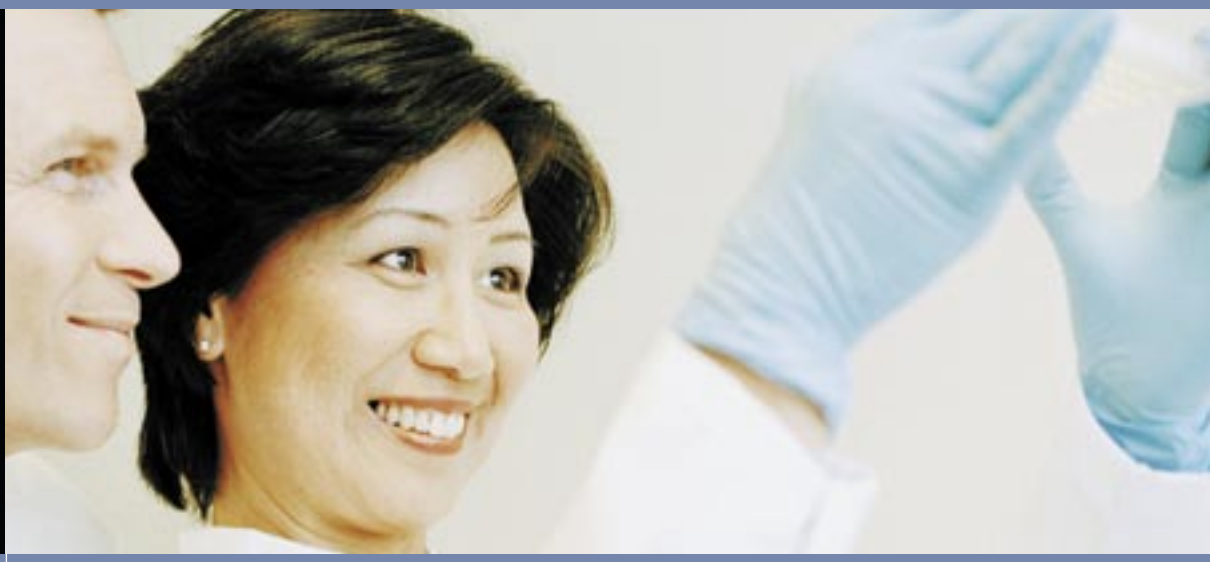
Product Catalogue 2004



Microplate Instrumentation

Analyze • Detect • Measure • Control™

Thermo ELECTRON CORPORATION

Contents

Microplate. Instrumentation. See for yourself.

Thermo Electron Corporation's Microplate Instrumentation Product Catalogue 2003-2004 shows you the full range of microplate instrumentation available from Thermo. We offer detection systems, liquid handling instruments and purification systems for scientists in the life science field.

You used to know us as Thermo Labsystems, a company with 25 year's experience in microplate instrumentation. As the producer of the first microplate reader, introduced in 1978, we are celebrating the 25th anniversary of our famous Multiskan microplate reader this year. During our years of experience, we have been continuously striving for the highest quality of products to offer the greatest reliability, the best results, and smart and convenient solutions for our customers.

Thermo Labsystems
Thermo CRS
Thermo Hybaid
Thermo Forma
Thermo Savant
Thermo IEC
and more than thirty other
Thermo business units

We are one Thermo

The Microplate Instrumentation business belongs to the Bioscience Technologies Division of Thermo. Bioscience Technologies offers solutions for

- sample preparation
- laboratory automation and integration
- controlled environment
- microplate instrumentation and
- laboratory consumables and pipetting

About Thermo Electron Corporation

A world leader in high-tech instruments, Thermo Electron Corporation helps life science, laboratory, and industrial customers advance scientific knowledge, enable drug discovery, improve manufacturing processes, and protect people and the environment with instruments, scientific equipment and integrated software solutions. Based in Waltham, Massachusetts, Thermo Electron has revenues of more than $2 billion, and employs appromimately 11,000 people in 30 countries worldwide.

Detection

Over the years Thermo has introduced a number of new products and technologies, including Multiskan® – the world's first microplate reader. Multiskan first became available 25 years ago, and today is part of our wide range of microplate detection systems, including photometers, fluorometers, luminometers and nephelometers.

www.thermo.com/microplate_instruments

New product

- Multiskan Spectrum

Fluoroskan Ascent®

The Fluoroskan Ascent sets the standard for performance, features and ease of use, for even the most demanding fluorometric applications, from detection of multiple analytes to FRET assays, for example.

High-performance optics

Based on a mirror and lenses, the direct illumination optics of the Fluoroskan Ascent produces a highly focused light beam. The sharp focus prevents crosstalk and ensures accurate readings. Two easy-to-select light beams allow the optimal choice for 1- to 96- and 384-well plates. The normal beam has a diameter of 3 mm in the sample, while the narrow beam is 1.5 mm in diameter. The easy-to-switch optical unit reads from the top or bottom of the plate. For cell biology applications, bottom reading allows closer proximity to cells and greater sensitivity. Black microplates and top reading eliminate crosstalk and reduce background signal, producing a better signal-to-noise ratio.

Simultaneous dispensing and measurement

Up to three dispensers can be fitted on board the Fluoroskan Ascent for Ca^{2+} measurement, enzyme kinetic studies, and other applications that require measurement immediately after reagent addition. The dispensers allow precise delivery of reagents over an adjustable volume range of 5 – 1000 µl.

On-board incubation and orbital shaking

To speed up reactions and improve assay performance Fluoroskan Ascent has a built-in incubator and orbital shaker. Both the speed and amplitude of shaking can be adjusted. The incubator is invaluable when it comes to cell biology, enzyme assays and other applications where temperature control is essential.

Convenient robotic integration

Robotic integration is simple and effective with the Fluoroskan Ascent. The plate carrier allows convenient access for the robotic arm, while Ascent Software is easy to integrate with robotic and HIS/LIMS systems. For high-volume testing, Fluoroskan Ascent can be combined with automated plate handling devices.

Easy-to-use Ascent Software®

Fluoroskan Ascent together with Ascent Software provide a system that performs well even with complicated and challenging applications and makes assay design easy. For further information about the features of Ascent Software, see pages 24–26.

Measurement of intracellular Ca^{2+} flux

Combined with the innovative dispenser system, the unique features of Ascent Software support intracellular Ca^{2+} measurement. To meet the critical requirements of time optimization, the instrument can dispense and measure simultaneously. Ascent Software is

Fluoroskan Ascent dispensers allow applications that require measurement immediately after reagent addition.

designed for flexible assay setup, allowing kinetic measurement of baseline fluorescence before addition of the active substance, and detection of the response, one well at a time.

Detection of multiple analytes

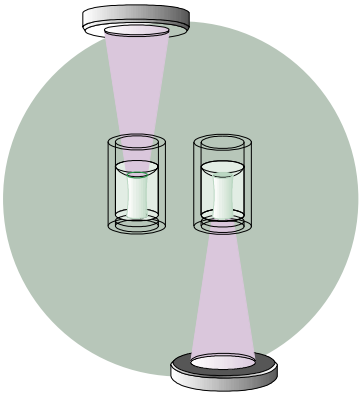
The detection of assays composed of combinations of several fluorochromes or fluorochromes and quenchers are demanding. For example, in molecular beacon assays labelled probes are used for the detection of single nucleotide polymorphism (SNP). After the amplification step the PCR plates or tubes can be measured directly in Fluoroskan Ascent using bottom reading with the caps on.

Many of these assays are based on Fluorescence Resonance Energy Transfer (FRET) where the energy from an excited fluorochrome is passed to another molecule without emitting photons.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is available for the Fluoroskan Ascent. For further information about the features of the IQ/OQ/PQ, see page 52.

Top reading for better signal-to-noise ratio



Bottom reading for cell biology assays

Technical Specifications

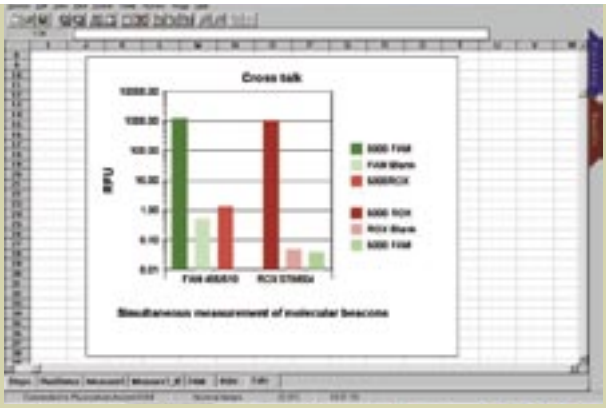
General specifications	
Plate types	1-, 6-, 12-, 24-, 48-, 96-, and 384-well plates, as well as Terasaki and PCR plates. Can also be programmed for custom configurations. Maximum dimensions 90 mm x 134 mm x 25 mm
Measuring speed	Minimum kinetic interval time 15 seconds for a 96-well plate
Shaker	Orbital; speed 60 – 1200 rpm, diameter 1 – 50 mm
Dispensers	1 to 3 dispensers
Dispensing volume	5 – 1000 µl in 1 µl increments
Dispensing speed	25 seconds per plate (96-well plate, 5 µl/well)
Incubator temperature range	From RT (25°C) +3°C to +45°C when ambient temperature is 25°C
Optical performance	
Light source	Quartz halogen lamp, 30 W
Detector	Photomultiplier tube
Excitation wavelength range	From 320 to 700 nm
Emission wavelength range	From 360 to 800 nm
Filters	High-quality interference filters. Both excitation and emission filter wheels hold a maximum of eight filters.
Excitation filters *)	320 nm, 355 nm, 390 nm, 430 nm, 440 nm, 444 nm, 485 nm, 530 nm, 544 nm, 578 nm, 584 nm, 646 nm Other filters available upon request
Emission filters *)	405 nm, 460 nm, 485 nm, 510 nm, 518 nm, 520 nm, 527 nm, 538 nm, 555 nm, 590 nm, 604 nm, 612 nm, 620 nm, 678 nm, 680 nm. Other filters available upon request
Theoretical sensitivity	2 fmol fluorescein/well in a black 96-well strip plate
Dynamic range	› 6 decades

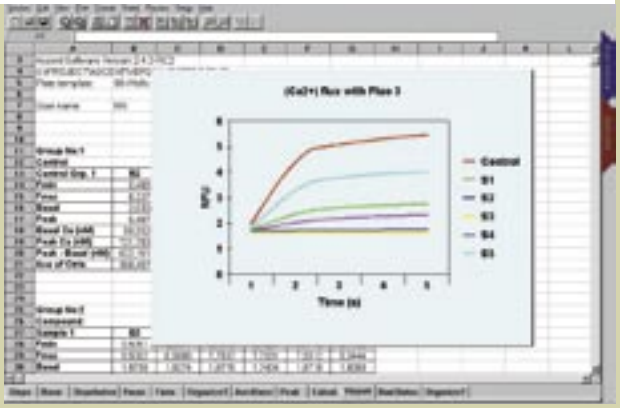
*) Standard instrument codes include two predefined filter pairs: Ex 355 nm/Em 460 nm, Ex 485 nm/ Em 538 nm. Additional filters should be specified when ordering.

Application areas of the Fluoroskan Ascent

- Ca^{2+} flux assays
- Cell proliferation
- Cytotoxicity
- Multi-drug resistance
- Cell adhesion
- DNA quantitation
- Reporter gene assays
- Hybridization assays
- Quantitation of PCR products
- FRET assays
- Molecular beacon assays
- Immunoassays
- Enzyme activity
- Neonatology
- Bacterial quantitation
- Phagocytosis
- Oligonucleotide assays**)

→ Ordering information on pages 54–55. **) Read more about Thermo's oligonucleotide products at **www.thermo.com/oligos**





Fluoroskan Ascent® FL

The Fluoroskan Ascent FL is a combination instrument equipped with both fluorometric and luminometric technologies. With on-board dispensers, an incubator and a shaker, this advanced reader is well suited to a wide range of fluorometric, glow and flash luminometric applications.

High-performance optics

The direct illumination optics of Fluoroskan Ascent FL produces the highly focused light beam for fluorometric measurements, preventing crosstalk and ensuring accurate readings. A choice of 3 mm and 1.5 mm beam diameter settings allows optimal readings of 1- to 96- and 384-well plates. High sensitivity is one of the main benefits of fiberless optics and a feature vital to luminometry. By adding filters, greater flexibility can be achieved for advanced luminometric applications.

On-board dispensers, incubator and shaker

With up to three reagent dispensers, an incubator and a shaker, the Fluoroskan Ascent FL provides full coverage for fluorometric and flash luminometric applications. Dispensing volumes can be adjusted in 1 µl increments over a volume range of 5 – 1000 µl. The system can dispense and measure simultaneously, which is essential for fast flash-type luminescence reactions, fluorometric Ca^{2+} measurements, and other fast kinetic applications.

Effective robotic integration

Specially designed for complete robot compatibility, the Fluoroskan Ascent FL can be used for high-volume tests. The plate carrier allows convenient access for different types of robotic arms, and Ascent Software enables easy integration with robotic and HIS/LIMS systems. To allow high-volume testing, Fluoroskan Ascent FL can be combined with automated plate handling devices.

Versatility for fluorometric and luminometric applications

Ascent Software for Fluoroskan Ascent FL is specially designed for fluorometric and luminometric applications. Both detection methods can even be used in one session for analyzing the same sample well. For example, a combination of fluorescent and luminescent reporter proteins, such as GFP and luciferase, can be used for the detection of two simultaneously present reporters. For further information about the features of Ascent Software, see pages 24–26.

Fluorometric DNA quantitation

Several fluorometric methods can be used to quantify DNA. PicoGreen, for example, is an ultrasensitive dye used for fast endpoint measurements of dsDNA in solution. Correspondingly, OliGreen is used for oligonucleotide and ssDNA quantitation. Cellular DNA can also be detected with a variety of fluorochromes, such as propidium iodide and ethidium homodimer. These dyes also indicate the viability of the cell population.

Bioluminescent aequorin detection

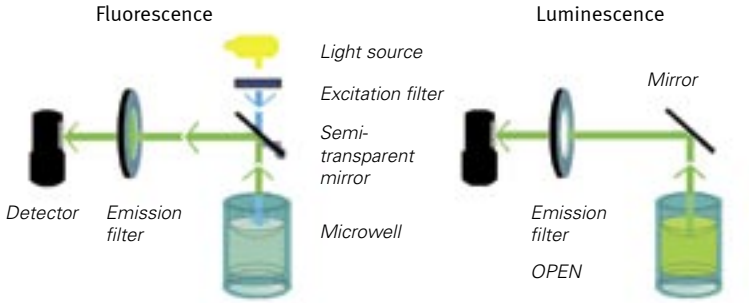
Aequorin and aequorin derivatives are used as labels in sensitive bioluminescence immunoassays and hybridization assays. In these procedures, the flash-type reaction of aequorin requires very fast monitoring of the signals produced. The Fluoroskan Ascent FL and Ascent Software support simultaneous dispensing and reading, enabling aequorin signals to be monitored from the start of the reaction.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is availbale for the Fluoroskan Ascent FL. For further information about the features of the IQ/OQ/PQ, see page 52.

Application areas of the Fluoroskan Ascent FL

- ATP detection
- Immunoassays
- Reporter gene assays
- DNA quantitation
- Hybridization assays
- Quantitation of PCR products
- FRET assays
- BRET and BRET^2 assays
- Molecular beacon assays
- Ca^{2+} flux assays
- Cytotoxicity
- Cell proliferation
- Cell adhesion
- Bacterial quantitation
- Phagocytosis
- Enzymatic activity
- Oligonucleotide assays***)



Technical Specifications

General specifications	
Plate types	1-, 6-, 12-, 24-, 48-, 96-, and 384-well plates, as well as Terasaki and PCR plates. Can also be programmed for custom configurations. Maximum dimensions 90 mm x 134 mm x 25 mm
Measuring speed	Minimum kinetic interval time 15 seconds for a 96-well plate
Shaker	Orbital, speed 60 – 1200 rpm, diameter 1 – 50 mm
Dispensers	1 to 3 dispensers
Dispensing volume	5 – 1000 µl in 1 µl increments
Dispensing speed	25 seconds per plate (96-well plate, 5 µl/well)
Incubator temperature range	From RT (25°C) +3°C to +45°C when ambient temperature is 25°C
Fluorometric specifications	
Light source	Quartz halogen lamp, 30 W
Detector	Photomultiplier tube
Excitation wavelength range	From 320 nm to 700 nm
Emission wavelength range	From 360 nm to 670 nm (optional from 360 nm to 800 nm)
Filters	High-quality interference filters. The excitation filter wheel can hold a maximum of eight filters, and the emission filter wheel can hold a maximum of six filters.
Excitation filters *)	320 nm, 355 nm, 390 nm, 430 nm, 440 nm, 444 nm, 485 nm, 530 nm, 544 nm, 578 nm, 584 nm, 646 nm **) Other filters available upon request
Emission filters *)	405 nm, 460 nm, 485 nm, 510 nm, 518 nm, 520 nm, 527 nm, 538 nm, 555 nm, 590 nm, 604 nm, 612 nm, 620 nm, 678 nm **), 680 nm **). Other filters available upon request
Theoretical sensitivity	2 fmol fluorescein/well in a black 96-well strip plate
Dynamic range	› 6 decades
Luminometric specifications	
Detector	Photomultiplier tube
Spectral range	From 270 nm to 670 nm
Theoretical sensitivity	5 fmol ATP/well (typical), ATP Monitoring Kit
Dynamic range	› 9 decades over whole gain setting area

*) Standard instrument codes include two predefined filter pairs: Ex 355 nm/Em 460 nm, Ex 485 nm/Em 538 nm. Additional filters should be specified when ordering.

**) Only with wide wavelength range PMT

→ Ordering information on pages 54–55. ***) Read more about Thermo's oligonucleotide products at **www.thermo.com/oligos**

Luminoskan Ascent®

The state-of-the-art Luminoskan Ascent is one of the most sophisticated and flexible microplate luminometers on the market.

Excellent sensitivity for 1- to 384-well plates

The high-performance fiberless optics enable measurement sensitivity of less than 1 fmol of ATP per well, and the dynamic range of Luminoskan Ascent covers more than nine decades. For maximum versatility and flexibility, Luminoskan Ascent reads a range of different plate formats, from 1- to 384-well plates.

Simultaneous dispensing and measurement

For easy and accurate addition of reagents, up to three dispensers can be fitted on-board. These dispensers allow precise delivery of reagents over an adjustable volume range of 5 – 1000 µl. For assays requiring sensitive temperature control, the Luminoskan Ascent has an on-board incubator. Orbital shaking with adjustable speed and diameter ensures effective mixing and speeds up reaction times.

Easy-to-use Ascent Software

Powerful Ascent Software allows easy assay optimization, flexible data handling and convenient report formatting. For flash luminescence reactions performed with acridinium esters or aequorin, for example, Ascent Software supports simultaneous reagent injection and signal monitoring. The ability to add reagents and take readings in any order allows for multiphase ATP and reporter gene assays. For further information about Ascent Software, see pages 24–26.

Effective robotic integration

Luminoskan Ascent is an ideal instrument for high-volume testing, such as high-throughput screening. Luminoskan Ascent has been designed for complete robot compatibility, with plate carriers allowing access for different types of robotic arms with easy integration of Ascent Software with any robotic and HIS/LIMS system.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is availbale for the Luminoskan Ascent. For further information about the features of the IQ/OQ/PQ, see page 52.

Luminoskan Ascent dispensers allow simultaneous dispensing and measurement.

Application areas of the Luminoskan Ascent

When combined with Ascent Software, Luminoskan Ascent works well for all luminescent applications.

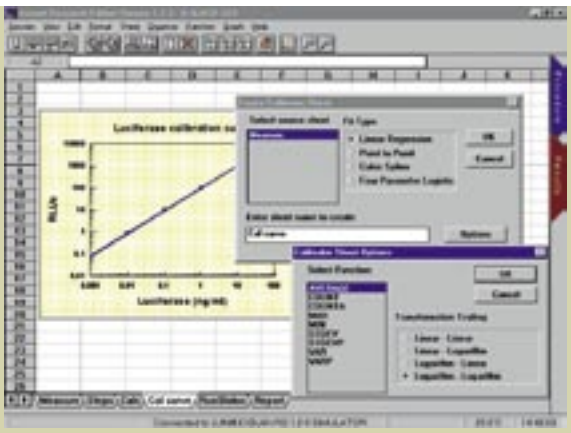
- **Reporter gene assays**
  Eukaryotic luciferase gene activity
  Prokaryotic bacterial luciferase gene activity
  Promega Dual-Luciferase Assay
  Gene activities with luminescent substrates
- **Immunoassays with luminescent substrates**
  Alkaline phosphatase, horseradish peroxidase, and others
- **Cytotoxicity and cell proliferation assays**
  MIC, EC, ATP assays
  Growth inhibition assays
- **Intracellular Ca^{2+} assays**
  Aequorin loading assays
- **ATP assays**
  Biomass assays
- **DNA quantitation**
  Biotin/streptavidin-linked chemiluminescent assays
- **Phagocytosis assays**
- **Reactive oxygen assays**
- **Microbiological assays**
  Antibiotic sensitivity testing
  Hygiene monitoring assays
- **Enzyme assays**
  Connected assays via ATP
  Assays with chemiluminescent substrates
- **BRET and $BRET^2$ assays**

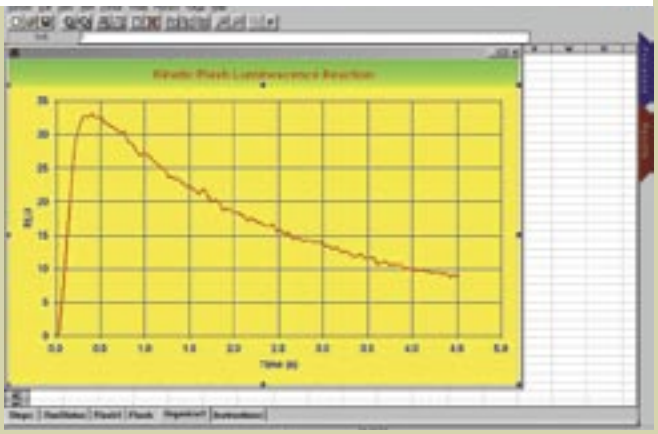
Technical Specifications

Weight	Basic unit 21 kg. Optional 3 dispensers add 3.5 kg
Overall dimensions	420 mm (W) x 420 mm (D) x 340 mm (H), options included
Operating conditions	+10°C to +40°C, relative humidity 90% max.
Warm-up time	‹ 15 min to rated accuracy
Detector	Photomultiplier tube (PMT)
Spectral response	270 – 670 nm
Measurement range	0.0001 – 5000 Relative Light Units (RLU)
Gain	User-changeable (300 – 1000 V)
Plate types	1-, 6-, 12-, 24-, 48-, 96-, 384-well plates. Can also be programmed for non-standard configurations. Maximum dimensions 90 mm x 134 mm x 25 mm
Measuring speed	Minimum measurement time for 96- well plate, 15 s
Typical sensitivity	‹ 1.0 fmol ATP/well with white 96-well plate
Dynamic range	› 9 decades over whole gain setting area
Shaker	Orbital method, speed 60 – 1200 rpm, ø 1 – 50 mm
Incubator	From RT (25°C) +3°C to +45°C when ambient temperature is 25°C
Dispensers	Optional 1–3 dispensers. Dispensing volume 5 – 1000 µl in 1 µl increments; accuracy: ±3 µl avg., and precision: 5 – 15 µl, ‹ 5%, 20 – 1000 µl, ‹ 2%. Dispensing speed: 25 s, 96-well plate, 5 µl/well

→ Ordering information on pages 54–55.

DLReady™





Cellular Assay Workstation

Thermo provides a whole platform for automation of cellular assays used in secondary screening of drugs in the drug discovery path. The CytoPro and Vitotox assay kits are used in toxicity assays either with the Cellular Assay Workstation or on their own.

The Cellular Assay Workstation is a complete platform for a series of workstations for different applications. The solution offers the possibility to run optimized and verified screening assays without time consuming assay development; therefore, saving lots of time and money.

The Cellular Assay Workstation includes:

- Thermo Luminoskan Ascent
- Thermo CataLyst Express
- Thermo Barcode Reader
- Thermo POLARA software
- Automatic liquid handler for sample preparation
- Robotic CO_2 Incubator

Cellular Assay Workstation features

The Cellular Assay Workstation is a smaller-scale turnkey HTS system for cellular assays. It carries out automatic sample and reagent pipetting, dispensing, incubation and readout, as well as automatic data collection and result calculation. The workstation is easily modified to perform different cellular assays, and has ready-made solutions for the following two toxicity assays: CytoPro, and Vitotox.

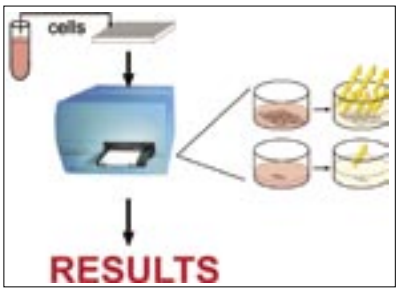
CytoPro

The CytoPro assay kit is a homogeneous assay based on ATP bioluminescence for cytotoxicity and cell proliferation studies with mammalian cell lines.

A turnkey solution for the Cellular Assay Workstation

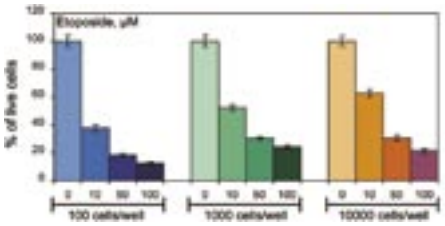
Assay principle

The CytoPro assay kits use changes in the total ATP content of the cell as a marker for the cytotoxicity or proliferation. When the ATP content of the cells is decreased by the sample, a cytotoxic effect has occurred, or when the ATP content is increased, a proliferation has occurred. The ATP content of the cells is measured using chemical cell lysis and a following luminescent ATP assay.



Benefits of the assay

The CytoPro assay kits can be used both in 384- and 96-well formats, and the addition of only one reagent is required, after the appropriate treatment of cells, prior to measuring the light intensity. The assay fulfills all needs for HTS screening assays; it is homogeneous, fast and tolerant to interference. The extra benefit of the assay is that a very low number of cells is required, no harmful chemicals are used in the assay and any common cell line (including both adherent and suspension cells) can be used as a test organism.

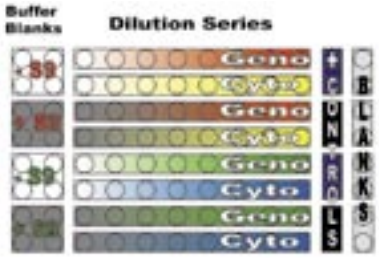


→ Ordering information on pages 54–55.

Vitotox® System

Vitotox is a high-throughput bioluminescent assay that offers a unique method for rapid and cost effective geno- and cytotoxicity screening.

A turnkey solution for the Cellular Assay Workstation



96-well layout for the Vitotox test

Unique assay principle

The Vitotox assay is a *Salmonella typhimurium* test that uses the light emission of bacteria to detect the genotoxicity, cytotoxicity and mutagenic potency of the sample. It is used for the detection of genetic damage caused by the chemical in pharmaceutical, cosmetic, environmental, etc., research. The assay is based on a reporter gene system where luciferase activity is used as a function of the genotoxicity. Luciferase expression is activated via a cascade of reactions known as the SOS response.

Benefits of the assay

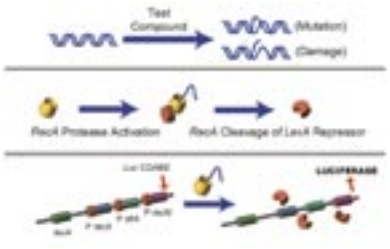
The entire DNA content of the cell functions as a target for the genotoxin to display its effect. Therefore, only a few micrograms of the sample is normally required for the assay.

A cytotoxicity assay is also performed together with each sample to prevent false positive and negative results.

No cell growth is required for the genotoxicity detection, resulting in very short assay times.

The test uses a simple "mix and measure" procedure: the compounds are pipetted into 96- or 384-well microplates as a dilution series along with blanks, positive control samples, and with or without S9 metabolic extract. The cultured test bacteria are added and the light emission is followed over a three-hour assay period.

Correlation with traditional genotoxicity assays is exceptionally good.

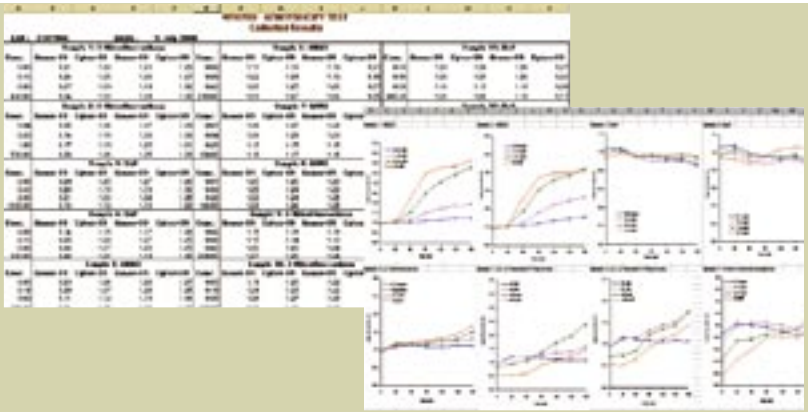


General principle of SOS induction. Derepression of the RecN gene is followed by placing a Lux reporter system under transcriptional control of the RecN promoter.

ATP Assay Products

Thermo's Quantitative ATP Monitoring Kit is used for measuring free ATP concentrations. Using the bioluminescence technique, the monitoring kit measures ATP in bacterial, plant or mammalian cells, as well as tissue samples over a concentration range of 10^{-11} to 10^{-6} moles per liter. This kit also enables any enzyme or substrate that can be coupled to the production or consumption of ATP to be measured quantitatively. The assay can be freely used with any cells and cell lysis reagents. It is convenient, rapid and reproducible, with results available in just minutes. Individual assay components are also available for those researchers who only have very few samples.

→ Ordering information on pages 54–55.



New

Multiskan® Spectrum

Multiskan Spectrum replaces separate spectrophotometers and microplate reading instruments providing both functions in one convenient, compact instrument.

Simultaneous use of cuvettes and microplates

The Multiskan Spectrum is truly two instruments in one, combining both cuvette reading capabilities and advanced microplate reading in one convenient, compact instrument. You can easily take quick absorbance measurements in a cuvette between the cycles of a microplate enzyme kinetics experiment. Additionally, you can use the cuvette port to optimize enzyme kinetics conditions before transferring kinetic protocols to microplate format. You can also scan the absorbance spectrum of a new dye in a cuvette to determine the optimum wavelength for microplate assays.

Versatile microplate and cuvette formats

For maximum flexibility, Multiskan Spectrum accepts all microplate formats from 6 to 384 wells, as well as cuvettes from standard to ultra-micro capacities in glass, plastic, or quartz. You can take multiple photometric readings per well on large format plates, or single measurements requiring just 30 µl in 384-well plates.

Scanning range of 200 – 1000 nm

The built-in monochromator makes it simple to select any wavelength from 200 nm to 1000 nm in 1 nm steps without ever changing a filter. Sample absorbances can be scanned over the whole spectrum either in microplates or cuvettes.

Two cuvette ports, for sample and reference

For better long-term stability, the cuvette reader is dual beam, with both sample and reference beams. This feature enables scanning of the sample spectrum with simultaneous subtraction of the blank spectrum. Additionally, in kinetic assays the blank is automatically subtracted from the sample absorbance at each measurement.

Incubator for microplates and cuvettes

For enzyme assays both the microplate chamber and the cuvette holders are temperature controlled up to 45°C. Additionally, PTFE coated stir fleas can be used in a cuvette during incubation to keep samples at a uniform temperature during enzyme kinetics studies.

Flexible software

Typical applications of the Multiskan Spectrum

- **UV/Visible spectrophotometry**
- **Spectrum scan**
- **Nucleic acid analysis**

  RNA concentration (A_{260})
  ssDNA concentration (A_{260})
  dsDNA concentration (A_{260})
  DNA purity (A_{260}/A_{280})
- **Enzyme kinetics**

  E.g., V_{max} and K_m
- **Protein analysis**

  Biuret protein determination
  Bradford protein determination
  BCA protein determination

Multiskan Spectrum Software supports analysis of both endpoint and kinetics assays. Custom-made protocols with comprehensive data reduction and quality control features can be created with the software. In addition, the data generated can easily be saved in text format and imported into MS Excel for customized data handling.

For various photometric assays

With its high optical performance, low UV capability and versatile plate formats, Multiskan Spectrum is well suited to laboratory applications where accuracy and flexibility are essential. As compared to other techniques, Multiskan Spectrum can read the native absorbances of DNA, RNA and proteins without the need of sample derivatization. Accurate absorbance measurements for naturally narrow peaks, such as DNA at 260 nm, are ensured by the narrow optical bandpass of just 2 nm. Multiskan Spectrum can perform both qantitation (e.g., A_{260}, A_{260}–A_{320}) and purity assessments (A_{260}/A_{280}) of nucleic acids and protein in microplate format. With the pathlength correction function, the results obtained using the microplate can be directly compared with data from any spectrophotometer.

Flexible robot integration

Multiskan Spectrum software has a special remote control interface for automation use, which enables easy integration with robotics and HIS/LIMS systems. The plate carriers allow both portrait and landscape gripping of the plate.

IQ/OQ/PQ

An instrument qualification IQ/OQ/PQ package is available for the Multiskan Spectrum. The package includes the IQ/OQ/PQ Protocol Book (page 52) and the Verification Plate for performance qualification (page 27). For your convenience, the verification plate can be ordered as a separate tool (pages 54–55).

Technical Specifications

Performance	
Wavelength range	200 – 1000 nm
Read-out range	0 – 4 Abs
Linearity	0 – 3 Abs, ± 2%
Accuracy	± 1% or ± 0.005 Abs (0 – 2 Abs) ± 2.0% (2 – 3 Abs)
Precision	CV ‹ 1% (0 – 2 Abs) CV ‹ 2% (2 – 3 Abs)
Optical bandpass	2 nm
Wavelength accuracy	± 1 nm
Stray light	‹ 0.02% at 230 nm
General Specifications	
Microplate types	6-, 12-, 24-, 48-, 96- and 384-well plates
Cuvette types	Two cuvettes, for sample and reference From standard (3 ml) to 50 µl; glass, plastic or quartz
Wavelength selection	Tunable monochromator, 200 – 1000 nm in increments of 1 nm
Light source	10 W Xenon flash lamp
Detectors	Photodiodes
Incubator temperature range	Ambient (+25°C) +4°C to 45°C
Mains input	100 – 240 V (50/60 Hz) autoranging
Power consumption	200 VA
Dimensions	397 mm (W) x 217 mm (H) x 450 mm (D) [15.6" (W) x 8.5" (H) x 17.7" (D)]
Weight	12.5 kg (27.5 lbs.)
System Requirements	
Hardware	Intel Pentium processor 300 MHz, 64 MB RAM 4 GB free hard disk Mouse RS232 interface Parallel printer
Operating system	Windows 2000 or Windows NT

→ Ordering information on pages 54–55.

Multiskan Ascent®

Multiskan Ascent is capable of reading 96- and 384-well plates with outstanding accuracy, precision, linearity and speed. The ease of robotic integration makes the Multiskan Ascent ideal for high-volume testing.

Class-leading accuracy, precision and linearity

Multiskan Ascent is suited to kinetic and end point measurements in the spectral range of 340 to 850 nm. The patented single channel technology of the Multiskan Ascent ensures excellent precision, accuracy and linearity. With 96-well plates Multiskan Ascent is linear up to 4 absorbance units, and with 384-well plates up to 3 absorbance units, assuring reliable results even from the most highly concentrated samples.

Reliability from well to well, plate to plate

Multiskan Ascent provides very low intra- and interplate variation. Measurements have excellent consistency across all wells, and no bias is observed as a result of curves being set up from different parts of the plate or between two separate plates. Good correlation is also observed between two different experiments using the same group of compounds (low inter-assay variation).

Ascent Software or internal software

Ascent Software is now supplied free of charge with the purchase of the instrument. The open assay setup and comprehensive data handling of Ascent Software enable various research applications. Please read more about Ascent Software on pages 24–26.

With the internal software, assay programming is made easy by sequential question-and-answer style data entry. For data handling, a wide range of quantitative curve fit types and qualitative cut-off equations are available together with transformation and extrapolation capabilities. Scaling, validation, quality control and controlled access of the software make the internal software even more functional. Up to 100 assay protocols and 50 assay results can be saved in the internal memory.

Rapid measurements and high-volume testing

It only takes 20 seconds to measure a 384-well plate and only 9 seconds to measure a 96-well plate. Thanks to its simple robotic (or HIS/LIMS) integration, Multiskan Ascent is ideal for high-volume testing. Using automated plate handling devices, walkaway reading capacity can easily be increased.

Optional incubator

An optional incubator can be included for assays requiring temperature control and this can heat samples up to 50°C.

Optional floppy disk station

To facilitate saving protocols or test results, or to transfer them from the internal software to a computer, Multiskan Ascent can include a floppy disk station. Data is stored in ASCII format, and is easily handled in MS Excel, for example.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ package is availbale for the Multiskan Ascent. The package includes the IQ/OQ/PQ Protocol Book and the Verification Plate for performance qualification. For your convenience, the Verification Plate can be ordered as a separate tool. For further information on the features of the IQ/OQ/PQ, see page 52, and for features of the Verification Plate, see page 27.

Multiskan Ascent applications

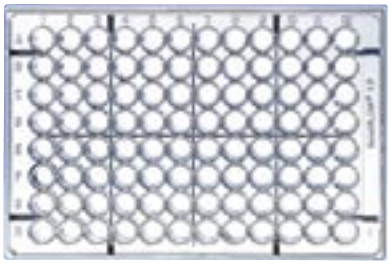
- immunoassays
- protein assays
- growth curves and hormones
- hybridization assays
- minisequencing assays
- cytotoxicity
- cell proliferation
- cell adhesion
- signal transduction
- enzyme assays
- endotoxins
- antioxidants
- food diagnostics

Technical Specifications

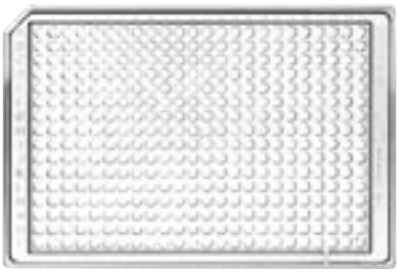
Wavelength range	340 nm – 850 nm, 3 filters now free of charge. The filter wheel can hold a maximum of eight filters.*)	
Linearity (96-well plate)	0 – 4 Abs, ± 2% with stepping mode 0 – 3 Abs, ± 2% with stepping mode at 340 nm and 405 nm 0 – 3 Abs, ± 2% with continuous mode	
Linearity (384-well plate)	0 – 3 Abs, ± 2% with stepping mode 0 – 2 Abs, ± 2% with continuous mode	
Read-out range	0 – 6 Abs	
Accuracy	± 1% or 0.003 Abs, whichever is greater (0 – 2 Abs) ± 2% (2 – 3 Abs)	
Precision	CV ‹ 0.2% (0.3 – 3 Abs), CV ‹ 1.0% (3 – 4 Abs) stepping mode CV ‹ 0.2% (0.3 – 2 Abs), CV ‹ 0.4% (2 – 3 Abs) stepping mode, 340 nm CV ‹ 0.3% (0.3 – 2 Abs), CV ‹ 1.0% (2 – 3 Abs) continuous mode CV ‹ 0.3% (0.3 – 2 Abs), CV ‹ 1.5% (2 – 3 Abs) continuous mode, 340 nm	
Resolution	0.001 Abs	
Measurement time	Continuous mode	9 s/96-well plate 20 s/384-well plate
	Stepping mode	14 s/96-well plate 42 s/384-well plate
Light source	Tungsten halogen lamp 6V/10 W	
Filters	Eight-position filter wheel Half bandwidth (HBW) 3 – 9 nm Wavelength accuracy ± 2 nm	
Detector	One silicon photo detector	
Optional incubator	Temperature range ambient +4°C to +50°C Uniformity ± 0.8°C across the plate	
Shaking	Linear shaking, 3 speeds	

*) Filters should be specified when ordering

→ Ordering information on pages 54–55.



Multiskan Ascent reads both 96- and 384-well plates.



Multiskan® EX

Multiskan EX is a basic microplate photometer for end point and kinetic assays, especially adapted for EIA applications. Multiskan EX has now been extended with the powerful Ascent Software and 3 filters free of charge.

25 years of Multiskan

Multiskan was the world's first microplate reader, developed to meet the needs of laboratories around the world. 25 years later, after continuous development, Multiskan is still the world's most used microplate photometer, thanks to its ease of use and reliability.

Exceptional reliability and extended 3-year warranty

With over 25,000 units serving laboratories worldwide, Multiskan has earned a global reputation as the most reliable microplate photometer available. For this reason, Thermo offers a 3-year extended warranty for Multiskan EX.

Proven optical system

The optical performance of Multiskan EX meets the requirements of current EIA technology, offering a linear measurement range of up to 2.0 absorbance units. Any other colorimetric assays that require detection in the visible range, from 400 nm to 750 nm, can be determined with the Multiskan EX. The proven optical system of Multiskan ensures accurate results and long-lasting reliability. Maintenance requirements are minimal.

Rapid measurement

Multiskan takes just 5 seconds to read a whole 96-well plate, giving a surprisingly low-noise reading.

Ascent Software free of charge

Ascent Software is now supplied free of charge with the purchase of the instrument. Ascent Software broadens Multiskan EX´s range of applications and data handling ability. Please read more about Ascent Software on pages 24–26.

Multiskan EX internal software

The flexible cut-off calculations and curve fit algorithms of the internal software give Multiskan EX flexibility for data manipulation in various diagnostic applications. Additionally, you can save up to 64 assay protocols in the internal memory and recall them with "quick buttons".

Multiskan 25 years

Performance verification

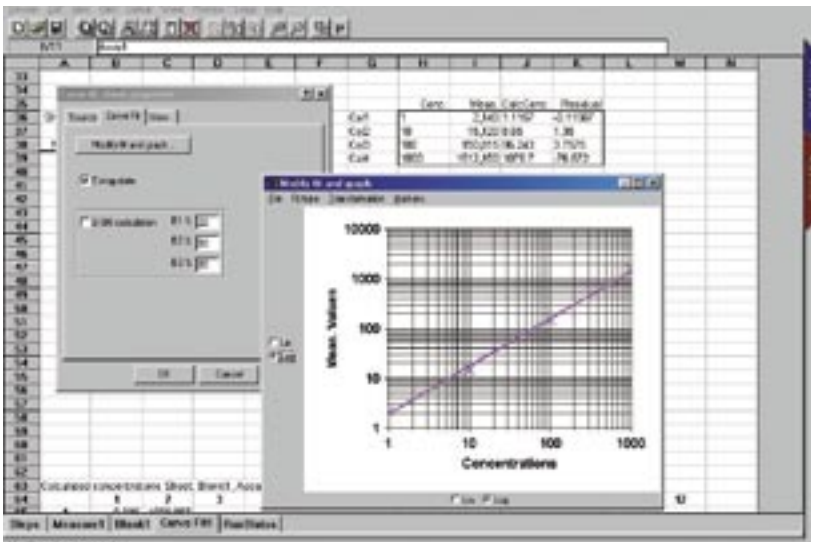
The on-board self-diagnostic routines assure proper instrument operation. To enable GLP verification of instrument performance, a Multiskan Verification Plate is available for the Multiskan EX (see page 27).

Technical Specifications	
Optical specifications	
Spectral range	400 – 750 nm, 3 filters included free of charge: 405 nm, 450 nm, 620 nm. The filter wheel can hold a maximum of eight filters.*
Linearity	0 – 2.0 Abs, ± 2% at 405nm
Read-out range	0 – 3.5 Abs
Accuracy	± 2% or 0.007 Abs, typical value ± 1% (0 –2.0 Abs) at 405 nm
Precision	CV ‹ 0,5% (0,3 – 1,5 Abs), CV ‹ 1.0% (1,5 – 2 Abs) at 405 nm
Resolution	0.001 Abs
General Specifications	
Filters	Up to 8 filters can be installed into the filter wheel
Measurement time	5 s/96-well plate
Shaking	Linear shaking, 3 speeds
Detector	Semiconductor photodiode
Interface connections	Serial RS-232 interface Parallel interface

* Additional filters should be specified when ordering.

→ Ordering information on pages 54–55.

The powerful Ascent Software extends Multiskan EX with comprehensive data handling.



Nepheloskan Ascent®

Nepheloskan Ascent is the first nephelometer adapted to measure from microplates. Accurate measurement of light scattering from microwells makes the Nepheloskan excellent for assays requiring detection of particles from low-volume samples. Nepheloskan is ideally suited for high-throughput solubility tests of drug compounds in the ADME phase of drug discovery.

Ultra-sensitive detection of particles

Nepheloskan Ascent has a dedicated optical system to measure light scattering of samples in microplate format, allowing excellent sensitivity in particle determinations. A detection limit (theoretical sensitivity) as low as 1.0 ng/ml can be obtained with the Nepheloskan when the diameter of the particles is approximately the same as the wavelength of the incident light (580 – 630 nm).

No color interference

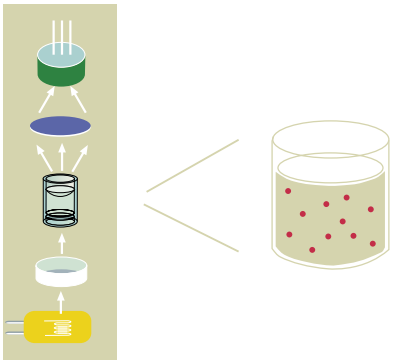
As scattered light is measured instead of absorbance, colored and organic compounds do not interfere with the measurement, thus avoiding the risk of false positives. The signal-to-noise ratio has been shown to be 10 – 50 times higher with the Nepheloskan Ascent than with photometers.

Adjustable sensitivity

Nepheloskan Ascent allows you to raise the detection limit should your samples require, e.g., samples with very small particles or a blue-greenish suspension. This can easily be done with the powerful Ascent Software by increasing the photomultiplier tube or/and lamp gain, which both dramatically increase the sensitivity and dynamic range of the instrument.

Incubator, orbital shaker and optional dispenser

The incubator and adjustable orbital shaker provide added advantages for studying factors that affect the solubility of pharmaceutical components.



The Nepheloskan Ascent has a highly sensitive optical system for detection of particles. A light source and an optical unit filter direct a focused light beam to the sample in the microwell. Another optical unit above the microplate allows only scattered light (angle about 30°) to pass towards the detector.

Minimal sample size

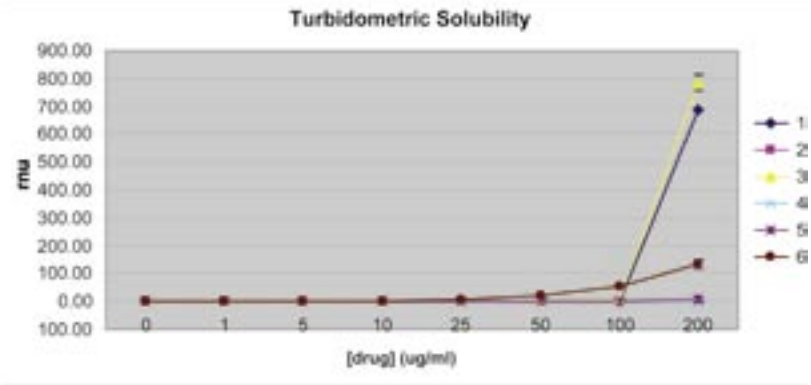
With the microplate format, several samples can be run simultaneously and only small quantities of compounds are needed, saving time and sample compared to conventional methods. The Nepheloskan Ascent measures 96 wells in only 18 seconds; thus measurement of 1000 samples takes just over 3 minutes.

Easy robotic integration

Specially designed for complete robot compatibility, the Nepheloskan Ascent can be used for high-volume tests. The plate carrier allows convenient access for different types of robotic arms, and Ascent Software enables easy integration with robotic systems.

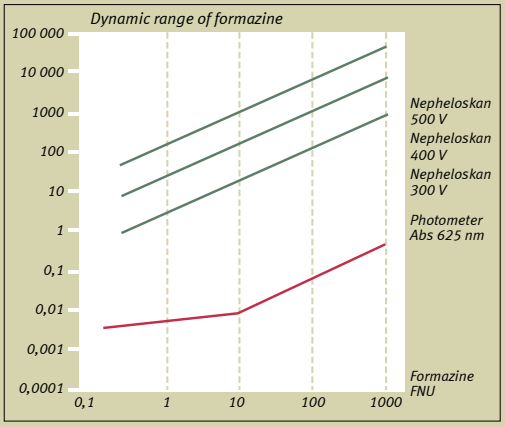
Technical Specifications	
Plate type	96-well plate
Light source	Quartz halogen lamp
Detector	Photomultiplier tube
Spectral response	580 – 630 nm
Measurement angle	Approx. 30°
Measurement speed	Minimum 18 s/plate depending on settle delay time
Shaker	Orbital method, speed 60 – 1200 rpm, diameter 1 – 50 mm
Temperature range	From RT (25°C) +3°C to +45°C when ambient temperature is 25°C
Dispenser	One dispenser as an option
Dispensing volume	5 – 1000 µl in 1 µl increments
Recommended assay volume	300 µl per well in Microtiter 96-Well Plates

→ Ordering information on pages 54–55.



Drug solubility test: a drug compound in DMSO solution is added to a microplate well containing deionized water or buffer, and after mixing, the turbidity is measured with Nepheloskan Ascent. One can easily see the precipitates (compounds) upon visual inspection as shown in this study.

Calibration: Nepheloskan Ascent is calibrated using NIST calibration standards, latex beads, which are first calibrated against the primary standard, a formazine suspension. The figure also shows the high sensitivity of the Nepheloskan as compared to a photometer.



Ascent Software®

Windows-based Ascent Software is designed to power all Thermo´s Ascent microplate research instruments. Whichever Ascent microplate instrument you use, the highly visual Ascent Software always looks the same, providing familiar and flexible control.

Clear and easy-to-follow approach

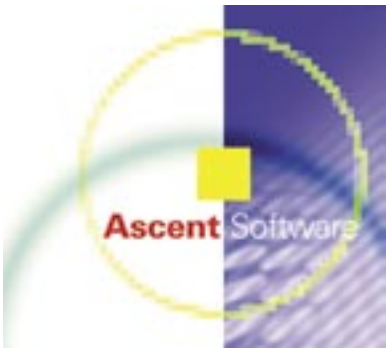
Ascent Software is divided into two major desktops – the Procedure and the Results Desktop. The Procedure Desktop is designed to control the instrument and it also allows easy arrangement of assay steps. The Results Desktop, which is a special spreadsheet environment, offers numerous options for specific data handling and graph formulation.

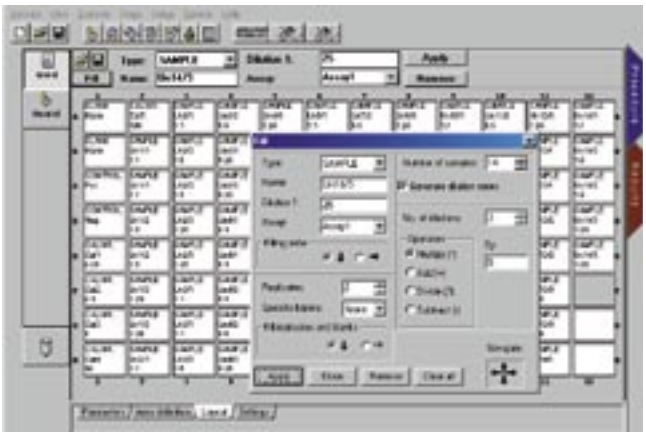
Highly visual assay setup

The assay procedure is created in the Procedure Desktop. The step properties can be modified to meet the needs of the application. Assay procedure steps, such as measure, dispense, shake, incubate, save/load, dispense and measure, print, as well as customized pause steps, are set with the drag-and-drop technique. The desired steps are selected from the on-screen toolbox and moved to the assay steplist. The steps can be customized for assay optimization and execution specified for individual or multiple wells. The steps can also form loops that can be completed for the defined target area before moving on to the next step. Multiple plate processing is time saving and cost effective when the calibrators are defined on the first plate, and then used to calibrate subsequent plates, which contain only samples.

Effective robotic integration

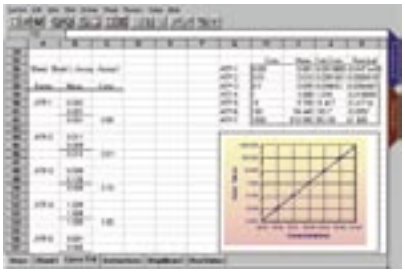
User-friendly robotic integration is simple and effective. Ascent Software enables easy integration with robots, and with HIS/LIMS systems. The execution of predefined assays can be controlled remotely by changing files between Ascent Software and the host system. This application is fully independent of the operating or network system used to control the computer.





Automatic data processors

Easy-to-use results handling, such as curve fit, qualitative cut-off and a wide selection of kinetic processors, make data handling truly user-friendly. Measurement data can also be precalculated prior to obtaining the required curve fit or qualitative analysis. User-defined sheets allow limitless flexibility for further calculations and customized report formatting.



Quantitative curve fit

Testing the suitability of various curve fits (linear regression, 2nd to 4th degree polynomials, point to point, cubic spline and several types of four parameter logistics) and changing them to meet the specific needs of an application is simple. As you change the fit type and transformation, you can immediately see the results of the curve fitting. Options as to what will be printed on the report can be selected from the curve fit sheet.

Effective kinetic processors

In kinetic measurements, 11 different processors, such as average rate, maximum rate, time to maximum rate and time to change, can be selected depending on the assay's needs. These processors calculate the measurement data to separate spreadsheets, and the calculations best suited for the assay can be processed further.

Qualitative cut-off

Automatic calculation of cut-off according to user-defined limits and interpretations is straightforward. Cut-off can also be added to the curve fit sheet, and the user can define up to 4 limits to the cut-offs with their individual interpretations.

Features by Instrument	Fluoroskan Ascent FL	Fluoroskan Ascent	Luminoskan Ascent	Multiskan Ascent	Multiskan EX	Nepheloskan Ascent
Template editor for different plate sizes	yes	yes	yes	yes	no	yes
Measurements						
Multipoint measurements	yes	yes	yes	no	no	no
Single	X	X	X	X	X	X
Dual	X	X	X	X	X	
Kinetic	X	X	X	X	X	X
Dual kinetic	X	X	X	X	X	
Scanning	X	X	X			X
Monitor	X	X	X			X
Dispensers						
Number of dispensers	0 to 3	0 to 3	0 to 3	0	0	0 or 1
Simultaneous dispensing and measuring	X	X	X			
Shaking						
Interval shaking	X	X	X	X	X	X
Adjustable shaking speed	X	X	X	X	X	X
Adjustable shaking diameter	X	X	X			
Incubation	RT +3°C – 45°C	RT +3°C – 45°C	RT +3°C – 45°C	RT +3°C – 50°C		RT +3°C – 45°C
Kinetic processing						
Average rate	X	X	X	X	X	X
Maximum rate	X	X	X	X	X	X
Time to maximum rate	X	X	X	X	X	X
Time to maximum rate / 2	X	X	X	X	X	X
Time to change	X	X	X	X	X	X
Maximum of well (Peak)	X	X	X	X	X	X
Maximum – Minimum (Change)	X	X	X	X	X	X
Time to maximum (Peak)	X	X	X	X	X	X
Time to maximum (Peak) / 2	X	X	X	X	X	X
Select reading	X	X	X	X	X	X
Integral	X	X	X	X	X	X
Cut-off analysis with 4 limits 5 interpretations	X	X	X	X	X	X
Curve Fits						
Linear regression (LLS)	X	X	X	X	X	X
Linear regression (SVD)	X	X	X	X	X	X
Quadratic polynomial	X	X	X	X	X	X
Cubic polynomial	X	X	X	X	X	X
Quartic polynomial	X	X	X	X	X	X
Point to point	X	X	X	X	X	X
Cubic spline	X	X	X	X	X	X
Four parameter logistic	X	X	X	X	X	X
Sigmoid logistic	X	X	X	X	X	X
Automatic ratio calculation	X	X	X	X	X	X
Sessions						
Execute session in group of	1 – 384 wells	1 – 384 wells	1 – 384 wells	96 & 384 wells	8, 16 & 96 wells	1 – 96 wells
Number of sheets in a session	85	85	85	85	85	85
Multiple curve fits in a session	X	X	X	X	X	X
Multiple reports in a session	X	X	X	X	X	X
Multiple graphs in a sheet	X	X	X	X	X	X
Manual and automatic data exporting	X	X	X	X	X	X
Remote control	X	X	X	X	X	X

System Requirements

Hardware	IBM PC compatible computer with Pentium processor, 128 MB RAM, SVGA display, CD-ROM drive, 200 MB free hard disk, 1 buffered (16550 AF) serial port
Operating system	Windows, 98 and Me, Windows NT 4.0, Windows 2000 and Windows XP Professional

→ Ordering information on pages 54–55.

Photometer Performance Verification Aids

The verification aids on this page provide user-friendly, independent methods of verifying and documenting correct optical performance of the microplate photometers in this catalogue.

Multiskan Spectrum Verification Plate

The Multiskan Spectrum Verification Plate is a dedicated performance verification system that makes it easy to verify and document the key performance parameters of the Multiskan Spectrum. Multiskan Spectrum Software offers convenient access to all the necessary test protocols.

The plate consists of five neutral density filters, one holmium oxide filter and one stray light filter. These tools enable you to verify parameters, such as photometric accuracy, precision and linearity, as well as wavelength accuracy and stray light radiation.

- Photometric accuracy and precision can be tested at three absorbance levels (0.5 – 2.5 Abs).
- The wavelength accuracy test is used to determine how well the expected wavelength maximum and the observed wavelength maximum agree. To achieve optimum performance the wavelength accuracy is tested at three different wavelengths.
- The stray light test determines the level of scattered light that is passed by the monochromator.

Multiskan Verification Plate

For verification of the correct performance of Multiskan Ascent, Multiskan EX and several other Thermo microplate photometers[1)], Thermo provides this package that includes a Verification Plate with neutral density filters and performance verification test sessions for Ascent Software.

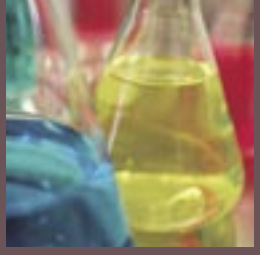
The Multiskan Verification Plate enables verification of the key performance parameters. The accuracy and precision is tested at six absorbance levels (0.3 – 4.0 Abs) and at eight wavelengths (340 – 850 nm). As a default the plate is calibrated at 340 nm, 405 nm, 414 nm, 450 nm, 492 nm, 540 nm, 620 nm and 690 nm. Calibration at user defined wavelengths can be provided upon request.

Traceable to NPL/NIST standards

Every Thermo Verification Plate comes with a calibration certificate, providing traceability to National Physical Laboratory (NPL) or National Institute of Standards and Technology (NIST) standards.

[1)] Ask for a list of other Multiskan and iEMS readers compatible with the Multiskan Verification Plate and Ascent Software from your local Thermo representative.

→ Ordering information on pages 54–55. Please read more about the complete instrument qualification (IQ/OQ/PQ) on page 52.



Purification

Thermo's KingFisher® magnetic particle processors use a revolutionary and patented method to purify proteins, nucleic acids and cells in a convenient, rapid and reproducible manner. The KingFisher system consists of instruments, specially designed plastics, optimized protocols and reagents to provide a total purification solution for customer applications.

www.thermo.com/kingfisher

New product

- KingFisher 96

New

KingFisher® 96

The KingFisher 96 magnetic particle processor is specifically designed to automate the time-consuming sample preparation processes of proteins, nucleic acids and cells in a 96-well plate format. The KingFisher 96 provides a total automated solution for high-speed purification of hundred of samples per day.

Unique KingFisher technology

KingFisher 96 uses an advanced patented technology in which magnetic rods move particles through the processing steps to provide efficient and reproducible purification of proteins, nucleic acids and cells from a variety of starting materials. The target molecules proceed automatically through binding, washing and incubation phases until the final purified or isolated material is eluted from particles for use in a variety of downstream applications. The KingFisher technology enables automated high-speed, high-quality processing with no cross contamination between the samples, nor reagent carryover.

KingFisher 96 is ideal for diverse application areas, and for isolating even difficult sample materials, which are almost impossible to handle with many other existing methods.

Hundreds of samples per day

In one run, 96 samples can be purified in as little as 15 minutes, enabling the processing of up to several hundred or even thousands of samples per day.

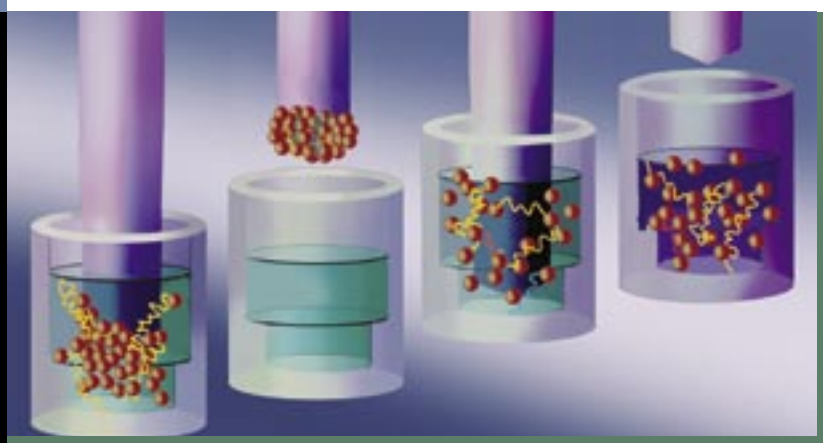
Flexible and easy-to-use automation

KingFisher 96 offers flexible automation with eight or more processing steps in each protocol. KingFisher 96 has a processing range from 10 to 1000 µl, which enables elution of small volumes and results in highly concentrated samples. It is fast and easy to set up. You only have to load samples and reagents onto the plates. Then you just press START and KingFisher 96 automatically does the rest.

The total solution

For your optimized applications, the KingFisher system provides you with a total solution, comprising the instrument, reagents, consumables, software, automated protocols and expertise to process your samples.

KingFisher 96 is compatible with deep well plates, PCR plates and KingFisher 96 plates. Specially designed magnetic rods (magnet heads) and tip combs that protect the magnets during the process are available for different plate types and applications.



1. 2. 3. 4.

The purification steps of KingFisher technology:

1. Binding

2. Moving

3. Washing

4. Incubating

KingFisher Software

KingFisher Software is designed to allow you to develop custom-made protocols for your own applications, and run them in the KingFisher 96 instrument. Protocols can be created and modified smoothly with the graphical user interface and loaded into the KingFisher 96 instrument for easy use. Protocols can be run directly from the PC or from the internal memory of the instrument.

KingFisher 96 Specifications	Description
Processing volume	20 – 1000 µl
Capacity	96 samples/run
Collection efficiency of the particles	› 95%
Particle size	ca. › 1 µm
Magnet rods	96 in one frame Interchangeable magnet heads
Plate types (disposable)	96-well plates: - KingFisher 96 plate (20 – 200 µl*) - PCR plate (20 – 100 µl*), skirted - Deep Well plate (100 – 1000 µl*), squared well
Tip combs (polypropylene – disposable)	96 in one frame - for KingFisher 96 plate - for PCR plate - for Deep Well plate
Heating temperature	From +4°C above ambient temperature to +96°C; for KingFisher 96 plate and PCR plate
Dimensions (W x D x H)	68 x 60 x 38 cm
Weight	*ca.* 28 kg
Internal software	Space for 100 internal protocols
Keyboard/display	START/STOP/four cursor keys/LCD

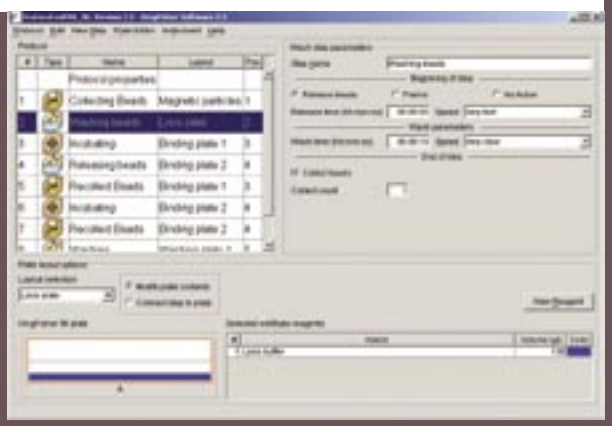
*) Recommended filling volume

KingFisher Software Specifications	Description
Compatibility	KingFisher, KingFisher mL & KingFisher 96
Supported operating system	Microsoft Windows NT 4.0, 2000 & XP Professional

→ Ordering information on pages 54–55.

Interchangeable magnetic heads and tip combs are available for deep well plates, KingFisher 96 plates and PCR plates.

KingFisher Software protocol editor



KingFisher®

The KingFisher magnetic particle processor is designed to automate time-consuming sample preparation processes, such as protein and nucleic acid purification, and cell separation. The KingFisher processes small-scale samples of 20 – 200 µl, with up to 24 samples per run.

KingFisher technology for small-scale samples

KingFisher automates virtually all manual handling stages involved in protein or nucleic acid purification, and cell separation. These capabilities make KingFisher suited to any application that requires small-volume sample processing, for example, forensic analysis.

High-speed performance

When compared to a typical manual extraction of 1 – 2 hours, KingFisher reduces the processing of 24 mRNA samples, for example, to just 17 minutes. KingFisher is easy to program and use; you simply pipette your reagents and samples into the microstrips, load the microstrips and press START.

Reproducible quality

KingFisher's unique concept of processing particles in microplate wells ensures that contaminants are left in the wells, producing excellent recovery and yield. The automation provides outstanding reproducibility by eliminating the potential for inaccuracies introduced by manual methods.

Improves user safety

Since KingFisher eliminates manual intervention, your risk of exposure to toxic reagents or potentially hazardous samples is minimized. The system can easily be put into a fume hood, further reducing the chance of contaminating yourself or your sample.

KingFisher Software

The new KingFisher Software gives you more flexibility by enabling you to create new custom-made protocols for your own applications. Protocols can be run directly from the PC or from the internal memory of the instrument.

Technical Specifications	
Processing volume	20 – 200 µl
Capacity	Up to 24 samples/run
Collection efficiency of the particles	› 99%
Optimal particle Ø	ca. › 1 µm
Magnetic rods (fixed)	2 x 12 format
Microplates (disposable)	Capacity 2 plates, 2 x 12 separate strips
Tip combs (disposable)	Special design, 2 x 12 format
Processing temperature	Ambient temperature (i.e., no incubation)
Dimensions W x D x H mm	300 x 300 x 300
Weight	11.5 kg
Internal software	Space for about 8 internal protocols
Keyboard/display	START/STOP/two cursor keys /LCD

→ Ordering information on pages 54–55.

KingFisher® mL

The KingFisher mL magnetic particle processor is designed to automate time-consuming sample preparation processes, such as protein and nucleic acid purification, and cell separation. The KingFisher mL is ideally suited to high-volume samples of 50 – 1000 µl, with up to 15 samples per run.

KingFisher technology for high-volume samples

KingFisher mL eliminates the laborious and time-consuming manual purification of your samples. KingFisher mL can automate almost all biomagnetic processes using magnetic particles varying in size and iron content. It can even isolate tissue or soil samples, which are difficult to handle with many other existing methods.

KingFisher mL applications

KingFisher mL is ideal for separation of specific cell populations, such as T and B cells, monocytes, leukocytes or fibroblasts, using antibody-coated magnetic particles directed against cell surface antigens. KingFisher mL also provides an ideal method for automating genomic DNA and RNA purification.

Efficient and easy to use

KingFisher mL has a volume range of 50 – 1000 µl, giving you the capacity to isolate cells and proteins with simultaneous concentration. KingFisher mL also offers flexible sample capacity; accommodating 1 – 15 samples per run. It is fast and easy to use, just pipette your reagents and samples into the tube strips, load the strips and press START.

As a compact instrument KingFisher mL also fits easily into a fume hood.

KingFisher plastics

Specially designed KingFisher plastics are optimized for efficient recovery of magnetic particles and minimal liquid carryover. KingFisher plastics are made of polypropylene and are ideal for purification of proteins, DNA/RNA and cells.

Technical Specifications	
Processing volume	50 – 1000 µl
Capacity	Up to 15 samples/run
Collection efficiency of the particles	› 95%
Optimal particle Ø	ca. › 1 µm
Magnetic rods (fixed)	3 x 5 format
Tube strips (disposable)	3 x 5 separate disposable tube strips, 5 tubes/strip
Tip combs (disposable)	Special design, 3 x 5 format
Processing temperature	Ambient temperature (i.e., no incubation)
Dimensions W x D x H mm	300 x 300 x 300
Weight	11.5 kg
Internal software	Space for about 8 internal protocols
Keyboard/display	START/STOP/two cursor keys /LCD

→ Ordering information on pages 54–55.

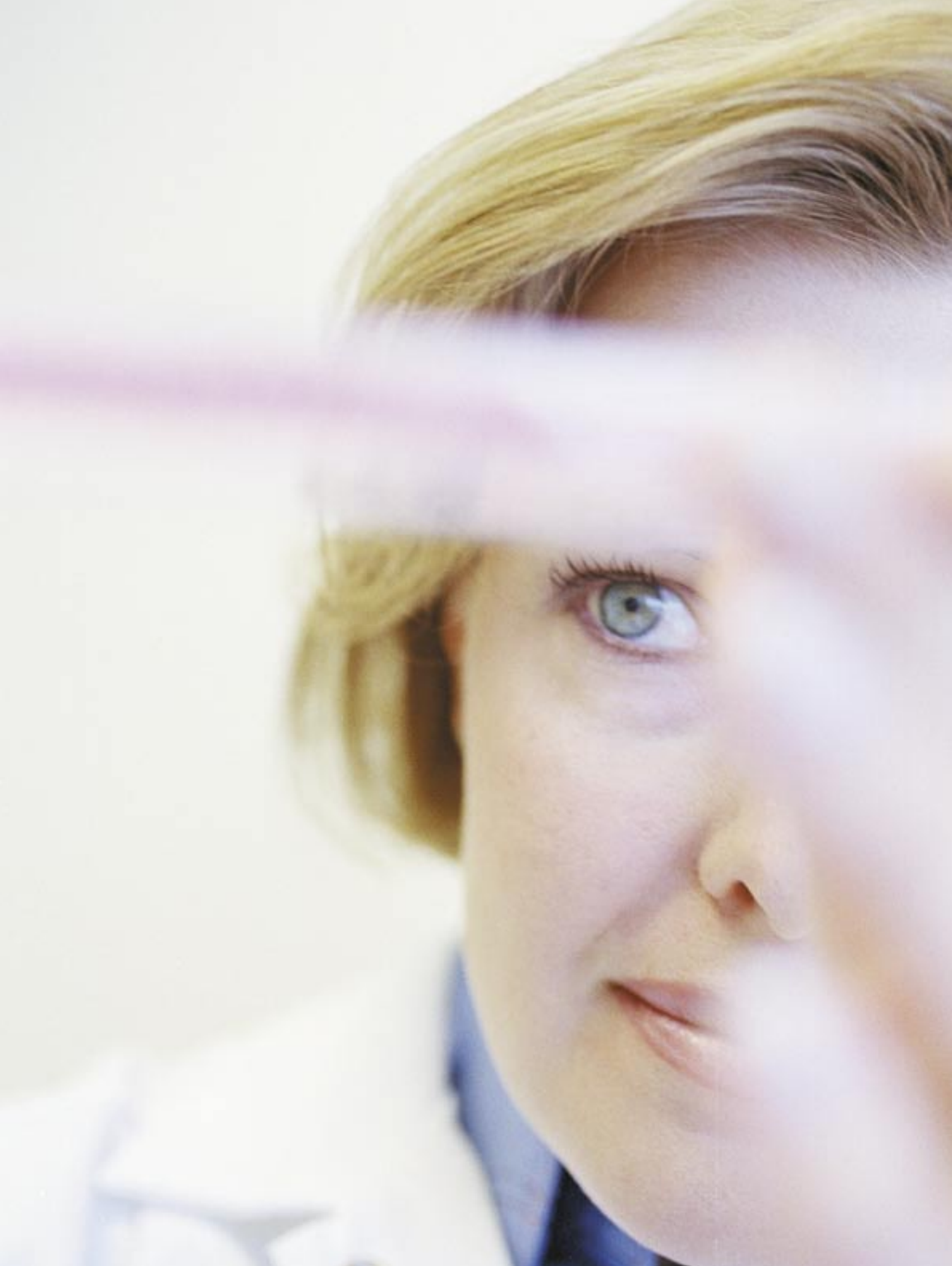
Liquid Handling

Thermo's highly regarded Multidrop® dispensers and Wellwash® microplate washers provide reliable liquid handling capabilities for almost every laboratory. The iEMS® Incubator/Shakers are also provided to optimize your assay conditions.

www.thermo.com/microplate_instruments

New products

- Multidrop Micro



New

Multidrop® Micro

Multidrop Micro, the high speed 1 µl bulk reagent dispenser is the newest addition to the well-respected Multidrop family. When dispensing microvolumes of less than 20 µl into 384- or 96-well microwell plates, Multidrop Micro is the correct choice for you.

Fast, precise and accurate dispensing

Multidrop Micro allows continuous dispensing of 1 – 50 µl in 1 µl increments to dispense directly from single or even multiple reagent bottles. Dispensing with the Multidrop Micro is fast, precise and accurate. Filling a whole 384-well plate with 1 µl takes only 14 s. All this enables miniaturization of assays and reagent cost savings in high-throughput laboratories.

Designed for convenience

Multidrop Micro is an easy-to-use compact stand-alone instrument, that fits, e.g., into safety hoods with quick volume selection from the instrument keypad.

Autoclavable dispensing cassette

The specially designed microvolume dispensing mechanism features an 8-channel detachable and autoclavable dispensing cassette to ensure sterile conditions and avoid cross contamination.

Flexible

Up to 8 different liquids can be dispensed into any number of columns in 96- and 384-well microplates. All reagent lines can be back flushed into the reagent bottle, minimizing the loss of expensive reagents.

Robot compatibility

The Multidrop Micro dispenser offers you the advantages of high speed and automation in the drug discovery process. Although Multidrop Micro is a stand-alone instrument, it can be integrated with robotic plate handling devices via the RS-232 serial port to provide even greater flexibility and higher throughput.

Autoclavable dispensing cassette

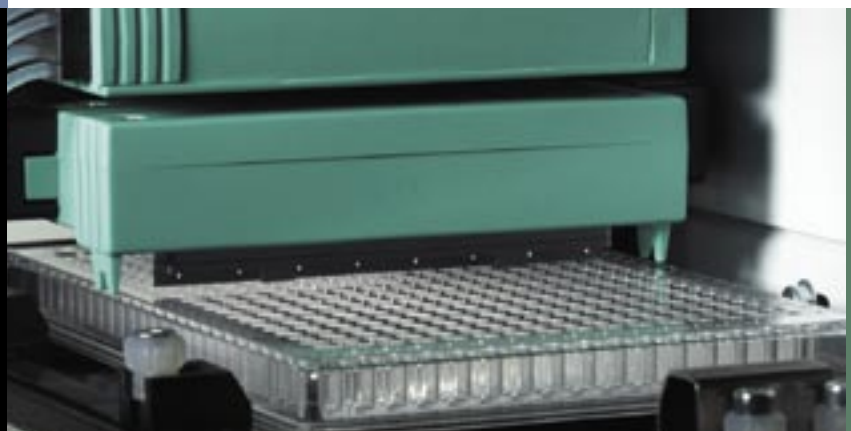
IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is available for the Multidrop Micro. For further information about the features of the IQ/OQ/PQ, see page 52.

Technical Specifications

Multidrop Micro	
Plates	384-well plates, 96-well plates
Dispensing volume	1 – 50 µl, in 1 µl increments
Dispensing speed	14 s/1 µl into 384 wells, 30 s/20 µl into 384 wells 55 s/50 µl into 384 wells, 6 s/1 µl into 96 wells 10 s/20 µl into 96 wells, 17 s/50 µl into 96 wells
Dispensing accuracy	± 10% at 2 µl (typical), ± 5% at ◊ 10 µl (typical)
Dispensing precision	CV ◊ 5% at 2 µl (typical), CV ◊ 3% at ◊ 10 µl (typical)
Interface	Serial RS-232 port

→ Ordering information on pages 54–55.



Multidrop® 384

Multidrop 384 is a well-known automated bulk reagent dispenser designed for high-throughput screening and microvolume dispensing into 384- and 96-well microplates. Multidrop 384 is recommended when the dispensing volume is more than 20 µl per well.

Flexible volume range

Multidrop 384 allows continuous dispensing in 5 µl increments with a flexible volume range: 5 – 100 µl for 384-well plates, and 5 – 395 µl for 96-well plates. Multidrop 384 offers outstanding flexibility. It dispenses up to 8 different liquids simultaneously and the plate format can easily be changed from 384- to 96-well plates. Multidrop 384 can also be programmed to dispense any number of columns of the plate.

Fast, precise and accurate dispensing

The fast, precise and accurate Multidrop 384 fills a 384-well plate with 20 µl/well in less than 20 seconds and a 96-well plate in 5 seconds.

Autoclavable dispensing cassette

Multidrop 384 and Multidrop DW use the same detachable and autoclavable 8-channel dispensing cassette. All reagent lines can be back flushed to the reagent bottle, minimizing loss of expensive reagents. For robotic applications, an additional dispensing cassette with 2 m tubing is also available.

Robot compatibility

Although Multidrop 384 can be used as a stand-alone instrument, it can also be integrated with robotic plate handling devices via an RS-232 serial port.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is available for the Multidrop 384. For further information about the features of the IQ/OQ/PQ, see page 52.

Technical Specifications

Multidrop 384		
Plates	384-well plates	96-well plates
Dispensing volume	5 – 100 µl in 5 µl increments into 384-well plates	5 – 395 µl in 5 µl increments into 96-well plates
Dispensing speed	20 s/20 µl into 384 wells	5 s/20 µl into 96 wells
Dispensing accuracy	± 2% at 20 µl (typical)	± 1% at 100 µl (typical)
Dispensing precision	CV ‹ 1.5% at 20 µl	CV ‹ 1% at 100 µl
Interface	Serial RS-232 port	

→ Ordering information on pages 54–55.

Multidrop® DW

Multidrop DW is a high-speed automated bulk reagent dispenser for deep well plates, Micronic tube racks, 1.1 ml test tubes in racks, and 96-well microplates. Multidrop DW is recommended for dispensing volumes of 20 – 995 µl.

Fast, precise and accurate dispensing

Specifically designed for fast dispensing of large volumes, the high-speed Multidrop DW can fill a deep well plate with 900 µl/well of reagent in just 74 seconds. Precise and accurate dispensing volumes assure high-quality results.

Autoclavable dispensing cassette

Multidrop DW is designed to dispense up to 8 different liquids into 1 – 12 columns using the same 8-channel dispensing cassette as Multidrop 384. To minimize the loss of expensive reagents, all reagent lines can be back flushed into the reagent bottle. For robotic applications, an additional dispensing cassette with 2 m tubing is also available.

Robot compatibility

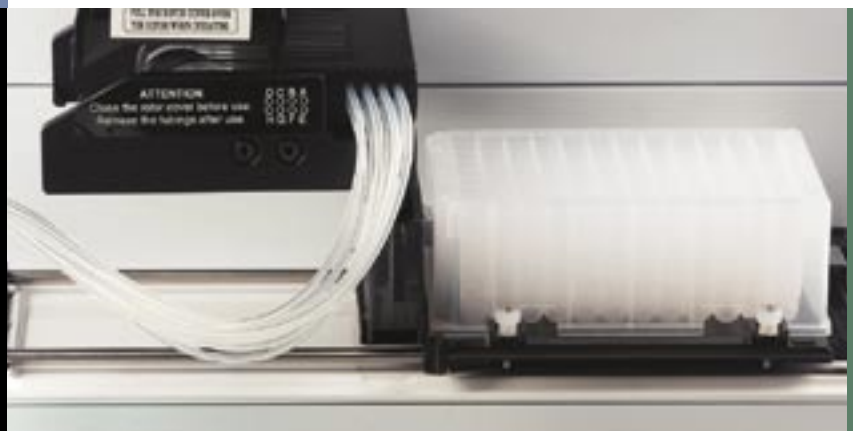
Although Multidrop DW can be used as a stand-alone instrument, it can also offer greater flexibility with the new optimized robotic plate adapter. Multidrop DW can be integrated with robotic plate handling devices via the RS-232 serial port.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is available for the Multidrop DW. For further information about the features of the IQ/OQ/PQ, see page 52.

Technical Specifications	
Multidrop DW	
Plates	Deep Well plates 96-well plates Micronic tube racks 1.1 ml tubes in rack
Dispensing volume	20 – 995 µl in 5 µl increments
Dispensing speed	5 s/20 µl into 96 wells 74 s/900 µl into Deep Well plates
Dispensing accuracy	± 2% at 20 µl (typical) ± 1% at 900 µl (typical)
Dispensing precision	CV ‹ 1.5% at 20 µl CV ‹ 0.5% at 900 µl
Interface	Serial RS-232 port

→ Ordering information on pages 54–55.



Wellwash® 4 Mk 2

The Wellwash 4 Mk 2 combines high performance and flexibility with reliability, simplicity and ease of use. This microplate washer meets the exacting standards of today's assay requirements.

The Wellwash 4 Mk 2 comes with four standard program cards and a programmable card.

The unique co-axial wash head ensures reliable washing.

Proven design

Wellwash 4 Mk 2 has unique co-axial wash heads, ensuring excellent washing efficiency and low residual volumes of less than 5 µl. For clean delivery of washing buffer, the inner dispensing tubes are made of stainless steel. A continuous vacuum in the outer tube prevents cross contamination and ensures complete liquid removal. Switching between the 8- and 12-way wash heads takes just a few seconds.

Quick and easy programming

For fast and accurate selection of routine protocols, the Wellwash 4 Mk 2 comes with four standard program cards (1 – 4 washing cycles). It is also available with a programmable card. Developed for user-defined programs, this card permits a quick selection of all wash parameters, including soak times and final wash protocols. A programmable dispensing volume of up to 750 µl enables effective removal of proteinaceous material in a top-washing process.

Effective liquid management

The quick-release bottle caps of the Wellwash 4 Mk 2 ensure easy buffer changes. An additional rinse bottle can be connected, making it easier to purge wash buffer from the wash head or change to a different wash buffer. Automatic pump shutdown, another useful feature, reduces wear and noise levels. If unused for 30 seconds, the wash pump of the Wellwash 4 Mk 2 automatically switches off.

Technical Specifications

Plate type	96-well plate
Weight	10 kg
Wash/waste bottle capacity	2 l + 2 l
Additional wash bottle capacity	2 l
Priming consumption	15 – 20 ml
Residual aspiration volume	‹ 5 µl
Dispensing precision	5%
Wash heads	8- and 12-way
Wash program cards	1 – 4 washes
Programmable card	Volume 0 – 750 µl Washes 1– 15 Soak time 0 – 10 min Pause 0 – 60 s
Wash time	120 s, 3 x 350 µl with 12-way wash head 165 s, 3 x 350 µl with 8-way wash head

→ Ordering information on pages 54–55.

Wellwash® AC

Wellwash AC guarantees excellent washing performance and low residual volumes for 96-well microplates in research or high-throughput applications.

Superb washing performance

Washing performance is excellent. Residual aspiration volumes after the washing cycle are less than 1 µl per well when the advanced sweep aspiration is used. During the advanced sweep function, the wash head moves in quick steps instead of scraping the bottom of the well.

Rapid washing

The twin-strip wash head of the Wellwash AC rapidly traverses the stationary plate during washing. The design also provides the quickest and safest way to change the wash heads, with a choice of double 24- or 16-way and single 12- or 8-way formats.

Enables reduced soaking times

Wellwash AC features an integrated orbital shaker with programs to adjust the duration of shaking and the speed, depending on the volume of the liquid in the wells. Shaking during a soak period improves sensitivity, specificity and precision of an assay; thereby, shorter soaking times can be used.

Unique multibuffer module

Wellwash AC is a multibuffer microplate washer with its own separate liquid management module. Switching to liquid purging is fully automated, ensuring secure wash buffer changes. Unique quick-release bottle caps house the liquid-level sensing system, which provides audiovisual warnings.

Minimal setup time

Wellwash AC has automatic rinsing and priming modes that can also be activated on demand. The useful stand-by function of Wellwash AC partially flushes the wash heads with rinsing solution and parks the wash head in the priming vessel that contains rinsing solution. In this way, Wellwash AC is ready for use whenever needed, with a minimal setup time.

Easy-to-use programming

Wellwash AC provides the easiest and most flexible programming. The easy programming is based on a question-and-answer format, allowing control over all wash parameters. A special feature is the ability to include additional dispensing of

a second buffer after the complete washing protocol, within the same program. A total of 99 wash assay programs, each with up to 4 linked protocols, can be stored.

Robot compatible

Thermo´s Wellwash AC offers laboratories additional capacity through its easy robot compatibility. Plate handling devices for stacking and transferring plates can be used to increase flexibility and improve throughput.

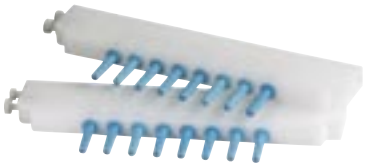
IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ Protocol Book is available for the Wellwash AC. For further information about the features of the IQ/OQ/PQ, see page 52.

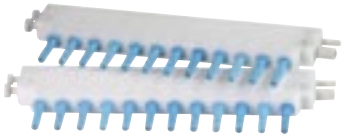
Technical Specifications			
Plate type	96-well plate		
Wash heads	8-, 12-, 16-, and 24- way		
Orbital shaker	2 mm orbit, 650 – 990 rpm		
Program memory	99 (each program can include up to four linked wash protocols even with different wash buffers)		
Washing volume	50 – 1000 µl in 50 µl increments		
No. of washing cycles	1 – 10		
Residual aspiration volume	‹ 3 µl with normal aspiration mode ‹ 1 µl with sweep aspiration mode		
Aspiration height	Adjustable		
Aspiration mode	Normal or sweep		
User interface	Keyboard with 20 key tactile membrane, 8 x 21 character LCD screen		
Interface	Serial RS-232 port		
Dispensing volume	50 – 400 µl		
Dispensing accuracy	± 5% at 300 µl		
Dispensing precision	CV 3% at 300 µl		
Soaking/shaking time	1 – 60 min		
Priming and rinsing volume	5 – 100 ml in 5 ml increments		
Washing time	100 s, 3 x 350 µl with 2 x 12-way wash head 140 s, 3 x 350 µl with 2 x 8-way wash head		
Liquid containers*/**Cat. no.**		**5161020**	**5161030**
	Wash bottle	2 x 2 liter	2 x 4 liter
	Rinse bottle	1 liter	2 liter
	Waste bottle	4 liter	10 liter
Dimensions (Including bottle module)			
Width	540 mm (21.3 in.)		640 mm (25.2 in.)
Depth	530 mm (20.9 in.)		670 mm (26.4 in.)
Height	390 mm (15.4 in.)		500 mm (19.7 in.)
Weight	13 kg (28.8 lbs.)		14.8 kg (32.6 lbs.)

* All containers are fitted with a liquid level sensor and quick-release cap.

→ Ordering information on pages 54–55.



2 x 8-way wash heads



2 x 12-way wash heads

Programming is easy with the keypad and visual LC display of the Wellwash AC.

Wellwash® 384

Wellwash 384 optimizes the washing process for high-throughput screening in your lab and ensures the best results for both 384- and 96-well formats.

Best HTS results

The Wellwash 384 features extremely low residual volumes for the best results. With Thermo´s 384 Round Well Plate the residual aspiration volume is less than 1 µl per well. The special crosswise aspiration is an additional feature for reaching very low residual volumes with a 96-well plate.

Two models

The Wellwash 384 comes as two models: with a wash head for 384-well plates, and with a wash head for 96-well plates. This washer is fast and powerful at the same time. Wellwash 384 washes a 384-well plate in two motions using 192 needles. For a 384-well plate, washing three times with 100 µl can be performed in less than 40 seconds. With a 96-well wash head, the Wellwash 384 washes a 96-well plate in one motion with 96 needles. Washing a 96-well plate three times, with 300 µl, can be done in less than 20 seconds.

For various shaped microplates

The effective wash head of the Wellwash 384 has been specifically designed to efficiently wash wells of various heights and shapes: U-shaped; V-shaped, or flat bottom microplates. The versatile internal software of Wellwash 384 has memory for up to 10 different plate templates.

Secure washing

For secure operation, Wellwash 384 has liquid level detection in the rinse, wash, second wash and waste bottles. An alarm appears when the wash or rinse bottle is empty or the wash bottle is full.

Robot compatible

Wellwash 384 allows easy integration with automatic or robotic systems via the serial RS-232 port. The plate carrier is designed for use with various robotic systems.

Versatile programming capabilities

The internal software of the Wellwash 384 has memory for up to 110 washing programs. All wash parameters needed for efficient washing are programmable using the Wellwash 384 keyboard.

Wellwash 384 comes with a 4 x 48-channel manifold for 384-well microplates or with a 4 x 24-channel manifold for 96-well microplates.

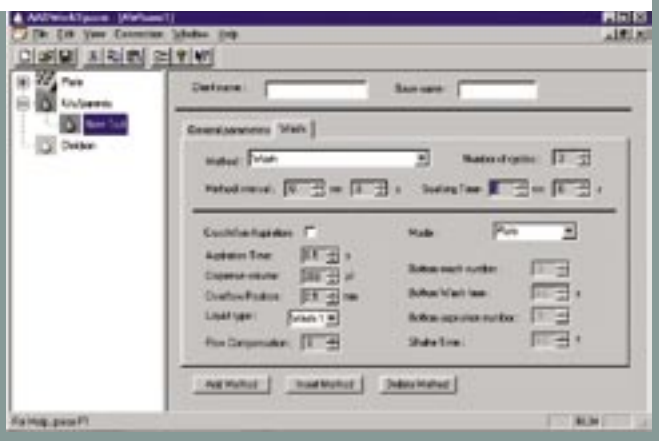
Technical Specifications		
Plate type	96- and 384-well plate; U-shaped, V-shaped or flat bottom microplates	
Wash heads	384-well plate, 4 separate 48-channel manifolds 96-well plate, 4 separate 24-channel manifolds	
Residual aspiration volume	‹ 1 µl with Round Well Plate 384 (flat bottom plate) ‹ 3 µl with a square 384-well plate (flat bottom plate)	
Dispensing accuracy	± 5% at 300 µl	
Washing volume	50 – 3000 µl	
No. of washing cycles	1 – 9	
Soaking time	0 – 59 min 59 s	
Priming volume	300 – 500 ml, adjustable	
Washing time	‹ 40 s three times 100 µl, 384-well microplate ‹ 20 s three times 300 µl, 96-well microplate	
No. of washing buffers	1 – 2 depending on the model	
Washing buffer bottle size	5 l (other sizes also available as spare parts)	
Rinse bottle size	5 l (other sizes also available as spare parts)	
Waste bottle size	10 l (other sizes also available as spare parts)	
User interface	Keyboard with 5 diaphragm keys 2 x 20 characters LCD backlighted screen	
Interface	Serial RS-232 port	
Wash programs	Memory up to 110 washing programs	
Plates	Memory for up to 10 sets of programmable plate template parameters Accepts U-shaped, V-shaped or flat bottom microplates	
	Wellwash 384	**External vacuum pump**
Line voltage	110 – 230 V, 50/60 Hz	115 V or 230 V, 50/60 Hz
Dimensions	Washer only (no bottle)	
Width	320 mm (12.6 in.)	214 mm (8.4 in.)
Depth	577 mm (22.7 in.), plate carrier out	471 mm (18.5 in.)
Height	216 mm (8.5 in.)	351 mm (2.0 in.)
Weight	13.0 kg (28.6 lbs.)	15 kg (33.0 lbs.)

→ Ordering information on pages 54–55.

IQ/OQ/PQ

The instrument qualification IQ/OQ/PQ package is available for the Wellwash 384. For further information about the features of the IQ/OQ/PQ, see page 52.

Wellwash 384 also features a Windows user interface as an alternative to programming the internal software via the keyboard. With this program, it is possible to load programs from a PC to the internal software of the Wellwash 384.



iEMS® Incubator/Shaker

The iEMS Incubator/Shaker is a high-performance microplate incubator and orbital shaker. It can be used for any microplate based assay requiring optimal incubation conditions up to 40°C.

Capacity up to 9 plates

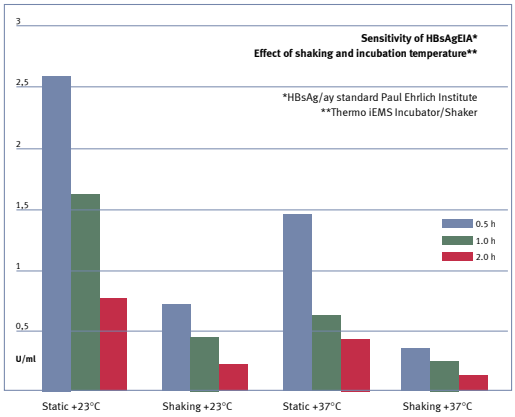
The iEMS Incubator/Shaker is designed to handle up to nine 96-well plates, and yet only takes up a small amount of bench space due to its compact design.

Unique temperature uniformity

The iEMS Incubator/Shaker has an individual thermal microplate holder for each microplate. To eliminate temperature gradients and edge effects, microplates are heated evenly from all sides. This ensures reproducibility of the assay wherever the sample is positioned on the plate. The iEMS Incubator/Shaker offers a temperature uniformity of less than 0.3°C across the entire microplate.

Orbital shaking for increased sensitivity

For effective mixing, the iEMS Incubator/Shaker incorporates a powerful variable-speed orbital shaker. With an orbit of 1.0 mm and speeds from 400 to 1400 rpm in 250 rpm increments, the shaker motion ensures efficient mixing of even very viscous liquids.



Orbital shaking at a constant incubation temperature of 37°C increases the sensitivity and specificity of EIA assays and reduces incubation times.

Improved sensitivity

Superior temperature control and efficient orbital shaking dramatically increase the sensitivity of EIA assays, as well as reducing incubation times. The detection limit of an HBsAg assay, for example, can be increased by a factor of two from 0.8 U/ml to 0.42 U/ml, simply by incubating at constant 37°C. Also when the sample is incubated at 37°C instead of at room temperature, the same sensitivity can be achieved in half the time.

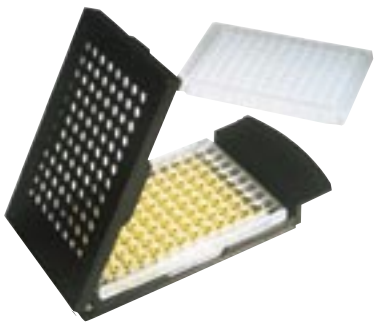
The effective orbital shaking motion of the iEMS Incubator/Shaker increases the detection limit by a factor of three, from 0.8 U/ml to 0.24 U/ml, after a two-hour incubation.

iEMS® Incubator/Shaker HT

The iEMS Incubator/Shaker HT is a high-performance microplate incubator and orbital shaker, ideal for assays requiring high temperatures up to 70°C, such as DNA hybridization.

iEMS Incubator/Shaker HT

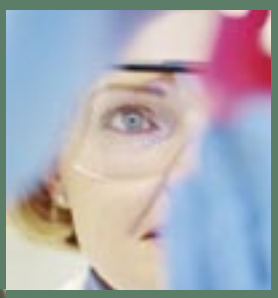
The iEMS Incubator/Shaker HT offers an extended temperature range up to nearly 70°C. Although the iEMS Incubator/Shaker HT has the same advantages as the iEMS Incubator/Shaker, its greater temperature range is specifically designed for more demanding applications. It is ideal for applications, such as DNA hybridization and primer extension assays.



The thermal microplate holders of both the iEMS Incubator/Shakers are designed for ease of use. High-quality materials ensure uniform heating, as well as a long service life.

Technical Specifications		
Capacity	iEMS Incubator/Shaker Up to nine 96-well plates	iEMS Incubator/Shaker HT Up to three 96-well plates
Temperature control		
Temperature range	+14°C to +40°C	+14°C to +69°C
Incubation range	Ambient +3°C to +40°C	Ambient +3°C to +69°C
Resolution	0.1°C	0.1°C
Incubation time	Up to 48 h in 1 s increments	Up to 48 h in 1 s increments
Warming speed	‹ 20 min from +24°C to +37°C	‹ 35 min from +24°C to +65°C
Accuracy	± 0.3°C	± 0.5°C
Uniformity	‹ 0.3°C across the entire plate	‹ 0.6°C across the entire plate
Evaporation	‹ 2 mg/h/well	No evaporation with a film-covered plate (all specifications are with film-covered plates)
Shaker		
Frequency	400 to 1400 rpm in 250 rpm increments (5 speeds)	400 to 1400 rpm in 250 rpm increments (5 speeds)
Orbit	1 mm (radius of 0.5 mm)	1 mm (radius of 0.5 mm)
Shaking time	Up to 48 h in 1 s increments	Up to 48 h in 1 s increments
Interval time	Up to 48 h in 1 s increments	Up to 48 h in 1 s increments

→ Ordering information on pages 54–55.



Supporting Products

Thermo provides a range of products that make everyday lab work more effective and efficient. These include everything from instrument qualification packages to Microtiter® plates and Finnpipette® pipettes. In addition to the products in this catalogue, Thermo also offers laboratory automation solutions for microplate instruments, molecular biology products and many other life sciences products.

www.thermo.com/hybaid

www.thermo.com/crs

www.thermo.com/finnpipette

New products

- Finnpipette Focus Single Channel Pipettes
- Finnpipette Focus Long Pipettes
- Finnpipette Focus Multichannel Pipettes
- IQ/OQ/PQ Packages

New

Finnpipette® Focus

The new Finnpipette Focus is the result of over 30 years pipetting expertise. The unique design specifically reduces user stress and optimizes pipetting performance so that you can set the volumes you need quickly and focus on your work.

Good Laboratory Pipetting

Finnpipette Focus is a pipette with superior accuracy, precision and reproducibility, and unparalleled control and comfort. Maintaining our lead in ergonomic design, the innovative short tip cone makes controlling the tip much easier, placing less stress on hands, wrists and arms. Finnpipette Focus pipettes are available in a range of single channel, single channel long and multichannel pipettes. Single channel fixed volume Finnpipette Focus pipettes are also available.

Designed to fit your hand

Each Finnpipette Focus pipette is provided with a Medium-sized snap-on handle. Small and Large-sized snap-on handle pieces can also be ordered to personalize your Finnpipette Focus for the most comfort. Incorporating the proven super blow-out technology, the Finnpipette Focus ensures that whatever volume you select, it will be aspirated and dispensed with the highest accuracy and precision.

Fast volume setting and fine adjustment controls

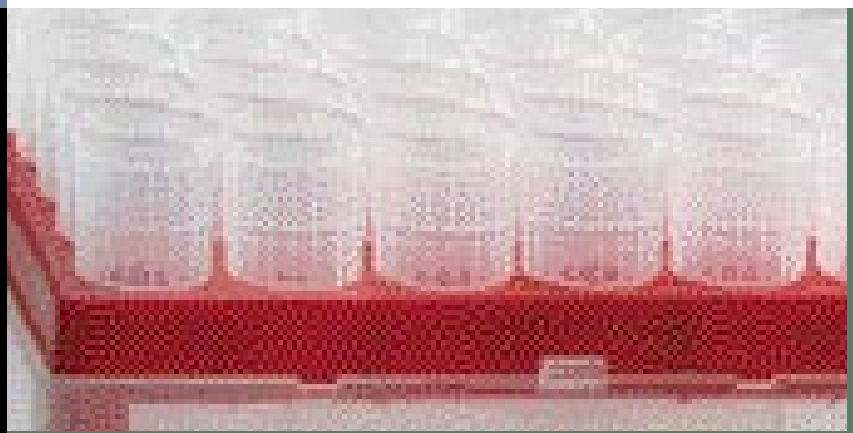
All Finnpipette Focus pipettes feature an advanced fast volume setting mechanism, which makes your work faster, more efficient and less stressful.

Finnpipette Focus also incorporates a new fine-volume adjustment wheel. This fine-tuning mechanism sets the volume of the last digit. The large easy-to-use quick-click wheel makes it easy to set small-volume increments.

Finntips®

Finntips are fully compatible with both old and new Finnpipettes, providing optimal liquid handling results. All Finntips – from the 0.2 – 10 µl Finntip 10 to the 2 – 10 ml Finntip 10 ml – are available in easy-to-open, fully autoclavable hinged tip racks with color-coded matrix trays.

→ For further information, please visit **www.thermo.com/finnpipette**



Microtiter® Microplates

Thermo offers a range of Microtiter plates that is designed to match the demanding requirements of biotechnology, life science and pharmaceutical research laboratories.

Experience and expertise

Thermo has great experience in the fields of microplate instrumentation, liquid handling and plastic molding processes. This heritage, combined with rigorous quality control, guarantees the highest quality products, with unrivalled consistency well to well, plate to plate and lot to lot.

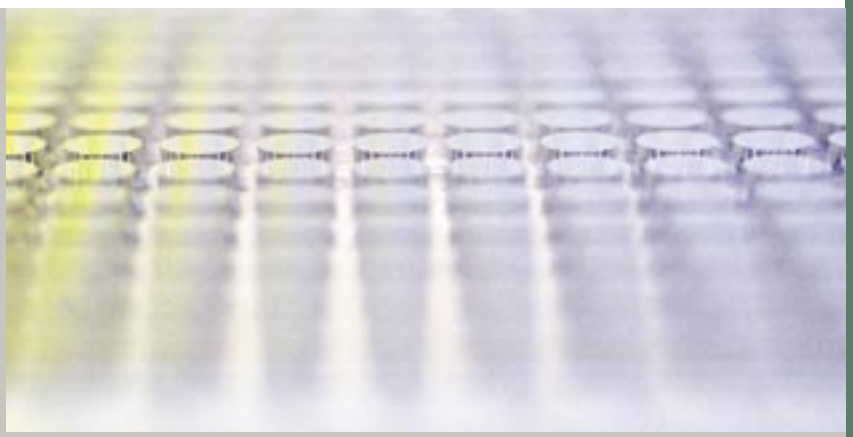
A choice of microplates

Thermo offers Microtiter microplates in 96- and 384-well formats, with a variety of well shapes for different applications. Microtiter plates are available with a choice of binding characte-ristics that includes hydrophobic and hydrophilic surfaces, and streptavidin-coated plates. Microtiter microplates are available in different colors to meet a range of applications; black plates for fluorescence applications, white plates for luminescence applications, and transparent plates for photometric and UV applications.

For further information about the compatibility of the plates with different detection instruments, see pages 50–51.

To find the Microtiter microplates best suited to your needs, please contact your local Thermo representative, and our specialists will work with you to identify several product options and arrange to have samples sent to you free.

→ Ordering information on pages 50–51. For further information, please visit **www.thermo.com/microtiter**



Microtiter Microplates – Detection Instrument Compatibility Guide

Microtiter Microplates – Detection instrument compatibility guide

Clear plates for absorbance readers

Instruments	Wells	Cat. no.	Description	Characteristics	Binding affinity	Examples of applications
Multiskan Ascent	96	3355	1B, Medium Binding	hydrophobic	peptide, polypeptide, lipoproteins	ELISA
	96	3855	4 HBX, High Binding Extra	hydrophilic/ charged	DNA, proteins	Streptavidin-biotin, ELISA, Fibroblast Migration Assay
	384	8555	New 1B, Medium Binding – square to round wells	hydrophobic	peptide, polypeptide, lipoproteins	HTS, ELISA, Kinase assay, Streptavidin-biotin, Sandwich ELISA
	384	8755	New 4HBX, Extra-high Binding – square to round wells	hydrophilic/ charged	DNA, proteins	HTS, ELISA, Kinase assay, Streptavidin-biotin, Sandwich ELISA
	96	9502227	Universal Binding	hydrophobic	protein	ELISA
	96	95029330	Enhanced Binding	hydrophilic/ charged	glycoproteins and high affinity for monoclonal antibodies	Sandwich ELISA, Competitive ELISA, IgG titer levels, Kinase assays
	96	95029780	Universal Binding, Sterile with Lid	hydrophobic	protein binding – cell applications	Cell fusion
	96	6310	1B 1 x 12 Medium Binding Strip assembly	hydrophobic	peptide, polypeptide, lipoproteins	ELISA
	96	6505	1B 2 x 8 Medium Binding Strip assembly	hydrophobic	peptide, polypeptide, lipoproteins	ELISA
	96	6405	4 HBX 1 x 12 High Binding Extra Strip assembly	hydrophilic/ charged	DNA, proteins	Streptavidin-biotin, ELISA, Fibroblast Migration Assay
	96	6508	4 HBX 2 x 8 High Binding Extra Strip assembly	hydrophilic/ charged	DNA, proteins	Streptavidin-biotin, ELISA, Fibroblast Migration Assay
Multiskan Spectrum	96	8404	Microtiter UV plate		DNA, proteins	DNA/RNA quantitation

White plates for luminescence readers

Instruments	Wells	Cat. no.	Description	Characteristics	Binding affinity	Examples of applications
Luminoskan Ascent/ Fluoroskan Ascent FL	96	7416	Microlite 1 Plate	hydrophobic	protein	Chemiluminescent and bioluminescent assays
	96	7417	Microlite 2 Plate	hydrophobic	peptide, polypeptide, lipoproteins	Chemiluminescent and bioluminescent assays
	96	7418	Microlite TCT Plate	hydrophobic	cells	Reporter gene assays, Cytotoxity, Apoptosis
	384	8155	New Microlite 1 square wells with rounded corners	hydrophobic	peptide, polypeptide, lipoproteins	Chemiluminescent and bioluminescent assays
	96	9502887	White Universal Binding	hydrophobic	protein	Intracellular Ca^{2+} assay
	96	95029770	White Universal Binding, Sterile with Lid	hydrophobic	protein	Phagocytosis assay, Antibiotic sensitivity testing
	96	8120	New White Clear bottom plate, TC treated, Sterile with Lid	hydrophilic	tissue culture, cells	Tissue culture cytotoxity, Apoptosis
	96	7421	Microlite 1 1 x 12 Strip Assembly	hydrophobic	protein	Chemiluminescent and bioluminescent assays
	96	7400	Microlite 2 1 x 12 Strip Assembly	hydrophobic	peptide, polypeptide, lipoproteins	Chemiluminescent and bioluminescent assays
	96	95029660	White 1 x 8 Universal Binding	hydrophobic	protein	Chemiluminescent and bioluminescent assays

Black and white plates for fluorescence readers

Instruments	Wells	Cat. no.	Description	Characteristics	Binding affinity	Examples of applications
Fluoroskan Ascent/ Fluoroskan Ascent FL	96	7605	Microfluor 1 Black Plate	hydrophobic, hydrophilic, low background, low cross talk, high signal	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	7805	Microfluor 2 Black Plate		protein, glycoproteins, DNA	Enzyme-linked oligosorbent assays, Viral protease
	384	8225	New Black Microfluor 1 square wells with rounded corners	hydrophobic	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	8220	New Black Clear bottom plate, TC treated, Sterile with Lid	hydrophilic	tissue culture, cells	Tissue culture cytotoxicity, Apoptosis
	96	7705	Microfluor 1 White Plate	hydrophobic, hydrophilic, high signal reflectance and reduced background	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	7905	Microfluor 2 White Plate		protein, glycoproteins, DNA	Nucleic acid hybridization
	96	9502867	Black Universal Binding	hydrophobic	peptide, polypeptide, lipoproteins	Thioflavine T fluorometric assays
	96	95029840	Black Universal Binding, Sterile with Lid	hydrophobic	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	9502887	White Universal Binding	hydrophobic	peptide, polypeptide, lipoproteins	Fusion assays
	96	95029770	White Universal Binding, Sterile with Lid	hydrophobic	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	95029800	Black 1 x 8 Universal Binding	hydrophobic	peptide, polypeptide, lipoproteins	Fluorescent ELISA immunoassays
	96	95029660	White 1 x 8 Universal Binding	hydrophobic	protein, lipoproteins	Fluorescent ELISA immunoassays

New

IQ/OQ/PQ Packages

Complete instrument qualification IQ/OQ/PQ packages are now available for many of our microplate instruments. These IQ/OQ/PQ packages enable our customers to prove the integrity and validity of their results.

Proof of integrity

An important element of demonstrating that data has integrity is verification that the sample-handling products function correctly for their intended use, and that the instrumentation used for data acquisition is qualified to produce reliable data. We provide IQ/OQ/PQ packages for full qualification of your Thermo microplate instruments.

Qualification of all aspects

Qualification starts right at the point when you receive the instrument package and ends when you have tested the instrument's performance with standard methods.

After performing instrument qualification, you can be sure that you have installed the instrument correctly and taken all necessary aspects into account. You will also have verified that the instrument operates as intended, and that it meets the given specifications.

During the IQ/OQ/PQ process each part is detailed, checked and the results documented and signed. These procedures guarantee that your instrument performs correctly and gives valid results.

The three discrete qualification elements

• Installation Qualification (IQ) verifies that the correct product has been delivered and that the facility is suitable for the product's proper use. IQ also ensures that the user is aware of the information required for the appropriate use of the system.

• Operational Qualification (OQ) verifies the operation of critical subfunctions of the instrument. The Operational Qualification begins at the point where the product is powered up as a system for the first time.

• Performance Qualification (PQ) verifies that the instrument is capable of properly accomplishing the task for which it is to be used according to the specifications given by the manufacturer of the instrument.

Easy to perform

Thermo provides everything necessary to make the qualification process as easy and convenient as possible. Each IQ/OQ/PQ package includes a convenient step-by-step guide for the instrument qualification process. Additionally, Thermo can provide trained service personnel to perform Product Qualification for your products.

IQ, OQ and PQ are normally performed during the initial product installation. Once a system has been fully qualified, periodic Operational Qualification and Performance Qualification is recommended.

Thermo currently provides IQ/OQ/PQ Packages/Protocol Books for Multiskan Spectrum, Multiskan Ascent, Fluoroskan Ascent FL, Fluoroskan Ascent, Luminoskan Ascent, Wellwash AC, Wellwash 384, and for the Multidrop Family: Multidrop Micro; Multidrop 384, and Multidrop DW.

→ Ordering information on pages 54–55.

Ordering Information*

Fluoroskan Ascent

5210470	Fluoroskan Ascent 100 – 240 V
5210480	Fluoroskan Ascent 100 – 240 V, including one dispenser
5210230	2nd or 3rd dispenser

Fluoroskan Ascent FL

5210450	Fluoroskan Ascent FL 100 – 240 V
5210460	Fluoroskan Ascent FL 100 – 240 V, including one dispenser
5210230	2nd or 3rd dispenser
5210290	Wide wavelength range PMT; emission wavelength range 360 – 800 nm

Luminoskan Ascent

5300160	Luminoskan Ascent, 100 – 240 V
5300170	Luminoskan Ascent with one dispenser, 100 – 240 V
5210230	2nd and 3rd dispenser

Nepheloskan Ascent

5210490	Nepheloskan Ascent 100 – 240 V with an incubator
5210500	Nepheloskan Ascent 100 – 240 V with an incubator and dispenser

Vitotox

6400000	Vitotox 10 Kit, for 10 samples
6400010	Vitotox 384 HTS Kit, for 345 samples
6400020	Vitotox 384 HTS Kit, for 3450 samples

CytoPro

6410000	CytoPro HTS kit, for cytotoxicity and cell proliferation assays, for 960/3840 tests
6410100	CytoPro Kit, for cytotoxicity and cell proliferation assays, 500 tests

ATP Assays

6410400	Quantitative ATP Monitoring Kit, for free ATP, 1250 tests
6415200	ATP Standard, about 0.1 µmol
6415400	Tris-Acetate Buffer, 50 ml
6425000	ATP Releasing Reagent, 10 ml
6415000	ATP Monitoring Reagent, 10 ml, for 250 tests

Multiskan Spectrum

51118500	Multiskan Spectrum with cuvette holders
51118550	Multiskan Spectrum without cuvette holders

Multiskan Ascent

51118300	Multiskan Ascent basic unit 200 – 240 V
51118307	Multiskan Ascent basic unit 100 – 120 V
51118380	Incubator option
51118390	Floppy disk option
142xxx5	Filters are optional. Please specify when ordering filters for Multiskan Ascent (xxx = wavelength nm)

Now includes Ascent Software for Multiskan Ascent and three standard filters free of charge.

Multiskan EX

51118177	Multiskan EX, 100 – 120 V
51118170	Multiskan EX, 200 – 240 V
142xxx0	Filter in the 400 – 750 mm range (xxx = wavelength nm)

Now includes Ascent Software for Multiskan and three filters free of charge (405nm, 450nm, 620nm).

Verification Plates

24072800	Multiskan Verification Plate
24073500	Multiskan Verification Plate with Ascent Software
24073405	Multiskan Spectrum Verification Plate

Ascent Software

5185410CD	Ascent Software for Fluoroskan Ascent/ Fluoroskan Ascent FL
5185440CD	Ascent Software for Nepheloskan Ascent
5185450CD	Ascent Software for Luminoskan Ascent
5185460CD	Ascent Software for Multiskan Ascent
5185480CDD	Ascent demo CD

KingFisher

5400000	KingFisher, 100 – 240 V
2803810	KingFisher software package (included in the instrument)
97002070	KingFisher tip comb RNase free 50 pcs/box
97002080	KingFisher plate 100 µl RNase free 50 pcs/box
97002084	KingFisher plate 200 µl RNase free 50 pcs/box
97002090	KingFisher plastics 100 µl 8-pack, 8 plates + 8 tip combs/box
97002094	KingFisher plastics 200 µl 8-pack, 8 plates + 8 tip combs/box

KingFisher mL

5400050	KingFisher mL, 100 – 240 V
2803810	KingFisher software package (included in the instrument)
97002111	KingFisher mL tip comb, 800 pcs
97002121	KingFisher mL tube, 900 pcs (15 x 60 pcs)
97002131	KingFisher mL Combi 60 (tubes and tip combs for 60 samples)
97002141	KingFisher mL Combi 240 (tubes and tip combs for 240 samples)

KingFisher 96

5400500	KingFisher 96 magnetic particle processor, 100 – 240 V (one magnet head)*
24073410	Magnet head for PCR plate
24073420	Magnet head for KingFisher 96 plate
24073430	Magnet head for Deep Well plate
2803810	KingFisher software package (included in the instrument)
97002510	KingFisher 96 tip comb for PCR magnets, 10 pcs/box
97002514	KingFisher 96 tip comb for PCR magnets, 8 x 10 pcs/box
97002520	KingFisher 96 tip comb for KF magnets, 10 pcs/box
97002524	KingFisher 96 tip comb for KF magnets, 8 x 10 pcs/box
97002530	KingFisher 96 tip comb for DW magnets, 10 pcs/box
97002534	KingFisher 96 tip comb for DW magnets, 10 x 10 pcs/box
97002540	KingFisher 96 plate (200 µl), 48 plates/box
97002544	KingFisher 96 plate (200 µl), 5 x 48 plates/box

Note: * When ordering, please specify the magnet head you want to have installed in the factory.

Wellwash AC

5161020	Wellwash AC 100 – 240 V, 50/60 Hz with 2 x 2 liter wash, 1 x 1 liter rinse and 1 x 4 liter waste bottles
5161030	Wellwash AC Big Bottles 100–240 V, 50/60 Hz with 2 x 4 liter wash and 1 x 2 liter rinse bottles *
1093620	10 liter waste bottle with modified cap, Wellwash AC
WW007/1	12-way wash head
WW007/11	8-way wash head
WW007/6	1-liter bottle with Level Sense assembly and LS cap
WW007/7	2-liter wash or rinse bottle with Level Sense assembly and LS cap
24072540	4-liter wash bottle with Level Sense assembly and LS cap
WW007/8	4-liter waste bottle with Level Sense assembly and LS cap

* Order 10 l waste bottle separately

Wellwash 4 Mk 2

5160770	Wellwash 4 Mk 2 220 – 240 Vac/50 Hz
5160772	Wellwash 4 Mk 2 110 – 120 Vac/60 Hz
WW934/1	2 l wash/waste bottle
WW004/1	12-way wash head
WW004/11	8-way wash head
WW004/39	Second dispense bottle kit (2 l rinse bottle)

Wellwash 384

5160470	Wellwash 384 with 384-well wash head, one 5 l wash, 5 l rinse, 10 l waste bottle, 110 – 230 V, 50/60 Hz
5160475	Wellwash 384 with 96-well wash head, one 5 l wash, 5 l rinse, 10 l waste bottle, 110 – 230 V, 50/60 Hz
5160480	Wellwash 384, with 384-well wash head, two 5 l wash, 5 l rinse, 10 l waste bottle, 110 – 230 V, 50/60 Hz
5160485	Wellwash 384, with 96-well wash head, two 5 l wash, 5 l rinse, 10 l waste bottle, 110 – 230 V, 50/60 Hz
5160440	Vacuum source, Wellwash 384, 230 V, 50/60 Hz
5160442	Vacuum source, Wellwash 384, 115 V, 50/60 Hz
2808760	4x96-well wash head (24-Channel)
2808770	4x384-well wash head (48-Channel)
2808820	Wash bottle 5 l (Wash1) – with level detector (empty)
2808840	Wash bottle 5 l (Wash2) – with level detector (empty)
2808860	Wash bottle 10 l – with level detector (empty)
2808900	Wash bottle 15 l – with level detector (empty)
2808920	Wash bottle 30 l – with level detector (empty)
2808880	Waste bottle 10 l – with level detector (full)
2808940	Waste bottle 30 l – with level detector (full)

Multidrop Micro

5840230	Multidrop Micro, 220 – 240 V, 50/60 Hz
5840237	Multidrop Micro, 100 – 120 V, 50/60 Hz
24073290	Dispensing cassette, Multidrop Micro

Multidrop 384

5840150	Multidrop 384, 220 – 240 V, 50/60 Hz
5840157	Multidrop 384, 100 – 120 V, 50/60 Hz
24072670	Dispensing cassette, extruded covers
24070300	Dispensing cassette, machined covers
24070290	Tubing set for dispensing cassette

Multidrop DW

5840170	Multidrop DW, 220 – 240 V, 50/60 Hz
5840177	Multidrop DW, 100 – 120 V, 50/60 Hz
24072670	Dispensing cassette, extruded covers
24070300	Dispensing cassette, machined covers
24070290	Tubing set for dispensing cassette

iEMS Incubator/Shaker and iEMS Incubator/Shaker HT

5112200	iEMS Incubator/Shaker with 9 thermal microplate holders 220 – 240 V, 50/60 Hz
5112207	iEMS Incubator/Shaker with 9 thermal microplate holders 100 – 120 V, 50/60 Hz
5921200	iEMS thermal microplate holder
5112250	iEMS Incubator/Shaker HT with 3 thermal holder HT 220 – 240 V, 50/60 Hz
5112257	iEMS Incubator/Shaker HT with 3 thermal holder HT 100 – 120 V, 50/60 Hz
5921210	iEMS Thermal Holder HT

IQ/OQ/PQ Packages/Protocol Books

24073490	Multiskan Spectrum IQ/OQ/PQ Package
24073530	Multiskan Ascent IQ/OQ/PQ Package
Packages include Protocol Book & Performance Verification Plate	
24073540	Fluoroskan Ascent FL IQ/OQ/PQ Protocol Book
24073550	Fluoroskan Ascent IQ/OQ/PQ Protocol Book
24073560	Luminoskan Ascent IQ/OQ/PQ Protocol Book
24073570	Wellwash AC IQ/OQ/PQ Protocol Book
24073580	Wellwash 384 IQ/OQ/PQ Protocol Book
24073600	Multidrop Family IQ/OQ/PQ Protocol Book

* Thermo offers many more products not included here, for more details, ask your local Thermo representative.

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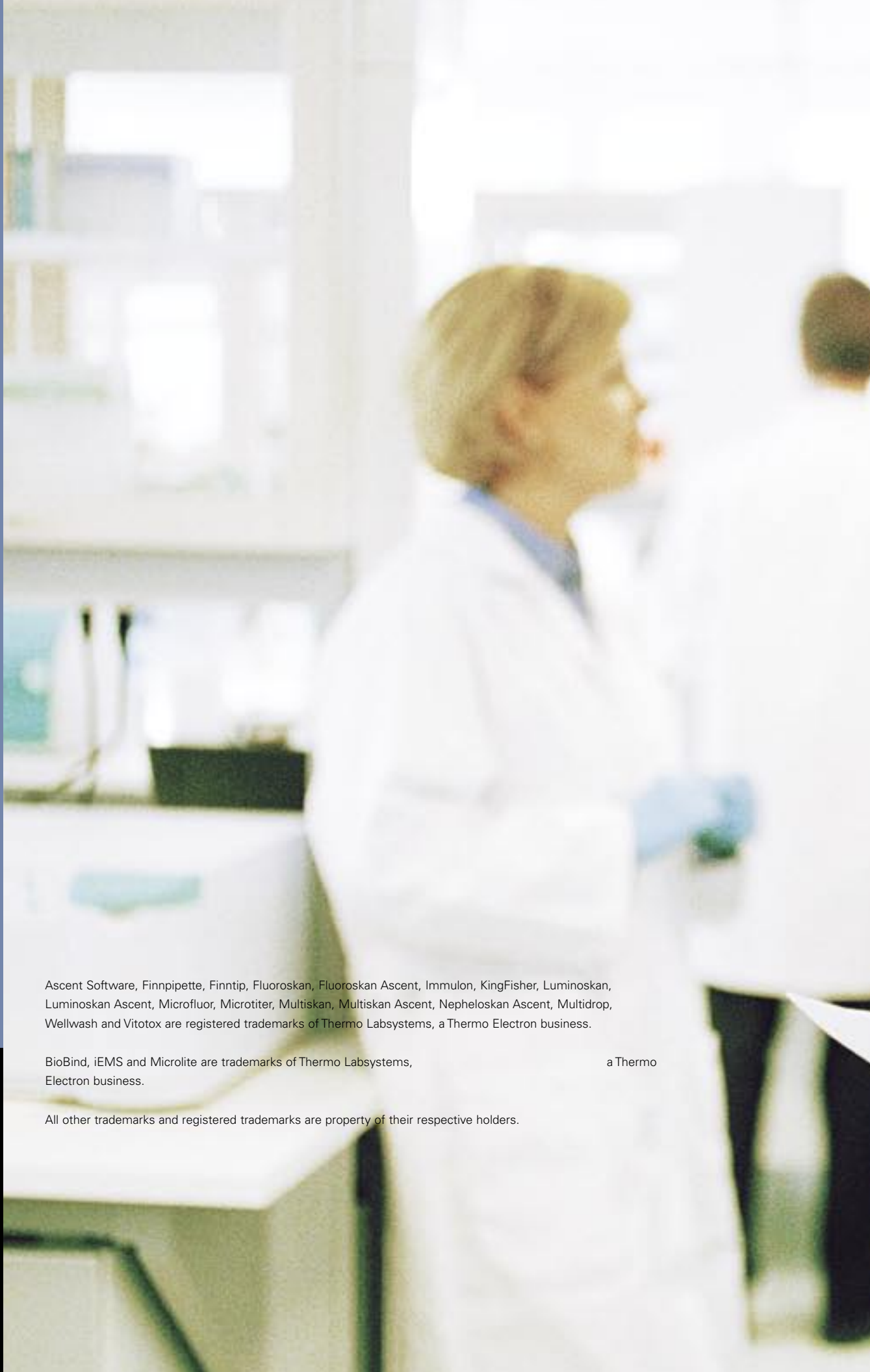

Ascent Software, Finnpipette, Finntip, Fluoroskan, Fluoroskan Ascent, Immulon, KingFisher, Luminoskan, Luminoskan Ascent, Microfluor, Microtiter, Multiskan, Multiskan Ascent, Nepheloskan Ascent, Multidrop, Wellwash and Vitotox are registered trademarks of Thermo Labsystems, a Thermo Electron business.

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