

Thermo Scientific
Evolution 201 and 220
UV-Visible Spectrophotometers



Reliable, versatile UV-Vis solutions
to get you fast answers

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Simplify your work with innovation that keeps you moving forward

Transform your UV-Visible experience with the Thermo Scientific™ Evolution™ 201 and 220 spectrophotometers. Simplified workflows, cutting-edge technology and an array of accessories consistently deliver the high-quality results you depend on. Equipped with the versatile and effective tools you require in the language you prefer, your instrument is always ready for the next challenge. Complete Thermo Scientific solutions are designed to simplify the sophisticated, moving you from samples to answers faster.

Industrial QA/QC
Food & Beverage
Pharmaceuticals
Environmental
Academic

ev•o•lu•tion (ěv'ə-lū'shən)

A gradual process in which something changes into a different and better form.

The American Heritage® Dictionary of the English Language, Fourth Edition



Reliable performance

The Evolution 200 series spectrophotometers deliver high performance and exceptional value in a modern, economical design that you can rely on – analysis after analysis.

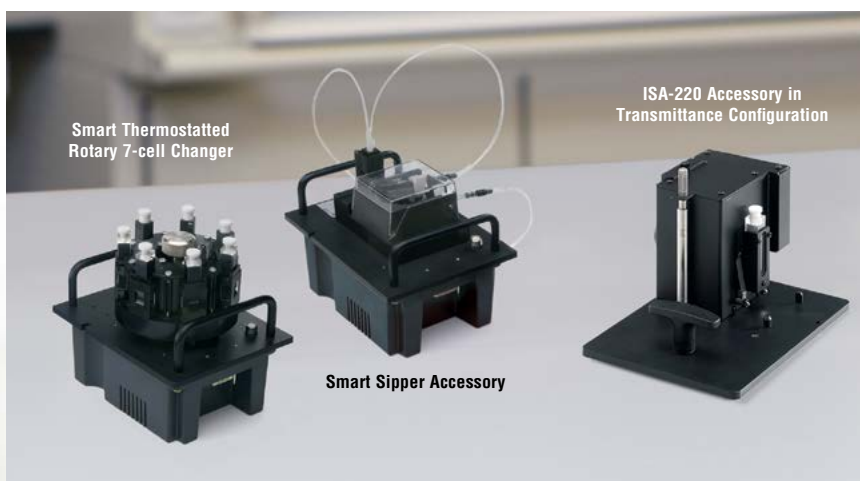
- Eliminate warm-up time and enjoy seven or more years of maintenance free operation with an instant-on Xenon flash lamp that is guaranteed for three years of continuous use
- Enjoy long-term stability during data acquisition with double beam optics and a reference position detector for monitoring control samples
- Ensure the accuracy of your data and minimize instrument downtime with automated performance verification



Versatile sampling

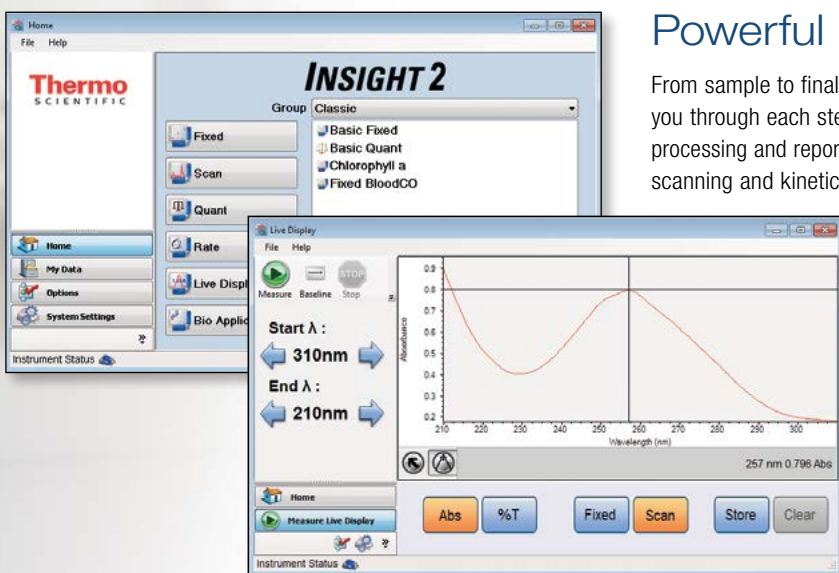
A complete line of Thermo Scientific spectrophotometer accessories and a large, room light resistant sample compartment provides flexibility and ease of use for your most challenging samples and high-throughput applications.

- Speed up your analysis with fully integrated Thermo Scientific™ Smart Accessories™ featuring cable-free, snap-in designs for convenience and consistency
- Eliminate manual set up requirements with auto recognition and seamless software integration of sippers, cell changers and autosampler accessories for increased productivity in high-throughput environments
- Improve data quality with integrated detectors and selectable beam options that work together to deliver optimal performance and greater dynamic range for fiber optic and integrating sphere accessories



Powerful software options

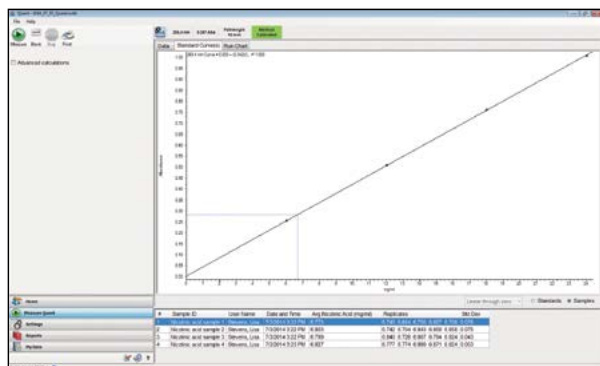
From sample to final report, Thermo Scientific™ INSIGHT™ software quickly guides you through each step of your analysis. Comprehensive tools for data collection, processing and reporting deliver the results you need for quantitative analysis, scanning and kinetics applications.



Unique quick scan feature in Live Display finds your peak maxima in seconds

- Get answers faster using our Live Display Mode with walk-up simplicity for real-time single wavelength measurements or simplified scans for the identification of sample peaks
- Customize even complex methods with ease using our workflow oriented application modules
- Enforce data security with optional INSIGHT Security software tools to assist you in achieving 21 CFR Part 11 compliance in your pharmaceutical laboratory
- Increase efficiency in high-throughput environments with optional INSIGHT Auto software for seamless integration of supported autosamplers

Solve your productivity challenges with integrated solutions for your QA/QC routines



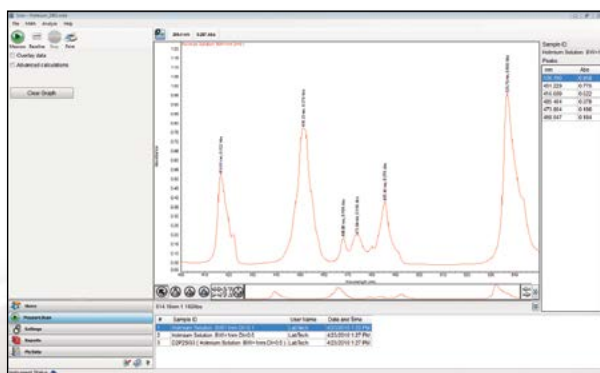
Automated data processing and visual cues accelerate result analysis

Comprehensive quantitative analysis

Reliable results are an essential component of quality control analyses. From simple, single-standard comparisons to standard curves based on peak area, we have the tools to get the answers you need every time.

- Choose to perform your analysis in fixed or scan mode
- Select a curve fit and standard averaging as desired
- Set minimum correlation coefficients or use concentration limits to define the requirements for your standards and samples

After measurements are complete, a run chart neatly displays the data and error bars, indicating whether or not each sample measurement falls within the defined concentration range.



Full-spectrum data and customizable graphical displays deliver greater clarity for complex problems

Versatile spectral analysis

Full spectrum analysis provides additional insight into your samples to aid in identification and troubleshooting activities. The Evolution 201 and 220 spectrophotometers with INSIGHT software allow you to analyze spectral data your way.

- Find up to 100 peaks and valleys automatically and sort them by height or location or manually choose them post-analysis
- Calculate the area under your peak or use value level crossing features to solve complex problems
- Eliminate manual data manipulation requirements with automated, user defined calculations and a comprehensive selection of post-processing math functions

Integrated Informatics Solutions

Laboratory Informatics are a critical part of any laboratory, facilitating end-to-end traceability of samples and associated laboratory processes, providing a central repository for data and test results and ensuring regulatory compliance. Thermo Scientific Lab Information Management Systems (LIMS) deliver a complete Informatics solution for method execution, laboratory and data management.

In combination with our Laboratory Execution System (LES), Scientific Data Management System (SDMS) and Integration Manager (IM), Thermo Scientific LIMS deliver the most comprehensive paperless lab solution available today. Now lab managers and scientists across all industries can achieve full instrument integration, manage methods and workflow, retrieve and archive any kind of raw scientific data, and export results across the organization.



To learn more, visit www.thermoscientific.com/paperlesslab

System Performance Verification Report

Company name: Thermo Scientific
 Test Name: Wavelength Reproducibility (Hidolium oxide)
 Operator: Brian, Claire
 Date: Thursday, April 15, 2013 9:51:29 AM (GMT-05:00)
 Instrument: Evolution 201
 Serial number: CMC_Remo8
 CVC Serial number: USP - 31773
 Accessory base serial number: R0F133802

Measurement Description	High Limit	Low Limit	Measured	Result
Wavelength of 265.53 nm (nm)	640.50	639.50	640.25	Pass
Wavelength of 278.23 nm (nm)	727.25	717.25	726.25	Pass
Wavelength of 311.43 nm (nm)	450.45	450.45	450.25	Pass
Wavelength of 363.33 nm (nm)	363.33	363.33	363.00	Pass
Wavelength of 377.10 nm (nm)	283.10	283.10	287.50	Pass
Wavelength of 377.13 nm (nm)	243.30	243.30	247.50	Pass

Company name: Thermo Scientific
 Test Name: Wavelength Reproducibility (Hidolium oxide)
 Operator: Brian, Claire
 Date: Thursday, April 15, 2013 9:59:20 AM (GMT-05:00)
 Instrument: Evolution 201
 Serial number: CMC_Remo8
 CVC Serial number: USP - 31773
 Accessory base serial number: R0F133802

Measurement Description	High Limit	Low Limit	Measured	Result
Standard deviation of 363 nm peak	0.10	0.00	0.00	Pass

Company name: Thermo Scientific
 Test Name: Resolution (Toluen-Hexane)
 Operator: Brian, Claire
 Date: Thursday, April 15, 2013 10:02:49 AM (GMT-05:00)
 Instrument: Evolution 201
 Serial number: CMC_Remo8
 CVC Serial number: USP - 31773
 Accessory base serial number: R0F133802

Measurement Description	High Limit	Low Limit	Measured	Result
Ratio: Max/Min (250 nm/260 nm)	2.00	2.00	2.00	Pass

Company name: Thermo Scientific
 Test Name: Stray Light (M2, 228 nm)
 Operator: Brian, Claire
 Date: Thursday, April 15, 2013 10:03:46 AM (GMT-05:00)
 Instrument: Evolution 201
 Serial number: CMC_Remo8
 CVC Serial number: USP - 31773
 Accessory base serial number: R0F133802

Measurement Description	High Limit	Low Limit	Measured	Result
Stray Light at 228 nm (%)	0.05	0.00	0.00	Pass

Company name: Thermo Scientific
 Test Name: Photometric Accuracy (Bichromatic)

Multiple results included in report

Automated performance verification

Ensure the accuracy and reliability of QA/QC data while improving the efficiency of your laboratory with automated performance verification.

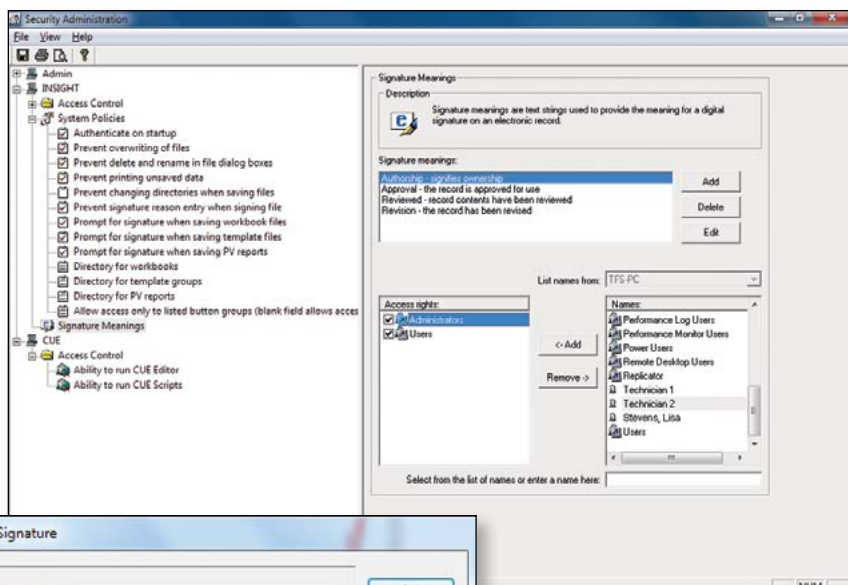
- Save your analyst's time, improving the productivity of your laboratory, with automated PV testing
- Eliminate transcription activities and return results that are ready for sign-off when tests are complete
- Ensure compliance to industry guidelines and regulations for industrial and pharmaceutical laboratories with traceable standards and your choice of configuration options



Reliable data security of your electronic records

If your laboratory requires 21 CFR Part 11 compliance, INSIGHT Security software is here to make your life easier. Using the same easy-to-use interface, INSIGHT Security software combines security and data integrity assurance with the versatility required for your multi-user laboratory.

- Achieve clear traceability with sample history and electronic signature details that are stored directly within your protected data files
- Ensure that any changes to files associated with INSIGHT Security are monitored and logged, even when the software is not running, with software that is seamlessly integrated with Microsoft® Windows® security features
- Manage your users' access and privileges quickly and easily from one central server location with our cross-platform Thermo Scientific Security Administration (TSA) software



INSIGHT Security software provides traceability and assures data integrity

Complete IQ/OQ Validation package

Thermo Scientific Validator packages provide support for system qualification and validation activities for instruments, software and accessories. All of the documentation and reference materials needed to facilitate compliance of your Thermo Scientific spectrophotometer system with the requirements of FDA, GxP, ISO 9001:2008 and

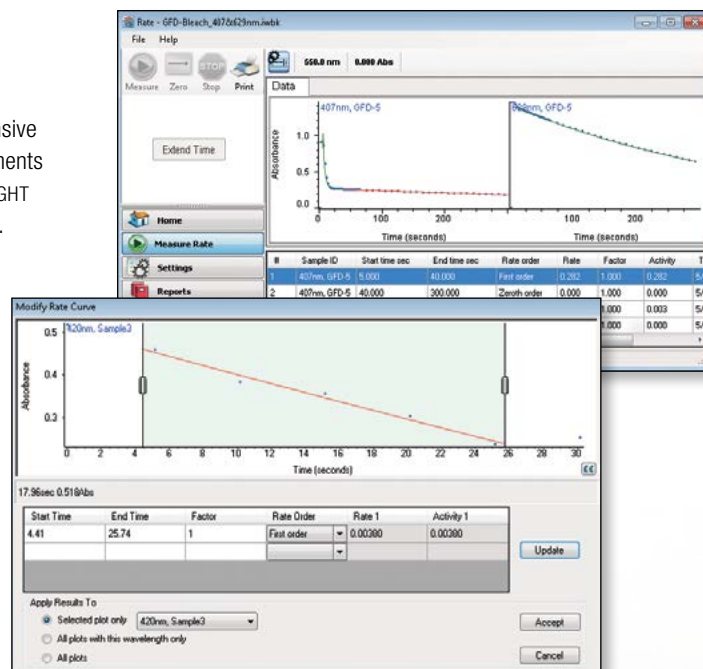
ISPE 2001 guidelines and regulations are included for your convenience. Validator packages streamline Installation Qualification (IQ), Operational Qualification (OQ) and assist in Performance Qualification (PQ) procedures and development for simple and efficient use.

Focus on the science with comprehensive tools that advance your research

Time and temperature based kinetics

Obtain accurate, reliable results quickly with comprehensive software and accessory solutions. From scanning experiments to stop-flow kinetics, the Evolution 200 Series with INSIGHT software delivers maximum versatility to meet any need.

- Collect a full spectrum with each measurement for enhanced analysis
- Get more data faster with an industry leading acquisition rate of 100 data points per second for single-cell measurements and 160 data-points per second using INSIGHT's Dwell Time feature and a Smart Linear 8-cell Changer
- Analyze complex data sets with ease using multi-stage curve fitting and consecutive reaction mode options for comprehensive data fitting
- Perform millisecond kinetic measurements with precise electronic triggering and our convenient Rapid Mixing accessory



A collection of versatile software tools provides complete control over your kinetics analysis

Have confidence in your results with precise temperature control

Leverage the capabilities of precise temperature control for accurate and reliable measurements. Whether you are performing thermal denaturation/renaturation experiments or simply have a temperature-sensitive sample, we have a thermostatted accessory for you.

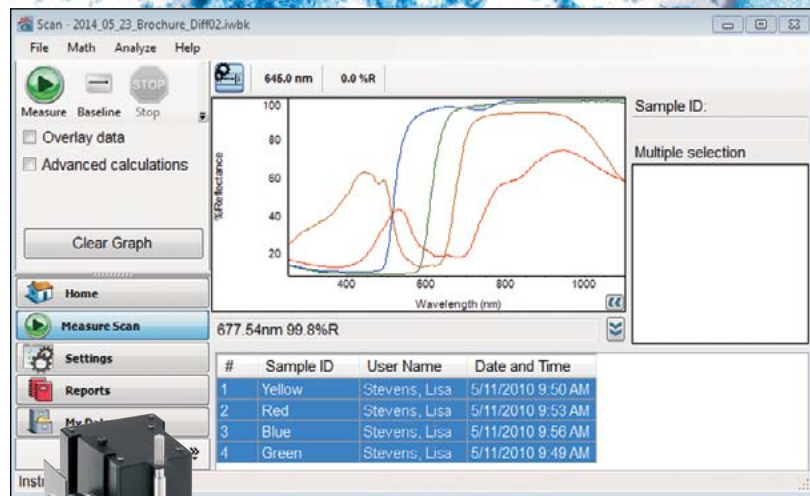
- Control the temperature of your samples at every stage of the experiment with a single or 8-cell Peltier system with temperature ranges up to 110 °C
- Monitor temperatures in up to eight sample locations with a Temperature Probe Hub
- Set parameters and interact directly with accessories throughout your sample analysis using INSIGHT software



Materials science solutions

From biological homogenates to mirrors and semi-conductor materials, make light work of your most challenging samples with powerful software and accessory solutions for solid samples and light-scattering materials. Equipped with a Solid Sample Holder or ISA-220 Integrating Sphere Accessory, the Evolution 220 UV-Vis Spectrophotometer with INSIGHT Software provides you with the premiere performance and valuable tools you need for your complex analyses.

- Precisely position samples at the focal point of the measurement beam with snap-in, kinematic mounting and your choice of right or left side sample compartment installation for optimized alignment of both transmittance and reflectance measurements
- Acquire smooth, accurate scattered transmittance data each time you measure with a built-in 10 mm silicon photodiode, 60 mm Spectralon® sphere, and dedicated Materials slit
- Minimize single beam substitution errors in your reflectance measurements by taking advantage of INSIGHT's unique, automated correction feature and the ISA-220's small reflectance port, offering the best energy efficiency in its class
- Collect spectral data in your choice of INSIGHT's eight data modes, including Kubelka-Munk for simplified band gap analysis applications



ISA-220 Accessory in Reflectance Configuration

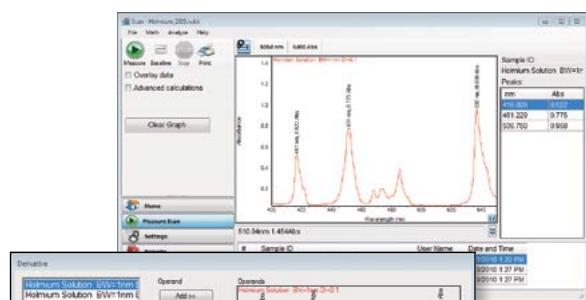


The powder cell holder is optimized to help you analyze small samples

Sophisticated data processing options

Powerful analytical tools embedded in INSIGHT software empower users to interpret analytical information quickly. Special display options let you view results the way you want for more effective data analysis and interpretation.

- Automatically pick peaks and valleys, apply smoothing or calculate derivatives as sample data is collected
- Convert Data into the format you need post-analysis with sophisticated math features, including spectral addition and subtraction, ratios and normalizing functions
- Merge data sets into a single workbook to quickly and conveniently compare data from multiple experiments with our Merge Workbooks feature
- Export spectral or result data in a portable format (XML, CSV, or TSV) or e-mail it to a chosen account for further off-line data processing and compatibility with other software platforms



Take advantage of cost-effective, reliable performance

1 Easy Sample Access

Have your hands full? Use your elbow. Unique, quick release sample compartment lid uses a push-button release to slide the lid open for easy access to the sample compartment.

2 Optimized Cell Positioning

Our innovative cell holder includes horizontal and vertical positioning adjustments to optimize energy throughput. A stable support system ensures accurate positioning of the cell in the beam every time. A cell lifter makes removing cells easy. An optional cell holder with temperature control is also available.

3 Long-term Stability

Double-beam geometry is ideal for kinetics or any sample that might change over time during a measurement. Use the reference detector to monitor a control sample during data acquisition for greater stability of your long-term measurements.

4 Faster Scanning

Our precision monochromator drive delivers fast-scanning data collection with high-wavelength accuracy. Scan samples up to 6,000 nm/min. A 31,000 nm/min slew speed makes both scanning and non-scanning measurements faster.

5 Accurate Rapid Kinetics

Accurate kinetics measurements rely on precisely known zero-time data. Electronic in/out triggering provides the highest level of accuracy for rapid-mixing kinetics measurements.



6 Versatile Sampling Options

Large, room light resistant sample compartment provides maximum versatility and ease of use for your most challenging samples. The connections plate keeps external connections out of your working space. Hose connectors, a pass-through slit for cables, and the option to remove the plate entirely to accommodate insulated tubes provides ideal support for all available accessories.

7 Fingertip Control

The integrated keypad communicates with INSIGHT software to start measurements or launch CUE scripts and other applications using the four programmable buttons. Optional tablet control module provides a color touch screen display with the power and flexibility of an external computer.



The xenon lamp

A green, economical solution for your laboratory

The xenon flash lamp in the Evolution 201 and 220 is only on when collecting a measurement; delivering energy and financial savings to your laboratory. It provides excellent performance over the entire wavelength range of 190–1100 nm. The intense light of the xenon lamp in the UV region of the spectrum delivers added sensitivity for life science, environmental, and organic chemistry applications. Additional benefits of the xenon lamp include:

- Instant measurements with **no warm-up time required**
- Seven or more years of **maintenance-free operation** and a guarantee for three years of continuous use
- **Minimized exposure of samples to UV effects** by powering on only during measurements
- Reduced heating of the sample compartment, providing **enhanced temperature stability** and eliminating sample degradation issues seen with traditional lamp sources

Choose the configuration that's right for you

The Evolution 201 and 220 spectrophotometers offer the freedom to choose a control configuration that's right for you.

- Choose the optional Thermo Scientific™ Evolution™ 200 Series Tablet Control Module to save precious bench space. The module comes complete with a 10-inch, Windows®-based tablet, 3 USB ports and simple-to-install instructions.
- Choose an external computer for simplified data processing and clearer display of your data on a large screen. External computer control also offers direct network connectivity and enhanced compliance in regulated settings.

Whichever format you choose, you will enjoy the same user experience delivered by INSIGHT software's modern, task driven design.

Acquire high resolution data with the Evolution 201

For focused quality control applications, the Evolution 201 with its fixed 1.0 nm spectral bandwidth will meet all your requirements for precise and accurate results. For pharmaceutical manufacturers and suppliers, this platform adheres to both U.S. and European pharmacopeia guidelines for UV-Visible spectroscopy instruments.

Access greater experimental flexibility with the Evolution 220

For research and more complex applications, expand your possibilities further with selectable beam configurations.

- A larger rectangle with a 2 nm spectral bandwidth offers enhanced photometric performance
- A round beam sized to match the input lens of the fiber optic coupler ensures maximum energy throughput for maximum performance (less noise, greater photometric range)
- A very large square beam sized to match the transmission port of the integrating sphere delivers the maximum possible energy for the maximum possible performance (less noise, greater photometric range) with solids and turbid samples

Select this model for use with our fiber optic coupler and integrating sphere accessories with built-in detectors for the best photometric performance.



Quickly measure and preview your sample

The Live Display feature in INSIGHT 2 offers walk-up simplicity for real-time single wavelength measurements or quick identification of a sample peak. Display your results in absorbance or transmittance mode and print them for your experimental records.



Expand the functionality of your spectrophotometer



Configuring your system couldn't be easier. Kinematic mounts allow easy interchange of accessories and ensure reproducible alignment each time. Thermo Scientific Smart Accessories are hot-swappable, featuring auto-intelligence and a cable-free design for added convenience and seamless integration with INSIGHT software. Smart accessories are automatically initialized on start-up, conveniently displaying the appropriate software menus and status monitors on the screen so they are ready to go when you are.



Smart Thermostatted Rotary 7-cell Changer



Smart Sipper Accessory



Smart Thermostatted Linear 8-cell Changer



Thermostatted Rectangular Cell Holder



8-cell Peltier System



Single-cell Peltier Holder



Mercury Lamp Calibration Accessory



Smart Calibration Validation Carousel (CVC)

Temperature Probe Hub and Temperature Probes

Temperature probe accessories monitor the temperature inside the cuvette from within INSIGHT software



RX2000 Rapid Mix Accessory



Evolution 200 Series Tablet Control Module



ISA-220 Accessory in Transmittance Configuration



15°, 20°, 30°, 45°, and 60° Specular Reflectance Accessories

Solid Sample Holder



The Solid Sample Slide Holder positions accessories supplied on standard 2-inch × 3-inch slides. Shown with a Universal Sample Holder and optional second slide holder.



Rectangular and Cylindrical Reference Cell Holders



Adjustable Microcell Holder



Fiber Optic Coupler, shown with Micro-probe



1 Inch Square Vial Holder



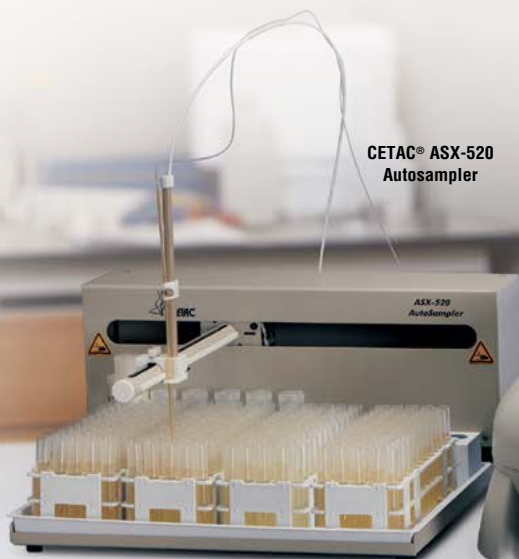
Combination Cuvette and Test Tube Holder



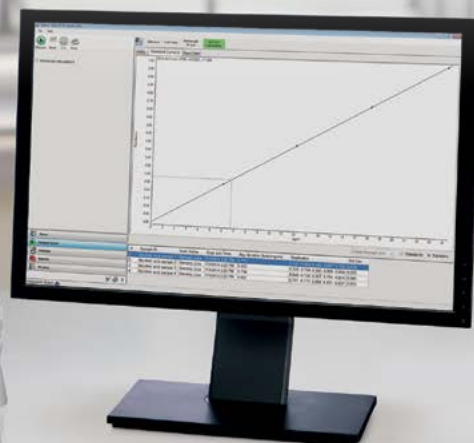
Cylindrical Cell Holder



Long Pathlength Rectangular Cell Holder



CETAC® ASX-520 Autosampler

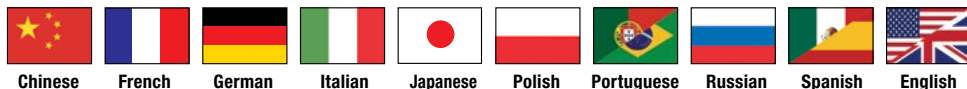


Laboratory Solutions Backed by Worldwide Service and Support

Tap into our expertise throughout the life of your instrument. Thermo Fisher Scientific offers professional support through our worldwide network of highly trained and certified engineers. In many nations, Unity™ Lab Services, part of Thermo Fisher Scientific, offers direct support. Elsewhere, our partner companies' engineers receive the same factory training as our Unity engineers and stand ready to provide you with the same high level of service and support.

Put our experts to work for you to provide the services you need from system installation and training to technical support. Ask your Thermo Scientific sales representative about available product support services designed to keep your instrument in peak operating condition.

LANGUAGE SUPPORT



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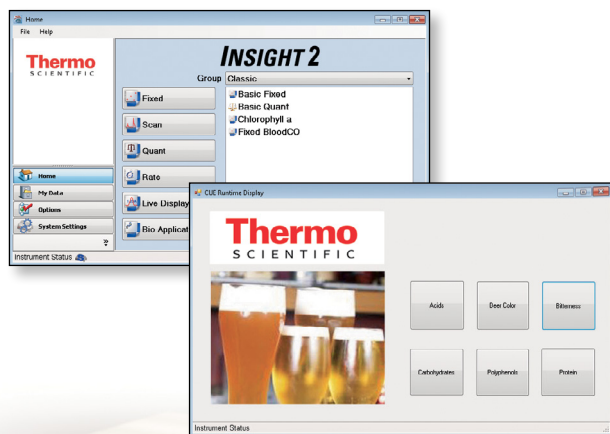
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Thermo Scientific Evolution 201, 220 and 260 Bio UV-Visible Spectrophotometers

Reliability, versatility and convenience move you
from samples to answers faster

From routine QA/QC measurements to complex research studies, the Thermo Scientific™ Evolution™ 200 Series UV-Visible (UV-Vis) spectrophotometers with Thermo Scientific™ INSIGHT™ and CUE™ software are designed to deliver the performance you need with the ease of use you desire, assuring high quality results user after user.



The Evolution 200 Series UV-Visible spectrophotometers offer unrivaled features and performance with a modern, double-beam design; large, room-light resistant sample compartment; and complete line of accessories. INSIGHT software streamlines your workflows and provides maximum support for all your analytical needs with comprehensive and versatile Fixed, Scan, Quant and Rate applications.

Evolution 201 features a 1.0 nm spectral bandwidth for high-resolution data in routine quality control and basic research applications.

Evolution 220 increases the versatility of your system with a selectable bandwidth option for a wider variety of applications. Use with fiber optic probes and integrating spheres for optimal performance with these accessories.

Evolution 260 Bio adds the convenience of pre-programmed Bio Applications for increased productivity in your life science laboratory.

Reliable Performance

Evolution spectrophotometers deliver high-performance and reliability in a convenient, economical design.

- Double-beam optics provide long-term stability during data acquisition
- Instant-on Xenon flash lamp eliminates warm-up requirements and is guaranteed for 3 years of continuous use, typically lasting seven or more years
- Optional Calibration Validation Carousel (CVC) offers hands-free performance verification to ensure accuracy and minimize instrument downtime
- Compliance with U.S. and European pharmacopoeia specifications for UV-Visible spectrophotometers

Versatile Sampling

Evolution spectrophotometers offer an extensive selection of accessories for the measurement of almost any sample type, including solids, liquids and diverse sample sizes and compositions.

- Snap-in, auto-recognition of Thermo Scientific™ Smart Accessories™ allows users to quickly and reliably move between experiments in a multi-user laboratory
- Seamless software integration with sippers, cell changers or autosampler accessories increases productivity for high-throughput applications
- Fiber probe coupler and integrating sphere accessories with integrated detectors and customized beam profiles minimize light loss and maximize photometric performance

Convenient Software Options

From samples to final report, INSIGHT quickly guides you through each step of your analysis.

- INSIGHT software offers comprehensive tools for data collection, analysis and reporting for Fixed, Scan, Quant and Time- or Temperature-based Rate experiments
- INSIGHT Bio software adds pre-programmed bio applications for routine nucleic acid and protein concentrations, colorimetric assays, labeling efficiency and DNA melting for life science laboratories
- INSIGHT Security software provides all the tools you need to achieve 21 CFR Part 11 compliance in the pharmaceutical industry
- INSIGHT Auto software provides connectivity and seamless integration of supported autosamplers for increased efficiency in high-throughput environments

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Guaranteed Performance Specifications

		Evolution 201 UV-Visible Spectrophotometer	Evolution 220 UV-Visible Spectrophotometer	Evolution 260 Bio UV-Visible Spectrophotometer
Optical Design		Double-beam with sample and reference cuvette positions; Czerny-Turner Monochromator	Double-beam with sample and reference cuvette positions; Application Focused Beam Geometry; Czerny-Turner Monochromator	Double-beam with sample and reference cuvette positions; Application Focused Beam Geometry; Czerny-Turner Monochromator
Spectral Bandwidth(s)		1.0 nm	Variable: 1.0 nm; 2.0 nm; AFBG Microcell optimized; AFBG Fiber optic optimized; AFBG Materials optimized	Variable: 1.0 nm; 2.0 nm; AFBG Microcell optimized; AFBG Fiber optic optimized; AFBG Materials optimized
Light Source		Xenon Flash Lamp, 3-year warranty (7 years typical lifetime)		
Detector		Dual Silicon Photodiodes		
Scan Ordinate Modes		Absorbance, % Transmittance, % Reflectance, Kubelka-Munk, log (1/R), log (Abs), Abs*Factor, Intensity		
Wavelength	Range	190–1100 nm		
	Accuracy	±0.5 nm (541.9, 546.1 nm mercury lines) ±0.8 nm (full range 190–1100 nm)		
	Repeatability	≤0.05 nm (546.1 nm mercury line, SD of 10 measurements)		
Scanning Speed		<1 to 6000 nm/min; variable		
Data Intervals		10, 5, 2, 1.0, 0.5, 0.2, 0.1 nm		
Photometric	Range	>3.5 A		
	Display Range	-0.3 to 4.0 A		
	Accuracy – Instrument*	1A: ±0.006 A 2A: ±0.010 A Measured at 440 nm using neutral density filters traceable to NIST		
	Repeatability	±0.0002 A		
	Noise	0A: ≤0.00015 A 1A: ≤0.00025 A 2A: ≤0.00080 A 260 nm, 1.0 nm SBW, RMS		
	Drift (Stability)	<0.0005 A/hr 500 nm, 1.0 nm SBW, 1 hour warm-up		
Stray Light		KCl, 198 nm: ≤1% T NaI, 220 nm: ≤0.05% T NaNO ₂ , 340 nm: <0.05% T		
Baseline Flatness		±0.0010 A 200–800 nm, 1.0 nm SBW, smoothing		
Keypad		Sealed Membrane		
Local Control Option		Optional tablet control module		
Dimensions (W × D × H)		62.2 × 48.6 × 27.9 cm (24" × 19" × 11")		
Weight		14.4 kg (32 lb)		
Electrical Supply		100–240 V, 50–60 Hz, selected automatically 150 W maximum		

Pharmacopoeia Compliance Testing (Guaranteed Performance Specifications)

Resolution (Toluene in Hexane)	≥1.8 A
Photometric Accuracy (60 mg/L K ₂ Cr ₂ O ₇)	±0.010 A
Stray Light	≤1%T at 198 nm: KCl; ≤0.05%AT at 220 nm: NaI, KI
Wavelength Accuracy	±0.5 nm 541.9, 546.1 nm Hg emission lines, ±0.8 nm full range
Wavelength Repeatability	≤0.05 nm, repetitive scanning of 546.1 nm Hg emission line

* Relative to the calibrated value for a neutral density filter

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