

# UV-VIS-NIR

CARY UV-VIS-NIR SPECTROPHOTOMETERS

## Guaranteed Specifications

## SPECIFICATIONS

### Guaranteed Specifications

Cary spectrophotometers are manufactured according to a Quality system certified to ISO-9001. The guaranteed specifications are listed below and are based on the  $\pm 3$  sigma statistical confidence level of the final acceptance tests performed at the factory. Typical instrument performance is listed in a separate brochure and demonstrates the average performance of a large number of instruments.

### Cary 400 and 500

Double beam, ratio recording, double out-of-plane Littrow monochromator, UV-Vis spectrophotometer (Cary 500 is UV-Vis NIR), 2 x 400 mm focal length, dual double sided gratings, centrally controlled by a PC. High speed non-measurement-phase-stepping wavelength drive. UV-Vis detector: high performance R928 photomultiplier tube, NIR detector (Cary 500 only): electrothermally controlled lead sulfide photocell, tungsten halogen visible source with quartz window, deuterium arc UV source. Choice of software interfaces.

### Cary 100 and 300

Double beam, dual chopper, ratio recording, Czerny-Turner monochromator UV-Vis spectrophotometer, centrally controlled by a PC. Cary 300 has double dispersion, 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 ultra violet source. Choice of software interfaces.

	Cary 500	Cary 400	Cary 300	Cary 100
<b>Monochromator</b>	Double out-of-plane Littrow monochromator		Czerny-Turner plus pre-monochromator	Czerny-Turner
<b>Grating</b>	70 x 45 mm UV/VIS: 1200 lines/mm, blazed at 250 nm NIR: 300 lines/mm blazed at 1192 nm		30 x 35 mm, 1200 lines/mm, blaze angle 8.6° at 240 nm	
<b>Beam Splitting System</b>	Chopper (30+Hz)		Chopper (30+Hz)	
<b>Detectors</b>	R928 PMT NIR: Cooled PbS	R928 PMT	R928 PMT	R928 PMT
<b>UV-Vis Limiting Resolution (nm)</b>	< 0.05	< 0.05	< 0.20	< 0.20
<b>Stray Light (%T)</b>				
At 220 nm (10 g/L NaI ASTM method)	< 0.00008%	< 0.00008%	< 0.0005%	< 0.02%
At 370 nm (50 mg/L NaNO <sub>2</sub> )	< 0.00008%	< 0.00008%	< 0.0002%	< 0.005%
At 200 nm (12 g/L KCl, TGA & BPEP method)	< 1%	< 1%	< 1%	< 1%
At 370 nm (0.25 g/L K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> , TGA method)	< 1%	< 1%	< 1%	< 1%
At 1420 nm (H <sub>2</sub> O, 1 cm pathlength)	0.00045%			
At 2365 nm (CHCl <sub>3</sub> , 1 cm pathlength)	0.0005%			
<b>Wavelength Range</b> (N <sub>2</sub> purge required below 185 nm)	175 - 3300 nm	175 - 900 nm	190 - 900 nm	190 - 900 nm
<b>Wavelength Reproducibility (nm)</b> (Peak separation of repetitive scanning of a UV-Vis line source)	< 0.025	< 0.025	< 0.08	< 0.08
<b>NIR</b>	< 0.1			
<b>Standard deviation of 10 measurements, UV-Vis</b>	< 0.005	< 0.005	< 0.02	< 0.02
<b>NIR</b>	< 0.02			
<b>Photometric Accuracy (Abs)</b>				
Using Double Aperture method at 1 Abs	± 0.0006	± 0.0006	± 0.0012	± 0.0012
At 0.3 Abs	± 0.0003	± 0.0003	± 0.0006	± 0.0006
Using NIST 930D Filters at 1 Abs	± 0.003	± 0.003	± 0.003	± 0.003
At 0.5 Abs	± 0.002	± 0.002	± 0.002	± 0.002
<b>Standard Solution methods:</b>				
At 0.2, 0.5 & 0.75 Abs (14.2%w/v KNO <sub>3</sub> , TGA method)	± 0.01	± 0.01	± 0.01	± 0.01
0.292 to 0.865 Abs (60.06 mg/L K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> , BP method)	± 0.01	± 0.01	± 0.01	± 0.01

	Cary 500	Cary 400	Cary 300	Cary 100
<b>Photometric Linearity (Abs)</b> (All tests performed by addition of filters technique) UV-Vis (500 nm, 1 second Signal Averaging Time)				
At 1.0 Abs	0.001	0.001		
At 2.0 Abs	0.0018	0.0018		
At 3.0 Abs	0.0081	0.0081		
<b>Photometric Linearity (Abs)</b> NIR (1200 nm, energy level 3)				
At 1.0 Abs	0.0015			
At 2.0 Abs	0.007			
<b>Wavelength Accuracy (nm)</b>				
UV-Vis	± 0.1	± 0.1	± 0.2	± 0.2
NIR	± 0.4			
<b>Photometric Range (Abs)</b>	7.0 (with RBA)	7.0 (with RBA)	5.0	3.7
<b>Photometric Display (Abs)</b>	± 9.99999	± 9.99999	± 9.9999	± 9.9999
%T	± 200.0000	± 200.0000	± 200.00	± 200.00
<b>Photometric Reproducibility (Abs)</b> Using NIST 930D filters, at 590 nm, 2 nm SBW, 2 second Signal Averaging Time				
Maximum deviation at 1 Abs	< 0.0008	< 0.0008	< 0.0008	< 0.0008
Standard deviation for 10 measurements	< 0.00016	< 0.00016	< 0.00016	< 0.00016
Using NIST 930D filters, at 546.1 nm, 2 nm SBW, 2 second Signal Averaging Time.				
Maximum deviation at 0.5 Abs	< 0.0004	< 0.0004	< 0.0004	< 0.0004
Standard deviation of 10 measurements	< 0.00008	< 0.00008	< 0.00008	< 0.00008
<b>Photometric Stability</b> After 2 hour warm up, 500 nm, 2 nm SBW, 1 sec Signal Averaging Time (Abs/hour)				
	< 0.0002	< 0.0002	< 0.0003	< 0.0003
<b>Photometric Noise (Abs, RMS)</b> UV-Vis (500 nm, 1 second Signal Averaging Time, 2 nm SBW)				
At 0 Abs	< 0.00005	< 0.00005	< 0.00006	< 0.000085
At 1 Abs	< 0.00015	< 0.00015	< 0.0002	< 0.0002
At 2 Abs	< 0.0003	< 0.0003	< 0.0003	< 0.0003
At 3 Abs, 1.6 Abs RBA	< 0.0003	< 0.0003	< 0.0004	< 0.0004
At 4 Abs, 1.6 Abs RBA	< 0.001	< 0.001	< 0.003	-
At 5 Abs, 1.6 Abs RBA	< 0.005	< 0.005	< 0.008	-
At 6 Abs, 3 Abs RBA	< 0.008	< 0.008	-	-
NIR (1500 nm, 1 second Signal Averaging Time, 2 nm SBW)				
At 0 Abs	< 0.00004			
At 1 Abs	< 0.0001			
At 2 Abs	< 0.001			
At 3 Abs, 1.6 RBA	< 0.005			
<b>Baseline Flatness (Abs)</b> 200 to 850 (Cary 100, 300, 400), 200 to 3000 nm (Cary 500), 4 nm SBW UV/Vis, Energy 1 NIR, baseline corrected, smooth 21 filter applied				
	± 0.001	± 0.001	± 0.001	± 0.001
<b>Sample Compartment</b> Beam Separation (mm)				
	190.5	190.5	110	110
<b>Compartment size (WxDxH)</b> (Extended Sample Compartment fitted)				
	160 mm x 433 mm x 215 mm		139 mm x 389 mm x 129 mm	
Access	top, front and base		top and front	
<b>Purging</b>				
Sample compartment	•	•	•	•
Optics	•	•		
<b>Instrument Dimensions (WxHxD)</b>				
	1000 mm x 340 mm x 650 mm		640 mm x 320 mm x 650 mm	
<b>Instrument Weight</b>				
	90 kg	90 kg	45 kg	45 kg

## Recommended environmental

<b>Instrument storage</b>	5-45 °C at 20-80% relative humidity, non-condensing, altitude < 2133 m.
<b>Instrument operation</b>	below 853 metres altitude: 10-35 °C, 8-80% relative humidity, non-condensing between 853 and 2133 metres altitude: 10-25 °C, 8-80% relative humidity, non-condensing
<b>Instrument electrical requirements</b>	Mains supply of 100/120/220/240 volts AC ± 10%, 50 or 60 Hz ± 1 Hz with 500 VA power consumption (Cary 400 & 500) 400 VA power consumption (Cary 100 & 300)

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### Operational

	Cary 500	Cary 400	Cary 300	Cary 100
Spectral Bandwidth (nm)	UV-Vis 0.01 nm to 5.00 nm, 0.01 nm steps, motor driven, NIR 0.04 to 20 nm		0.20-4.00 nm, 0.1 nm steps, motor driven	
Signal Averaging (seconds)	0.033 to 999	0.033 to 999	0.033 to 999	0.033 to 999
Maximum Scan Rate (nm/min)/(cm-1/min*)/Å/min)				
UV-Vis	2000/31206/20000	2000/31206/20000	3000/37046/30000	3000/37046/30000
NIR	8000/57142/80000			
*max. rate is dependent upon range				
Slew Rate (changing between wavelengths, nm/min)				
UV-Vis	16000	16000	3000	3000
NIR	64000			
Data Interval				
UV-Vis (nm)	0.005-1.111	0.005-1.111	0.02-1.67	0.02-1.67
cm-1*	1.627-17.335	1.633-13.699	5.541-20.6	5.541-20.6
Å	0.05-11.1	0.05-11.1	0.2-16.7	0.2-16.7
NIR(nm)/(cm-1*)/Å)	0.02 to 4.444/ 0.3145-4.0753/ 0.2-44.44			
*Interval range is dependent upon scan range				
Data Collection Rate (kinetic studies) points per min per cell				
1 cell	1800	1800	1800	1800
6 cells	3 to 4	3 to 4	5	5
12 cells	3 to 4	3 to 4	5	5
14 cells	n/a	n/a	3 to 4	3 to 4
6 cells, 0.033 SAT 0.34 s Dwell time	30 to 40	30 to 40	50	50
12 cells, 0.033 SAT 0.34 s Dwell time	30 to 40	30 to 40	40 to 50	40 to 50
14 cells, 0.033 SAT 0.34 s Dwell time	n/a	n/a	30 to 40	30 to 40
Repetitive Scanning				
Max. number of cycles	999	999	999	999
Maximum cycle time (min)	9999	9999	9999	9999
Temperature Monitors	Cell block, up to 4 temperature probes inside cuvettes or elsewhere			

### Software functionality

Operating system	Windows 95®	OS/2
<b>Graphical display</b> What options are available for the display of data traces?	<ul style="list-style-type: none"> <li>• Data files can be retrieved with the associated Methods and all other settings</li> <li>• Data files can be retrieved with the associated Methods and all other settings</li> <li>• Display grids are available as well as multiple line types and the option of a legend to identify traces</li> <li>• Scans can displayed overlaid or individually</li> <li>• Graph labels and bitmaps, including chemical structures, can be displayed and saved with data files (fonts and size are selectable)</li> </ul>	<ul style="list-style-type: none"> <li>• Data files can be retrieved with or without the Method</li> <li>• Display grids are available as well as multiple line types and the option of a legend to identify traces</li> <li>• Scans can displayed overlaid or individually</li> <li>• Graph labels and bitmaps can be added</li> </ul>
<b>File opening</b>	Using the Win 95 File Association functionality, files can be automatically opened by clicking on the file name. Files can be also be dragged and dropped into the application for easy opening.	Not available
<b>Data Conversion</b> What file formats can the software import and export?	<ul style="list-style-type: none"> <li>• Import: Cary OS/2, Cary DOS, ASCII XY formats</li> <li>• Export: ASCII (*.csv format), ASCII with Audit log format</li> </ul>	<ul style="list-style-type: none"> <li>• Import: JCAMP, ASCII XY, Cary DOS</li> <li>• Export: JCAMP (packed, XY or SpectraCalc/GRAMS), ASCII XY, DDE (Dynamic Data Exchange)</li> </ul>
<b>File System</b> How does the file system work?	Method, Report, Data, Graphic template and files can be stored individually or all together in a batch file. The number of files is limited only by hard disk capacity. File names: Windows 95 standard, unlimited length	Methods, reports, data, report templates are stored in individual 'User' directories. Each instrument user can have their own file directory. File names: OS/2 standard.

<b>Operating system</b>	<b>Windows 95®</b>	<b>OS/2</b>
<b>Fast loading of methods</b>	You can setup shortcut icons on the desktop for methods used frequently in your laboratory.	Not available
<b>Cursor modes</b> What options are available for the graphics cursor?	Cross hair cursor in either tracking or free mode. Kinetics ruler mode also available.	Cross hair cursor which can be used in one of freehand, track, peak, valley, peak/valley, zero crossover, variable crossover modes
<b>Running Cary multiple applications</b>	More than one Cary application may be run at any time, allowing method development or data review and manipulation while the instrument is collecting. Either multiple same or different applications may be opened simultaneously.	Only one Cary application can be run at the same time. Other non-Cary applications can be run at the same time as a Cary OS/2 application.
<b>Built-in programming language</b>	None	Applications Development Language which allows the software to be tailored for specific applications
<b>Dynamic Data Exchange transfer to other software packages</b>	Not included	Data can be directly to a DDE-compliant application from the Cary software as it is collected
<b>Multimedia help</b>	Video and audio explain how to set up and use the instrument and accessories.	On-line Help describes software use only.

## Quantitative analysis

	<b>Cary Win UV</b>	<b>Cary OS/2</b>
<b>Calibration Curve Fits</b>	Linear, Linear direct and Quadratic curve fits	Linear, Linear direct and Quadratic curve fits
<b>Fibre optics system</b>	Remote read fibre optics system for in-situ measurements using Dip Probe (measure up to 180 samples/hr)	Remote read fibre optics system for in-situ measurements using Dip Probe (measure up to 180 samples/hr).
<b>Sipper/Autosampler support</b>	SPS-5 Autosampler only supported for fibre optic measurements (Cary 100/300 only)	SPS-5 Autosampler with Routine Sampler accessory supported (Cary 100/300 only) as well as fibre optic measurements
<b>Sample name importation</b>	Sample names can be imported from disk or LAN system.	Sample names can be imported from disk or LAN system.
<b>Calibration Standards</b>	Up to 30 standards	Up to 12 standards
<b>Maximum Number of Samples</b>	Up to 500 samples	Up to 500 samples
<b>Measurement replicates</b>	Up to 5 replicates of each sample may be performed	Up to 5 replicates of each sample and standard may be performed
<b>Sample/standard averaging</b>	Up to 3 samples/standards can be averaged	Not available
<b>User specified data collection</b>	Single wavelength measurements with on-line calculations can be performed on data collected using +, -, /, x functions. For example: • Abs 540 nm - Abs 700 nm • Abs 366 nm x factor	The User collect field offers access to the programming language so almost any data collection/calculation can be performed.
<b>Quality checks</b>	Not available	High and low warning limits can be specified
<b>Weight/volume correction for sample results</b>	Yes	No

## Biochemical analysis

	<b>Cary WinUV</b>	<b>Cary OS/2</b>
<b>Data comments</b> Extra information about the sample, which is stored with the data file	The User Data Form allows entry of information about the samples analyzed, eg: pH, ionic, substrate and inhibitor concentration etc.	Not available
<b>Minimum sample volume</b> What is the smallest volume of sample that can be measured accurately?	Approximately 2.5 µL	Approximately 2.5 µL
<b>Preset methods</b> Methods for common measurements that are built into the software	Simple Reads application: • Protein estimation • Nucleic acid estimation • 260/280 ratio readings • Warburg & Christian co-efficient • User defined Concentration application: • Bradford • Lowry HS, LS • Biuret • BCA • Direct UV	Preset methods not supplied but the User Collect field in the Simple Absorbance application allows the automatic measurement and calculation of these values.
<b>RNA/DNA calculations</b>	User-selectable background correction, and Warburg Christian protein and nucleic acid factor entry	Separate application is available featuring background correction, scanning of the sample and protein and nucleic acid factor entry.

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### Biochemical analysis – Kinetics

	Cary WinUV	Cary OS/2
<b>Temperature measurement</b>	Temperature can be measured inside the cuvette with the optional Temperature probe accessory or the temperature of the multicell block can be used. Temperature data is stored with the data file	Temperature can be measured inside the cuvette with the optional Temperature probe accessory or the temperature of the multicell block can be used. Temperature data is stored with the data file
<b>Number of stages</b> How many different data collection rates can be specified for a single analysis?	5 A different fit can be used for each stage	5
<b>Kinetics ruler</b> Can I visually define the area of the data that I want to use for rate calculations?	Use a cursor to nominate the range for a point to point least squares slope calculation	Use a cursor to nominate the range for a point to point least squares slope calculation
<b>Plot Fits</b> Can the fits used to calculate the rate of the reaction be displayed and saved?	Kinetic rate plots can be displayed with the data and stored.	Kinetic rate plots can be displayed with the data and stored.
<b>Stop time extension</b> Can the time of the data collection be extended without stopping the analysis	Yes	No
<b>Min/Max data collection time</b>	0.01 to 8000 min	0.01 to 8000 min
<b>Pause control</b> Can the measurement be paused to allow the addition of a reagent before continuing?	Yes	No
<b>Synchronized start</b> A 2 minute countdown is provided before data collection begins	Yes	Yes
<b>Cell loading guide</b> A visual guide to show how to load the multicell holder before starting the data collection.	Yes	Yes
<b>User specified data collection</b>	Single wavelength, Multi-wavelength (up to 6), and combinations of wavelengths using the user collect function.	Full functionality of the programming language, ADL, can be used.

### Biochemical analysis – Thermal Denaturation/Renaturation

	Cary WinUV	Cary OS/2
<b>Thermal analysis data collection</b> How many different temperature ramp rates/directions can be specified for a single analysis?	Up to 20	Up to 12
<b>End of measurement temperature</b> What temperature is the sample held at after the data collection is complete?	User specified	Automatically goes to 25 °C
<b>Hold time</b> Can a non-measurement period of time be specified to allow the temperature to equilibrate?	Holding time can be specified at the start and end of each stage of the measurement.	Holding time applied when the temperature is ramped in the opposite direction to the previous ramp.
<b>Data smoothing</b>	Data may be smoothed with Savitzky Golay algorithm with a selectable interval and filter size.	Data may be smoothed with Savitzky Golay algorithm with a selectable interval and filter size.
<b>Calculations provided</b>	Derivative and Hyperchromaticity (including alpha curve and Van't Hoff) are provided.	Derivative and Hyperchromaticity (including alpha curve and Van't Hoff) are provided. The built-in ADL programming language makes any other calculation possible.

## Scanning

	Cary WinUV	Cary OS/2
<b>Baseline Correction</b>	<ul style="list-style-type: none"> <li>• Unlimited Baseline scans can be stored. These baselines can be retrieved and re-used.</li> <li>• Baselines correction modes include: 0% and 100% correction (normal, DRA – as per ASTM E903), known mirror correction for specular reflectance measurements.</li> </ul>	<ul style="list-style-type: none"> <li>• Unlimited Baseline scans can be stored. These baselines can be retrieved and re-used.</li> <li>• Baselines correction modes include: 0% and 100% correction (normal, DRA – as per ASTM E903).</li> </ul>
<b>Ordinate Modes</b>	A, %R, %T, Log A, F(R), Log F(R), Absorptivity, Absolute %R, Log (1/R)	A, %R, %T, Log A, Absorptivity, Absolute %R, Derivatives 1-4
<b>Abscissa modes</b>	Nm, cm <sup>-1</sup> , A Stepped mode can be applied to any of these abscissa modes (The Kinetics application provides time as an abscissa mode and the Thermal application provides temperature as an abscissa mode)	Nm, cm <sup>-1</sup> , A, time, angle, distance Stepped mode or Random abscissa value mode can be applied to any abscissa.
<b>Independent NIR control (Cary 500 only)</b> Can various parameters be set to different values in the UV-Vis and the NIR regions?	Signal averaging, data interval, scan rate, SBW/Energy can be specified for the UV-Vis the NIR regions separately	Signal averaging, data interval, scan rate, SBW/Energy can be specified for the UV-Vis the NIR regions separately
<b>Signal to noise mode scanning</b> Can a signal to noise ratio be specified for the automatic collection of data with a constant level of precision?	Yes	Yes
<b>Reports</b> What can be included in a printed report?	You can choose to include method parameters, graphics and/or results tables, all with various options.	You can choose to include method parameters, graphics and/or results tables, all with various options.
<b>Spectral smoothing</b>	Yes	Yes
<b>Maths, on line calculations</b>	Yes, +, -, /, x, log and Square root functions as well as: <ul style="list-style-type: none"> <li>• Smooth (up to 101 points) Savitzky Golay</li> <li>• Mean</li> <li>• Normalize</li> <li>• 1st to 4th Derivative</li> <li>• and convert to:</li> <li>• %T, A, Log(A), %R, F(R), log (F(R)), Log(1/R)</li> </ul>	Built-in programming language, ADL, allows complete flexibility in data handling.

## Instrument validation

Validation tests are supplied as a standard with all software packages. The tests comply with: USP, EP/BP, TBA (Australia). Also provided are all the performance tests used during instrument manufacture as well as other specification tests. The results of all tests performed using the Instrument Validation package are automatically stored by the system.

Instrument validation	US Pharmacopeia	British Pharmacopeia	Australia Code for GMP for Therapeutic Goods	Additional test
<b>Wavelength Accuracy</b>				
Holmium Oxide test	•		•	
Holmium Perchlorate		•	•	
<b>Wavelength Reproducibility</b>				•
<b>Resolution Power</b>				
Maximum resolution				•
Toluene/Hexane test		•	•	
<b>Baseline Flatness</b>			•	•
<b>Photometric Noise</b>				•
<b>Stray Light</b>				
NaI test at 220 nm				•
NaNO <sub>2</sub> test at 370 nm				•
KCl test at 200 nm		•	•	
K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> test at 370 nm			•	
<b>Photometric Linearity</b>				•
<b>Photometric Accuracy</b>				
NIST filters test	•			
K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> test	•	•	•	
KNO <sub>3</sub> test			•	
<b>Photometric Stability</b>				•

## GLP functionality

Setting of privileges for users or groups of users (Win UV only). Allows password protection of data and methods from change or deletion. Audit log saved with all data collected. Inclusion of operator name and Lab ID, data file name, report creation date and time, full documentation and parameters in reports.

## Computers

The following configurations are suitable for operation of the Cary software (Win UV or OS/2)

Minimum	Recommended
IBM compatible, Intel Pentium processor	IBM compatible, Intel Pentium processor
16 M RAM	32 M RAM
150 MB free space on hard disk	500 MB free space on hard disk
3.5" 1.44 MB floppy drive	3.5" 1.44 MB floppy drive
Video card supporting 800 x 600, high color (16 bit) mode	Video card supporting 800 x 600, high color (16 bit) mode
Super VGA screen	Super VGA screen
4 x CDROM drive and 16 bit sound card	10x CDROM drive and 16 bit sound card
Microsoft or compatible mouse	Microsoft or compatible mouse
1 spare AT bus 16 bit ISA expansion slot for the IEEE card	1 spare AT bus 16 bit ISA expansion slot for the IEEE card
Microsoft Windows 95 or IBM OS/2 version 4	Microsoft Windows 95 or IBM OS/2 version 4

## Ordering information

For part numbers and other ordering details, please consult either your Varian Sales person or the Varian parts and supplies catalog on Varian's Web site.

## Further details

For accessory specifications and further details on software, please refer to the other Cary publications:

Cary Color Measurement, Publication number 85 101330 00,

Cary Solid Sample Measurements, Publication number 85 101071 00,

Cary Life Science Measurements, Publication number 85 101167 00 and

Cary-Vankel Tablet Dissolution, Publication number 85 101520 00

## Varian Customer Support Policies

<b>Warranty</b>	12 months, though this may vary according to locations
<b>Hardware support period</b>	7 years from date of last unit manufacture. After this time, parts and supplies will be provided if available
<b>Software support</b>	Telediagnostic capability is available for some instrument models. Availability of Telediagnostic support may vary according to location. Software upgrades to fix nonconformances or safety problems will be issued free of charge. Software upgrades to add additional functionality will attract a fee. The customer is solely responsible for selecting a Varian instrument to achieve their desired results or for particular applications.



### Manufacturing Facilities

Varian Optical Spectroscopy Instruments, Mulgrave, Victoria, Australia  
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GC, GC-MS, HPLC,  
AAS, ICP-MS, ICP-AES,  
UV-Vis-NIR, NMR,  
Sample Preparation,  
Vacuum Products

Specifications subject to  
change without notice.

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Tel (11) 820 0444

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### Europe (other)

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Les Ulis Cédex  
Tel (16) 986 38 38

### Germany

Darmstadt  
Tel (6151) 703 362

### India

Mumbai  
Tel (22) 857 0181

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Torino  
Tel (11) 997 9319

### Japan

Tokyo  
Tel (3) 5232 1239

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Tel (2) 3452 2452

### Mexico

Col. Del Valle  
Tel (5) 525 4450

### Netherlands

Bergen op Zoom  
Tel (164) 282 800

### Russian Federation

Moscow  
Tel (95) 937 4280

### South America

Sao Paulo  
Tel (11) 820 0444

### Spain

Madrid  
Tel (91) 472 7612

### Sweden

Solna  
Tel (8) 445 1620

### Switzerland

Basel  
Tel (61) 295 80 00

### Taiwan

Taipei Hsien  
Tel (22) 698 9555

### United Kingdom & Eire

Walton-on-Thames  
Tel (1932) 898 000

### United States

Houston  
Tel (800) 926 3000

### Venezuela

Valencia  
Tel (41) 257 608

### Other countries

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