Flexible. Accurate. Intuitive.

AGILENT CARY 100/300 SERIES
UV-VIS SPECTROPHOTOMETERS

The Measure of Confidence

Agilent Technologies

AGILENT CARY 100/300 SERIES UV-VIS

Agilent Technologies is your premier resource and partner for molecular spectroscopy. With the addition of the world-renowned Cary product line, encompassing FTIR, UV-Vis-NIR and Fluorescence, Agilent offers you a comprehensive range of molecular spectroscopy solutions.

Answers you can trust

The Agilent Cary 100/300 Series UV-Vis spectrophotometers are flexible, accurate and intuitive. They are designed to meet your application requirements — now and in the future. With a variety of sampling options, high sensitivity, and superior photometric performance, you can be sure that the Agilent Cary 100/300 Series UV-Vis will give you answers you can trust.

Agilent Cary 100 (190–900nm)

The Agilent Cary 100 double beam UV-Vis, with a working range past 4.0 Abs, is ideal for routine and research laboratory work. With variable slit widths, it provides optimum control over data resolution.

Agilent Cary 300 (190–900nm)

The Agilent Cary 300 double beam UV-Vis, with a working range past 6.0 Abs and resolution better than 0.24 nm, is a research grade instrument with a pre-monochromator, making it ideal for the analysis of highly turbid biological samples or highly absorbing solid materials.

Molecular Spectroscopy Innovations

1947 First commercial recording UV-Vis, the Cary 11 UV-Vis	**1954** Release of the Cary 14 UV-Vis-NIR	**1969** First rapid-scanning fourier transform infrared spectrometer, the FTS-14	**1977** Release of the Cary 219 UV-Vis	**1979** First commercial diode-array spectrophotometer, the 8450A	**1989** Release of the acclaimed Cary 1 and 3 UV-Vis	**1995** Launch of the 8453A, the first small-footprint, full-featured diode-array
1997 Cary 50 Series released to coincide with 50th anniversary of Cary 11	**1999** Launch of the Cary Eclipse Fluorescence Series	**2000** First ATR chemical imaging system	**2002** Cary 4000/5000/ 6000i research grade UV-Vis-NIR series released	**2008** Launch of the 600 Series FTIR spectrometers, microscopes and imaging systems	**2011** Agilent offers out-of-lab FTIR solutions	**2011** Release of the Cary 60 UV-Vis

FOR YOUR APPLICATION

Agilent is committed to providing solutions for your application. We have the technology, platforms, and expert guidance you need to be successful.

	 MATERIALS TESTING & RESEARCH	 CHEM & PETROCHEM	 BIOTECH & PHARMA
	ACADEMIA		
Common applications for the Agilent Cary 100	Thin film measurements Measurement of films/multiple filters Color measurements and color matching	Analysis of heavy metals in water, food and agriculture Analysis of organics in water, food and agriculture	DNA and protein quantification Measuring small volumes Monitoring kinetics of reactions that occur at sub-second rates
Common applications for the Agilent Cary 300	Manufacture and testing of optic components/coatings Refractive index measurements Measurement of the UV protection factor (UPF) of fabrics and clothing	Small volume measurements High throughput liquid quantitation Powder and pigment analysis Measuring suspensions and highly scattering samples	DNA and protein denaturation/thermal melts Measuring enzymatic reactions Measuring highly turbid biological samples such as cytochrome P450
Common sampling techniques supported by the Agilent Cary 100/300	Diffuse reflectance accessories (internal and external) Fibre optic coupler accessory 6x6 or 8x6 multicell holder accessories	Diffuse reflectance accessories (internal and external) Fibre optic coupler accessory 6x6 or 8x6 multicell holder accessories Routine sampling accessory	Rapid mix accessory Single cell peltier accessory (accurate temperature control) Peltier multicell accessory Fibre optic coupler accessory Diffuse reflectance accessories (internal and external) Temperature Probe accessory (monitor temperature inside cuvette) Micro-volume cuvettes

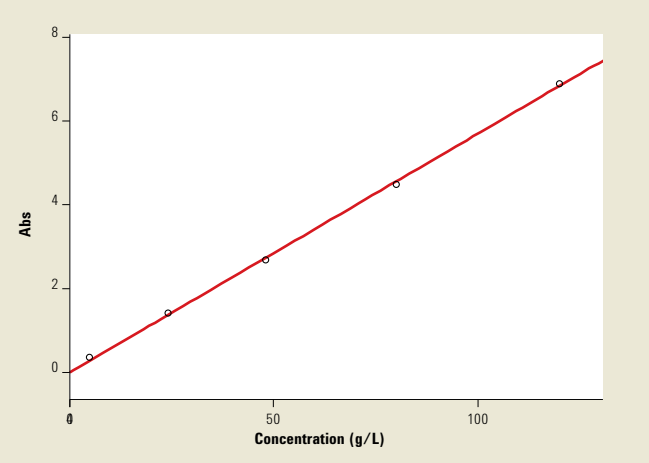
accurate

QUALITY AND PERFORMANCE BY DESIGN

Our proven record of optical design excellence and innovation ensures you get the right answer every time.

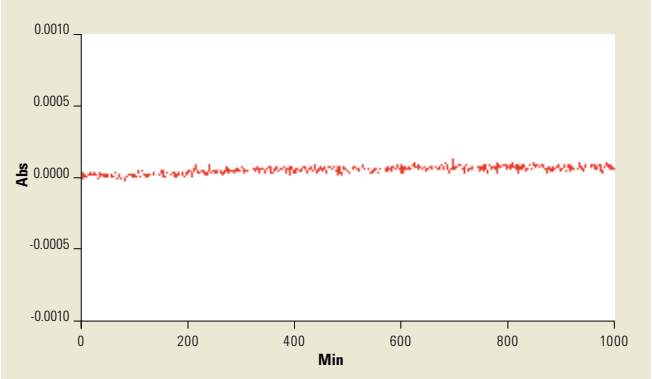
Superior linearity

The excellent linearity of the Agilent Cary 300 makes it ideal for measuring samples as high as 6 Abs accurately and with confidence.



Excellent photometric stability

The optical design of the Agilent Cary UV-Vis instruments ensures superior photometric stability. This means that any absorbance change you observe over time, for example during a kinetics run, is due only to the sample, not to drift in the instrument.



Signal to noise

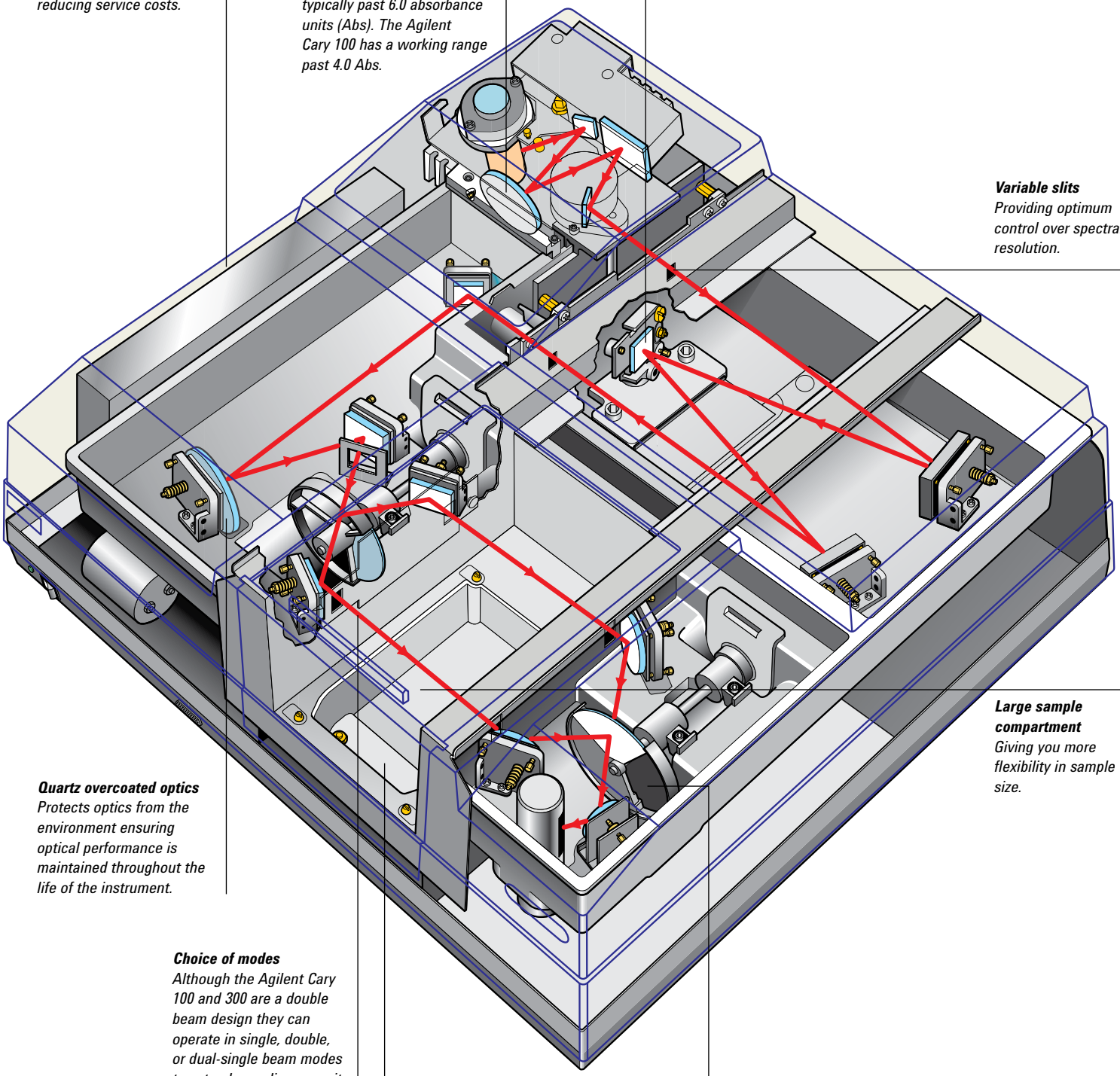
Signal-to-noise (S:N) mode is a unique scanning mode available only on the Agilent Cary instruments that enables you to control the level of precision you want across the whole scan. It is particularly useful for samples that vary significantly in either absorbance or reflectance across the wavelength range.

S:N mode reduces scanning times by over 50% as the system scans quickly in areas of high energy throughput and increases signal averaging when energy throughput is less.

Reduced cost of ownership
The sealed optics prevent exposure to corrosive environments, extending the instrument's lifetime and reducing service costs.

Premonochromator extends range
The Agilent Cary 300 has a premonochromator, extending its linear photometric range typically past 6.0 absorbance units (Abs). The Agilent Cary 100 has a working range past 4.0 Abs.

No peak shifts
A phase locked wavelength drive prevents peak shifts and peak suppression at high scan speeds.



Variable slits
Providing optimum control over spectral resolution.

Large sample compartment
Giving you more flexibility in sample size.

Quartz overcoated optics
Protects optics from the environment ensuring optical performance is maintained throughout the life of the instrument.

Choice of modes
Although the Agilent Cary 100 and 300 are a double beam design they can operate in single, double, or dual-single beam modes to extend sampling capacity.

Accessory controller
The accessory controller offers centralized accessory control, allowing you to control Agilent and common third-party accessories.

Superior optical design
Double choppers ensure that the sample and reference beam strike the detector at the same point, eliminating any errors due to non-uniformity of the detector.

YOU CAN DO IT ALL WITH A CARY

Agilent Cary 100/300 Series UV-Vis spectrophotometers are complemented by a range of accessories, supplies and software designed specifically for your application needs.

Performance enhancing accessories

The vast range of accessories for Agilent Cary 100/300 Series UV-Vis ensures you can handle the widest variety of sample sizes and types.

Accessories for solids, powders and pastes

- Internal and external diffuse reflectance accessories (DRA)
- Sample transport accessory and film holder
- Solid sample holder

Accessories for liquid samples

- Diffuse reflectance accessories (DRA)
- Multicell holder
- Peltier temperature single and multicell holders
- Polarizer and depolarizer
- Rapid mix accessory
- SPS 3 sample preparation system (Autosampler)
- Routine sampler accessory, water thermostatted or peltier controlled
- Temperature probe

Consumables for UV-Vis

- Agilent's range of UV-Vis consumables includes cuvettes, flow cells and lamps

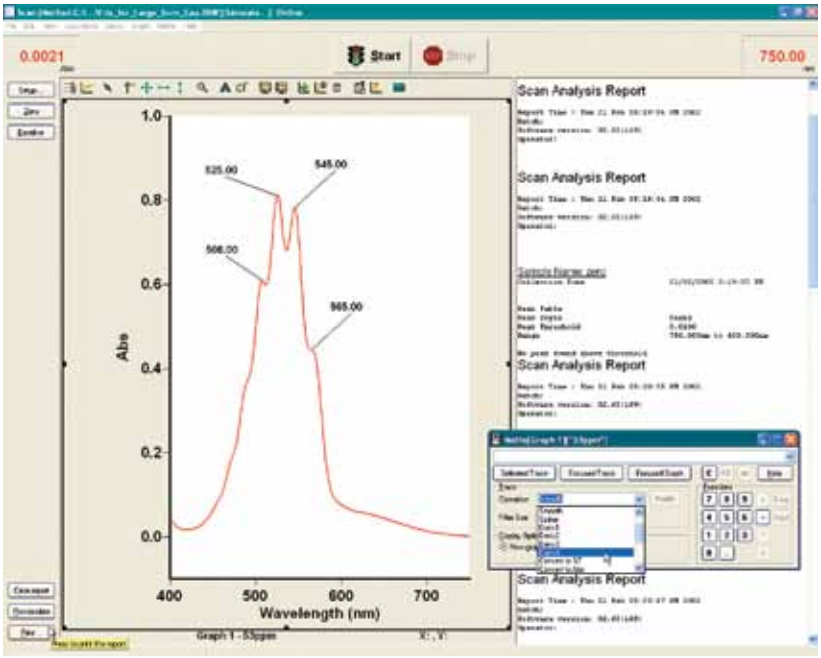
Control cell temperature from -10 °C–100 °C
The thermostattable multicell holder consists of two staggered six cell holders which provide magnetic stirring in each of the 12 cells. Use it in conjunction with the temperature probe to measure the temperature inside the cuvette.

DISTINCTLY BETTER SOFTWARE

User friendly, application focused software provides complete instrument control.

Software designed for real samples

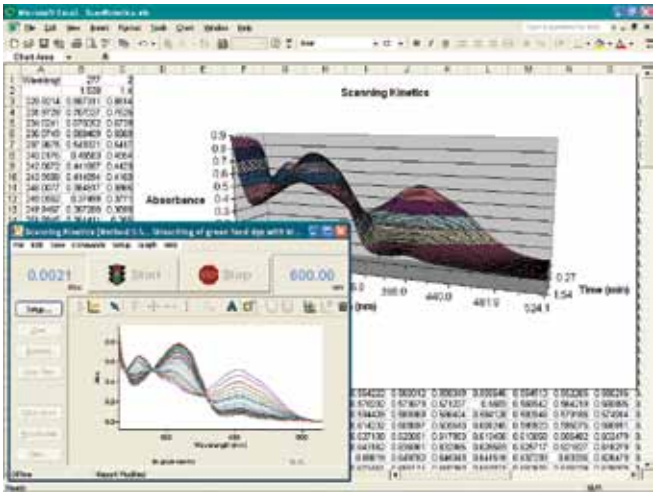
The modular design of the Cary WinUV software means that it can be tailored to suit your analytical requirements — whether it's a materials science application using wavelength scanning measurements or life science applications requiring advanced enzyme kinetics or thermal control.



Advanced data processing
Use the spectrum calculator to apply mathematical operations, including addition, subtraction, division, multiplication, log and square root functions, to spectra. The calculator also features mean, normalization, smoothing, up to fourth order derivatives, integration and the Kubelka-Munk correction algorithm.

Enhanced graphics features
The graphics control module has automatic peak labelling, zoom, free and tracking cursor, multiple ordinate and abscissa formats, smart copy/paste and overlay modes, making spectral interpretation and presentation for publications a breeze.

Meet your application challenges
Use the powerful built-in Applications Development Language (ADL) to tailor the WinUV software to meet your most specific applications.



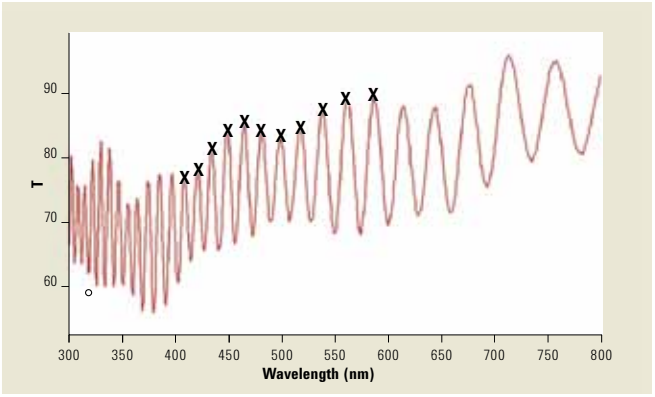
Enhanced file transfer and report export capabilities
The auto convert function allows you to convert your data files automatically for use in another program. You can also elect to store your data files in formats that can be directly imported into a spreadsheet.

MATERIALS TESTING AND RESEARCH APPLICATIONS

When you need to consistently and cost-effectively deliver the highest quality finished products and materials, innovative, reliable analytical solutions are essential to your success. The Agilent Cary 100/300 Series UV-Vis provide unrivalled photometric accuracy and linearity across the broadest wavelength range, combined with the widest and most versatile sampling solutions.

Thin Film Measurements

The Agilent Cary 100/300 Series UV-Vis with internal diffuse reflectance accessory (DRA) or VW specular reflectance accessory (VW SRA) accurately determines the thickness of thin film coatings in the UV-Vis spectral region by measuring the number of interference fringes from the sample. For calculating the refractive index (RI) of the sample or measuring thin film coatings in the Near IR region, use the Agilent Cary 5000 or Cary 6000i.



Fringes were used to determine the film thickness of a thin film coating on a polycarbonate substrate. The thickness was calculated to be 4.52 µm.

VW Specular Reflectance Accessory (VW SRA)
The VW SRA can be used with the Agilent Cary 100/300 UV-Vis to accurately determine the film thickness.

Solid sample measurements
Use the solid sample holder for securing and positioning samples during UV transmission measurements of solids such as filters, glass and textiles. These versatile holders can be configured to cater to a range of sample sizes.

DRA for diffuse transmission measurements
Use the Agilent Cary 100/300 Series UV-Vis with DRA or fibre optic reflectance probes to perform color measurement or color matching of liquids, solids and pastes, and samples that are too large to fit in the sample compartment.

Measurement of films/multiple filters

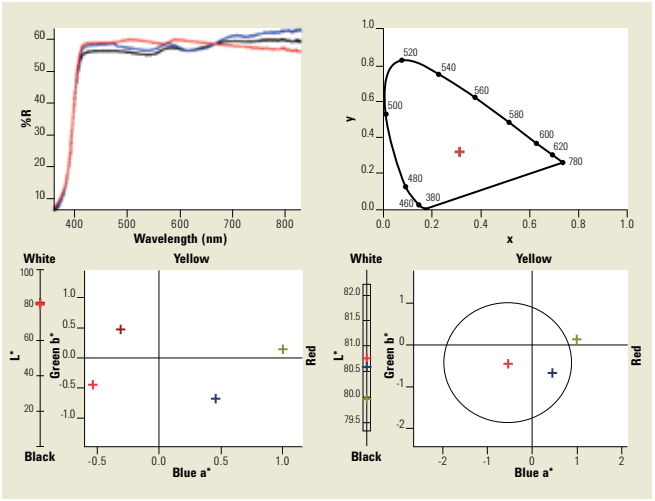
Use the Agilent Cary 100/300 Series UV-Vis with motorized sample transport accessory and film holder to determine surface homogeneity and/or defect rates of films, gels, wafers or multiple filters.

- Eliminates time-consuming, manual adjustments, reducing operational error and cost
- Accurate and reproducible sample positioning in the sample compartment
- Automated scanning capability is ideal for monitoring intra-sample homogeneity and detecting sample defects
- Able to accommodate multiple optical samples, making it ideal for fast QA/QC or accelerated R&D applications requiring inter-sample comparisons

Solid sample measurements
For rapid measurement of sheets, films, gels, wafers or multiple filters.

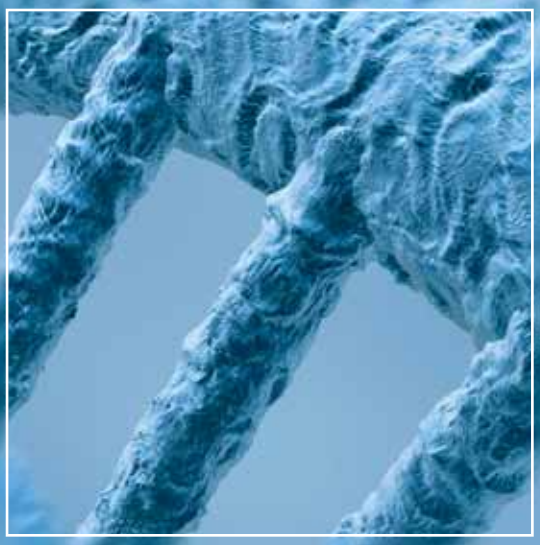
Color Measurements

Use the Agilent Cary 100/300 Series UV-Vis with DRA or fibre optic reflectance probes to perform color calculations for liquids, solids, pastes or samples that are too large to fit in the sample compartment.



The optional Color Calculation software supports an extensive range of color calculations, including Tristimulus, Chromaticity, CIE Lab, CIE LUV, and many more.

trusted



BIOTECH AND PHARMA APPLICATIONS

In a field that demands accuracy, productivity and regulatory compliance, your challenges have never been greater. The Agilent Cary 100/300 Series UV-Vis provide unrivalled optical performance and superior temperature control to measure the most challenging samples with the highest accuracy.

Complete IQ/OQ services

Agilent offers complete qualification services (IQ/OQ) for the Agilent Cary 100/300 Series UV-Vis hardware, software and accessories.

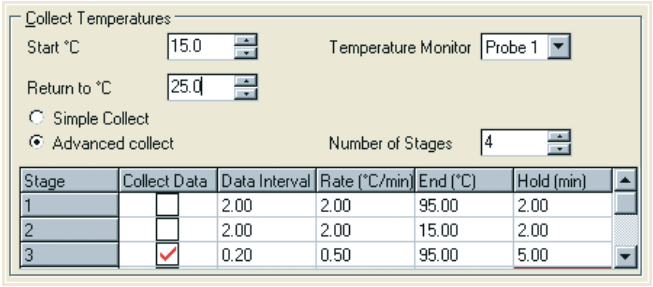
Excellent temperature control

The temperature controlled single or multicell peliter thermostatted cell holders offer:

- Excellent stability control over time (typical variation ±0.05 °C)
- Minimal cell-to-cell variation (maximum difference, 0.2 °C at 37 °C)
- Accurately measure the temperature of the actual sample within the cuvette using temperature probes
- In-built electromagnetic stirring providing complete control of the stirring speed, with no fluctuations (up to 12 cells).

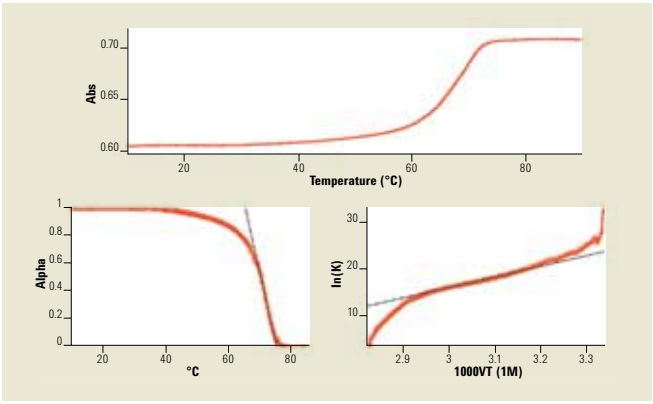
The leader in thermal melts

Superior multi- and single-cell peltier temperature control allows temperature ramp rates as slow as 0.06 °C/min to be selected for high resolution DNA and protein thermal melting experiments.



Unrivaled temperature control

Select up to 20 thermal denaturation and renaturation ramps within one data file for annealing and thermal melt experiments in one vessel.



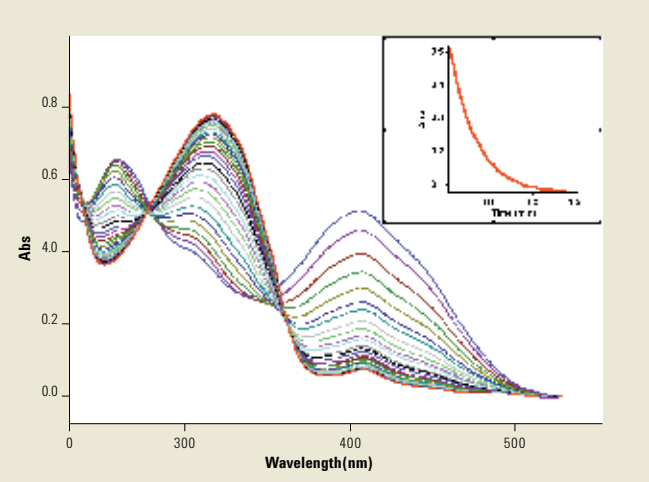
Superior signal to noise performance

The excellent signal to noise performance of the Agilent Cary 100/300 Series UV-Vis instruments means you can detect very small absorbance changes in thermal melt (Tm) curves with ease.

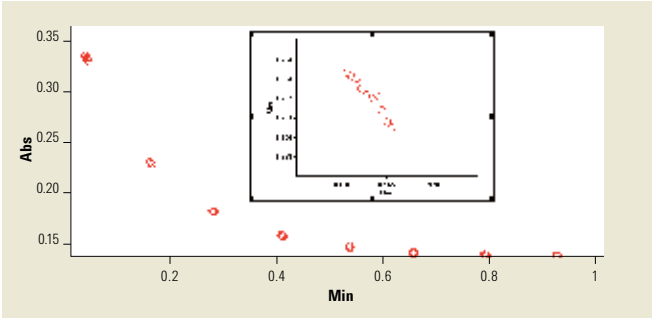
Monitor temperature control
The Temperature probe accessory enables the temperature inside the cuvette to be measured and used to control the temperature rates of your experiment.

Advanced kinetics analysis

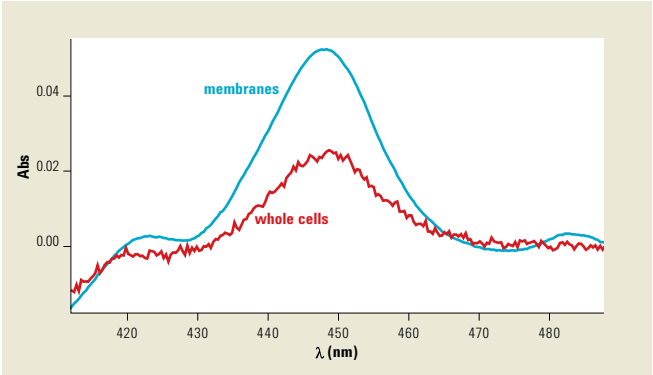
Data collection rates can be varied to collect more data when you need it — fast at the start (up to 30 data points per second) and then slower during the later part of the reaction. The Kinetics software also accommodates long, slow reactions and is capable of collecting data for up to 5.5 days without limiting the number of data points collected.



Obtain kinetics curves easily
With a mouse-click you can obtain a kinetics curve from a series of repetitive curves. The insert shows the kinetics curve at 410 nm.



Perform 1 experiment instead of 12
The Dwell Time option allows you to measure multiple data points per cell before moving to the next cell. The insert is a zoomed section showing data points collected in less than 1 second.



Measure highly turbid samples
Baseline corrected scans of both whole cells and plasma membrane vesicles from a bacterial strain expressing low levels of cytochrome P450 are shown. Such cultures are highly turbid suspensions with high background optical density, which typically makes it difficult to detect very small changes in absorbance. The Agilent Cary 300 enables such measurements to be taken directly on whole cells directly from a cuvette.

Trust Agilent to keep your lab running at peak productivity

Agilent's Advantage Service protects your investment in Agilent instruments and connects you with our global network of experienced professionals who can help you get the highest performance from every system in your lab. Count on us for the services you need at every stage of your instrument's lifecycle – from installation and upgrade to operation, maintenance and repair.

For customers who require full system validation, Agilent offers complete qualification services (Installation and Operational Qualification) for the Agilent Cary 100/300 Series UV-Vis hardware, software and accessories.

And if ever your Agilent instrument requires service while covered by an Agilent service agreement, we guarantee repair or we will replace your instrument for free. No other manufacturer or service provider offers this level of commitment.

Further information

For full details of the Agilent Cary range of molecular spectroscopy products, ask for a brochure or visit our web site at www.agilent.com/chem/UV/

Cary 60 UV-Vis Spectrophotometer
Publication number 5990-7789EN

Cary 4000/5000/6000i UV-Vis-NIR Spectrophotometers
Publication number 5990-7786EN

Cary Eclipse Fluorescence Spectrophotometer
Publication number 5990-7788EN

Molecular Spectroscopy Portfolio
Publication number 5990-7825EN

Our catalog of new applications is ever growing.

To learn about the latest, contact your local Agilent Representative or visit us at:
www.agilent.com/chem/

Find out how Agilent's Molecular Spectroscopy Solutions can deliver the performance, accuracy and flexibility you need.

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Agilent Cary 100/300 Series UV-Vis

Typical specifications

Design overview

Double beam, dual chopper, ratio recording, Czerny-Turner 0.278 m monochromator UV-Vis spectrophotometer, centrally controlled by a computer. Agilent Cary 300 has double dispersion, Agilent Cary 100 has single dispersion. High light throughput optical system with all reflective optical design, high speed accurate scanning. Optional centrally-controlled accessory system. High performance R928 photomultiplier tube, tungsten-halogen visible source with quartz window, deuterium arc ultraviolet source.

Agilent Cary 100/300 Series UV-Vis spectrophotometers are manufactured according to a quality management system certified to ISO 9001. These typical specifications represent the average results of the final acceptance tests performed in the factory. With a sample of over two thousand Cary 100 and 300 UV-Vis instruments, the specifications are indicative of the performance of Cary 100/300 Series UV-Vis instruments. These specifications are not guaranteed. The guaranteed specifications are listed in a separate publication and are based on the ±4 sigma statistical confidence level.

Performance

	Agilent Cary 100	Agilent Cary 300
Monochromator	Czerny-Turner 0.278 m	Czerny-Turner 0.278 m plus pre-monochromator
Grating	30 x 35 mm, 1200 lines/mm, blaze angle 8.6° at 240 nm	
Beam splitting system	Chopper (30+ Hz)	Chopper (30+ Hz)
Detectors	R928 PMT	R928 PMT
UV-Vis limiting resolution	≤ 0.189 nm	≤ 0.193 nm
Stray light		
At 198 nm (12 g/L KCl, TGA & BP/EP method)	≤ 0.50 %T	≤ 0.32 %T
At 220 nm (10 g/L NaI ASTM method)	≤ 0.0074 %T	≤ 0.00008 %T
At 370 nm (50 mg/L $NaNO_2$)	≤ 0.0013 %T	≤ 0.000041 %T
Wavelength range	190–900 nm	190–900 nm
Wavelength accuracy		
At 656.1 nm	± 0.02 nm	± 0.02 nm
At 486.0 nm	± 0.04 nm	± 0.04 nm
Wavelength reproducibility		
Peak separation of repetitive scanning of a UV-Vis line source	< 0.008 nm	< 0.008 nm
Standard deviation of 10 measurements	< 0.02 nm	< 0.02 nm
Photometric accuracy		
Using double aperture method at 0.3 Abs	± 0.00016 Abs	± 0.00016 Abs
Using NIST 930D filters at 1 Abs	± 0.003 Abs	± 0.003 Abs
At 0.5 Abs	± 0.002 Abs	± 0.002 Abs
Standard solution methods:		
At 0.2, 0.5 & 0.75 Abs (14.2% w/v KNO_3, TGA method)	± 0.01 Abs	± 0.01 Abs
0.292 to 0.865 Abs (60.06 mg/L $K_2Cr_2O_7$, BP method)	± 0.01 Abs	± 0.01 Abs
0.955 Abs (600.06 mg/L $K_2Cr_2O_7$, BP method)	± 0.012 Abs	± 0.012 Abs
Photometric range	4.0 Abs	6.0 Abs
Photometric display	± 9.9999 Abs	± 9.9999 Abs
	± 200.00 %T	± 200.00 %T
Photometric reproducibility		
Using NIST 930D filters at 590 nm, 2 nm SBW, 2 s SAT:		
Maximum deviation at 1 Abs	< 0.0008 Abs	< 0.0008 Abs
Standard deviation for 10 measurements	< 0.00016 Abs	< 0.00016 Abs
Using NIST 930D filters, at 546.1 nm, 2 nm SBW, 2 s SAT:		
Maximum deviation at 0.5 Abs	< 0.0004 Abs	< 0.0004 Abs
Standard deviation for 10 measurements	< 0.00008 Abs	< 0.00008 Abs
Photometric stability		
After 2 h warmup, 500 nm, 2 nm SBW, 1 s SAT	< 0.0003 Abs/h	< 0.0003 Abs/h

Agilent Cary 100/300 Series UV-Vis

Performance

	Agilent Cary 100	Agilent Cary 300
Photometric noise 500 nm, 2 nm SBW, 1 s SAT		
At 0 Abs	≤ 0.000030 Abs, RMS	≤ 0.000030 Abs, RMS
At 3 Abs, 1.5 Abs RBA	≤ 0.00014 Abs, RMS	≤ 0.00025 Abs, RMS
At 5 Abs, 1.5 Abs RBA	–	≤ 0.0022 Abs, RMS
Baseline flatness 200 to 850 nm, smooth 21 filter applied, baseline corrected	± 0.00022 Abs, RMS	± 0.00025 Abs, RMS
Sample compartment		
Beam separation	110 mm	110 mm
Size (Extended Sample Compartment fitted)	139 x 389 x 129 mm (width x depth x height)	139 x 389 x 129 mm (width x depth x height)
Access	Top and front	Top and front
Purging	Sample compartment	Sample compartment
Instrument dimensions	640 x 650 x 320 mm (width x depth x height)	640 x 650 x 320 mm (width x depth x height)
Instrument weight	45 kg	45 kg

Operational

Spectral bandwidth	0.20–4.00 nm, 0.1 nm steps, motor-driven	0.20–4.00 nm, 0.1 nm steps, motor-driven
Signal averaging	0.033 to 999 s	0.033 to 999 s
Maximum scan rate	3000 nm/min	3000 nm/min
	37 046 cm^{-1}/min depending on range	37 046 cm^{-1}/min depending on range
	30 000 Å/min	30 000 Å/min
Slew rate (changing between wavelengths)	3000 nm/min	3000 nm/min
Data interval	0.02-1.67 nm	0.02–1.67 nm
	5.541-20.6 cm^{-1} depending on scan range	5.541–20.6 cm^{-1} depending on scan range
	0.2-16.7 Å	0.2–16.7 Å
Repetitive scanning	1800	1800
Maximum number of cycles	999	999
Maximum cycle time	999 min	999 min
Data collection rate (kinetic studies)		
1 cell	1800 points/min per cell	1800 points/min per cell
6 cell	5 points/min per cell	5 points/min per cell
12 cell	5 points/min per cell	5 points/min per cell
14 cell	3–4 points/min per cell	3–4 points/min per cell
6 cells, 0.033 SAT 0.34 s dwell time	50 points/min per cell	50 points/min per cell
12 cells, 0.033 SAT 0.34 s dwell time	40–50 points/min per cell	40–50 points/min per cell
14 cells, 0.033 SAT 0.34 s dwell time	30–40 points/min per cell	30–40 points/min per cell
Temperature monitors	Cell block, up to 4 temperature probes inside cuvettes or elsewhere	

Recommended environmental conditions

	Agilent Cary 100/300
Instrument storage	5–45 °C at 20–80% relative humidity, non-condensing, altitude < 2133 m.
Instrument operation	Below 853 m altitude: 10–35 °C, 50–80% relative humidity, non-condensing. Between 853 and 2133 m altitude: 10–25 °C, 50–80% relative humidity, non-condensing.
Instrument electrical requirements	Mains supply of 100/120/220/240 ± 10%, 230 +14% -6%, 230 +6% - 14% volts AC, 50 or 60 Hz ± 1 Hz with 400 VA power consumption.

Support policies

Type	Policy
Warranty	12 months, though this may vary according to location.
Hardware support period	Seven (7) years from date of last unit manufacture. After this time, parts and supplies will be provided if available.
Software support	Telediagnostic capability is available for some instrument models. Availability of Telediagnostic support may vary according to location. Software upgrades to add additional functionality will attract a fee.

Further details

More information
For further information, consult your Agilent office or supplier, or our website at www.agilent.com

www.agilent.com/chem

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