metabolism
- Biologics drug discovery and development
- Drug discovery
- Cell proliferation
- Cytotoxicity
- Biomarker quantification
- Genetic analysis
- Environmental testing
- Food safety
- Nucleic acid quantification
- Protein quantification

PATENTED HYBRID OPTICS

Take3 Compatible

SPECIFICATIONS

General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence Alpha detection
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	6- to 1536-well plates
Other labware	Petri and cell culture dishes Take3 Micro-Volume Plates
Temperature control	4-Zone incubation to 65 °C with Condensation Control
Shaking	Linear, orbital, double orbital
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
CO_2 and O_2 control	0 - 20% CO_2 control and 1 - 19% O_2 control, with optional Gas Controller
Barcode reader	1D and 2D camera-based scanner

Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	230 - 999 nm, in 1 nm increments
Monochromator bandwidth	2 nm (230 - 285 nm); 4 nm (>285 nm)
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	<1% at 2.0 OD <3% at 3.0 OD
OD linearity	<1% from 0 to 3.0 OD
OD repeatability	<0.5% at 2.0 OD
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 well: 6 seconds 384 well: 11 seconds 1536 well: 25 seconds

Fluorescence Intensity	
Light source	Xenon flash
Detector	Dual top PMTs Single top PMT (option) Low noise PMT (bottom filter system) Red shifted PMT (top/bottom monochromator system)
Wavelength selection	Quad monochromators (top/bottom) Filters (top/bottom)
Wavelength range	Monochromators: 250 - 850 nm Filters (dual PMT): 200 - 850 nm
Monochromator bandwidth	Variable; from 3 - 50 nm, in 1 nm increments
Dynamic range	7 decades
Sensitivity (Fluorescein)	Filters: 0.2 pM (4 amol/well, 384-well low vol plate) - top 1 pM (10 amol/well, 1536-well plate) - top 1 pM (0.1 fmol/well, 384-well plate) - bottom Quad Monochromator: 2 pM (40 amol/well, 384-well low vol plate) - top 2.5 pM (0.25 fmol/well, 384-well plate) - bottom
Reading speed (kinetic)	96 well: 6 seconds 384 well: 11 seconds 1536 well: 25 seconds

Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	>6 decades
Sensitivity	5 amol ATP (384-well low volume plate)

Fluorescence Polarization	
Light source	Xenon flash
Detector	Dual PMT or single PMT (option)
Wavelength selection	Filters
Wavelength range	280 - 850 nm
Sensitivity	1 mP standard deviation at 1 nM fluorescein (384-well low volume plate) 1.5 mP standard deviation at 1 nM fluorescein (1536-well plate)

Time-Resolved Fluorescence	
Light source	Xenon flash
Detector	Dual PMT or single PMT (option)
Wavelength selection	Quad monochromators (top/bottom) Filters (top/bottom)
Wavelength range	Monos: 250 - 850 nm Filters (dual PMT): 200 - 850 nm
Sensitivity	Europium 40 fM (384-well low volume plate) Europium 70 fM (1536-well plate)

Alpha Detection	
Light source	100 mW 680 nm laser
Detector	PMT
Wavelength selection	Filters (top)
Sensitivity	100 amol bio-LCK-P (384-well low volume plate)
Read speed	96 well: 30 seconds 384 well: 1 minute 50 seconds 1536 well: 7 minutes 20 seconds

Reagent Injectors	
Number	2 syringe pumps
Supported labware	6- to 384-well plates, Petri dishes
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments

Physical Characteristics	
Power consumption	250 W max
Dimensions	15.4" W x 20.7" D x 16.1" H (39 x 52.5 x 41 cm)
Weight	78 lbs (35kg)

Regulatory	
Regulatory	CE and TUV marked. RoHS Compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

SYNERGY|H1

hybrid multi-mode reader

Synergy™ H1 Hybrid Multi-Mode Reader is equipped with both mono-chromator and filter optical systems. Synergy H1 provides flexibility and performance, at a very attractive price.

Flexibility at a Great Price

Synergy H1 is available in a monochromator-only configuration. Supporting top and bottom fluorescence, UV-visible absorbance and luminescence, it is the most cost-effective solution of its type on the market. Combined with the Take3™ Micro-Volume Plate for low volume 2 µL assays, it is the perfect instrument for life-science research laboratories.

Patented Hybrid Optical System

Adding the optional filter module turns the Synergy H1 into an advanced Hybrid reader. This patented optical design is only available from BioTek. Monochromators provide ease-of-use and flexibility, while filters provide increased optical efficiency and sensitivity.

Gas Controller for Live Cell Assays

An available Gas Controller for Synergy H1 allows control and monitoring of CO_2 and O_2 levels in the system. The Gas Controller, along with advanced temperature control to 45 °C and orbital shaking, create the ideal physiological environment needed for assays using live cells. Live cell workflows can be automated by integrating Synergy H1 with BioSpa™ 8 Automated Incubator.

Upgradable to Advanced Read Modes

When equipped with the optional filter module, Synergy H1 may be used for fluorescence polarization assays as well as Time-Resolved Fluorescence (TRF) and TR-FRET assays.

Dual Reagent Injector Module

For rapid, precise reagent injection in all plate types, Synergy H1 has an available dual reagent injector module, ideal for inject/read applications.

TYPICAL APPLICATIONS

- Nucleic acid quantification
- Protein quantification
- Enzyme kinetics
- Biomarker quantification
- ELISAs
- Yeast kinetic analysis
- Genetic analysis
- Drug discovery
- Cell proliferation
- Cytotoxicity
- Drug absorption and metabolism
- Biologics drug discovery and development
- Food safety
- Environmental monitoring

Synergy H1 shown with optional Gas Controller module

PATENTED HYBRID OPTICS

Take3 Compatible

SPECIFICATIONS

General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	6- to 384-well plates
Other labware	Petri and cell culture dishes Take3 Micro-Volume Plates
Temperature control	4-Zone incubation to 45 °C with Condensation Control™
Shaking	Linear, orbital, double orbital
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
CO_2 and O_2 control	0 - 20% CO_2 control and 1 - 19% O_2 control, with optional Gas Controller
Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	230 - 999 nm, in 1 nm increments
Monochromator bandwidth	4 nm (230 - 285 nm); 8 nm (>285 nm)
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	<1% at 2.0 OD <3% at 3.0 OD
OD linearity	<1% from 0 to 3.0 OD
OD repeatability	<0.5% at 2.0 OD
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 wells: 11 seconds 384 wells: 22 seconds
Fluorescence Intensity	
Light source	Xenon flash
Detector	PMT (monochromator system) PMT (filter system)
Wavelength selection	Quad monochromators (top/bottom) Filters (top)
Wavelength range	Monochromators: 250 - 700 nm (850 nm option) Filters: 200 - 700 nm (850 nm option)
Monochromator bandwidth	Fixed, 16 nm
Dynamic range	7 decades
Sensitivity (Fluorescein)	Filters: 0.25 pM (0.025 fmol/well, 384-well plate) Quad Monochromator: 2.5 pM (0.25 fmol/well, 384-well plate) - top 4 pM (0.4 fmol/well, 384-well plate) - bottom
Reading speed (kinetic)	96 well: 11 seconds 384 well: 22 seconds
Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	>6 decades
Sensitivity	Monos: 20 amol ATP (flash) Filters: 10 amol ATP (flash), 100 amol (glow)
Fluorescence Polarization	
Light source	Xenon flash
Detector	PMT
Wavelength selection	Filters
Wavelength range	280 - 700 nm (850 nm option)
Sensitivity	1.2 mP standard deviation at 1 nm fluorescein
Time-Resolved Fluorescence	
Light source	Xenon flash
Detector	PMT
Wavelength selection	Quad monochromators (secondary mode) Filters (top)
Wavelength range	Filters: 200 - 700 nm (850 nm option)
Sensitivity	Filters: Europium 40 fM (4 amol/well, 384-well plate) Monos: Europium 1200 fM (120 amol/well, 384-well plate)
Reagent Injectors	
Number	2 syringe pumps
Supported labware	6- to 384-well plates, Petri dishes
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µL or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	130 W max
Dimensions	15.4" W x 18.6" D x 12.9" H (39.1 x 47.2 x 32.8 cm)
Weight	50 lbs (22.5 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS Compliant. Models for In Vitro Diagnostic use are available.

SYNERGY 2

multi-mode reader

The Synergy™ 2 is designed for life science research and drug discovery applications. It incorporates enhanced fluorescence, luminescence and absorbance optics for superior performance. Advanced read modes such as fluorescence polarization and time-resolved fluorescence are available as individual, upgradable modules, and an available reagent injection system expands the applications range.

Best Price/Performance Ratio

The Synergy 2 incorporates dedicated, optimized optical paths for each detection mode using filters for fluorescence and a monochromator for absorbance. The result is excellent performance in all modes, at an attractive price.

Sensitive Dichroic-based Fluorescence Optics

The Synergy 2 fluorescence optics are a step up from the Synergy HTX, incorporating dichroic mirrors, which decrease background noise, as well as a liquid-filled emission fiber that increases the system's light collection efficiency. The result is higher sensitivity for demanding assays.

Dedicated Luminescence Light Path

A dedicated liquid-filled light guide coupled with a low noise detector provides high-performance luminescence detection, on par with dedicated microplate luminometers. Synergy 2 is DLReady™ certified by Promega to run their Dual-Luciferase® assay system.

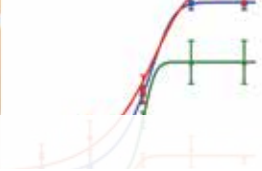
Advanced, Modular Read Modes

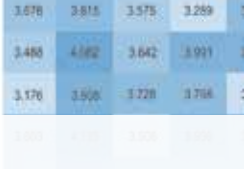
In addition to the basic read modes available on the Synergy HTX, Synergy 2 offers fluorescence polarization, time-resolved fluorescence and Alpha detection modes, available as individual, upgradable modules.

TYPICAL APPLICATIONS

- Nucleic acid quantification
- Protein quantification
- Enzyme kinetics
- Biomarker quantification
- ELISAs
- Genetic analysis
- Drug discovery
- Cell proliferation
- Cytotoxicity
- Drug absorption and metabolism
- Biologics drug discovery and development
- Food safety
- Biofuels research
- Environmental monitoring

Take3 Compatible





SPECIFICATIONS

General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Fluorescence polarization Time-resolved fluorescence Alpha detection
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	6- to 1536-well plates 6- to 384-well (luminescence)
Other labware	Petri and cell culture dishes Take3 Micro-Volume Plates
Temperature control	4-Zone incubation to 65 °C
Shaking	Linear
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible
Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	2.4 nm
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	<1% at 2.0 OD <3% at 3.0 OD
OD linearity	<1% from 0 to 3.0 OD
OD repeatability	<0.5% at 2.0 OD
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 wells: 11 seconds 384 wells: 22 seconds 1536 wells: 42 seconds
Fluorescence Intensity	
Light source	Tungsten halogen Xenon flash (option)
Detector	PMT
Wavelength selection	Filters/dichroic mirrors
Wavelength range	Tungsten lamp: 300 - 700 nm (850 nm option) Xenon lamp: 200 - 700 nm (850 nm option)
Dynamic range	>6 decades
Sensitivity (Fluorescein)	Top: 1 pM (0.2 fmol/well 96-well plate; 0.1 fmol/well 384-well plate) Bottom: 5 pM (1 fmol/well 96-well plate; 0.5 fmol/well 384-well plate)
Reading speed (kinetic)	96 wells: 11 seconds 384 wells: 22 seconds 1536 wells: 42 seconds

Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	>6 decades
Sensitivity	10 amol ATP (flash) 100 amol ATP (glow)
Fluorescence Polarization	
Light source	Tungsten halogen High energy DPR xenon flash (option)
Detector	PMT
Wavelength selection	Filters/dichroics
Wavelength range	400 - 700 nm (320 - 850 nm option)
Sensitivity	3 mP at 1 nM fluorescein
Time-Resolved Fluorescence	
Light source	Xenon flash
Detector	PMT
Wavelength selection	Filters/dichroics
Wavelength range	Filters: 200 - 700 nm (850 nm option)
Sensitivity	Europium 60 fM (12 amol/well 96-well plate; 6 amol/well 384-well plate)
Alpha Detection	
Light source	Tungsten halogen
Detector	PMT
Wavelength selection	Filters
Sensitivity	100 amol bio-LCK-P, 25 µL/well in 384-well plate
Read speed	96 well: 2 minutes
Reagent Injectors	
Supported detection modes	All modes
Number	2 syringe pumps
Supported labware	6- to 384-well plates
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µL or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	250 W max
Dimensions	17" W x 17.5" D x 14.5" H (43.5 x 44.5 x 37.3 cm)
Weight	60 lbs (27 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS Compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

SYNERGY|HTX

multi-mode reader

The Synergy™ HTX is an entry-level, affordable and upgradeable multi-mode microplate reader. Available read modes include top and bottom fluorescence, UV-visible absorbance and luminescence detection. Temperature control to 50 °C, shaking and advanced Gen5™ data analysis software are also included. A dual reagent injector module is available for all read modes and plate types.

Ideal for Basic Research Applications

The Synergy HTX is the ideal instrument for nucleic acid and protein quantification, enzyme assays, biomarker quantification and ELISA assays, as well as cell-based assays (gene expression, cellular growth, cytotoxicity).

AlphaScreen®/AlphaLISA®

AlphaScreen and AlphaLISA assays can be performed on Synergy HTX with excellent results. Alpha-capable configurations add assay versatility to basic research requirements.

Sensitive Filter-based Fluorescence

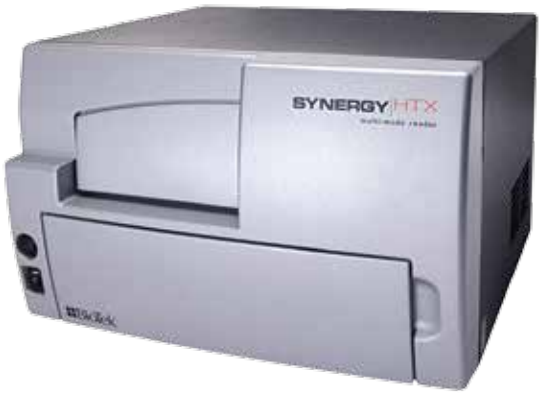
Two excitation and two emission filters are included with the reader, and can be used for top and bottom reading. Bottom reading is usually recommended when working with adherent cells, as it often provides better signal-to-background ratios. Top reading is typically best for assays where the fluorescence signal comes from the solution.

Flexible Monochromator-based Absorbance

All Synergy readers use monochromators for absorbance detection. This provides unlimited wavelength selection from the low UV to the near infrared, in 1 nm steps, and enables spectral scanning.

Low-noise Luminescence Detection

The Synergy HTX can automate glow and flash luminescence assays, thanks to its optional dual reagent injector module. Typical assays include ATP quantification as well as luciferase gene expression assays.



TYPICAL APPLICATIONS

- AlphaScreen/AlphaLISA
- Nucleic acid quantification
- Protein quantification
- Enzyme kinetics
- Biomarker quantification
- ELISAs
- Genetic analysis
- Cell proliferation
- Cytotoxicity
- Drug absorption and metabolism
- Food safety
- Environmental monitoring

Take3 Compatible

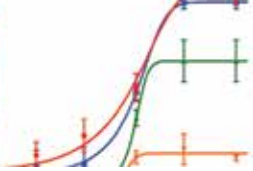
SPECIFICATIONS

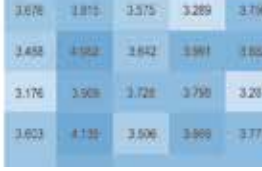
General	
Detection modes	UV-Vis absorbance Fluorescence intensity Luminescence Time-resolved fluorescence (secondary mode) Alpha detection
Read methods	Endpoint, kinetic, spectral scanning, well area scanning
Microplate types	6- to 384-well plates
Other labware	PCR plates, Petri and cell culture dishes Take3 Micro-Volume Plates
Temperature control	4-Zone incubation to 50 °C with Condensation Control
Shaking	Linear, orbital
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible
Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	2.4 nm
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	<1% at 2.0 OD <3% at 3.0 OD
OD linearity	<1% from 0 to 3.0 OD
OD repeatability	<0.5% at 2.0 OD
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 wells: 14 seconds 384 wells: 26 seconds
Fluorescence Intensity	
Light source	Tungsten halogen Xenon flash (option)
Detector	PMT
Wavelength selection	Filters
Wavelength range	300 - 700 nm (200 - 850 nm option)
Dynamic range	>6 decades
Sensitivity (Fluorescein)	5 pM (1 fmol/well, 96-well plate) - top and bottom
Reading speed (kinetic)	96 wells: 31 seconds 384 wells: 80 seconds

Luminescence	
Wavelength range	300 - 700 nm
Dynamic range	>6 decades
Sensitivity	10 amol ATP (flash) - Lum and Abs / Lum configurations 30 amol ATP (flash) - Multi-mode configurations
Time-Resolved Fluorescence	
Light source	Xenon flash
Detector	PMT
Wavelength selection	Monochromator
Alpha Detection	
Light source	Tungsten halogen
Detector	PMT
Wavelength selection	Filters
Sensitivity	300 amol bio-LCK-P, 25 µL/well in 384-well plate
Read speed	96 well: 2 minutes
Reagent Injectors	
Supported detection modes	All modes
Number	2 syringe pumps
Supported labware	6- to 384-well plates
Dead volume	1.1 mL with back flush
Dispense volume	5 - 1000 µL in 1 µL increments
Dispense accuracy	±1 µL or 2%
Dispense precision	≤2% at 50 - 200 µL
Physical Characteristics	
Power consumption	130 W max
Dimensions	6" W x 15" D x 10" H (40.6 x 38 x 25.4 cm)
Weight	40 lbs (18 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS Compliant. Models for In Vitro Diagnostic use are available.

Multi-Mode Reader Comparison Chart

	Synergy™ Neo2	*Cytation™*	
Key Features			
Monochromator-based UV-Visible absorbance	•	•	
Fluorescence top/bottom	•	•	
Luminescence	•	•	
Filtered luminescence	•	•	
Injectors	•	•	
TRF & TR-FRET	•	•	
Fluorescence polarization	•	•	
Standard AlphaLISA®/AlphaScreen®			
Laser AlphaLISA/AlphaScreen	•	Cytation 5	
Hybrid Technology™	•	Cytation 5	
Dual PMT read head	•		
Performance Specifications			
Fluorescein typical – top	2 pM (monos) / 0.2 pM (filters)	2.5 pM (monos) / 0.25 pM (filters)	
Fluorescein typical – bottom	1 pM (filters)	4 pM (monos)	
ATP typical – flash luminescence	5 amol	10 amol	
Polarization typical – 1 nM fluorescein	1 mP SD	1.2 mP SD	
Europium typical	40 fM	40 fM (filters)	
AlphaScreen typical - LCK peptide	100 amol	100 amol (Cytation 5)	
Fastest read speed 96-/384-well plates (seconds)	6/11	11/22	
General Specifications			
Microplate types	6 to 1536	Mono: 6 to 384 Filter and imaging: 6-1536	
Gas Controller compatible	•	•	
BioSpa™ 8 Automated Incubator compatible	•	•	
Automation ready/BioStack™ compatible	•	•	
Dual reagent injector compatible	•	•	
Barcode reader option	•		
Take3™ Micro-Volume Plate compatible	•	•	
Temperature control system	to 65 °C	to 45° C (Cytation 1) to 65° C (Cytation 5)	
Condensation Control™	•	•	
Filter capacity	Up to 6 filter sets	2 filter sets	
Fluorescence bandwidth	Filter dependent Mono: variable from 3 nm to 50 nm	Filter dependent Mono: variable from 9 nm to 50 nm (Cytation 5)	





Synergy H1	*Synergy 2*	*Synergy HTX*
•	•	•
•	•	•
•	•	•
•	•	•
•	•	•
•	•	(secondary mode)
•	•	
	•	•
•		
2.5 pM (monos) / 0.25 pM (filters)	1 pM	5 pM
4 pM (monos)	5 pM	5 pM
10 amol	10 amol	30 amol/10 amol (luminescence only configuration)
1.2 mP SD	3 mP	n/a
40 fM (filters)	60 fM SD	n/a
n/a	100 amol	300 amol
11/22	11/22	14/26
6 to 384	6 to 1536	6 to 384
•		
•		
•	•	•
•	•	•
•	•	•
to 45 °C	to 65 °C	to 50 °C
•		•
2 filter sets	4 filter sets	4 filter sets
Filter dependent Mono 16 nm	Filter dependent	Filter dependent

EPOCH 2

microplate spectrophotometer

Epoch™ 2 is a compact monochromator-based microplate spectrophotometer for 6- to 384-well microplates, cuvettes and 2 µL measurements. Epoch 2 features a 10" color touchscreen interface with easy to navigate controls, and full onboard Gen 5™ software for data collection, powerful analysis and flexible export and report options. Incubation, shaking and robot compatibility are standard features.

UV-Vis Measurements

Epoch 2's monochromator-based optics offer wavelength selection from 200 nm to 999 nm – for applications from nucleic acid quantification to ELISA, without using filters. Epoch 2 can measure up to forty-eight 2 µL samples in the unique Take3 Micro-Volume plates for rapid direct quantification.

An optional cuvette port provides quick 1 cm measurements, making Epoch 2 a versatile spectrophotometer for multiple applications.

Touch. Run. Done.

Designed for easy-to-use, yet powerful functionality, Epoch 2 features a color touchscreen interface, WiFi, Bluetooth and USB connectivity and flash drive storage. It's a self-contained computer, in a space and cost saving design, configurable for the laboratory's needs today and in the future.

Full Gen5 Data Analysis Software

With Epoch 2, "onboard software" doesn't mean "limited software". Complete reader control, protocol design, data analysis and export/report functions are at your fingertips. For applications in microplates, cuvettes or Take3 plates, Gen5 offers the same intuitive navigation and full capability as an external computer. With Gen5 on the Epoch 2 – there's no need for a dedicated computer – it's all built-in!

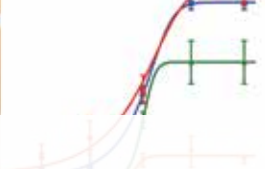
Advanced 4-Zone™ Incubation

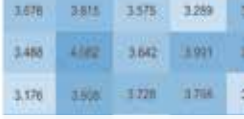
Epoch 2 features BioTek's 4-Zone natural convection incubator up to 65 °C with minimal variation across the plate – ideal for a wide range of temperature-sensitive assays. Epoch 2's unique Condensation Control™, solves the common problem of condensation build-up on plate lids during incubated kinetic runs. Epoch 2 can be integrated with BioSpa™ 8 Automated Incubator for unattended automation.

TYPICAL APPLICATIONS

- ELISA
- Enzyme kinetics
- Nucleic acid and protein quantification
- Cell proliferation
- Cytotoxicity
- Spectral scanning
- Reactive oxygen species
- Food safety and quality
- Bacterial identification
- Total protein determination
- Nucleic acid purity assessment

Take3 Compatible





SPECIFICATIONS

General	
Detection mode	Absorbance
Read methods	Endpoint, kinetic, well area scanning
Microplate types	6- to 384-well plates
Other labware	Take3 Micro-Volume plates, standard cuvettes (option)
Temperature control	4-Zone incubation to 65 °C
Shaking	Linear, orbital, double-orbital
Onboard software	Gen5 Microplate Reader and Imager Software (touchscreen configurations)
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	2.9 nm
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	0 to 2 OD: +1% +0.010 OD 2 to 2.5 OD: +3% +0.010 OD
OD linearity	0 to 2.0 OD: ±1% ±0.010 2.0 to 2.5 OD: ±3% ±0.010
OD repeatability	0 to 2.0 OD: ±1% ±0.005 2.0 to 2.5 OD: ±3% ±0.005
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 wells: 8 seconds 384 wells: 14 seconds
Physical Characteristics	
Power consumption	120 W max
Dimensions	With touchscreen: 12.5" W x 15.5" D x 13" H (32 x 39.3 x 33 cm) Without touchscreen: 12.5" W x 15.5" D x 8" H (32 x 39.3 x 20.3 cm)
Weight	With touchscreen: 25 lbs (11.3 kg) Without touchscreen: 20 lbs (9.1 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

EPOCH

microplate spectrophotometer

Epoch™ is a monochromator-based microplate spectrophotometer that offers superior functionality for the life science laboratory at an accessible price. Controlled by the powerful, yet easy-to-use Gen5™ Data Analysis Software, Epoch is designed to be the new lab workhorse for a wide variety of applications. For walkaway automation, an optional BioStack™ compatible Epoch is available.

200 nm to 999 nm Wavelength Range

The monochromator-based optical system in Epoch allows any wavelength selection between 200 and 999 nm in 1 nm increments. No filters required! From low UV nucleic acid measurements to standard ELISA assays, Epoch is ideally suited to the life science laboratory where application flexibility is required.

6- to 384-well Microplate Reading

Epoch's optical and mechanical systems are designed to provide optimal measurements in a variety of microplates. The area scanning capability provides multiple measurements across larger diameter wells, resulting in more meaningful data analysis.

Take3™ Micro-Volume Plate Compatible

When sample size matters, as in critical nucleic acid and protein quantification, the Take3 plate provides up to sixteen 2 µL measurements – without needing to dilute important samples.

Endpoint, Kinetic, Spectral Scanning

There's no need to buy expensive instrumentation to perform a variety of absorbance measurements. Epoch, driven by Gen5 Data Analysis Software, is the ultimate high-value system with maximum assay flexibility.

TYPICAL APPLICATIONS

- Nucleic acid quantification
- Protein quantification
- 260/280 and 260/230 purity measurements
- ELISA
- Enzyme kinetics
- Cytotoxicity
- Cell proliferation
- Micro-volume assays with Take3 plate

Specifications

General	
Detection mode	Absorbance
Read methods	Endpoint, kinetic, well area scanning
Microplate types	6- to 384-well plates
Other labware	Take3 Micro-Volume plates
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible ("R"model)
Absorbance	
Light source	Xenon flash
Detector	Photodiode
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	5 nm
Dynamic range	0 - 4.0 OD
Resolution	0.0001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	0 to 2 OD: +1% +0.010 OD 2 to 2.5 OD: +3% +0.010 OD
OD linearity	0 to 2.0 OD: ±1% ±0.010 2.0 to 2.5 OD: ±3% ±0.010
OD repeatability	0 to 2.0 OD: ±1% ±0.005 2.0 to 2.5 OD: ±3% ±0.005
Reading speed (kinetic)	96 wells: 15 seconds 384 wells: 31 seconds
Physical Characteristics	
Power consumption	48 W max
Dimensions	12" W x 12.5" D x 7.7" H (30.5 x 31.8 x 19.6 cm)
Weight	<15 lbs (6.8 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

Take3 Compatible

POWERWAVE|HT

microplate spectrophotometer

The PowerWave™ HT is a high throughput, robot-friendly microplate spectrophotometer with a very small footprint, ideal for integration into automated systems. Wavelength selection in 1 nm increments, temperature control and superior performance up to 4.0 OD add to its appeal for a variety of assay needs.

High Speed, Higher Throughput

In automation and high throughput, timing is everything… With 8 reading channels, the PowerWave HT can read a 96-well plate in 5 seconds.

Low Stray Light Monochromator Optics

PowerWave HT's monochromator optics pre-select the measurement wavelength before light goes through the sample. This results in very low stray light reaching the detector…with the added benefit of excellent performance even at high optical densities.

BioStack™ Compatible for Benchtop Automation

When walkaway benchtop automation is required, the PowerWave HT, coupled with BioStack, provides a compact system for rapid processing of up to 50 plates at a time.

Gen5™ Control for Assay Flexibility

Gen5 Software not only allows easy control of all the functionality of the PowerWave HT, it also supports a vast number of applications in absorbance. Export to Microsoft® Excel® or use Gen5's powerful data analysis tools to make quick work of the most complex assays.

TYPICAL APPLICATIONS

- Enzyme kinetics
- ELISAs
- Genetic analysis by colorimetry
- Cellular analysis by colorimetry
- Cell proliferation

Specifications

General	
Detection mode	Absorbance
Read methods	Endpoint, kinetic
Microplate types	96- and 384-well plates, standard cuvettes (option)
Temperature control	4-Zone incubation to 50 °C
Shaking	Linear
Software	Gen5 Microplate Reader and Imager Software included Gen5 Secure for 21 CFR Part 11 compliance (option)
Automation	BioStack and 3rd party automation compatible
Absorbance	
Light source	Xenon flash
Detector	Photodiodes
Wavelength selection	Monochromator
Wavelength range	200 - 999 nm, in 1 nm increments
Monochromator bandwidth	5 nm
Dynamic range	0 - 4.0 OD
Resolution	0.001 OD
Pathlength correction	Yes
Monochromator wavelength accuracy	±2 nm
Monochromator wavelength repeatability	±0.2 nm
OD accuracy	1% + 0.01 OD
OD linearity	±1%
OD repeatability	0.5% + 0.005 OD
Stray light	0.03% at 230 nm
Reading speed (kinetic)	96 wells: 5 seconds 384 wells: 11 seconds
Physical Characteristics	
Power consumption	100 W max
Dimensions	8.5" W x 16" D x 8.5" H (21.6 x 40.6 x 21.6 cm)
Weight	24 lbs (11 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

ELx808

microplate absorbance reader

Excellent optical performance and superior incubation are among the top features of this multi-channel reader. The ELx808™ is suitable for a wide array of applications, from endpoint ELISAs to kinetic cell growth studies.

4-Zone™ Temperature Control

For temperature sensitive assays, there is no better incubation system in this microplate reader class than the ELx808. The natural convection heating is software controlled for consistency and performance over time.

Fast Measurement

The ELx808 can collect kinetic data in intervals as short as 6 seconds, for the most demanding assays. Gen5™ Data Analysis Software provides multiple kinetic and endpoint data analysis options for a variety of applications.

Superior Optical Performance

The ELx808 can accommodate up to six absorbance filters, and its optical channels are staggered to prevent crosstalk between wells. The reference channel eliminates channel-to-channel variation. This unique design gives the ELx808 its proven optical performance.

TYPICAL APPLICATIONS

- ELISA
- Enzyme kinetics
- Endotoxin assays
- Cell growth studies
- Cytotoxicity
- Protein assays

Specifications

General	
Detection mode	Absorbance
Read methods	Endpoint, kinetic, linear scanning
Microplate types	96-well plates
Temperature control	4-Zone incubation to 50 °C ±0.2 °C at 37 °C
Software	Gen5 Reader Control Software included Gen5 Data Analysis Software (optional)
Absorbance	
Light source	Tungsten halogen
Detector	Photodiode
Wavelength selection	Filters
Wavelength range	380 - 900 nm 340 - 900 nm (ELx808IU)
Filter capacity/supplied	6 positions/4 (5 with UV configurations)
Dynamic range	0 - 4.0 OD
Resolution	0.001 OD
Pathlength correction	No
OD accuracy	<1% at 2.5 OD <2% at 3.5 OD
OD linearity	<1% at 2.5 OD
OD repeatability	<0.5% at 2.5 OD <1.5% at 3.5 OD
Reading speed (kinetic)	96 wells: 8 seconds
Physical Characteristics	
Power consumption	100 W max
Dimensions	15.5" W x 16" D x 8.75" H (39.4 x 40.6 x 22.2 cm)
Weight	30 lbs (13.6 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. For In Vitro Diagnostic use.

Specifications are subject to change. Performance values represent the average observed factory test values.

800 | TS

microplate absorbance reader

For high quality microplate reading at an affordable price, look no further than the 800™ TS Absorbance Reader. Robust instrument hardware and powerful software, along with unparalleled service and support, make BioTek the #1 plate reader brand for the clinical and research laboratory.

Wide Range of Applications

The 800 TS is ideal for a variety of applications including ELISA, protein and other endpoint protocols. Incubation and shaking expand the application range to include enzyme kinetics and cell-based assays. The 800 TS partners perfectly with the 50™ TS Microplate Washer to automate all your workflows.

Quick and Easy Programming

The touchscreen interface makes protocol creation intuitive and simple. Defined protocols are saved onboard for convenient, quick selection. The 800 TS reads the plate efficiently, delivering results quickly and reliably.

USB Flash Drive Convenience

Results are displayed immediately after measurement, and can be sent to the optional printer or a USB flash drive. Import data to Gen5™ Software for advanced data handling and custom reporting.

High Performance, Excellent Results

With the 800 TS, affordability doesn't mean compromised performance. The high quality hardware and optical design ensure excellent results for all assays. As an FDA registered and ISO certified manufacturer, BioTek understands the importance of performance and data verification: Verify and qualify the 800 TS performance over time, using BioTek's Absorbance Test Plate and Product Qualification Package.

TYPICAL APPLICATIONS

- ELISA
- Enzyme kinetics
- Protein assays
- Cell-based assays

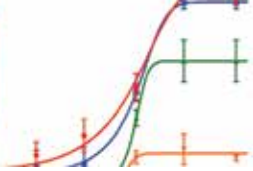
Specifications

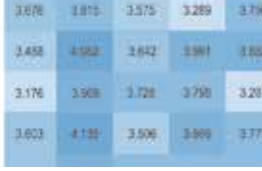
General	
Detection mode	Absorbance
Read methods	Endpoint, kinetic and well area scanning (under computer control)
Microplate types	6-, 12-, 24-, 48-, 96-well microplates; 384-well and Terasaki trays (NB configurations)
Temperature control	To 50 °C
Shaking	Linear (except NB configurations)
User interface	4.3" color LCD touchscreen display
Onboard software	Up to 40 user-programmable protocols
Software	Gen5 Software for external computer control and data analysis (optional)
Absorbance	
Light source	Tungsten halogen lamp
Detector	Photodiode
Wavelength selection	Filters
Wavelength range	400 - 750 nm; 340 - 750 nm (UV configurations)
Filter capacity/supplied	5 positions/4 (5 with UV configurations)
Dynamic range	0 - 4.0 OD (normal & rapid read modes)
Resolution	0.001 OD (standalone mode) 0.0001 OD (under Gen5 control)
OD accuracy	Normal read mode ±1.0% ±0.010 OD from 0.0 to 2.0 OD @ 405 nm
OD linearity	Normal read mode ±1.0% ±0.010 OD from 0.0 to 2.0 OD @ 405 nm
OD repeatability	Normal read mode ±0.5% ±0.005 OD from 0.0 to 2.0 OD @ 405 nm
Read speed	96 wells, single wavelength Normal/Rapid/Sweep read mode: 30 seconds/ 18 seconds/11 seconds
Physical Characteristics	
Power consumption	40 W max 150 W max with incubation
Dimensions	15" W x 16.5" D x 7" H (38.1 x 41.9 x 17.8)
Weight	18.5 lbs (8 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. For In Vitro Diagnostic use.

Specifications are subject to change. Performance values represent the average observed factory test values.

Absorbance Reader Comparison Chart

	Epoch™ 2	*Epoch*	
Key Features			
Wavelength selection	Monochromator-based	Monochromator-based	
Wavelength range (nm)	200 - 999	200 - 999	
Microplate types	6 to 384	6 to 384	
Absorbance range	0 - 4.0	0 - 4.0	
Temperature control	to 65 °C		
Shaking	Linear, orbital, double-orbital		
Cuvette measurement	Cuvette port (optional), Take3 or cuvette adapter	Take3 or cuvette adapter	
Filter capacity	n/a	n/a	
Automation ready/BioStack™ compatible	•	("R" configuration)	
BioSpa™ 8 Automated Incubator compatible	•		
Gen5™ Software version included	Gen5	Gen5	
Take3™ Micro-Volume Plate compatible	•	•	
Fastest read speed: 96 wells (seconds)	8	15	
Typical Performance			
OD accuracy	0 to 2.0 OD: ±1% ±0.010 OD 2.0 to 2.5 OD: ±3% ±0.010 OD	0 to 2.0 OD: +1% +0.010 OD 2.0 to 2.5 OD: +3% +0.010 OD	
OD linearity	0 to 2.0 OD: ±1% ±0.010 OD 2.0 to 2.5 OD: ±3% ±0.010 OD	0 to 2.0 OD: +1% +0.010 OD 2.0 to 2.5 OD: +3% +0.010 OD	
OD repeatability	0 to 2.0 OD: ±1% ±0.005 OD 2.0 to 2.5 OD: ±3% ±0.005 OD	0 to 2.0 OD: +1% +0.005 OD 2.0 to 2.5 OD: +3% +0.005 OD	
Resolution	0.0001 OD	0.0001 OD	





PowerWave™ HT	*ELx808™*	*800™ TS*
Monochromator-based	Filter-based	Filter-based
200 - 999	340 - 900	400 - 750 (340-750 option)
96 and 384	96	6 to 96 (6 to 384 option)
0 - 4.0	0 - 4.0	0 - 4.0
to 50 °C	to 50 °C	to 50 °C
Linear	Linear	Linear
Cuvette adapter		
n/a	6	5
•		
Gen5	Gen5RC	Gen5RC
5	8	11
1% +0.01 OD	<1% at 2.5 OD <2% at 3.5 OD	<1% at 2.0 OD
±1%	<1% at 2.5 OD	<1% at 2.0 OD <3% at 3.0 OD
0.5% ±0.005 OD	<0.5% at 2.5 OD <1.5% at 3.5 OD	<0.5% at 2.0 OD
0.001 OD	0.001 OD	0.001 OD

Gen5™

data analysis software

Gen5™ Data Analysis Software offers a unique combination of power and ease-of-use that drives productivity and saves time. Use Gen5 to control BioTek's microplate readers for a wide range of life science applications, from ELISA to parallel line analysis. Collect and analyze data, design custom reports and export files.

Logical Workflow

Gen5 is built around logical laboratory workflows to read microplates and produce/analyze data. Gen5's Task Manager makes it simple to get started designing a protocol or simply reading a plate quickly. With Gen5 you don't have to spend hours figuring out how to get things done.

Powerful Functionality

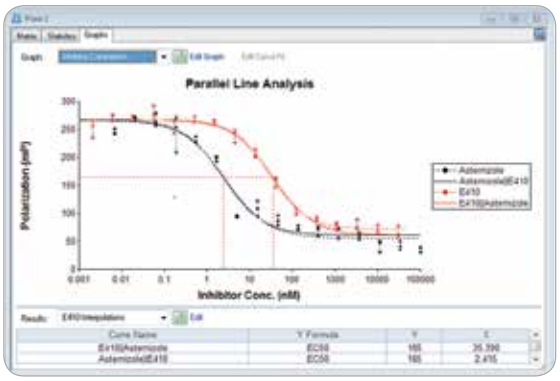
Gen5 offers extensive data analysis tools for quantitative and qualitative analysis, including 4- and 5-parameter curve fits, EC/IC_{50} and Z' calculations. Data reduction transformations and customizable validation and cutoff calculations are all easily defined within the protocol. Gen5 provides quick low volume results with the Take3 plates, and data from any screen is exportable to Microsoft® Excel® at the touch of a single button.

Gen5 Secure: GxP Compliance

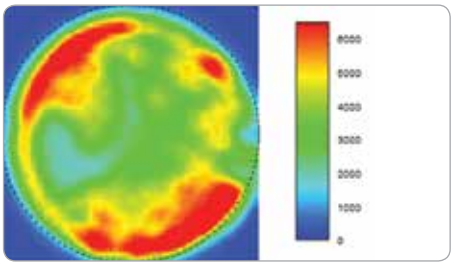
To meet GxP laboratory requirements, Gen5 Secure offers features designed to meet 21 CFR Part 11 rules. Gen5 Secure is available for multi-mode and imaging application – all include: Built-in administration with no additional software required, multi-level user permissions, electronic signature and protocol and data audit trails with configurable alerts.

QC and Validation Tools

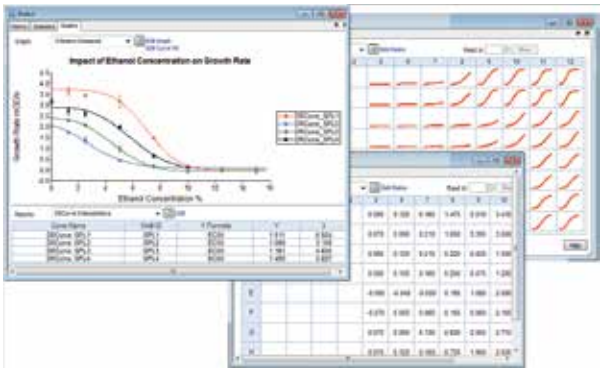
Gen5 is fully validated at BioTek, however, the available Gen5 Validation Package provides an efficient, step-by-step approach to facilitate your internal validation. The Gen5 Validation Package is compatible with BioTek's microplate reader Product Qualification Packages (IQ/OQ/PQ). Gen5 IVD and Gen5 IVD Image+ have QC trending capability, security features and validation protocols for convenience and efficiency.



Parallel line analysis and EC_{50} determinations



High-resolution 99 x 99 area scan



Multiple window views of plate data and results

Gen5™ Comparison Chart

	Gen5 RC	Gen5	Gen5 Secure	Gen5 Image+	Gen5 Secure Image+	Gen5 Image Prime	Gen5 Secure Image Prime
Instruments Supported							
All Synergy and Cytation, Epoch 2 (external), Epoch, PowerWave HT, ELx808, 800 TS	•	•	•	•	•	•	•
All Lionheart FX and Cytation Imagers	•	•	•	•	•	•	•
Read Modes and Methods							
Absorbance, fluorescence, luminescence, time-resolved fluorescence, fluorescence polarization, Alpha	•	•	•	•	•	•	•
Endpoint, kinetic, spectral scanning, linear scanning, Take3 interface	•	•	•	•	•	•	•
Imaging Modes and Methods							
Fluorescence, brightfield, phase contrast, color brightfield	•	•	•	•	•	•	•
Single color, multi-color, montage, z-stacking	•	•	•	•	•	•	•
Single and Multi-Mode Data Analysis							
Qualitative, quantitative, kinetic, spectral analysis, custom transformations, EC_{50}, parallel line analysis, Z′ calculation, validation and cutoff		•	•	•	•	•	•
Image Processing and Analysis							
Cell counting		•	•	•	•	•	•
Subpopulation analysis				•	•	•	•
Hit-picking				•	•	•	•
Z-projection				•	•	•	•
Digital phase contrast				•	•	•	•
Image stitching				•	•	•	•
Spot counting						add-on module	add-on module
Advanced Image Analysis							
Movie making and video recording				•	•	•	•
Add, save image and graph annotations				•	•	•	•
Secondary mask to measure cytoplasm or whole cell						•	•
Expand/reduce nuclear mask						•	•
Dynamic thresholding option for cellular analysis						•	•
Security / 21 CFR Part 11							
User groups, single sign-on (SSO) option			•		•		•
Secure database data storage, audit trails			•		•		•
Electronic signature, email notification			•		•		•

TAKE3
micro-volume plate

Quickly quantify ultra-low volume samples of DNA, RNA and protein. Measure up to 48 samples with volumes as low as 2 µL without dilution. Take3™ can be used to measure a standard cuvette or patented BioCells™ for quick 1 cm measurements. Low volume, higher throughput is available with the Take3 Trio.

Compatible with Most BioTek Detection Systems

Epoch™, Synergy™ and Cytation™ reader functionality can easily reach into the micro-volume range using the Take3 plate. Measure multiple 2 µL samples, cuvettes or BioCells. Adding the Take3 plate to a BioTek detection system creates an incredibly versatile workstation for a variety of applications.

Unique Robust Construction and Easy Maintenance

The anodized aluminum base construction, precision crafted slides and hydrophobic sample surfaces make

pipetting simple and cleanup effortless. For routine cleaning of the sample surfaces, a laboratory wipe is all that's needed. If a slide becomes damaged, replacement is easy – no need to return the Take3 to the factory for repair or calibration.

Gen5 Take3 Module: Automated DNA, RNA and Protein Quantification

It couldn't be easier to get multiple (up to 48) nucleic acid or protein sample results. Gen5's Take3 module includes pre-programmed protocols with immediate results output including spectral scans and purity ratios. There's no need for complicated configuration or calculation.

TYPICAL APPLICATIONS

- Micro-volume DNA, RNA and protein quantification
- Micro-volume fluorescence measurements in Synergy and Cytation readers
- Fluorescent dye incorporation measurements
- Spectral scanning in micro-volume, cuvette or BioCell

Specifications

	Take3	Take3 Trio
2 µL sample capacity	16	48
Detection limit	2 ng/µL dsDNA	2 ng/µL dsDNA
BioCell capacity	2	2
Cuvette capacity	1	n/a

Specifications are subject to change. Performance values represent the average observed factory test values.

Reader Accessories

BioTek offers a wide range of accessories to help increase productivity, expand your plate reader's capabilities, and maintain the performance of your BioTek microplate reader system. See our web site for a complete listing of available accessories.

Dual Reagent Injector Module

Automate inject/read assays such as flash luminescence assays (ATP, luciferase) and fluorescent ion channel assays on all Synergy™ and Cytation™ readers.

Gas Controller

The Gas Controller module for the Synergy H1, Synergy Neo2 and Cytation allows full control over CO_2 and O_2 concentrations to modulate the environment for microplate-based live cell assays.

Gen5™ Secure Software

Upgrade to Gen5 Secure for 21 CFR Part 11 compliance, user management features, data encryption and much more.

Filters and Mirrors

A full range of standard and custom filters and dichroic mirrors are available for applications from the low UV to the near infrared.

Instrument Qualification

See the Compliance Section on pages 70-71 for details about BioTek's product qualification tools and services.

BioStack™ Microplate Stacker

Automate routine processes with this compact stacker. BioStack is also compatible with BioTek's liquid handling instruments.

BioSpa™ 8 Automated Incubator

BioSpa 8 is an automated incubator that links BioTek readers or imagers together with washers and dispensers for full workflow automation of up to 8 microplates.

Liquid Handling

BioTek offers a range of compact and affordable solutions for your laboratory's specific liquid handling needs. BioTek is world renowned for manufacturing the most reliable and versatile microplate washers on the market. From basic ELISA to sensitive cell washing to bead washing (including Luminex® xMAP® technology), the EL406™, 405™ TS, 50™ TS and MultiFlo™ FX are configured with many options to meet myriad assay requirements.

For unattended automation of live cell and other assays, the 405, EL406 and MultiFlo FX integrate with the BioSpa™ 8 Automated Incubator. From milliliters down to 500 nanoliters, our reagent dispensers offer simple, repeatable and precise liquid delivery throughout their defined volume range. Single, 8- and 12-channel transfer tools are available, along with bulk reagent dispensers, to meet varied liquid handling requirements.

"The MultiFlo FX is unbelievably compact, saving the much needed workbench space. The software and colour touch-screen user interface have been well designed - with fast and simple protocol programming and operation. It comes with some typical protocols for quick, routine use, and you can easily create protocols and save them for future use. The Dispenser has been very effective in my research, particularly on the quality of my experiments."

TRUSTED REVIEWS

EL|406

microplate washer dispenser

The EL406™ Washer Dispenser is the only instrument on the market offering fast microplate washing together with BioTek's unique Parallel Dispense™ technologies for optimized liquid handling processes.

Unattended Automation of ELISAs and Cell-based Assays

The EL406 integrates 96-, 384- and 1536-well microplate washing with three dispensers in one compact instrument. Now you can simply press a button and walk away, or automate an entire batch by adding a BioStack™ Microplate Stacker. For entire workflow automation, the EL406 can be integrated to BioSpa™ 8 Automated Incubator along with a BioTek imager or reader.

Patented Dual-Action™ Manifold and Ultrasonic Advantage™

The EL406 incorporates BioTek's Dual-Action™ manifold for thorough yet gentle washing of loosely adherent cell layers, and Ultrasonic Advantage™ for automated wash manifold maintenance.

Parallel Dispense Technologies

The EL406 eliminates the need to choose a dispensing technology by offering both peristaltic and syringe pumps on a single platform.

Fast and Efficient Biomagnetic Separation and Vacuum Filtration

The EL406 automates full microplate washing of magnetic microspheres used in an increasing number of multiplex assays. Developed in conjunction with Luminex® xMAP® technology leaders, BioTek's separation modules incorporate high energy neodymium iron boron magnets for speed and efficiency. An available vacuum filtration module makes the EL406 also well suited for polystyrene beads and filtration-to-waste processes.

TYPICAL APPLICATIONS

- ELISA automation
- MSD assay automation
- HCS immunocytochemistry
- Cell-based assays
- FLIPR® Ca^{2+} flux
- Magnetic bead assay automation
- Polystyrene bead assay automation
- Drug transport assays
- Automated cell washing, fixing and staining for cellular imaging
- SiLA compliant integration (with LHC software)

SPECIFICATIONS

General	
Microplate types	96-, 384-, 1536-well Low profile and standard height Solid and filter bottom (option)
Onboard software	Create, edit or run multiple protocols
Software	LHC Software (option) LHC Secure for 21 CFR Part 11 compliance (option) SiLA Compliant driver (option)
Separation	Biomagnetic separation, vacuum filtration (option)
Shaking	Programmable up to 60 minutes Slow, medium, fast or variable
Soaking	Programmable up to 60 minutes
Ultrasonic Advantage	Yes (standard on most configurations)
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
Washing	
Manifold types	96-well washing: 96-tube manifold 96- and 384-well washing: 96-tube Dual-Action manifold 384-well washing (fast): 192-tube Dual-Action manifold 1536-well washing: Two 32-tube dispense manifolds, 316 SS tubes or sapphire jeweled 316 SS tubes
Volume range	3- 3000 µL/well, in 1 µL increments
Wash cycles	1 - 250
Buffer/reagent selection	Auto switching module for up to 4 buffers (option)
Supply bottle	4 L or 10 L (optional)
Dispense accuracy	±3%
Dispense precision	<3% CV (model dependent)
Residual volume	<2 µL/well
Wash speed	96 wells, 300 µL/well, 96-tube manifold: 13 seconds 384 wells, 100 µL/well, 192-tube manifold: 17 seconds 1536 wells, 10 µL/wells, two 32-tube manifolds: 36 seconds
Flow rates	High flow to low flow Optimized rates for cell assays
Sterilization	Chemical
Vacuum range for filtration	0 to -380 mm Hg
Dispensing - Peristaltic Pump (Multi-Channel)	
Manifold types	8-tip (1 x 8) cassette with plastic, 316 stainless steel or sapphire jeweled 316 stainless steel tips
Dispense speed	96 wells, 10 µL/well: 8 seconds 384 wells, 5 µL/well: 12 seconds 1536 wells, 1 µL/well: 27 seconds
Volume range	500 nL - 3000 µL/well, selectable in 1 µL increments
Flow rates	User programmable rates from high to low Optimized rates for cell assays
Dispense performance	1 µL: Recommended volume range: 1 - 50 µL Dispense accuracy: ±5% at 1 µL Dispense precision: ≤5% CV at 1 µL ≤10% CV at 500 nL Minimum prime volume: 1.20 mL 5 µL cassette: Recommended volume range: 5 - 2,500 µL Dispense accuracy: ±2.0% at 5 µL Dispense precision: ≤2.5% CV at 5 µL Minimum prime volume: 4.23 mL 10 µL cassette: Recommended volume range: 10 - 3000 µL Dispense accuracy: ±2.0% at 10 µL Dispense precision: 2.0 CV at 10 µL Minimum prime volume: 7.36 mL
Recommended cassette replacement interval	1 µL Cassette: 1000 384-well microplates at 5 µL well 5 µL Cassette: 1000 96-well microplates at 50 µL well 10 µL Cassette: 1000 96-well microplates at 100 µL well
Sterilization	Autoclave, chemical
Dispensing - Syringe Pump (Multi-Channel)	
Manifold types	96-well dispensing: One 16-tube (2 x 8) manifold - 316 stainless steel tubes 96-/384-well dispensing: Two 16-tube (1 x 16) manifolds - 316 stainless steel tubes 1536-well dispensing: Two 32-tube (1 x 32) manifolds - sapphire jeweled 316 stainless steel or 316 stainless steel tubes
Dispensing speed	20 µL/well, 96 wells, 1 x 16 tubes: 5 seconds 20 µL/well, 384 wells, 1 x 16 tubes: 14 seconds 3 µL/well, 1536 wells, 2 x 32 tubes: 7 seconds
Volume range	3 - 3000 µL/well, selectable in 1 µL increments Minimum prime volume: 12 mL
Flow rates	User programmable rates from high to low
Dispense accuracy	±1 µL at 5 µL ±1 µL at 20 µL ±1% at 100 µL
Dispense precision	≤5% CV at 5 µL ≤2.5% CV at 20 µL ≤1% CV at 100 µL
Supply bottle	1 L or 2 L
Sterilization	Chemical, autoclavable option
Physical Characteristics	
Power consumption	900 W max 1250 W max with vacuum pump
Dimensions	16.5" W x 18" D x 12.5" H (42 x 46 x 32 cm)
Weight	32 lbs (14.5 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

405|TS
microplate washer

BioTek's 405™ TS Microplate Washer takes plate washing to the next level with an enhanced user interface, increased convenience, assay applications and automated maintenance features.

Industry Leading, User Pleasing

The 405 TS Microplate Washer incorporates all the features and functionality of the prior ELx405 models, and improves accessibility through its touchscreen and extensive onboard software. 96- and 384-well microplate-based wash procedures are only 'two touches' away with the easy-to-use interface. Additionally, two USB ports provide convenient file transfer, storage and operation. A context sensitive Help System and several instructional videos are also included.

The Standard for Automation

The 405 TS Microplate Washer makes quick work of any washing assay, and is especially well suited for integration into automated systems, where the wash process is controlled remotely. The 405 TS can be integrated with the BioSpa™ 8 Automated Incubator for unattended automation of many common processes.

Cell and Bead Assays

The 405 TS is available in various models for optimized performance with the most sensitive and rigorous assay requirements. When the protocol calls for washing loosely adherent cells, the Select model is fine-tuned with angled dispense tubes, extra low flow rates and unique X, Y and Z positioning. Magnetic and polystyrene bead washing are effectively accomplished with the 405 TS.

Verify™ Technology and Automated Ultrasonic Cleaning

BioTek's patented Verify technology runs an automated QC check for manifold tube blockage, and visually reports any failures. Patented Ultrasonic Advantage™ can then be used to automatically clean the manifolds. Together, these features make the 405 TS a self-checking, self-maintaining microplate washer!

Applications in Deep Well Washing

The ELx405 Select Deep Well washes 96- and 384-well plates up to 50 mm tall, and is also compatible with standard height plates without any hardware or software changes. This versatile system is optimal for labs working in deep well blocks and standard plates.

TYPICAL APPLICATIONS

- ELISA automation
- MSD assay automation
- HCS immunocytochemistry
- FLIPR® Ca^{2+} flux
- Cell-based assays
- Magnetic and polystyrene bead assays
- Gene expression assays
- Cytokine assays
- ELISPOT assays
- Plasmid DNA purification
- Serum/plasma sample preparation
- Cell signaling – phospho flow setup for flow cytometry
- SiLA compliant integration (with LHC software)

SPECIFICATIONS

General	
Microplate types	96- and 384-well Low profile and standard height Solid and filter bottom (option) Filter pore sizes from 0.45 µm to 1.2 µm
Onboard software	Create, edit or run multiple protocols
Software	LHC Software LHC Secure for 21 CFR Part 11 compliance (option) SiLA Compliant driver (option)
Separation	Biomagnetic separation, vacuum filtration (optional)
Shaking	Programmable up to 60 minutes Slow, medium, fast or variable
Soaking	Programmable up to 60 minutes
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
Washing	
Manifold types	96-tube manifold for 96-well washing 96-tube Dual-Action manifold for 96- & 384-well washing 192-tube Dual-Action manifold for fast 384-well washing
Volume range	25 - 3000 µL/well, in 1 µL increments
Wash cycles	1 - 250
Buffer/reagent selection	Auto switching (internal) for up to 4 buffers (option)
Supply bottle	4 L or 10 L (optional)
Dispense precision	<3% CV: 300 µL/well (96-well washing) <4% CV: 80 µL/well (384-well washing)
Residual volume	< 2 µL/well (96- & 384-well plates) 96-tube manifold for 96 wells; 192-tube for 384 wells
Wash speed	96-wells, 300 µL/well, 3 cycles; ≤30 seconds 384-wells,100 µL/well, 3 cycles: ≤80 seconds 384-wells, 400 µL/well, 1 cycle: ≤20 seconds
Flow rates	High flow to low flow Optimized rates for cell assays
Sterilization	Chemical
Vacuum range for filtration	-38 mm Hg to -506 mm Hg
Ultrasonic Advantage	Ultrasonic manifold cleaning (option)
Verify clog detection	Automated clog detection and reporting (option)
Physical Characteristics	
Power consumption	800 W max 1250 W max with vacuum pump
Dimensions	14" W x 17" D x 10" H (35.6 x 43.2 x 25.4 cm)
Weight	With internal buffer switching: 36 lbs (16.5 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

50 TS
microplate washer

The 50™ TS Microplate Washer brings high quality and excellent automated washing to your laboratory at an affordable price. The robust design, easy to use software and excellent performance are typical of BioTek Microplate Washers, the #1 plate washer brand in the world for the clinical and research laboratories.

Broad Applications Range

Applications for the 50 TS extend far beyond simple dispense and aspirate routines typical of many ELISA processes. Fluid delivery can be optimized for gentle cell-based assay washing and available modules automate biomagnetic and vacuum filtration protocols. To automate many lower throughput workflows, the 50 TS partners well with the 800™ TS Microplate Reader.

Simple, Powerful Programming and Operation

The 50 TS software includes pre-defined protocols for quick selection of commonly used wash parameters. Creating custom protocols onboard the 50 TS is easy – the touchscreen interface makes multi-step program creation intuitive and simple. Protocols are saved for quick recall. From just a single strip to a full microplate, the 50 TS washes quickly, efficiently and reliably.

Automated Buffer Switching

To facilitate maintenance or to accommodate complex wash routines, the 50 TS offers automated switching between supply bottles. Automated buffer switching is an affordable option for the 50 TS.

Reliable, Safe and Low Maintenance

Liquid level sensors will alert you to low supply or full waste levels, allowing wash programs to run safely and reliably. Pre-defined, automated maintenance routines keep the fluid path clean and prevent build-up of salt, protein or other material that can block manifold tubes, causing inadequate washing. As an FDA registered and ISO certified manufacturer, BioTek understands the importance of performance and data verification - BioTek's Product Qualification Package provides simple, straightforward instructions for verification of the 50 TS performance over time.

TYPICAL APPLICATIONS

- ELISA
- Cell-based assays
- Biomagnetic separation protocols
- ELISpot assays
- Vacuum filtration protocols
- Multiplex assays

SPECIFICATIONS

General

Microplate types	96 wells 96 and 384 wells (“16” configurations) Low profile and standard height 24 wells (with 4-well manifold) Solid and filter bottom (“V” models) Filter pore sizes 0.45 µm to 1.2 µm
Onboard software	Up to 75 user-programmable protocols Quick menu Create or edit custom protocols Run protocols created onboard or downloaded from LHC Software
Software	Liquid Handling Control (LHC), for external computer control and operation (optional)
Separation	Biomagnetic separation (“M” configurations) Vacuum filtration (“F” configurations)
Shaking	Programmable in mm:ss up to 30 minutes
Soaking	Programmable in mm:ss up to 30 minutes
User interface	4.3” color LCD touchscreen display

Washing

Manifolds	**Manifold type**	**Plate type**
	4-well manifold	24-well
	8-well manifold	96-well
	8s-well manifold (short dispense tube)	96-well
	2x8-well manifold	96-well
	12-well manifold	96-well
	16-well manifold	96- and 384-well
Volume range	25 - 3000 µL/well	
Wash cycles	1 - 10	
Buffer/reagent selection	Auto switching module for up to 3 buffers (“V” configurations)	

Dispense precision	**Plate type**	**Manifold**	**Performance**
	96-well	8- and 8s-well	≤3.0% CV when measured over six 300 µL/well dispenses of deionized water with 0.1% Tween 20
	96-well	12-well	≤3.0% CV when measured over four 300 µL/well dispenses of deionized water with 0.1% Tween 20
	384-well	8-,16-well	≤4.0% CV when measured over six 100 µL/well dispenses of deionized water with 0.1% Tween 20
	96-well	2 x 8-well	≤4.0% CV when measured over six 300 µL/well dispenses (whole plate) of deionized water with 0.1% Tween 20
	24-well	4-well	≤4.0% CV when measured over six 1120 µL/well dispenses of deionized water with 0.1% Tween 20
Residual volume	**Plates**	**Manifold**	**Performance (avg residual/well)**
	96-well	8-well, 12-well	≤2.0 µL/well after 3-cycle wash, 300 µL/well dispensed
	96-well	2x8-well	≤4.0 µL/well after 3-cycle wash, 300 µL/well dispensed
	384-well	8-,16-well	≤4.0 µL/well after 1-cycle wash, 100 µL/well dispensed
	24-well	4-well	≤5.0 µL
	96-well filter bottom	8-, 2x8-, 12- well	<1.2 g increase after blotting
Wash speed	96 wells, 8-tube manifold, >300 µL/well: <130 seconds		
Fluid delivery	One positive displacement syringe drive		

Physical Characteristics

Power consumption	40 W max
Dimensions	15” W x 15” D x 8” H (35.6 x 40.6 x 16.5 cm)
Weight	22 lbs (9.8 kg)

Regulatory

Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

Washer Comparison Chart

	EL406™	*MultiFlo™ FX*	
Key Features			
ELISA	•	•	
Cell-based assays	•	•	
Magnetic bead assays	•	•	
Polystyrene bead assays	•		
Filtration-to-waste processes	•		
Touchscreen user interface		•	
USB ports for protocol transfer		•	
Performance Specifications			
Washing speed: 3 aspirate/dispense cycles, 96-well solid bottom plate, 300 µL/well	≤30 sec	≤130 sec	
Dispense precision	≤3% CV	≤3% CV	
Residual volume: solid bottom plate	≤2 µL/well	≤2 µL/well	
Vacuum filtration: 1.2 µm 96-well plate	0 mm Hg to -380 mm Hg		
General Specifications			
Microplate types	96, 384 and 1536	6, 12, 24, 48, 96 and 384	
Low profile and standard height	•	•	
Solid and filter bottom	•		
Deep well			
Manifold			
6-, 12-, 24-, 48-well washing		Custom manifolds available	
96-well washing	96-tube (8x12)		
96-/384-well washing	Dual-Action 96-tube (8x12)	Dual-Action 8-tube (1x8)	
384-well washing	Dual-Action 192-tube (16x12)		
1536-well washing	Dispense: Two 32-tube (1x32) Aspiration: 128-tube (4x32)		
Ultrasonic Advantage™	•		
Verify™ technology			
BioSpa™ 8 Automated Incubator compatible	•	•	
Automation ready/BioStack™ compatible	•	•	
Automatic buffer switching	Up to 4		
Flow rates	High flow rates to low cell wash rates	High flow rates to low cell wash rates	
Volume range	3 - 3000 µL/well	25 - 30,000 µL/well	
Microplate shaking	•	•	
Fluid and waste detection	•	•	
Flow and vacuum detection	•		
Overflow protection	•	•	
Pre-programmed maintenance routines	•	•	
Onboard software included	•	•	
Liquid Handling Control™ Software compatible	•	•	

405™ TS	*ELx405™ Select*	*50™ TS*
•	•	•
•	•	•
•	•	•
•		•
•		•
•		•
•		
≤30 sec	≤30 sec	≤130 sec
≤3% CV	≤3% CV	≤3% CV
≤2 µL/well	≤2 µL/well	≤2 µL/well
-38 mm Hg to -506 mm Hg		-95 mm Hg to -299 mm Hg
96 and 384	96 and 384	24, 96 and 384
•	•	•
•		•
	•	
		4-tube for 24-well plates
96-tube (8x12)		8-tube (1x8) or 12-tube (1x12)
Dual-Action 96-tube (8x12)	Dual-Action 96-tube (8x12)	Dual-Action 16-tube (1x16)
Dual-Action 192-tube (16x12)		
•	•	
•	•	
•		
•	•	
Up to 4	Up to 4	Up to 3
High flow rates to low cell wash rates	High flow rates to low cell wash rates	High flow rates to low cell wash rates
25 - 3000 µL/well	50 - 3000 µL/well	25 - 3000 µL/well
•	•	•
•	•	•
•	•	
•	•	•
•	•	•
•	•	•
•	•	•

MULTIFLO|FX

multi-mode dispenser

The MultiFlo™ FX Multi-Mode Dispenser offers modular configurations of up to four independent dispensers and a microplate washer in one compact platform. A color touchscreen interface makes programming quick and easy.

Multi-Mode Dispensing

MultiFlo FX becomes a versatile multi-mode dispenser with the addition of either the RAD™ technology for random access dispensing to 6- to 384-well plates or a wash module for 6- to 384-well plate washing. Fast, intuitive programming and operation are via the color touchscreen user interface. A MultiFlo FX configured with either RAD™ technology or the wash module replaces up to five liquid handlers.

Parallel Dispense™ Technologies

Offering BioTek's unique combination of peristaltic and microprocessor controlled syringe pump dispensing, the MultiFlo FX enables users to choose which is best for a specific reagent. While peristaltic pumps offer low prime volumes and back flush capabilities, BioTek's syringe drives are program-and-forget solutions that never require recalibration. Automated dispensing with walkaway confidence.

Modular and Upgradable

The MultiFlo FX is configurable and upgradable from dispense or wash only, to a combined dispense and wash combination, with 1-to-4 reagent dispensing with peristaltic and/or syringe driven precision dispensers, or the addition of a RAD module for single channel and high volume dispensing. Purchase the modules required now, and upgrade in the future as assay needs change. With its compact footprint and base height of less than 8 inches, the MultiFlo FX comfortably fits on any lab bench or robotic system. The MultiFlo FX is easily integrated with a BioStack™ Microplate Stacker for walkaway automation. For complete live cell workflow automation, MultiFlo FX can be integrated with the BioSpa™ 8 Automated Incubator.

Versatile Applications - Liquid Handling

A wide array of plate type settings accommodates 6- to 1536-well plate formats up to 50 mm high for dispensing. Volumes from 500 nL to 3 mL are dispensed with accuracy and precision. The wash module works with 6- to 384-well plates in standard, half and deep well, and with cluster or mini-tubes. Automate cell-based assays by integrating MultiFlo FX with the BioStack™ 4 to handle lidded plates with speed and ease.

TYPICAL APPLICATIONS

- Cell-based assays
- Primary and secondary screening assays
- Dispense/wash protocol automation
- Compound storage
- Genomics and proteomics research
- Magnetic bead assays
- ELISAs
- Multiplex assays
- Automated cell washing, fixing and staining for cellular imaging

SPECIFICATIONS

General	
Microplate types	Dispensing (peri pump and syringe): 96-, 384- and 1536-well standard, deep and PCR plates 6-, 12-, 24- and 48-well plates (dispense tip configurable) Washing: 96-, 384-well standard plates; 6-, 12-, 24-,and 48-well plates (with compatible manifold)
Onboard software	Create, edit or run multiple protocols
Software (PC control)	LHC Software LHC Secure for 21 CFR Part 11 compliance (option) SiLA Compliant driver (option)
Shaking	Programmable up to 60 minutes Slow, medium, fast or variable
Soaking	Programmable up to 60 minutes
Automation	BioStack and 3rd party automation compatible BioSpa 8 Automated Incubator compatible
Washing	
Manifold types	96- and 384-well washing: 8-tube manifold Custom manifolds available for 6-, 12-, 24-, 48-well washing
Volume range	20 - 30,000 µL/well
Wash cycles	1 - 10
Supply bottle	2 L
Dispense accuracy	±3%
Dispense precision	≤3% CV (96-/384-well plates; 300 µL/well) ≤5% CV (6-well plates; 5560 µL/well)
Residual volume	< 2 µL/well, 300 µL dispense, 0.1% Tween
Wash speed	96-wells, 8-tube manifold, >300 µL/well: <130 seconds
Flow rates	140 - 422 µL/well/second
Sterilization	Chemical
Dispensing - Peristaltic Pump (Multi-Channel)	
Manifold types	1 x 8 - sapphire jeweled 316 SS, 316 SS or polypropylene tips, with 1, 5 or 10 µL tubing
Fluid delivery	1 or 2 peristaltic pumps
Dispense speed	96 wells, 5 µL cass, 10 µL/well: 3 seconds 96 wells, 5 µL cass, 20 µL/well: 3.5 seconds 384 wells, 5 µL cass, 5 µL/well: 6.5 seconds 384 wells, 10 µL cass, 10 µL/well: 8 seconds 384 wells, 1 µL cass, 1 µL/well: 6 seconds 1536 wells, 1 µL cass, 1 µL/well: 21 seconds
Volume range	500 nL - 3000 µL/well, selectable in 1 µL increments
Flow rates	User programmable rates from high to low
Dispense performance	1 µL: Recommended volume range: 1 - 50 µL Dispense accuracy: ±5% at ≥2 µL Dispense precision: ≤5% CV at ≥2 µL ≤10% CV at 500 nL Minimum prime volume: 0.78 - 1.20 mL 5 µL: Recommended volume range: 5 - 2500 µL Dispense accuracy: ±2.0% at ≥10 µL Dispense precision: ≤2.5% CV at ≥10 µL Minimum prime volume: 2.75 - 4.23 mL 10 µL: Recommended volume range: 10 - 3000 µL Dispense accuracy: ±2.0% at 20 µL Dispense precision: ≤-2.0% CV at 20 µL Minimum prime volume: 4.79 - 7.36 mL
Recommended cassette replacement interval	1 µL Cassette: 1000 384-well microplates at 5 µL well 5 µL Cassette: 1000 96-well microplates at 50 µL well 10 µL Cassette: 1000 96-well microplates at 100 µL well
Sterilization	Autoclave, chemical

Dispensing - Syringe Pump (Multi-Channel)	
Manifold types	96- and 384-well dispensing: One 16-tube (2 x 8) manifold - 316 SS tubes Two 16-tube (1 x 16) manifolds - 316 SS tubes 1536-well dispensing: Two 32-tube (1 x 32) manifolds - sapphire jeweled 316 SS or 316 SS tubes 6- to 48-well dispensing: custom autoclavable manifolds available
Fluid delivery	Two positive displacement syringe drives
Dispensing speed	20 µL/well, 96 wells, 1 x 16 tubes: 5 seconds 20 µL/well, 384 wells, 1 x 16 tubes: 14 seconds 3 µL/well 1536 wells, 2 x 32 tubes: 7 seconds
Volume range	3 - 3000 µL/well, selectable in 1 µL increments Minimum prime volume: 12 mL
Flow rates	User programmable rates from high to low
Dispense accuracy	±1 µL at 5 µL and 20 µL; ±1% at 100 µL
Dispense precision	≤5% CV at 5 µL; ≤2.5% CV at 20 µL; ≤1% CV at 100 µL
Supply bottle	1 L or 2 L
Sterilization	Chemical, autoclavable option
Dispensing - RAD	
Labware types	Single tip: 6-, 12-, 24-, 48-, 96-, 384-well plates; low profile standard height and deep well formats; PCR trays and microtubes 8-to-1 tip: 6-, 12-, and 24-well plates
Manifold types	RAD single, with plastic or steel tip with 1, 5 or 10 tubing, 7° angle RAD 8-to-1 plastic tip, with 5 µL tubing, angled bulk dispense chute
Volume range	500 nL - 30,000 µL
Minimum prime volume	1 µL cass, 18”: 90 µL ; 1 µL cass, 30”: 150 µL 5 µL cass, 18”: 320 µL; 1 µL cass, 30”: 530 µL 10 µL cass, 18”: 555 µL; 10 µL cass, 30”: 920 µL
Dispense speed (high flow)	1 µL cass, 1 µL/well: 19s (96 wells), 55s (384 wells) 1 µL cass, 10 µL/well: 33s (96 wells), 112s (384 wells) 5 µL cass, 5 µL/well: 19s (96 wells), 58s (384 wells) 5 µL cass, 100 µL/well: 76s (96 wells), 286s (384 wells) 10 µL cass, 10 µL/well: 21s (96 wells), 66s (384 wells) 10 µL cass, 100 µL/well: 70s (96 wells), 259s (384 wells)
Dispense performance	1 µL cass (med), 0.5 µL/well: Precision 10% CV 1 µL cass (med), 1 µL/well: Accuracy ± 10%, Precision 10% CV 1 µL cass (med), ≥2 µL/well: Accuracy ± 5%, Precision 5% CV 5 µL cass (high), 5 µL/well: Accuracy ± 4%, Precision 5% CV 5 µL cass (high), ≥10 µL/well: Accuracy ± 2%, Precision 2.5% CV 10 µL cass (high), 10 µL/well: Accuracy ± 4%,Precision 4% CV 10 µL cass (high), ≥20 µL/well: Accuracy ± 2%, Precision 2 %CV 8-to 1 cass (high), 40 µL/well: Accuracy ± 4% 8-to 1 cass (high), ≥10 µL/well: Precision 2.5%CV 8- to 1 cass (high), ≥80 µL/well: Accuracy ± 2%
Physical Characteristics	
Power consumption	90 W max
Dimensions	Base instrument: 17.19” W x 11.75” D x 8” H (43.5 x 29.2 x 20.3 cm)
Weight	Base instrument: 19.5 lbs (8.8 Kg)
Regulatory	
Regulatory	CE and TUV marked. ROHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

MICROFILL

microplate dispenser

With its microprocessor-controlled syringe drive technology, the MicroFill™ Microplate Dispenser provides outstanding accuracy and precision while dispensing into 24-, 96- and 384-well plates.

Low Maintenance Design

The MicroFill is an economical, compact and reliable alternative to conventional microplate dispensers. Its microprocessor-controlled syringe pump provides optimal dispense performance without time-consuming recalibration, cassette replacement and maintenance. Syringes are ideal for higher volume filling, with noteworthy speed improvements compared to other dispense technologies.

Guaranteed Sterility

The entire fluid path is autoclavable for applications requiring sterility. The MicroFill's pump, tubing, dispense manifold and supply bottle are quickly changed for no reagent carryover. User-controlled dispense flow rates allow low- to high-velocity dispensing for both biochemical and cell-based assays. Low profile, standard and deep well microplates are all accommodated with a broad volume range from 5 µL to 6 mL.

Unattended Operation

For increased throughput, the MicroFill can be integrated with BioTek's BioStack™ Microplate Stacker or interfaced to third-party automated systems with its available interface software. MicroFill drivers are available from most of today's leading system providers.

TYPICAL APPLICATIONS

- Primary and secondary screening assays
- Compound storage
- Genomics and proteomics research
- Cell-based assays
- ELISAs

SPECIFICATIONS

General	
Microplate types	24-, 96- and 384-well Low profile, standard and deep well formats
Other labware	PCR tubes, microtubes
Onboard software	Create, edit or run multiple protocols
Software (PC control)	Interface software (optional) for robotic system integration
Shaking	Programmable up to 60 minutes Slow, medium, fast or variable
Soaking	Programmable up to 60 minutes
Automation	BioStack and 3rd party automation compatible
Dispensing - Syringe Pump (Multi-Channel)	
Manifold types	24-well dispensing: One 8-tube (1x8) manifold - 316 stainless steel tubes 96-well dispensing: One 8-tube (1x8) manifold - 316 stainless steel tubes 96-/384-well dispensing: One 16-tube (1x16) manifold - 316 stainless steel tubes
Dispense speed	96 wells, 10 µL/well, 1 x 16: 4 sec 384 wells, 5 µL/well, 1 x 16: 7 sec
Volume range	5 - 6000 µL/well (manifold dependent) Minimum prime volume: 10 mL
Flow rates	User programmable rates from high to low
Dispense accuracy	±1 µL at 5 µL and 20 µL ±1% at 100 µL
Dispense precision	≤5% CV at 5 µL ≤2.5% CV at 20 µL ≤1% CV at 100 µL
Supply bottle	1 L
Sterilization	Autoclave, chemical
Physical Characteristics	
Power consumption	40 W max
Dimensions	15" W x 18" D x 7" H (38 x 46 x 18 cm)
Weight	20 lbs (8.9 kg)
Regulatory	
Regulatory	CE and TUV marked. ROHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

Dispenser Comparison Chart

	EL406™
Key Features	
ELISA	•
Cell-based assays	•
Number of reagents	1 to 3
Dispense technology	Peristaltic and/or Syringe
Fully modular and upgradable	•
Performance Specifications	
Dispensing speed	
Peristaltic pump (8-tip, 1x8)	
96-well, 10 µL/well; 384-well, 5 µL/well	3 sec; 6 sec
Syringe pump (16-tube, 1x16)	
96-well, 20 µL/well; 384-well, 20 µL/well	5.25 sec; 14 sec
Dispense accuracy - typical at 5 µL	
Peristaltic pump	±2%
Syringe pump	±1 µL
Dispense precision - typical at 5 µL	
Peristaltic pump	≤2.5% CV
Syringe pump	≤5% CV
General Specifications	
Microplate types	96, 384 and 1536
Low profile and standard height	•
Deep well	
Strips and full plates	•
Cassette/manifold	
RAD cassettes	
Peristaltic pump	8-tip (1x8)
Syringe pump, 6-well to 384-well dispensing	
Syringe pump, 96-well to 1536-well dispensing	8-tube (1x8)
Automation ready/BioStack™ compatible	•
BioSpa™ 8 Automated Incubator compatible	•
Variable flow rates	•
Volume range	1 - 3000 µL/well
Microplate shaking	•
Autoclavable fluid path	•
Onboard software included	•
Liquid Handling Control™ Software compatible	•

MultiFlo™ FX	*MicroFill™*
•	•
•	•
1 to 4	1
Peristaltic and/or Syringe	Syringe
•	
3 sec; 6 sec	
5.25 sec; 14 sec	4 sec; 7 sec
±2%	
±1 µL	±1 µL
≤2.5% CV	
≤5% CV	≤5% CV
6 to 1536	24, 96 and 384
•	•
•	•
•	•
•	
8-tip (1x8)	
•	8-tube (1x8)
	8-tube (1x8)
•	•
•	
•	
1 - 30,000 µL/well	5 - 6000 µL/well
•	
•	•
•	•
•	

LHC

liquid handling control software

Liquid Handling Control™ (LHC™) Software allows MultiFlo™ FX Dispenser, EL406™ Washer Dispenser and 405™ TS Washer users the convenience of programming important assay-specific protocol requirements in a Microsoft® Windows® environment.

Expanded Versatility

LHC Software is a powerful yet flexible interface for use with BioTek's microplate dispensers and washers. Any programming sequence possible onboard the liquid handler may be duplicated from the computer with LHC Software. LHC also allows a virtually unlimited number of methods to be linked together for the most complex liquid handling routines. From a washer's first prime routine, multiple microplate processes over time, ultrasonic cleaning to dissolve protein or salt crystal build-up to a final system rinse, LHC Software enables unattended operation.

21 CFR Part 11 Compliance

To meet the demands of the GxP laboratory, LHC Secure offers features to ensure compliance to 21 CFR Part 11. Flexible multi-user permission levels and electronic protocol and system audit trail signing are all available whenever additional security is required.

Custom Maintenance Reminders

To facilitate maintenance and keep a washer or dispenser in peak condition, factory recommended maintenance procedure reminders can be preset and customized appropriately for a busy laboratory's usage and throughput requirements. LHC also supports BioStack™ Microplate Stacker and BioSpa™ Automated Incubator integrations.

Safe Record Keeping

Protocol parameters may be quickly printed for safe record keeping. Alternatively, onboard instrument protocols may be uploaded and backed up on a laboratory's network. Satellite research labs working on joint projects can be certain their wash parameters are identical for experimental integrity.

SiLA Compliant Drivers

For automated systems that require SiLA compliant integration, LHC SiLA is available.

Intuitive StepWise™ protocol creation for ultimate flexibility

Washer & Dispenser Accessories

BioTek offers a wide range of accessories to help increase productivity, expand your plate washer's and dispenser's capabilities, and maintain the performance of your BioTek microplate liquid handling system. See our web site for a complete listing of available accessories.

Peristaltic Pump Dispenser Cassettes

A wide selection of peristaltic pump cassettes are available with choices in volume ranges, tip materials and bore sizes for use with EL406™ and MultiFlo™ FX.

BioStack™ Microplate Stacker

Automate routine processes with this compact stacker.

BioSpa™ 8 Automated Incubator

BioSpa 8 is an automated incubator linking BioTek readers or imagers together with washers and dispensers for full workflow automation of up to 8 microplates.

Dispense/Waste Systems

A dispense/waste system is required on all 405™ TS, 405 LS and EL406 models. Many selections are available based on throughput, bottle size and vacuum pump requirements.

Syringe Pump Dispenser Manifolds

A range of MultiFlo FX and MicroFill™ dispense manifolds are available for various microplate types and reagent characteristics.

3-Instrument Rack

For third-party robotic system integration, a rack is available for supporting up to three dispensers or other BioTek instrumentation.

Instrument Qualification

See the Compliance Section on pages 70-71 for details about BioTek's product qualification tools and services.

PRECISION

automated pipetting workstation

The Precision™ is an innovative solution for automated liquid handling. With its ability to perform virtually any routine liquid transfer, Precision replaces tedious manual pipetting.

Automate Manual Pipetting

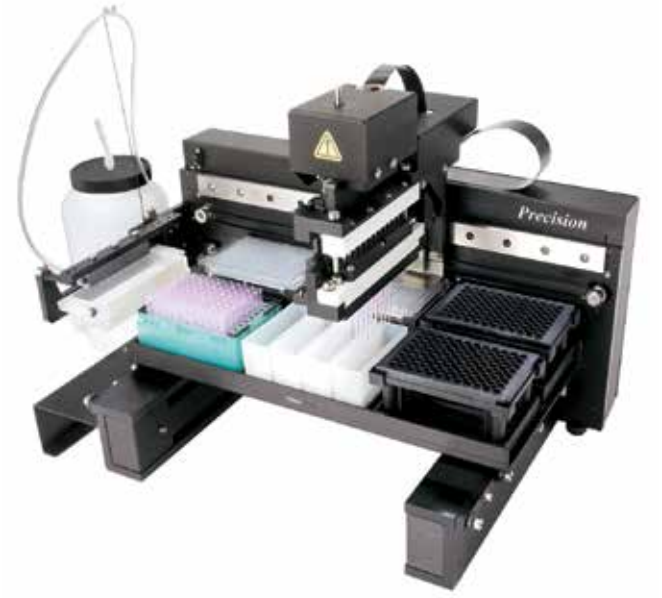
The Precision can be customized with a range of options perfect for medium throughput labs looking to automate their everyday pipetting with walkaway confidence. BioTek's proprietary pipette technology and unique tip sealing allow most standard tips to be used for transfers in common sample tubes and 6- to 384-well microplate formats.

Open Deck Layout and Flexible Software

A user-configurable, multi-station deck allows for flexible experimental design; microplates, tips and other labware may be placed in nearly any location for optimal efficiency. Available Precision Power™ Software offers complete Precision control with intuitive protocol creation, expanding the instrument's dynamic capabilities with a graphical program simulator and sample ID tracking.

Space Saving, Compact Footprint

Its small footprint and well-organized design make the Precision ideally suited for installation inside standard size biological safety cabinets and chemical fume hoods. The Precision XS model delivers outstanding liquid handling performance with four liquid transfer tools on a single platform. All four may be intermixed throughout a fully automated protocol – single and multi-channel pipetting along with single- and multi-channel bulk reagent dispensing.



TYPICAL APPLICATIONS

- Sample transfers from tube to microplate
- Serial dilutions
- Mixing
- Plate replication - mother/daughter transfers
- Reagent addition
- Hit picking
- ELISA automation
- Secondary screening assays
- Compound profiling
- Cell-based assays

SPECIFICATIONS

General	
Microplate types	Precision XS: 6-to 384-well microplates Precision: 96- and 384-well microplates
Other labware	Test tubes <100 mm
Onboard software	Precision: Create, edit or run multiple protocols Precision XS: Computer control only
Software (PC control)	PrecisionPower Software
Automation	BioStack and 3rd party automation compatible (except 1 x 12 pipetting)
Platform	Precision XS: 6 stations Precision: 1x8, 6 stations; 1x12, 4 stations
Dispensing - Syringe Pump	
Manifold types	Precision XS: 96-/384-well dispensing: One 8-tube (1x8) manifold - 316 SS tubes 6- to 384-well dispensing: One single-channel probe Precision: One 8- (1x8) and/or 12-tube (1x12) manifold - 316 SS tubes
Dispense speed	Precision XS: 100 µL/well, 96 wells, 1x8: 14 seconds 100 µL/well, 96 wells, single-channel: 4 minutes Precision: 100 µL/well, 96 wells, 1x8: 14 seconds
Volume range	Precision XS: 1x8: 10 µL - 10 mL Single-channel: 5 µL - 10 mL Precision: 10 µL - 10 mL
Dispense accuracy	±1% at 100 µL
Dispense precision	≤1.5% CV at 100 µL
Supply bottle	2 L; 2 L and 125 mL (Precision XS)
Sterilization	Autoclave, chemical

Pipetting	
Manifold types	Precision XS: 1x8, single channel Precision: 1x8, 1x12 (configuration dependent)
Pipetting speed	Precision XS: 1x8: 100 µL/well, 96 wells, tip change: 3 min Single-channel: 100 µL/well, 96 wells, tip change: 22 min Precision: 1x8: 100 µL/well, 96 wells, tip change: 3 min
Volume range	Precision XS: 1x8: 5 - 120 µL Single channel: 5 - 200 µL Precision: 5 - 120 µL
Fluid delivery	Air displacement syringe drives
Dispense accuracy	±1% at 100 µL
Dispense precision	≤1.5% CV at 100 µL
Pipette tips	BioTek and other commercially available tips
Physical Characteristics	
Power	100 - 240 Volts AC. 50/60 Hz
Dimensions	Precision XS: Instrument only: 25" W x 16" D x 20" H (64 x 41 x 51 cm) Instrument with optional cabinet: 30" W x 20" D x 22" H (76 x 51 x 56 cm) Precision: Instrument only: 21" W x 15" D x 16" H (52.5 x 37.4 x 40 cm) Instrument with optional cabinet: 23" W x 17.5" D x 17.5" H (57.5 x 43.5 x 43.5 cm)
Weight	Precision XS: Instrument only: 40 lbs (18 kg) Instrument with optional cabinet: 64 lbs (29 kg) Precision: Instrument only: 28 lbs (12.7 kg) Instrument with optional cabinet: 38 lbs (17.2 kg)
Regulatory	
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.

Specifications are subject to change. Performance values represent the average observed factory test values.

Robotics

Many life science workflows benefit from expanded automation, for increased throughput or process efficiency. BioTek offers unique automation solutions that integrate with our microplate washers, dispensers, readers and imagers. BioStack™ is a compact stacker that offers fast plate exchange options for 50 plates or more, and patented plate de-lidding and re-lidding with BioStack 4.

BioSpa™ 8 Automated Incubator links BioTek readers or imagers together with washers or dispensers for full workflow automation of up to 8 microplates. Temperature, CO_2/O_2 and humidity levels are controlled and monitored through the BioSpa software to maintain an ideal environment for cell cultures during all experimental stages.

"BioStack is very simple to program and operate through a PC based software. It is a very reliable machine. Its open format allows for easy cleaning and maintenance and the release mechanism is up front and easily accessible for rapid removal and installation of the stacks."

BIOSPA 8

automated incubator

BioTek's BioSpa™ 8 automates incubated assay workflows by moving and storing microplates containing live cells or temperature sensitive reagents. More versatile than a benchtop incubator, BioSpa 8 manages up to 8 microplates, flasks, or cell culture dishes in a CO_2/O_2, temperature and humidity monitored environment. Integrated with BioTek's washers, dispensers, imaging and detection systems, BioSpa 8 manages the entire process from sample preparation to detection or imaging in one compact system.

Environment Control and Monitoring Leads to Cell Assay Success

BioSpa 8 offers incubation to 45 °C, CO_2/O_2 control and monitoring, plus humidity monitoring – everything a successful live cell assay needs.

Biosafety Cabinet Compatible

BioSpa 8 is designed to help protect against contamination, with a HEPA filter for incoming air and an interior that is easily cleaned and decontaminated. For the ultimate protection against potentional contamination, BioSpa 8 is compact – it fits within a biosafety cabinet along with the integrated washer, dispenser, imager or plate reader.

Full Workflow Automation Integrates Sample Prep

BioSpa 8 automates processes that commonly burden many labs working with live cells; inconvenient culture maintenance requirements, contamination hazards and handling multiple instruments required for both sample plate preparation and downstream processing. BioSpa 8 handles from 1 to 8 plates, moving them between the integrated washer or dispenser and imaging system or multi-mode reader for complete, unattended process automation.

Continuous Recording and Monitoring with Notifications

BioSpa 8 continuously monitors and records important workflow parameters, and can automatically send text or email notifications. BioSpa 8 provides confidence and control for unattended automation.

Simple Integration for Rapid Implementation

BioSpa 8 is compatible with several BioTek imaging and multi-mode readers, plate washers, dispensers and combination systems. The simple integration doesn't require specialized tables or other hardware or software, and BioSpa 8 is compact enough to be used in a biosafety cabinet for critical live cell assays.

TYPICAL APPLICATIONS

Automated sample preparation for cell-based assays

- Drug absorption
- Cell culture QC
- Cell proliferation
- Apoptosis
- Cytotoxicity
- 3D cell culture
  - Tumor invasion
  - Signal transduction
  - Stem cell differentiation
  - Phenotypic assays
- Cell migration and invasion
- Fluorescent protein detection
- RNA expression

SPECIFICATIONS

General	
Microplate types	6- to 1536-well standard height microplates, with or without lids Plate height range: 7.6 mm to 25.4 mm
Other labware	Petri and cell culture dishes (35 mm and 60 mm), T25 flasks
Plate capacity	Up to 8 microplates
Air filter	User-replaceable HEPA filter
Decontamination	Easy interior access for cleaning and decontamination
Plate handler	Robotic arm moves plate to and from BioSpa 8 and connected instrument; handles de-lidding and re-lidding plates
Compatible BioTek instruments	Cytation 5, Cytation 1, Synergy Neo2, Synergy H1, Epoch 2, EL406, 405 TS, 405 LS, MultiFlo FX, MultiFlo
Interfacing capacity	1 or 2 devices: Reader/imager only, washer/dispenser only, or both
Temperature Control	
Range	To 45 °C
Control resolution	0.1 °C
Uniformity	±0.5 °C at 37 °C
CO_2 Control	
Range	1 - 20%
Control resolution	±0.1%
Stability	±0.2 at 5% O_2
O_2 Control	
Range	1 - 20%
Control resolution	±0.1%
Stability	±0.2 at 5% O_2
Humidity	
rH	80 to 95% (lidded plates and 5% CO_2)
Source	Removable water pan
Water level sensor	Low water level alert
Software	
BioSpa Software	Provides programming interface for BioTek detection and liquid handling devices Allows user notification (text or email) of events and/or errors in the system Provides control, monitoring and logging of: - CO_2/O_2 - temperature control Provides humidity level monitoring and logging Allows long-term uninterrupted runs up to 2 weeks
Physical Characteristics	
Power consumption	250 W max
Dimensions	27.2" W x 20.1" D x 18.9" H (69 x 51 x 48 cm)
Weight	< 85 lbs (39 kg)
Regulatory	
Regulatory	CE and TUV marked, RoHS compliant. Models for In Vitro Diagnostic use are available.

BIOSTACK

microplate stacker

BioStack™ is a compact and versatile microplate stacker compatible with BioTek's microplate washers, dispensers, pipetting, detection and imaging systems. BioStack is easy to use and provides walkaway automation for routine processes, including processes requiring plate de-lidding and re-lidding.

Ultra Fast Transfer Speeds

BioStack offers the fastest plate transfer time, taking less than 10 seconds to remove and replace plates on the instrument carrier. BioStack is well-suited for high throughput plate stacking requirements with BioTek readers, washers and dispensers.

Plate De-lidding

Many cell-based microplate processes require lidded plates during incubation and to protect sterility. Typically, automation of these processes meant purchasing an expensive microplate handler to de-lid the plates for measurement or liquid handling operations. BioStack now offers an affordable option for plate de-lidding in the BioStack 4 model to interface with BioTek's detection and liquid handling instruments.

Multiple Microplate Geometry Compatible

BioStack is compatible with standard 96- and 384-well plates, low volume 384-well plates and 1536-well plates. The BioStack 4 adds 24- and 48-well plates to its menu of compatible microplate labware, providing higher throughput in a walkaway system for a variety of microplate geometries. An available barcode scanner provides additional automation for high-throughput plate processing.

Plate IDs are read and sent to the plate data file in Gen5™ or LHC™ Secure Software for storage or export.

10-, 30- or 50-Microplate Stacks

Choose between 10-, 30- or 50-plate stacks to best suit your throughput requirements. Low volume, half-height plates are also compatible, with up to a 75-plate capacity in the 50-plate stack.

Compact, Rugged Design

BioStack allows worry-free operation, even under the heaviest usage. The motors, mechanical assemblies and software are all designed for long term, continuous and maintenance-free use. The rotational gripper and very small footprint allows for integration position versatility and for optimal fit within a biosafety enclosure or for space-savings on the benchtop.

TYPICAL APPLICATIONS

- Cell-based assays
- ELISAs
- Primary screening assays
- Colorimetric, fluorometric and luminescent assays

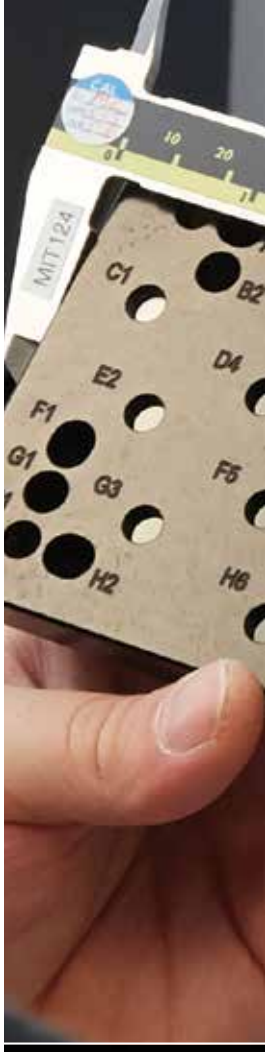
SPECIFICATIONS

	BioStack 4	BioStack 3 • BioStack Neo • BioStack
General		
Microplate types	ANSI/SLAS Standard and low profile 96-, 384- and 1536-well plates 24- and 48-well plates (model dependent) Maximum plate height 23.2 mm	ANSI/SLAS Standard and low profile 96-, 384- and 1536-well plates Maximum plate height 14.6 mm
Lidded plate handling	De-lidding capability: (lids always removed during processing) 96-,384 and 1536-well plates. Maximum height, including lids: 16.9 mm Nunc plates: (lids can remain on plate during process, or can be removed) 6-, 12-, 24-, 48- well plates Maximum height, including lids: 23.2 mm	n/a
Microplate capacity	10 and 30 plate stacks are removable and interchangeable (50-plate stacks may be used with non-lidded plates only) 96-/384-well plates: Up to 30 plates (with lids) 1536-well plates: Up to 75 plates	10-, 30- and 50-plate stacks are removable and interchangeable 96-/384-well plates: Up to 50 plates 1536-well plates: Up to 75 plates
Barcode scanner (option)	Landscape or portrait orientation, Code 39, Codabar, UPC/EAN, Code 128 compatible	Landscape or portrait orientation, Code 39, Codabar, UPC/EAN, Code 128 compatible 1D and 2D barcodes (BioStackNeo)
Processing speed (plate exchange time)	<20 seconds (with de-lidding) <12 seconds (without lids)	<10 seconds: BioStack 3, BioStack Neo <33 seconds: BioStack
Direct control	Washers and dispensers with keypad interface can directly control BioStack	Washers and dispensers with keypad interface can directly control BioStack
Software (PC control)	LHC for liquid handling instruments (optional) Gen5 for readers	LHC for liquid handling instruments (optional) Gen5 for readers
Physical Characteristics		
Power consumption	40 W max	40 W max
Dimensions	8.3" W x 22" D (21 x 56 cm) Overall height will vary depending on connected instruments and stacks used	BioStack and BioStack Neo 7.4" W x 20.7" D (18.8 x 52.6 cm) BioStack 7" W x 18.5" D (18 x 47 cm) Overall height will vary depending on connected instruments and stacks used
Weight	<25 lbs (11.3 kg)	<25 lbs (11.3 kg)
Regulatory		
Regulatory	CE and TUV marked. RoHS compliant. Models for In Vitro Diagnostic use are available.	

Specifications are subject to change. Performance values represent the average observed factory test values.

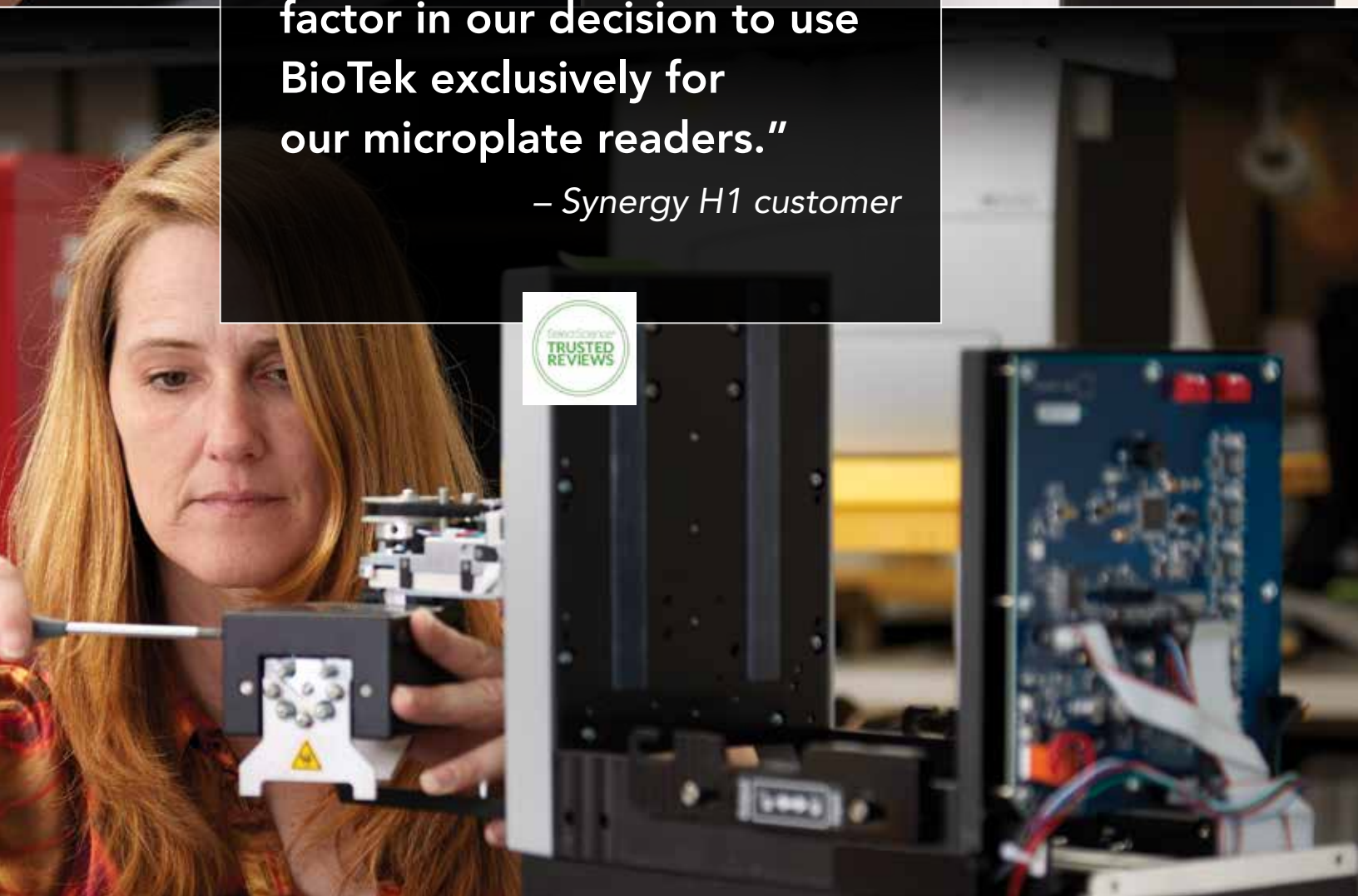
Service & Support

Our teams are committed to providing the service and support you need to sustain the optimal performance of your BioTek products. BioTek Service Engineers provide personal support for instrumentation, software, parts and applications at our Global Technical Support Center. BioTek Scientists, Engineers, Technicians and Sales Representatives provide valuable assistance to laboratories worldwide.



"Consistent high-quality BioTek service, both online and by service representatives, is a major factor in our decision to use BioTek exclusively for our microplate readers."

– Synergy H1 customer



Compliance

As an FDA registered and ISO certified manufacturer, BioTek understands the importance of both standardized product qualification procedures and traceability. BioTek provides a number of tools and services designed to streamline these processes and minimize the resources required to perform such testing.

21 CFR Part 11 Compliance Products

Gen5™ Secure and **LHC™ Secure** software editions are uniquely designed to help ensure compliance to 21 CFR Part 11. Both software programs offer important security features, including:

- Electronic signature of data and protocol files
- Secure data storage
- Multiple and definable user permission levels
- Data and protocol audit trails
- Protected functions

IVD Compliance

Many BioTek microplate instruments are labeled for In Vitro Diagnostic use. Other products may have IVD Compliant models available. Email CustomerCare@biotek.com for more information.

Software Validation

A Validation Package is available for Gen5 Software to allow testing and validation of key functions within Gen5 and Gen5 Secure. Included in the easy-to-use package are:

- Test plans
- Results checklists
- Data sets

Product Qualification

All product Qualification Packages are fully validated to ensure that the procedures and associated data/spreadsheets supplied in the package meet regulatory requirements. Within each package, you'll find detailed:

- Product specifications
- Qualification interval guidelines
- IQ/OQ/PQ test plans and procedures
- Data sets (where applicable)
- Qualification checklists and log sheets for complete documentation

RoHS2 Directive 2011/65/EU

BioTek is committed to helping protect the environment. All of BioTek's products meet the RoHS directive as indicated in the Regulatory section of the product specifications in this catalog.

Instrument IQ/OQ/PQ Packages

BioTek offers a complete menu of Product Qualification Packages for all of our microplate instruments.

Test Plates

The use of standardized plates to supplement the verification of an instrument's performance is a time- and resource-saver in most laboratory environments. BioTek offers several test plates to facilitate the test procedures found in our microplate reader IQ/OQ/PQ packages, and can be automated through the Gen5 Software.

Absorbance Test Plate

For use with BioTek absorbance readers and multi-mode readers with absorbance capability. Ensure GxP compliance by checking instrument performance against specifications for:

- Accuracy
- Repeatability
- Linearity
- Wavelength accuracy (for monochromator-based systems)
- Instrument alignment

A 340 nm-only test plate is available to replace liquid NADH tests.

Fluorescence Test Plate

The Fluorescence Test Plate replaces fluorescence liquid tests. Instrument performance can be evaluated against specifications to ensure GxP compliance by automatically checking a series of critical performance parameters, including:

- Fl limit of detection
- FP limit of detection
- TRF limit of detection
- Carrier flatness
- Linearity

The fluorescein equivalent standards used in the plate are NIST-traceable.

Luminescence Test Plate

This NIST-traceable Luminescence Test Plate is used with the applicable Product Qualification Package or updated User's Manual. Features include:

- NIST-traceability certificate guarantees a controlled light output from the test plate
- Simple design, easy to use: just turn the plate on, and read the ultra-stable, low light level LEDs

Test Plate Certification

Since the BioTek Absorbance Test Plate is a precision validation tool, it is highly recommended that it be calibrated and recertified every year. BioTek offers a test plate certification program to assist laboratories in maintaining the quality of their results.

TEST PLATE RECERTIFICATION PROGRAMS ARE AVAILABLE.

Contact BioTek Service for details.

www.biotek.com/contact

Global Service & Support

Extend the life of your BioTek instrument, and protect your research results, with BioTek's service professionals. Our service experts in the field and at our regional service centers receive extensive, ongoing training at our headquarters to stay abreast of the latest products, and service techniques. Our products and services are compliant with FDA, GLP and ISO requirements. With all of this information at hand, our service experts help you to maintain precise results over the life of your BioTek instrument. For any service or support need, contact us at TAC@biotek.com or (888) 451-5171.

Field Service

Our team is ready to visit your laboratory and provide:

- Installation, training and installation qualification
- Operational qualification
- Preventive maintenance
- Instrument upgrades and software upgrades
- Repairs

Regional Service Centers

BioTek Service Centers are located across the globe ready to service your BioTek products:

- Test plate certification
- Preventive maintenance
- Instrument upgrades
- Dispense cassette refurbishment

Technical Assistance Center (TAC)

BioTek's TAC is staffed with skilled scientists and engineers available to provide technical assistance for instrumentation, software and applications.

Customer Resource Center (CRC)

BioTek's Customer Resource Center gives customers access to information about their specific BioTek microplate instrumentation and software. This web site makes it easy for customers to acquire relevant and necessary information about their products.

Customers can:

- Track orders
- Maintain equipment inventory
- Access warranty information
- Download technical information, user manuals and software updates
- Request service and technical support

BioTek Preventive Maintenance Service includes a certificate of calibration for every instrument.

THIRD-PARTY CUSTOMER SATISFACTION SURVEY EXCERPTS

"I was discussing with a colleague after the help BioTek provided how competent and willing to help BioTek has always been. Because you guys are willing to just sort out problems, even with old equipment, you have a loyal customer base. I have and will continue to buy BioTek products wherever I work. So, thanks, we look forward to continued positive interactions with BioTek."

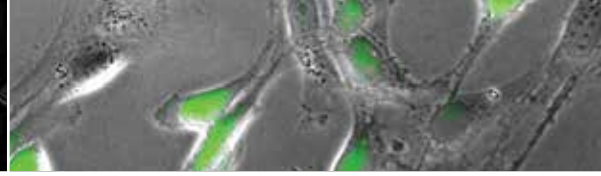
"BioTek provided the best customer service. Service was able to listen to my problem and resolve it very quickly. I am very pleased by the level of service I received. I actually enjoy calling BioTek."

"Working with BioTek is really Awesome. I get my answer quickly, a high level of follow up. Always good results. Just keep it like this."

ACCESS TO BIOTEK'S

Customer Resource Center and more details on BioTek's service and support are available at ***www.biotek.com***

Applications Support



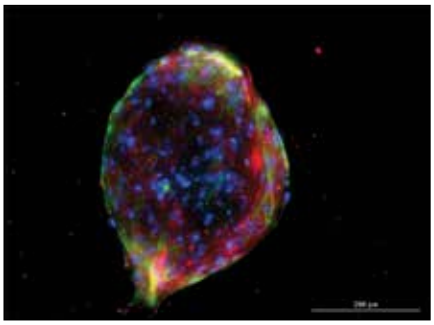
BioTek recognizes the critical need to fully support our customers and their unique applications. Showing the efficacy of customer assays running our wide range of instruments is key to our customers' success and advancing scientific research in general. Under the direction of Dr. Peter Banks, Scientific Director, BioTek continues its commitment in 2017 by more than doubling the size of its fully equipped laboratory and cell culture facility and increasing scientific staff by 50%.

Our in-house, full time scientists have over 100 years accumulated experience all with the goal of assisting our existing and prospective customers with their most difficult challenges. With over 500 scientific articles ranging from peer-reviewed publications, application notes, conference presentations on topics such as 3D cell culture methods, quantitative phenotypic assays and live cell imaging, the Applications Team is experienced in the latest assay technologies.

Our support for our customers' research does not stop there. BioTek has a global team of more than thirty (30) Field Application Scientists (FAS) dedicated to understanding and trouble shooting customers' applications. Their role is to demonstrate customer assays on BioTek instrumentation and provide post sales applications training in our customers' laboratories to their full satisfaction. Both our in-house scientists and our FAS team cooperate closely to ensure BioTek's full scientific knowledge and experience are available to support our customers' needs.

APPLICATIONS

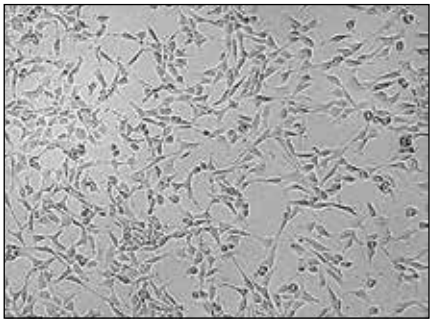
BioTek's life science instrumentation addresses a very broad range of applications in imaging & microscopy, multi-mode microplate detection, associated liquid handling and assay automation. Browse our growing list of timely applications and see how BioTek instrumentation can facilitate even the most complex workflows.



3D Cell Culture

Some of the most commonly incorporated technologies to create the desired 3D spheroids or tumoroids include polymeric and biological scaffolds, ultra-low attachment, hanging drop, and magnetic bioprinting. 3D workflows are performed in a variety of microplate types, and are commonly analyzed using microplate reader optics or digital widefield microscopy.

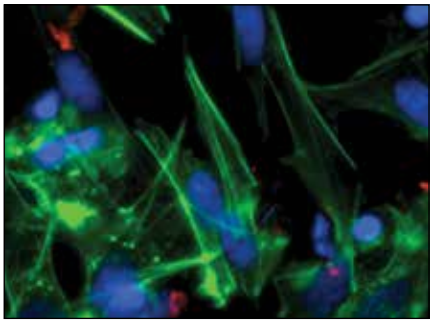
3D Cell Culture applications can be performed with several BioTek instruments, including: Cytation 5, BioSpa System



Live Cell Assays

BioTek's instruments support a wide variety of live cell applications addressing diverse biological processes in timescales from milliseconds to multiple days. Features such as reagent injectors, temperature and CO_2/O_2 control, and humidity monitoring enable applications in live cell kinetics and uninterrupted monitoring of rapid cellular reactions.

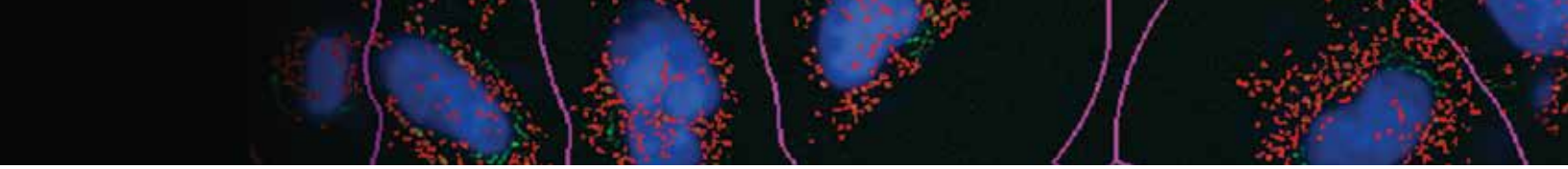
Live Cell Assays are supported with several BioTek instruments, including: Lionheart FX, Cytation 5, BioSpa System

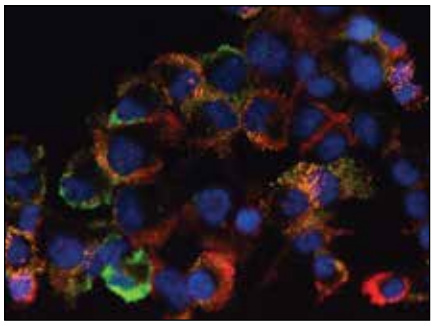


Immunofluorescence

Immunofluorescence reagent options range in scope from individual primary antibodies, to out-of-box multiplexed assay solutions for cell signaling pathway analysis. The basic IF workflow can be labor intensive, and benefits from automation to manage assays in microplates, microscope slides, Petri dishes and cell culture inserts.

Immunofluorescence workflows can be automated with several BioTek instruments, including: Cytation 5, BioSpa System, EL406

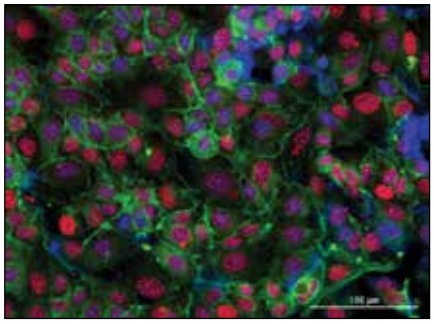




Biomarker Assays

Quantitative determination of specific mRNA and protein biomarkers in cells can be performed using either conventional microplate reading to obtain an averaged cell population result or digital widefield microscopy to provide individual cell responses and the spatial location of the molecular biomarker. Biomarker assays are commonly run in higher density microplates using automated microscopy and multi-mode detection, as well automated liquid handing for sample preparation to reagent addition.

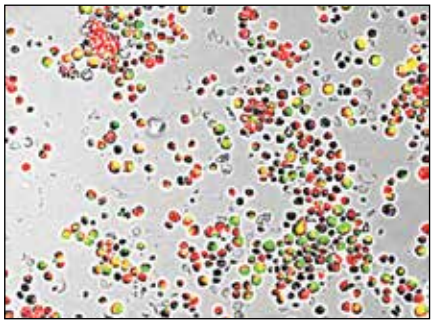
Quantitative biomarker assays can be facilitated using: Cytation 5, Cytation 1, 405 TS, EL406



Phenotypic Assays

Phenotypic assays provide quantitative cellular structure and function data, measured using digital widefield microscopy. They are used to assess whether a compound or drug produces a desired effect on the cells. Gen5 software can analyze multiple cellular phenotypic parameters simultaneously including size, shape, area, and intensity; providing a comprehensive picture of individual cell phenotypes and entire population phenotypes that allows a researcher to make an educated decision.

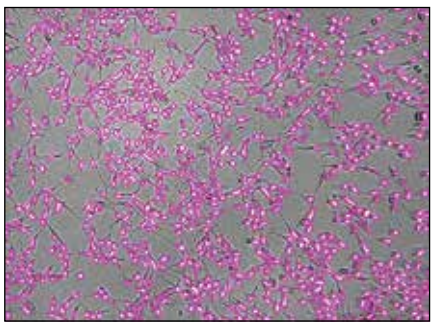
Phenotypic assays can be performed in: Cytation 5, Cytation 1, BioSpa System



Cellular and Microbial Growth

Microplate-based cell proliferation assays can take on many different characteristics: Fluorescence stains that bind DNA are used to quantitate relative changes in DNA using whole-well PMT-based detection, stained nuclei can be counted using microscopy followed by image-based analysis, compounds that become colored, fluorescent or luminescent when acted upon in live cells can be used to quantitate cell growth or cell death though increases or decreased of their signal respectively.

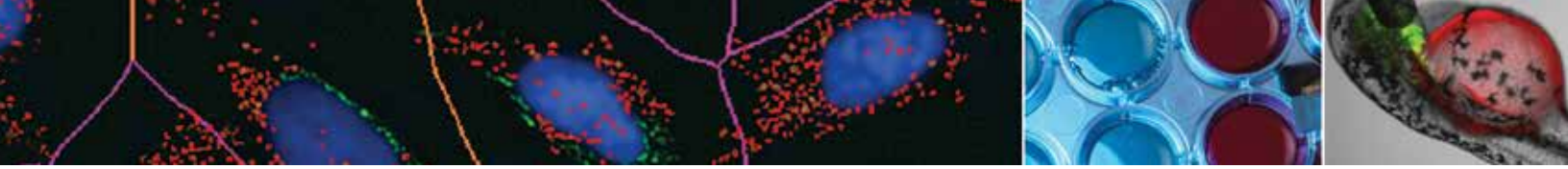
Lionheart FX and Cytation can be used to perform imaging assays
Synergy Neo2 and Synergy H1 can be used for quantitative well-based data

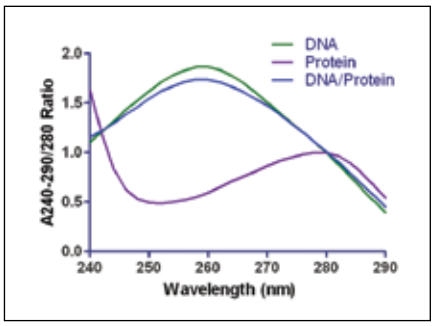


Cell-based Assays

Microplate readers have adapted to accommodate advances in, and the complexities of, cell-based assays. Highly sensitive detection modes, such as time-resolved fluorescence, aid in the development of robust assays using cell lines or primary cells. Environment control within the detection chamber enables long kinetic readouts. Many of these assays are now incorporated into screening campaigns where sample throughput and automation are of prime importance.

Cell-based assays benefit from the sensitivity available in Cytation and Synergy Multi-Mode Readers

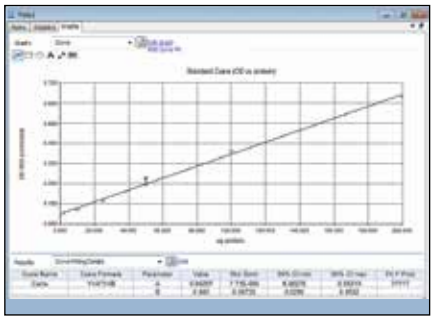




Nucleic Acid Quantification

Nucleic acids quantification assays use either absorbance or fluorescence to measure the concentration of DNA or RNA in the sample. With either method, many laboratories have adapted single cuvette protocols to 96- and 384-well microplate-based formats. These standardized formats, in conjunction with instrumentation capable of recording measurements from them, allow for the rapid quantification of large numbers of samples.

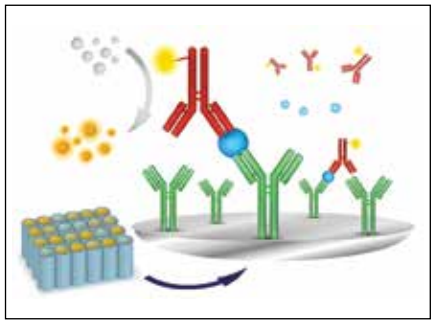
BioTek's Synergy and Cytation multi-mode readers, Epoch 2 and Epoch can be used for nucleic acid quantification. Micro-volume assessments can be made with the Take3 Plate



Total Protein Quantification

Total protein is quantified using the same methods as nucleic acids: Spectrophotometric determination of protein and peptides at A_{280}, colorimetric determination and fluorometric determination using intrinsic fluorescence or fluorescent probes. Several different fluorescence techniques eliminate many of the problems associated with the traditional absorbance-based colorimetric methods to measure total protein content.

Total protein quantification can routinely be run in a variety of labware on BioTek instruments, including: microplates, Take3 Micro-Volume plates, cuvettes and BioCell



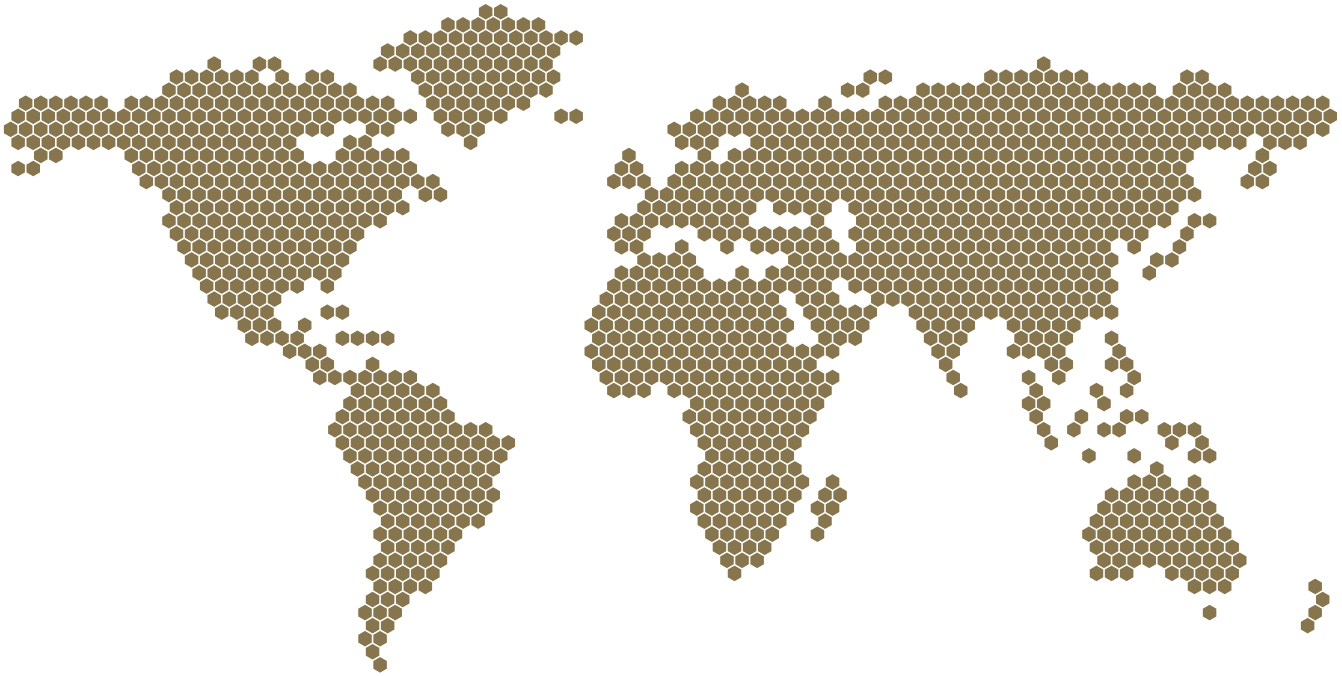
ELISA and Related Immunoassays

The ELISA technique causes formation of specific immune complexes that can be measured with colorimetric, fluorometric or luminometric detection, TR-FRET or HTRF, AlphaScreen and AlphaLISA methods. ELISAs are typically run in 96- to 1536-well microplates, but can also be performed in micro-volumes using specialized very low volume plates like the Take3 Micro-Volume Plate.

ELISA and other immunoassays can be performed using many of BioTek's detection and liquid handling systems, including 800 TS, Epoch 2, Synergy and Cytation, along with 50 TS, 405 TS and EL406

Think Possible

BioTek®



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At BioTek, our philosophy transcends conventional thinking and challenges the status quo. We develop fresh, original solutions by unifying concepts that often appear to be opposed. It means to shape and reshape. To engineer, build, deliver and support products that best serve the marketplace by providing what you need, when you need it.

Think Possible. It's the difference between leading and following.

Think Possible

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