**Thermo Scientific**
Evolution 201 and 220 UV-Visible
Spectrophotometers

# Reliable, versatile UV-Vis solutions
## to get you answers faster

# 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 (ĕv′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*
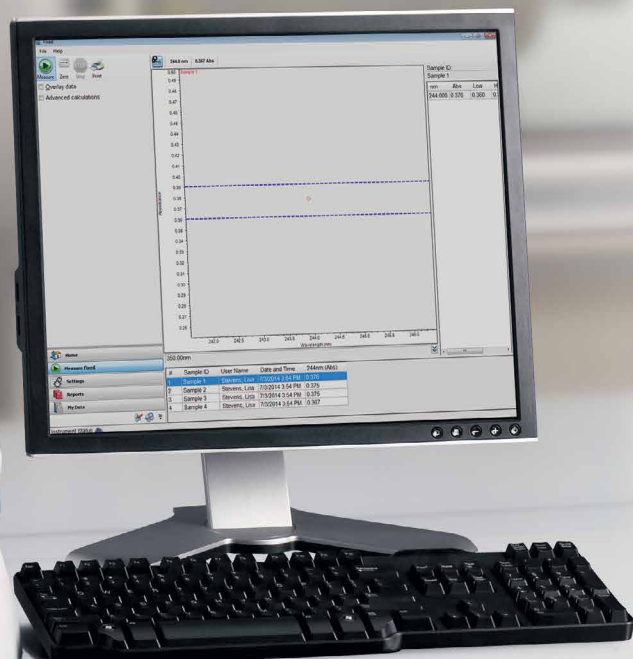
# Reliable performance

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 an optional Calibration Validation Carousel (CVC) for 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
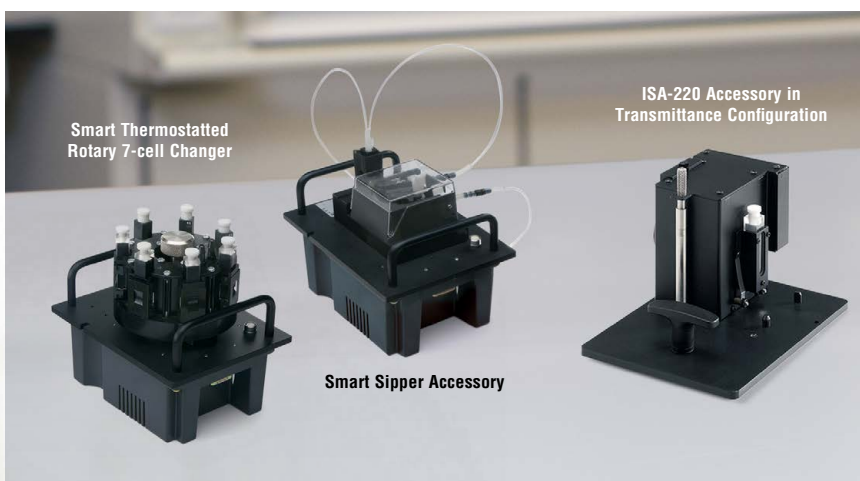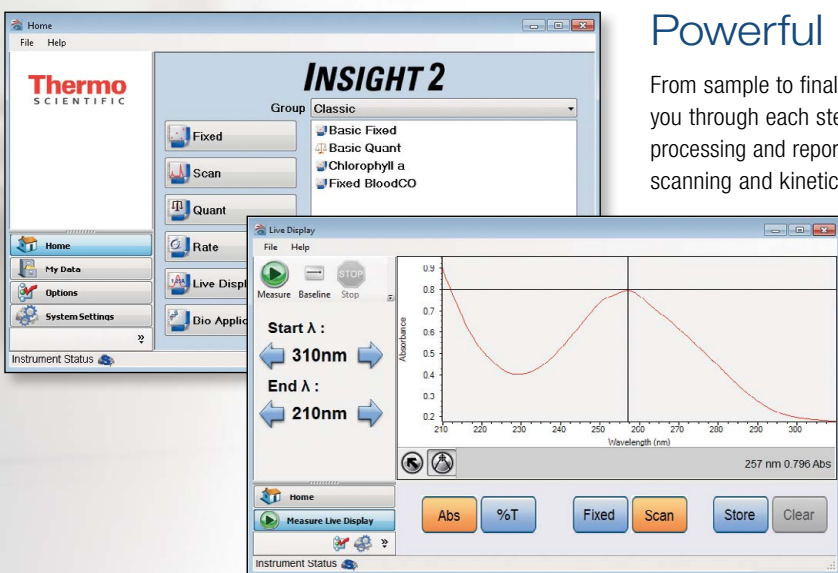
Smart Thermostatted Rotary 7-cell Changer

ISA-220 Accessory in Transmittance Configuration

Smart Sipper Accessory

# 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.

- 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, which provide the same user experience on the built-in touch screen display as an external computer
- 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

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

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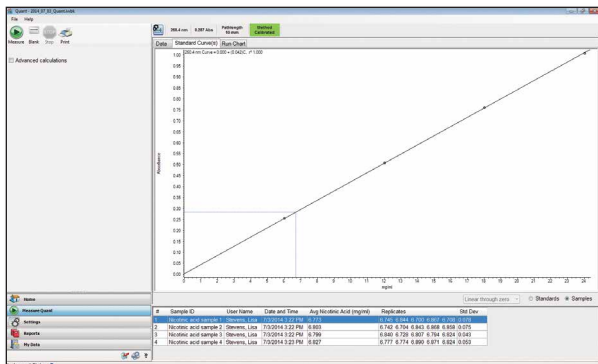


**Automated data processing and visual cues accelerate result analysis**

## 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.
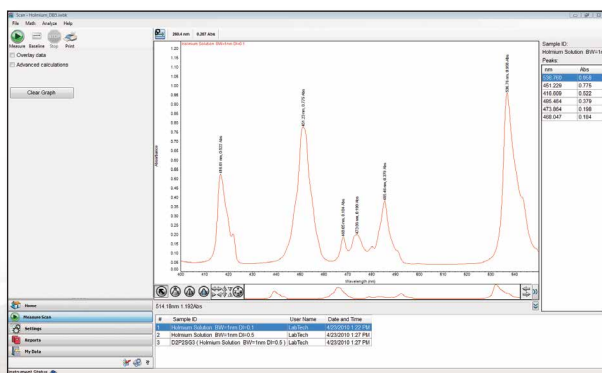


**Full-spectrum data and customizable graphical displays deliver greater clarity for complex problems**
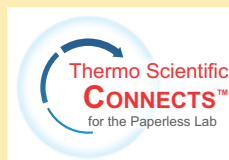
## Versatile spectral analysis

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.

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System Performance Verification Report

Company name: Thermo Scientific
Test Name: Wavelength Accuracy (Holmium oxide)
Operator: Beane, Claire
Date: Thursday, April 11, 2013 9:51:59 AM (GMT-05:00)
Instrument: Evolution 201
Serial number: CMC_Beta10
CVC Serial number: USP - 31773
Accessory base serial number: ROT133902

| Measurement Description | High Limit | Low Limit | Measured | Result |
|---|---|---|---|---|
| Wavelength of 640.55 nm line | 641.55 | 639.55 | 640.28 | Pass |
| Wavelength of 536.63 nm line | 537.63 | 535.63 | 536.46 | Pass |
| Wavelength of 451.41 nm line | 452.41 | 450.41 | 451.79 | Pass |
| Wavelength of 361.31 nm line | 362.31 | 360.31 | 361.80 | Pass |
| Wavelength of 287.90 nm line | 288.30 | 286.30 | 287.76 | Pass |
| Wavelength of 241.21 nm line | 242.21 | 240.21 | 241.73 | Pass |

Company name: Thermo Scientific
Test Name: Wavelength Repeatability (Holmium oxide)
Operator: Beane, Claire
Date: Thursday, April 11, 2013 9:59:50 AM (GMT-05:00)
Instrument: Evolution 201
Serial number: CMC_Beta10
CVC Serial number: USP - 31773
Accessory base serial number: ROT133902

| Measurement Description | High Limit | Low Limit | Measured | Result |
|---|---|---|---|---|
| Standard deviation of 361 nm peak | 0.10 | 0.00 | 0.00 | Pass |

Company name: Thermo Scientific
Test Name: Resolution (Toluene/Hexane)
Operator: Beane, Claire
Date: Thursday, April 11, 2013 10:02:49 AM (GMT-05:00)
Instrument: Evolution 201
Serial number: CMC_Beta10
CVC Serial number: USP - 31773
Accessory base serial number: ROT133902

| Measurement Description | High Limit | Low Limit | Measured | Result |
|---|---|---|---|---|
| Ratio: Max/Min (268 nm/267 nm) | 5.0 | 1.6 | 2.1 | Pass |

Company name: Thermo Scientific
Test Name: Stray Light (KI, 220 nm)
Operator: Beane, Claire
Date: Thursday, April 11, 2013 10:03:46 AM (GMT-05:00)
Instrument: Evolution 201
Serial number: CMC_Beta10
CVC Serial number: USP - 31773
Accessory base serial number: ROT133902

| Measurement Description | High Limit |
|---|---|
| Stray Light at 220 nm (%T) | 0.05 |

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

Multiple results files included in report

# Hands-free performance verification

Ensure the accuracy and reliability of QA/QC data while improving the efficiency of your laboratory with hands-free performance verification. Combine one of our Calibration Validation Carousels (CVCs) with INSIGHT software to minimize errors and instrument downtime.

- Save more than four hours of 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 with automatic CVC identification and file matching

- 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
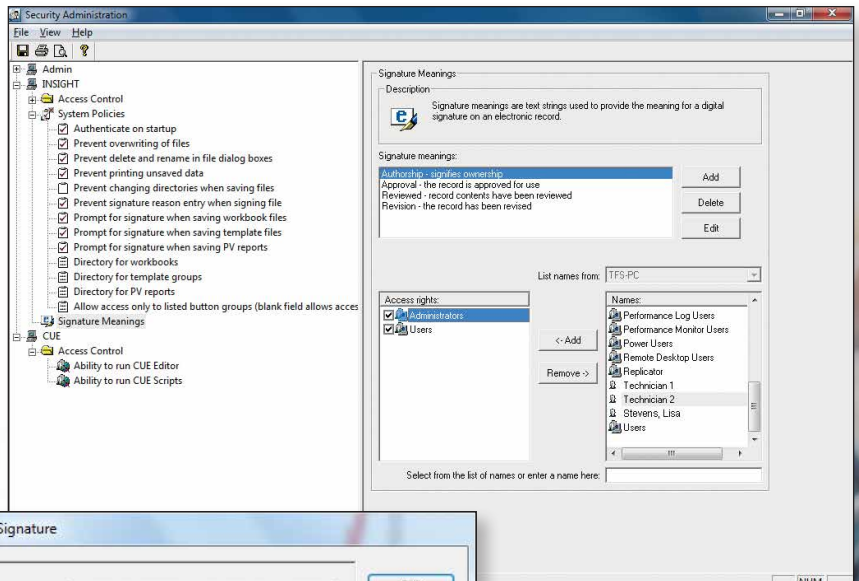


**INSIGHT Security software provides traceability and assures data integrity**

# 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
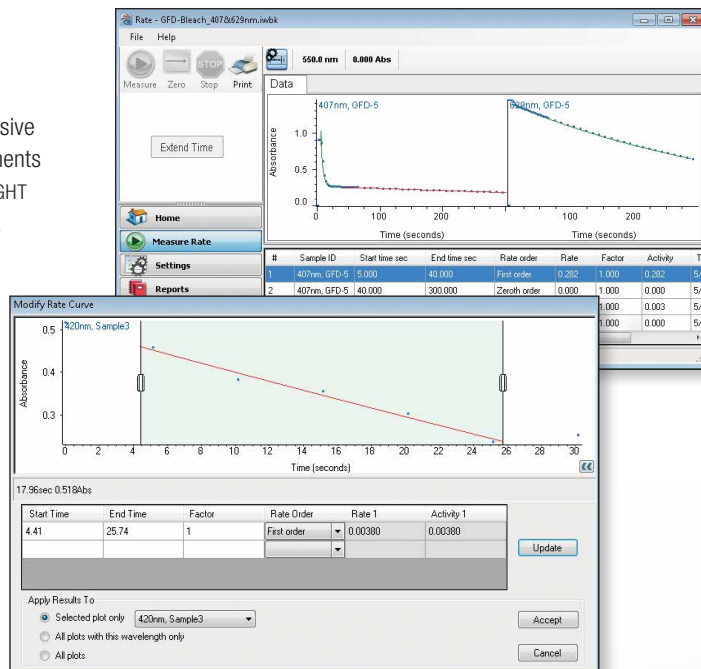


**A collection of versatile software tools provides complete control over your kinetics analysis**

## 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 and record 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
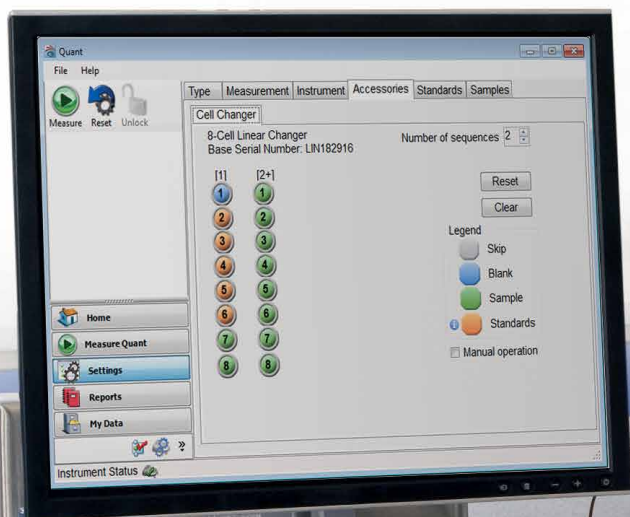
# Materials science solutions

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

**The powder cell holder is optimized to help you analyze small samples**
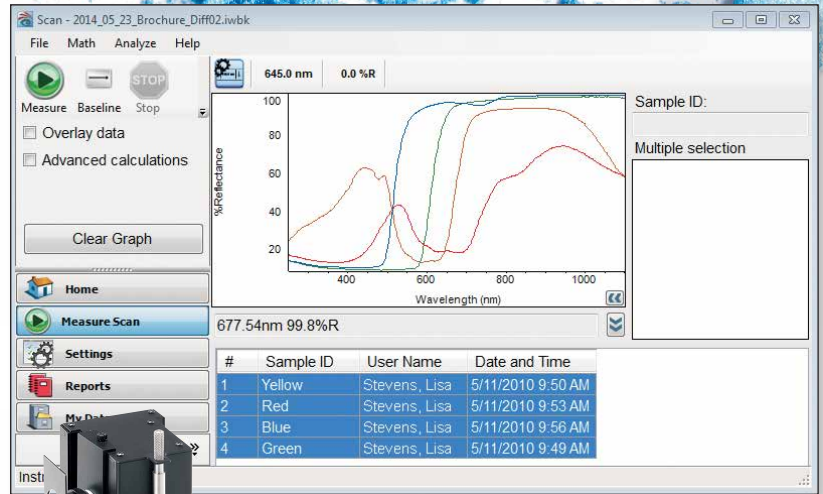
**ISA-220 Accessory in Reflectance Configuration**

# 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 in local and computer controlled instruments. The color touch screen display provides powerful control of the built-in computer in local control instruments.

## 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 an on-board, color touch screen interface in the local control for small footprint and walk-up convenience. USB-A ports provide direct connection from the instrument to a printer or USB keyboard, mouse or other device for simplified data input and control. A USB-B port gives you the added option to use an external computer when desired.
- Choose an external computer for simplified data processing and clearer display of your data on a large screen. External computer control also offers 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 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.
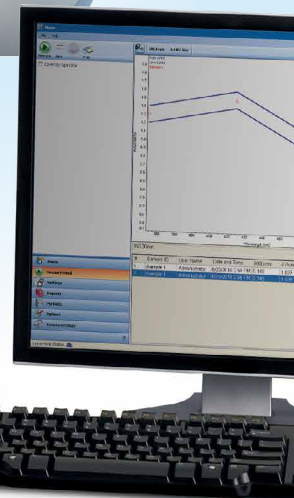
# Expand the functionality of your spectrophotometer

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**

**Single-cell Peltier Holder**

**8-cell Peltier System**

**Smart Thermostatted Linear 8-cell Changer**
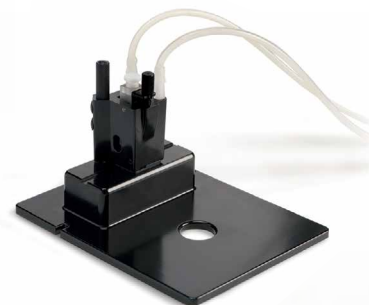
**Thermostatted Rectangular Cell Holder**

**Temperature Probe Hub and Temperature Probes**

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

**Mercury Lamp Calibration Accessory**

**RX2000 Rapid Mix Accessory**
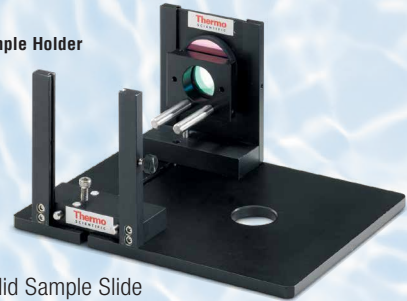
**Smart Calibration Validation Carousel (CVC)**

**Solid Sample Holder**

**ISA-220 Accessory in Transmittance Configuration**

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

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.
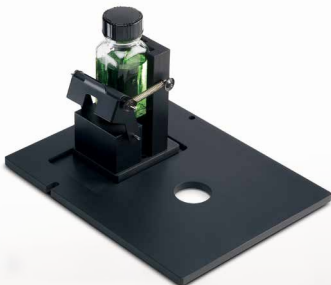
**Rectangular and Cylindrical Reference Cell Holders**

**Adjustable Microcell Holder**

**Fiber Optic Coupler, shown with Micro-probe**

**1 Inch Square Vial Holder**

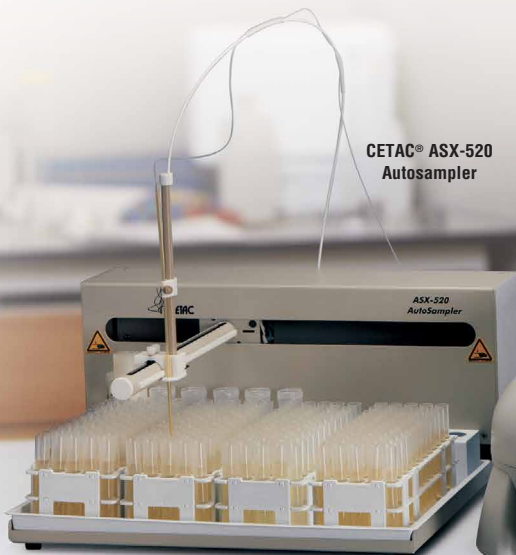**Combination Cuvette and Test Tube Holder**

**Cylindrical Cell Holder**

**Long Pathlength Rectangular Cell Holder**
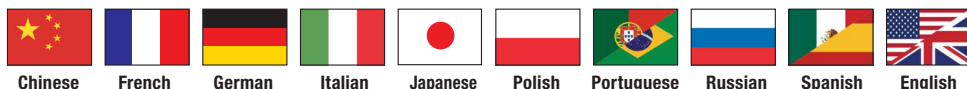
**CETAC® ASX-520 Autosampler**

# 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.

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