thermo scientific

Guide to microplate readers

A one-stop solution for your microplate detection needs

ThermoFisher SCIENTIFIC

Choose the microplate reader that best suits your research needs

Thermo Scientific™ microplate readers provide flexibility, performance, and ease of use for a variety of microplate assays. Whether you need to measure fluorescence, absorbance, luminescence, or time-resolved fluorescence, or perform AlphaScreen™ assays, we offer a microplate reader solution to meet the needs of your specific workflow. With a portfolio of dedicated and modular, upgradeable multimode readers, we also offer solutions that fit your current budget with options to meet your lab's future needs.

Thermo Scientific plate readers have a number of features to help you save time and maximize productivity, including:

- Auto-calibration
- Easy export to Microsoft™ Excel™ format
- Automation readiness with robot compatibility
- No limit to the number of computers on which you can install the intuitive Thermo Scientific™ SkanIt™ Software
- Ready-to-use protocols available in an extensive online protocol library

For more information, go to **thermofisher.com/platereaders**

Considerations	Multiskan FC photometer	Multiskan SkyHigh spectrophotometer	
Applications	Absorbance		
Wavelength range	340–850 nm	200–1,000 nm	
Wavelength selection	Filters	Monochromator	
Plate format	96 wells (384 wells optional)	Thermo Scientific™ µDrop™ and µDrop™ Duo Plates, 6-48 well plates*, 96 and 384 well plates	
Incubation	Optional	Yes	
Shaking	Yes	Yes	
Dispensers	No	No	
Top/bottom reading	NA	NA	
Cuvettes	No	Optional	
Gas control module	No	No	
			

* Maximum plate height with lid 19.5 mm.

** Third dispenser requires additional installation.

† Instruments with bottom-read capabilities feature multilocation reads per well.

	Fluoroskan fluorometer	Luminoskan luminometer	Fluoroskan FL fluorometer and luminometer	Varioskan LUX scanning multimode reader
	Fluorescence	Luminescence	Fluorescence, luminescence	Absorbance, fluorescence Optional: time-resolved fluorescence (TRF), luminescence, AlphaScreen readout
	Excitation: 320–700 nm; emission: 360–800 nm	270–670 nm	Fluorescence: excitation: 320–700 nm; emission: 360–670 nm Luminescence: 270–670 nm	Absorbance and fluorescence excitation: 200–1,000 nm Fluorescence emission: 370–840 nm Luminescence: 360–670 nm TRF excitation: fixed to 334 nm (spectral scanning 200–840 nm) TRF emission: 400–700 nm (spectral scanning 270–840 nm) AlphaScreen excitation: fixed to 680 nm AlphaScreen emission: 400–660 nm
	Filters	Not required for most applications Filters can be used when necessary	Filters	Monochromator for UV-Vis absorbance and fluorescence intensity Filters for luminescence when necessary, TRF, AlphaScreen assays
	6–384 wells	6–384 wells	6–384 wells	6–1,536 wells (fluorometry, TRF, luminometry, AlphaScreen assays) µDrop and µDrop Duo Plates/6–384 wells (absorbance)
	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes
	Optional (to three)**	Optional (to three)**	Optional (to three)**	Optional (to two)
	Top/bottom†	Top	Top/bottom†	Top (standard) Bottom (optional)†
	No	No	No	With µDrop Plate
	No	No	No	Optional
				

A range of microplate readers for maximum flexibility and performance

To measure absorbance

Thermo Scientific™ Multiskan™ FC Microplate Photometer

A robust and reliable filter-based instrument that can be used for a wide variety of research and routine applications. It can be used as a stand-alone instrument or under PC control with intuitive SkanIt Software.

- Wide variety of applications, including ELISAs, endotoxin assays, cytotoxicity assays, and growth curves
- Shaking and incubation up to 50°C for temperature-sensitive assays
- Proven performance and reliable day-to-day results through patented optical design and self-diagnostics

thermofisher.com/multiskanfc

Thermo Scientific™ Multiskan™ SkyHigh Microplate Spectrophotometer

The Multiskan SkyHigh Microplate Spectrophotometer is easy to use for any photometric or turbidimetric research application, especially nucleic acid and protein analysis. It offers an optional easy-to-use graphic touchscreen user interface and multiple connectivity options (USB, computer, or cloud).

- Allows kinetic, spectral, and endpoint measurements for a variety of applications
- Separates optimized measurement modes for absorption and turbidimetric measurements
- Fast reading speed essential for kinetic applications
- Available in three different configurations: 1) touchscreen, 2) cuvette and touchscreen, and 3) operated only with SkanIt PC Software
- Reads µDrop and µDrop Duo plates for microvolume analysis of DNA, RNA, and protein
- Models with a touchscreen have an easy-to-use interface for stand-alone use, including ready-made protocols for UV-based nucleic acid and protein quantification as well as colorimetric protein quantification
- Fast operation: full spectrum (200–1,000 nm) of a well is obtained in less than 10 seconds and a full 96-well microplate is read in 6 seconds
- Access to Connect or Microsoft™ OneDrive™ cloud-based tools allows you to securely store, access, share, and manage data remotely (touchscreen models)

thermofisher.com/multiskanskyhigh

To measure fluorescence

Thermo Scientific™ Fluoroskan™ Microplate Fluorometer

Featuring excellent optical performance, the Fluoroskan Microplate Fluorometer is ideal for life science research applications such as fluorometric protein and enzyme studies, molecular interaction studies, and nucleic acid quantification, as well as reporter gene, fluorometric kinase, immunological, and cell-based assays.

- High sensitivity for both top and bottom reading
- Onboard dispensers for precise initiation of kinetic reactions
- Can be equipped with up to three reagent dispensers for use during fast kinetic assays, such as Ca^{2+} flux assays

thermofisher.com/fluoroskan

To measure luminescence

Thermo Scientific™ Luminoskan™ Microplate Luminometer

Useful for a variety of luminometric research applications, the Luminoskan Microplate Luminometer is a compact and robust instrument offering plate format versatility, fast reading speeds, and up to three dispensers. The Luminoskan luminometer provides simplicity and reliability for increased efficiency of workflows.

- Fast reading speed essential for kinetic applications
- Onboard dispensers for precise initiation of kinetic reactions
- Capable of reading a 96-well plate in just 18 seconds, essential for kinetic applications such as enzyme kinetic studies and phagocytosis assays

thermofisher.com/luminoskan

To measure fluorescence and luminescence

Thermo Scientific™ Fluoroskan™ FL Microplate Fluorometer and Luminometer

Featuring excellent optical performance, the Fluoroskan FL Microplate Fluorometer and Luminometer is ideal for fluorometric and luminometric assays in life science research. The Fluoroskan FL fluorometer and luminometer offers plate format versatility, fast plate reading speeds, and up to three dispensers.

- High sensitivity for both top and bottom reading
- Fast reading speed essential for kinetic applications
- Onboard dispensers for precise initiation of kinetic reactions
- Fluorometric GFP measurement and luminometric luciferase measurement from the same well occurs quickly due to the versatility of the assay programming

thermofisher.com/fluoroskan

To measure multimode readouts

Thermo Scientific™ Varioskan™ LUX Multimode Microplate Reader

Designed to suit a wide variety of needs, the Varioskan LUX Multimode Microplate Reader provides a flexible range of measurement modes. The instrument simplifies measurement setup with automatic dynamic range selection, and its smart safety controls help you avoid experimental errors. The Varioskan LUX multimode reader raises the bar for reliability and ease.

- Five detection modes: absorbance, fluorescence, luminescence, TRF, and AlphaScreen modules
- Five measurement modes: endpoint, kinetic, spectral, multipoint, and kinetic-spectral
- Spectral scanning for assay optimization
- Simultaneous dispensing and measurement of fast reactions right from the start
- Integrated gas module for control of CO_2 and O_2

thermofisher.com/varioskanlux

Software for readout

SkanIt Software

The intuitive interface of our updated SkanIt Software will guide you through the measurement process to help you get the results you need. With SkanIt Software, you have full control over the instrument settings for all your Thermo Scientific microplate readers. SkanIt Software is available in two editions. The research edition is for scientists working in life science research, and the drug discovery edition provides features to help you comply with the requirements of FDA 21 CFR Part 11.

SkanIt Software makes microplate reading easy

SkanIt Software provides excellent usability and flexibility, even for the most challenging microplate assays. This software offers visual workflow setup and effortless data reduction and exporting.

- Extensive cloud-based library of ready-made protocols
- Intuitive user interface simplifies measurement setup
- Fluorometric SpectraViewer tool
- Virtual pipette tool makes it easy to define samples-to-plate layout
- User-customizable graphs
- Visual tools and instructional pictures guide users through every step
- Built-in calculation options ease data processing
- Single-click data export to Excel program
- Several file formats for data export available: .xlsx, .pdf, .xml, and .txt
- Manual or automatic data export to any location
- Automatic emailing of result report after a run is complete
- No limit on the number of licenses; install the software on as many computers as needed
- No annual fee to use the software
- Measurement data continuously saved to the database, helping prevent data loss due to interruptions such as a power outage or accidental aborting

thermofisher.com/skanit

Applications

Cell health and imaging assays

Fluorescence microplate assays

Combining the sensitivity of a fluorescence-based assay with a microplate format enables a rapid, quantitative readout suitable for high-throughput analysis. We offer a diverse selection of probes and assays for the analysis of cell viability, proliferation, cytotoxicity, apoptosis, ion flux, generation of reactive oxygen species, and various enzymatic activities. In a microplate well, the fluorescence signal can be generated within whole cells, in cell lysates, or in purified enzyme preparations, and it may then be analyzed by measuring fluorescence intensity from the well without the need for cellular imaging. Additionally, these products have been verified on multiple instrument platforms including microplate readers.

thermofisher.com/microplate-fluor-assays

Absorbance microplate assays

For more than 30 years, absorbance-based detection has been the preferred mode for many microplate-based assays, such as ELISA, protein, and nucleic acid quantitation or enzymatic assays. Many absorbance assays use a chromogenic substrate, which, upon enzymatic conversion to the final product, results in a compound that will absorb light at a specific wavelength.

Absorbance assays are popular because of their ease of use, cost-effectiveness, and superior well-to-well reproducibility. Additionally, the color change associated with absorbance assays can help confirm the progression of the enzymatic reaction.

thermofisher.com/elisa
thermofisher.com/cytotoxicity
thermofisher.com/microplate-cell-viability

Luminescence microplate assays

Luminescence microplate assays utilize biochemical or chemical reactions to generate photons that are detected by a photomultiplier tube (PMT) or charge-coupled device (CCD) present within the plate reader.

Typically, the full spectrum of signal from luminescence assays is collected, and measurement is not restricted to particular wavelengths. Luminescence assays are desired because of assay sensitivity and the resulting large dynamic range.

thermofisher.com/luciferase

Colorimetric and fluorometric protein and peptide assays

We offer numerous colorimetric assays for detection and quantitation of total protein that can be utilized in both tube and microplate formats. Thermo Scientific™ Pierce™ protein assays provide exceptional accuracy, compatibility, and broad applicability that enable most laboratory protein samples to be quantitated with ease. We also offer easy-to-use colorimetric or fluorescent peptide assays that are designed specifically to improve the sensitivity and reproducibility of peptide mixture quantitation.

thermofisher.com/proteinassays

The pairing of the Varioskan LUX instrument with Thermo Scientific™ assay kits and reagents allows researchers to elucidate even the most intricate biological questions, with minimal effort needed for optimizing instrument settings or assay conditions. In particular, the Varioskan LUX instrument offers excellent capabilities to interrogate cellular viability and other cellular functions in 2D as well as 3D models.

Cell viability readouts can be performed on complex 3D cell structures using the Varioskan LUX multimode reader. For example, exposure of A549 lung 3D spheroids to gambogic acid results in a concentration and time-dependent cytotoxicity, which is easily measurable on this instrument using the Invitrogen™ CyQUANT™ Direct Cell Proliferation Assay. This assay allows for effective quantitation using microplate readers, but also simultaneous imaging of cell death using imaging platforms such as the Invitrogen™ EVOS™ M7000 Imaging System or the Thermo Scientific™ CellInsight™ CX7 High-Content Analysis (HCA) Platform.

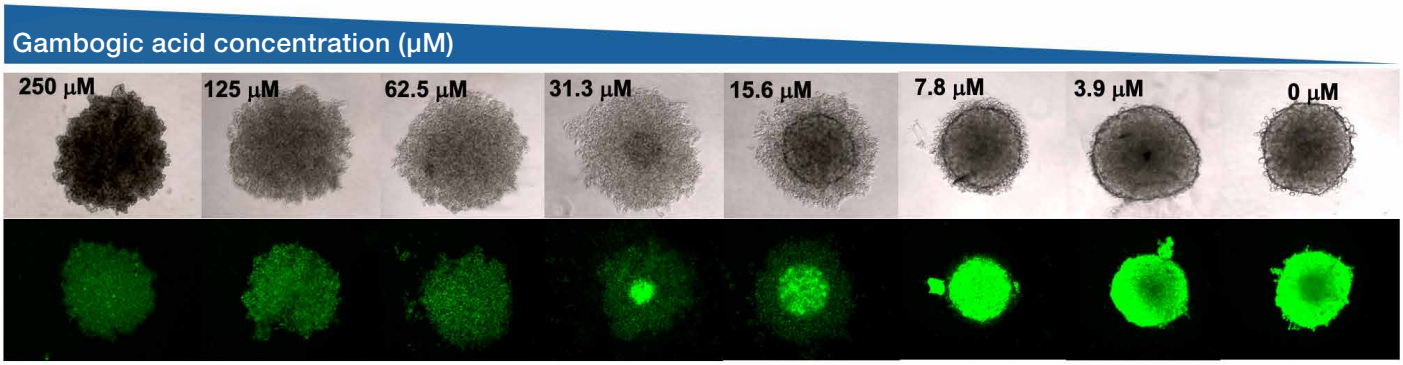

Figure 1. Measurement of A549 lung spheroids' viability using the Varioskan LUX instrument (top) and visualization of viable cells using the CellInsight CX7 HCA Platform (bottom). Spheroids were grown for 19 hours in Thermo Scientific™ Nunclon™ Sphera™ 96-well plates, and then stained with the CyQUANT Direct Cell Proliferation Assay. Green fluorescence, associated with living cells with high DNA content, was measured using bottom optics in the Varioskan LUX instrument (12 nm excitation bandwidth) and excitation/emission = 508/527 nm.

Microplates

Thermo Scientific™ Nunc™ cell culture plates

Choose from a wide selection of surface modifications and formats for a variety of 2D and 3D cell-based assays.

Thermo Scientific™ Nunc™ black and white polystyrene plates

Get optimal performance with minimal background and crosstalk between wells for maximal signal detection.

Thermo Scientific™ Nunc™ Edge™ plates

Minimize evaporation concerns for live cell assays with long incubations.

To find the Nunc plate that best suits your needs, go to **thermofisher.com/cellcultureplates**

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Ordering information

Description	Cat. No.
Multiskan FC Microplate Photometer	
Multiskan FC Microplate Photometer	51119000
Multiskan FC Microplate Photometer with incubator	51119100
Multiskan SkyHigh Microplate Spectrophotometer	
Multiskan SkyHigh Microplate Spectrophotometer	A51119500C
Multiskan SkyHigh Microplate Spectrophotometer with touchscreen	A51119600C
Multiskan SkyHigh Microplate Spectrophotometer with touchscreen and cuvette	A51119700C
Multiskan SkyHigh Microplate Spectrophotometer with touchscreen and µDrop Plate	A51119600DPC
Multiskan SkyHigh Microplate Spectrophotometer with touchscreen, cuvette, and µDrop Plate	A51119700DPC
Fluoroskan Microplate Fluorometer	
Fluoroskan Microplate Fluorometer, 100–240 V, 50/60 Hz	5200110
Fluoroskan Microplate Fluorometer, 100–240 V, 50/60 Hz, with one dispenser*	5200111
Fluoroskan Microplate Fluorometer, 100–240 V, 50/60 Hz, with two dispensers*	5200112
Luminoskan Microplate Luminometer	
Luminoskan Microplate Luminometer, 100–240 V, 50/60 Hz**	5300330
Luminoskan Microplate Luminometer, 100–240 V, 50/60 Hz, with one dispenser**	5300331
Luminoskan Microplate Luminometer, 100–240 V, 50/60 Hz, with two dispensers**	5300332
Fluoroskan FL Microplate Fluorometer and Luminometer	
Fluoroskan FL Microplate Fluorometer and Luminometer, 100–240 V, 50/60 Hz*	5200220
Fluoroskan FL Microplate Fluorometer and Luminometer, 100–240 V, 50/60 Hz with one dispenser*	5200221
Fluoroskan FL Microplate Fluorometer and Luminometer, 100–240 V, 50/60 Hz with two dispensers*	5200222
Varioskan LUX Multimode Microplate Reader	
Varioskan LUX Multimode Microplate Reader with fluorescence (top) and absorbance	VL0000D0
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, and luminescence	VL0L00D0
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and TRF	VL0L0TD0
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and AlphaScreen	VL0LA0D0
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, AlphaScreen, and TRF	VL0LATD0
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom) and absorbance	VLB000D0
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, and luminescence	VLBL00D0
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and TRF	VLBL0TD0
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and AlphaScreen	VLBLA0D0

Description	Cat. No.
Varioskan LUX Multimode Microplate Reader, continued	
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, AlphaScreen, and TRF	VLBLATD0
Varioskan LUX Multimode Microplate Reader with fluorescence (top) and absorbance, 1 dispenser	VL0000D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, and luminescence, 1 dispenser	VL0L00D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and TRF, 1 dispenser	VL0L0TD1
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and AlphaScreen, 1 dispenser	VL0LA0D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, AlphaScreen, and TRF, 1 dispenser	VL0LATD1
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom) and absorbance, 1 dispenser	VLB000D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, and luminescence, 1 dispenser	VLBL00D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and TRF, 1 dispenser	VLBL0TD1
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and AlphaScreen, 1 dispenser	VLBLA0D1
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, AlphaScreen, and TRF, 1 dispenser	VLBLATD1
Varioskan LUX Multimode Microplate Reader with fluorescence (top) and absorbance, 2 dispensers	VL0000D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, and luminescence, 2 dispensers	VL0L00D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and TRF, 2 dispensers	VL0L0TD2
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, and AlphaScreen, 2 dispensers	VL0LA0D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top), absorbance, luminescence, AlphaScreen, and TRF, 2 dispensers	VL0LATD2
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom) and absorbance, 2 dispensers	VLB000D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, and luminescence, 2 dispensers	VLBL00D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and TRF, 2 dispensers	VLBL0TD2
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, and AlphaScreen, 2 dispensers	VLBLA0D2
Varioskan LUX Multimode Microplate Reader with fluorescence (top and bottom), absorbance, luminescence, AlphaScreen, and TRF, 2 dispensers	VLBLATD2

* Includes PC software and filter pairs: Ex 355 nm/Em 460 nm, Ex 485 nm/Em 538 nm. Other filters are available upon request.

** Includes PC software. Luminometric filters are available upon request.

Find out more at **thermofisher.com/platereaders**

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