



Cintra

UV-Vis Spectrometer



www.**GBC**sci.com
SCIENTIFIC EQUIPMENT

Who is GBC Scientific Equipment?

"Sensitive Technology
for a Sensitive World."



GBC Scientific Equipment Pty Ltd commenced operations in 1978. GBC designs, manufactures and markets a range of award winning scientific instruments comprising quality analytical Atomic Absorption Spectrometers.

ISO 9001 QUALITY ACCREDITATION

GBC has always placed a strong emphasis on quality in all aspects of our operation, from design and manufacture to the provision of service and support to our customers, and we are fully committed to continuous evaluation and improvement in all areas.

The GBC Quality Management System has been accredited to the ISO 9001 quality standard by Lloyd's Register Quality Assurance Limited. This certification is your assurance that the procedures and processes used to produce the goods and services which GBC provides comply with the relevant International Standard, and demonstrates our commitment to meeting the needs and expectations of our customers.



What is the GBC vision?

G B C Scientific Equipment

will

advance people's knowledge

and

their capacity to enhance the quality of life



for all humankind.

GBC's product lines...



AAS



HPLC



ICP-OES



ICP-TOFMS



Rheometer



UV-Vis



XRD

GBC and the New Cintra Series

GBC's growth has been fuelled by its extensive AA expertise, innovative thinking and an obsession for quality and reliability. GBC now produces the widest range of AA spectrometers in the world.

GBC has been the proud recipient of many international design and export awards, acknowledging the superior standard and world acceptance of both the organisation and the products.

The company's head office is based in Melbourne and proudly Australian. The GBC network spans all sectors of the globe.

Now more than 25 years after its inception, GBC is renowned as both progressive and successful.



*You'll be enlightened
with Cintra's
outstanding
optical specifications*

The New Improved Cintra Series

Cintra is State-Of-The-Art in UV-Visible Spectrometry

GBC's third generation of high performance UV-Vis Spectrometers demonstrate improved specifications.

The new Cintra Series consists of the Cintra 101, 202, 303 and 404 with improved optical specifications. High performance features of the Cintra Series include:

- True Double Beam optics for excellent long term stability, guaranteeing accurate precise results.
- Innovative optical design which ensures uncompromised results, even from μL volumes.
- Satisfies all the performance criteria of a range of regulatory bodies. These tests for IQ/OQ, pharmacopoeias and other performance criteria may be easily performed by the use of the Cintral Softwares automatic System Validation Module.
- Many software applications are available including General, Quantify, System Validation, Colour Analysis, Kinetics/Time Studies and DNA Melt.

Cintra 101 the economical choice

The Cintra 101 is a budget priced entry level instrument. It is a true-double beam spectrometer with low stray light and noise specifications. The Cintra 101 and Windows XP based Cintral software and is capable of wavelength scanning, time scanning, fixed wavelength measurement and has a Quantify application and an Instrument validation application.

Cintra 202 for flexibility and power

The Cintra 202 will challenge many higher priced UV-Vis and UV-Vis-NIR instruments with its wavelength range of 190 to 1200 nm and very low stray light and noise specifications. This true double beam spectrometer will suit routine lab work or more advanced applications reaching into the NIR regions. With a full range of accessories available including samples changers, auto samplers, peltier or water thermostatable temperature control, reflectance spheres capable of measurement up to 1150nm. The Cintra 202 provides maximum flexibility and power for all applications.

Cintra 303 for specialised and research applications

The Cintra 303 is a research grade spectrometer with enhanced sensitivity in the UV range. It has a variable slit width for best sensitivity and resolution, with improved stray light, noise and drift specifications. The Cintra 303 accepts the full range of GBC UV-Vis accessories for it's wavelength range of 190 to 900nm making it the perfect instrument for specialised and research applications.

Cintra 404 for the most demanding applications

The Cintra 404 is a true double beam, double monochromator spectrometer which offers the ultimate in resolution and sensitivity. Using a variable slit width from 0.1 to 2.0nm, and dual Littrow monochromators in a Czerny Turner arrangement to achieve the highest resolution with extremely low stray light and photometric linearity of better than 1.2% at 5 Abs. The wide dynamic range and excellent other optical specifications make the Cintra 404 the best performing UV instrument in its price range allowing for the most demanding applications.

Capable of the most demanding applications

Optical systems you can rely on

High performance optical systems

The optical design is the heart of any spectrometer, and at GBC we have a long history of quality optical systems. The Cintra series provides unmatched optical performance. High-efficiency all-reflective optics with a minimal optical component count ensures maximum light throughput, utilising a monochromator designed for maximum efficiency at all wavelengths.

Unparalleled optical stability

The Cintra family of instruments all have true double beam optics with a single detector providing excellent long-term stability. This ensures your confidence in the reliability of your results, and also saves time as there is no need to continually re-define baselines or re-zero the instrument.

Increased productivity with the world's fastest scanning instrument

Advanced design features allow distortion-free spectra at scan speeds of up to 10,000 nm/minute, reducing the time to scan a wavelength range by a factor of two when compared to other conventional scanning instruments. Not only does the rapid scan speed ensure increased productivity for your laboratory but also allows the measurement of rapidly changing systems often encountered in kinetics applications.

Guaranteed reproducible optical performance

Precise, reproducible optical performance is achieved day after day, with no operator effort, through a fully automated instrument set-up. Every time the instrument is powered-up, wavelength is calibrated and the source mirror optimised. Source changeover occurs automatically at an operator-set wavelength.

High performance by superior optical design

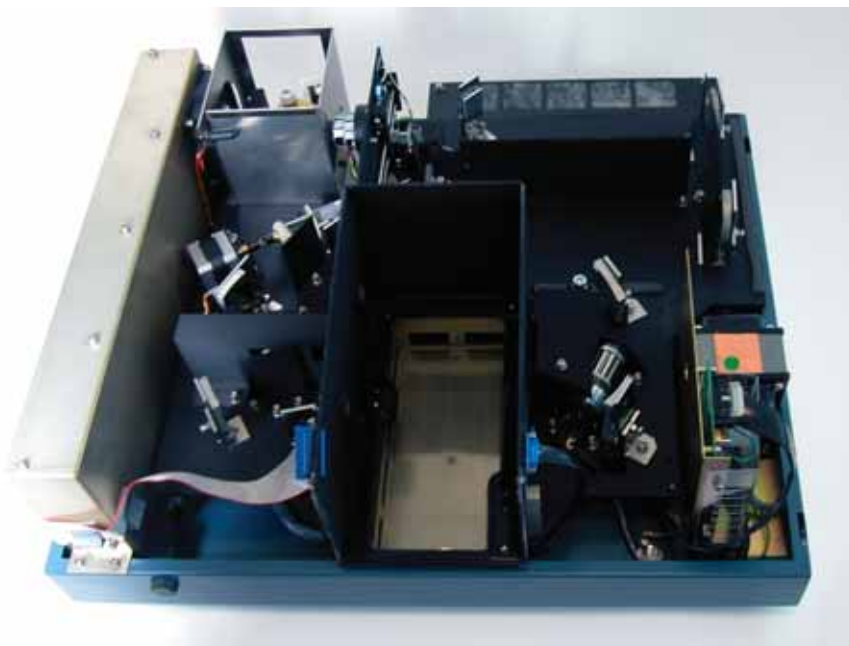
A totally new approach to UV-Visible design, incorporating high speed focused aperture chopping, achieves the optimum ratio of signal sampling time to scan speed with a minimum of lost measurement time during beam changeover. This means improved signal-to-noise ratios and more accurate results.

Stable analytical signal

The unique design of the chopper system in the Cintra series automatically corrects for any beam movement caused by slight eccentricities in chopper wheel rotation, ensuring an extremely stable system.

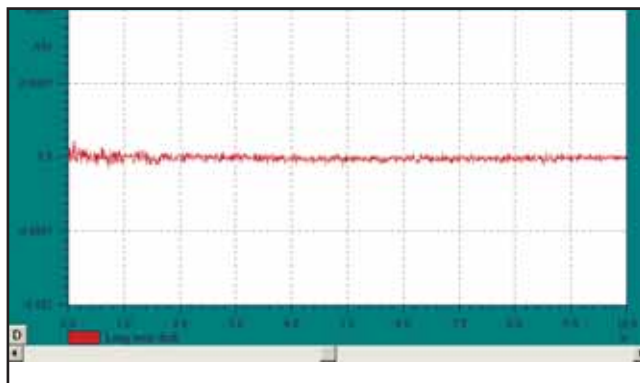
Improved linearity

By measuring and correcting for detector dark current twice in every chopper revolution, errors due to dark current drift have been eliminated, improving measurement stability and linearity. The linearity is better than 1.2% @ 5 Abs on a Cintra 404.

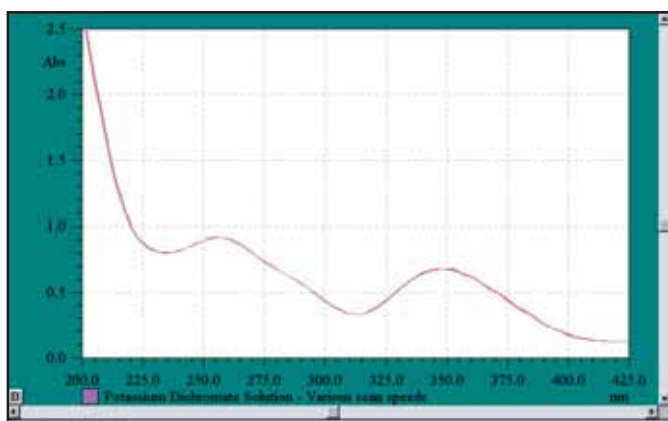


Reliability

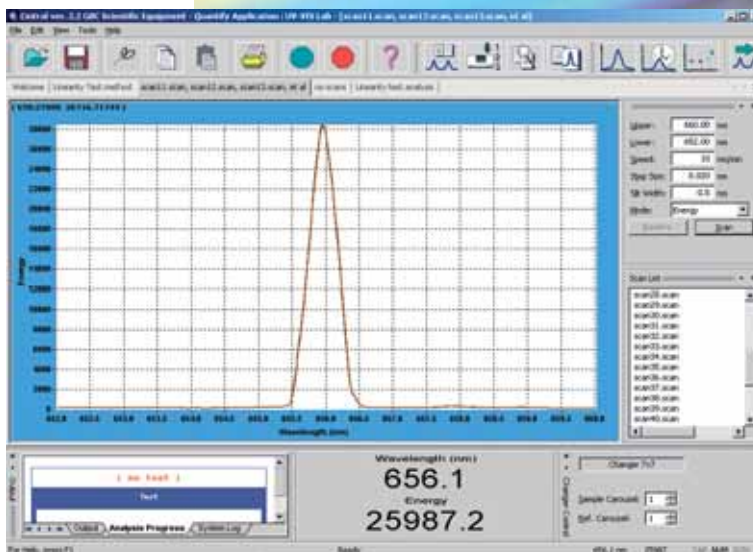
Outstanding wavelengths



The impressive long term stability at 340 nm over 10 hours illustrates the drift-free optics of the Cintra series of instruments.



The rapid chopper-synchronized wavelength drive allows distortion free spectra at scan speeds up to 7,000 nm/minute. The screen shows overlaid scans of potassium dichromate solution, scanned at 5000, 2500, 1250, and 625 nm/minute.



Forty overlaid measurements of the deuterium light source demonstrate the outstanding wavelength accuracy and reproducibility of the Cintra.

Stability, Accuracy and Reproducibility

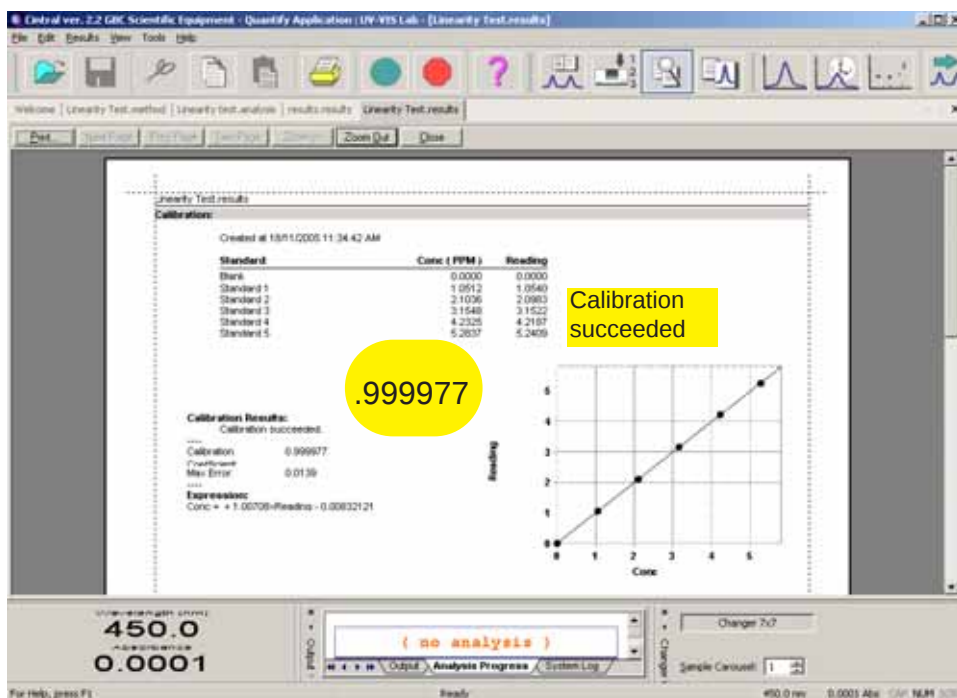
Expand the photometric range with the Cintra 404

Precise, accurate results even at high absorbance

Low stray light levels are achieved using a holographic grating so that photometric accuracy can be maintained over a wide absorbance range. Measure samples with confidence up to 3 Abs with the Cintra 202 and Cintra 303.

Expand the photometric range with the Cintra 404

The Cintra 404 is a true double beam, double monochromator spectrometer. Unlike some instruments which use a pre-monochromator and a main monochromator, the Cintra 404 uses two Littrow monochromators in a Czerny-Turner arrangement. Utilizing double monochromators results in high resolution with extremely low stray light, assuring precise measurement at greater than 5.0 Abs. The calibration curve shown displays very high linearity up to well over 5 Abs with an R^2 value of 0.999977.



Cintra 404

Easy access for sampling accessories

Versatile sample compartment with integrated accessory communications

The Cintra series boasts a large sample compartment capable of housing the complete range of available accessories without the need for additional sample compartment extensions. Accessory communication and control is accomplished via inbuilt ports located within the sample compartment.

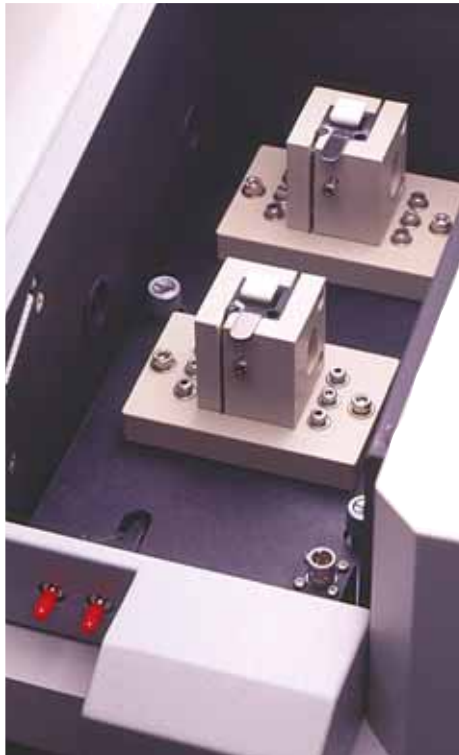
High resolution and versatility with the Cintra 303 and 404

The Cintra 202 provides a fixed 1.5 nm slit width which is ideal for the majority of applications. The Cintra 303 and 404 each provide a continuously variable slit enabling the selection of the optimum slit width for any sample.

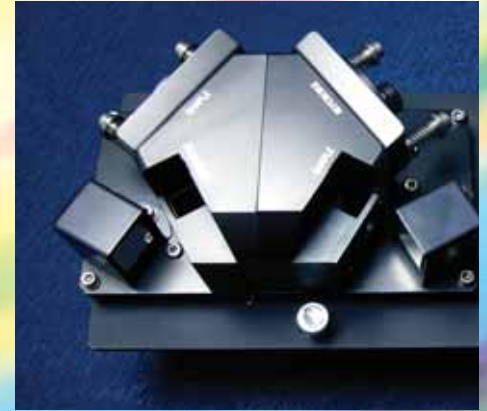
Cintra 404

Variable bandpass between 0.1 and 2.0 nm for high resolution and sensitivity

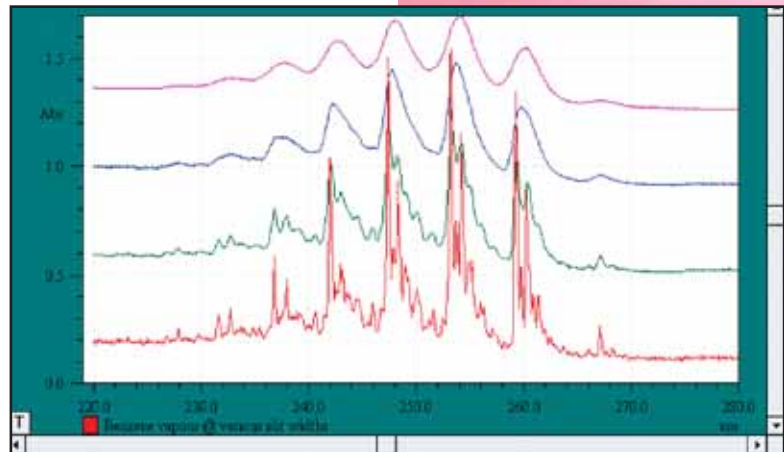
The high resolution Cintra 404 allows variable bandpass down to 0.1nm. Overlaid scans of the SAME benzene vapour sample are shown at 0.1, 0.5, 1.0 and 2.0 nm bandpass. Note that as the slit width decreases the 5 broad peaks are resolved to many narrower peaks providing more information about the sample. Also the peak maxima increase from 1.25 Abs to 5 Abs showing increased sensitivity with decreased bandpass.



Sampling accessories may be readily exchanged and are automatically identified by the software when fitted.



The unique DRS 1150 reflectance sphere allows unprecedented reflectance measurements up to 1150nm in a standard UV-Vis without the need to purchase an expensive NIR instrument. An ideal accessory for military and textile applications.



Versatility

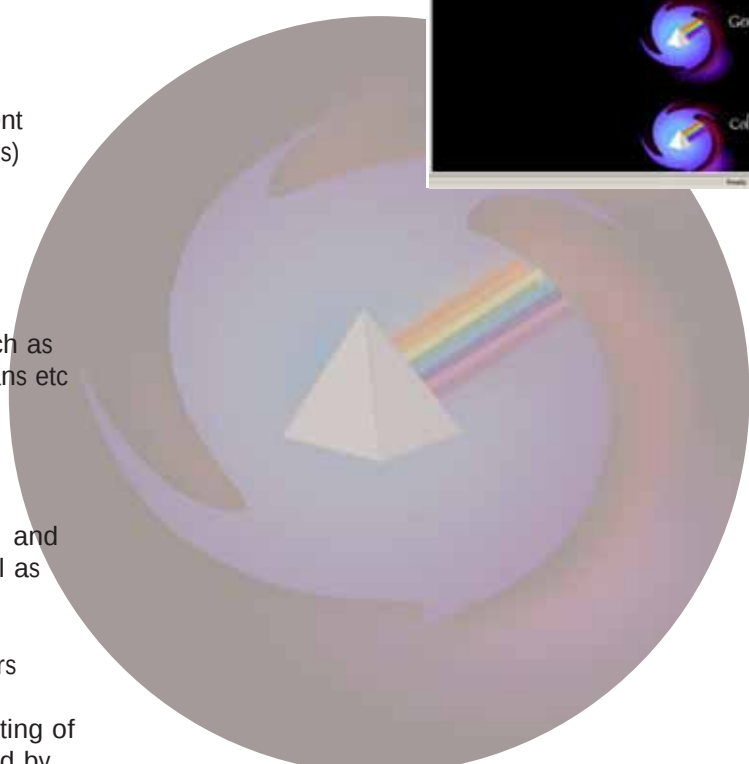
New Cintral Software - integrated with Windows[®] software

Our new UV-Vis control system, the Windows XP based Cintral Work Station software represents the latest in modular design and ease of use.

Among the many features available, applications such as Quantify, and Colour are also included as part of the standard package. Cintral's state of the art design platform offers the user both ease of use and the power of a fully customisable user interface, intuitive booklet format method, and many other features such as:

- General Application
- Quantify Application
- System Validation Application for performance verification and IQ/OQ requirements
- Colour Application
- Fixed wavelength measurement (single or multiple wavelengths)
- Time scanning
- Standard curve fitting
- Spectrum transformation such as derivatives, sine, negating scans etc
- Peak and Valley find feature
- Scan Calculator allowing calculations such as addition and subtractions of scans, as well as derivatives, sine etc.
- Full quality control parameters
- Report Generation and printing of results to any printer supported by Windows

- Data export to text format for importing to Excel or other data analysis packages or .xml format
- Auto recognition of accessories when connected
- Control of automatic cell changers - 6 x 1, 6 x 6, 7 x 7
- Control of Sipper and auto samplers
- SDS-270 nd FS 3000



Powerful software

Real Applications

The outstanding optical specifications of the Cintra series allows applications which would not be normally available on such low cost instruments.

Here are some examples for you:

Cintra 202 - 0.2 ppb phosphorus detection limit

The extended wavelength range of the Cintra 202 allows more light in the important 650 to 1025 nm range. The red scan is the raw light from a Cintra 202 and the blue scan is the raw light from a PMT detector.

By using a method at 830 nm, the Cintra 202 can measure phosphorus to 0.2 ppb! This cannot be done on a PMT type UV-VIS as there is virtually no light at this wavelength. Competitors quote phosphorus detection limits of 200 ppb using a 470 nm method. As well as giving 1000 times better detection limit, the 830 nm method also produces complexes within 10 minutes which are stable for up to 24 hours allowing large batches of samples to be processed. The 470 nm method produces complexes after a long stabilization time and these are stable for only 1 - 2 hours. The 830 nm method gives sensitivity and ability to analyse large batches with confidence.

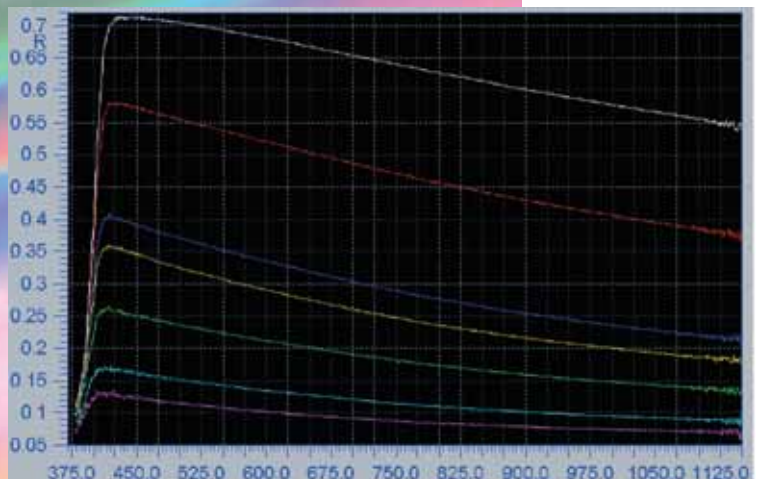
Cintra 202 and DRS 1150

Military reflectance application in the near infra red

The Cintra 202 with the extended range DRS 1150 allows reflectance analysis from the visual region all the way up to 1,150 nm. Measurements in the region 800nm to 1150nm are of particular interest for military imaging applications where it is desirable to know the reflectance due to natural light sources and infra-red lasers.

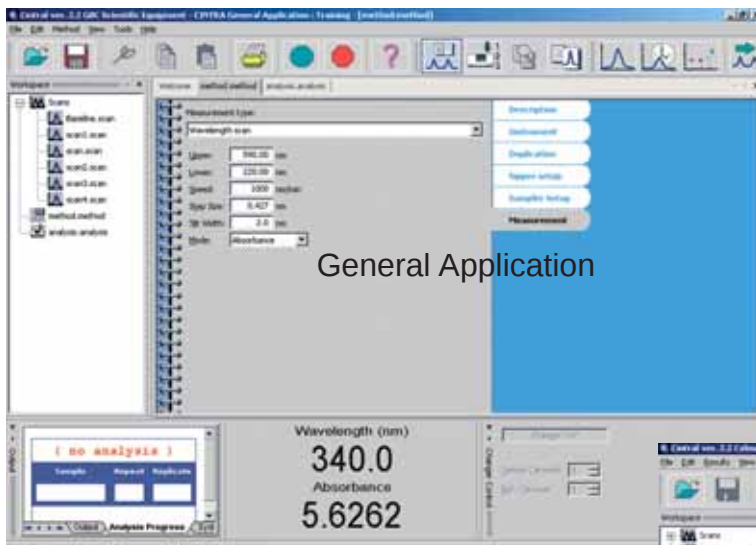
This application has been successfully used in various military institutions to assist the research and development of Battle Dress Uniforms, military paints and other military items to be invisible to night vision devices and infra red lasers.

The scans show various military materials and their reflectivity from 375 to 1125nm.



Simplify your tasks

Smart software features

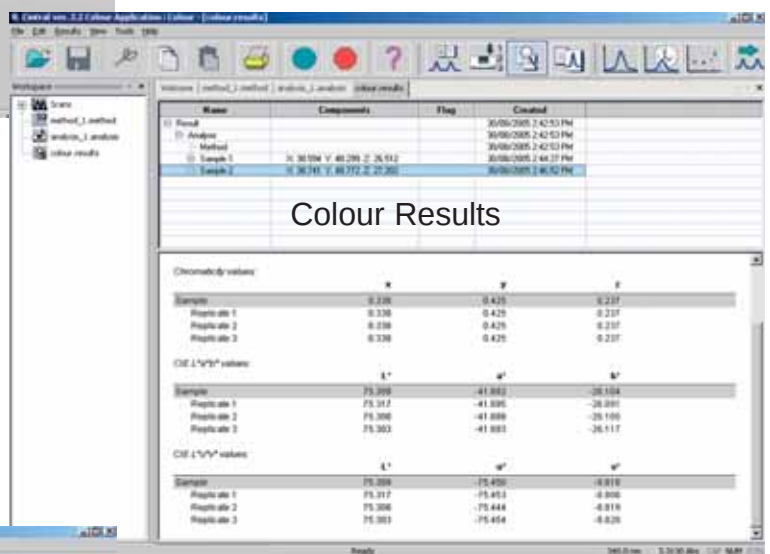


The high specification and performance of the Cintra Series of UV-Vis Spectrometers and accessories allows unprecedented flexibility for any demanding applications. To complement the hardware a wide range of software applications are available to make common sample analysis tasks easier than ever. Software applications available include:

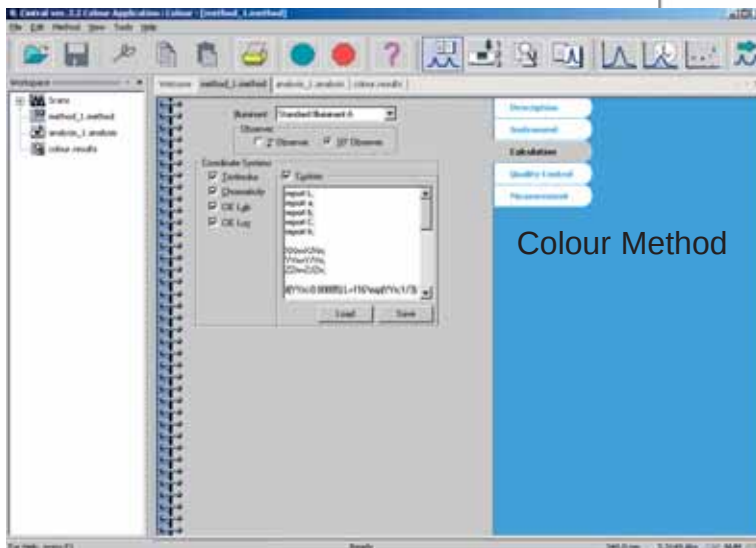
General Application - a general purpose application used for wavelength scanning, time scanning and fixed point measurements. Automation of these measurements and scan calculations and transformations are also available.

Quantify Application - for the quantification of a component in a sample using fixed wavelength(s), peak height, or peak area measurements.

System Validation Application - includes several automated test suites to allow users to perform tests which comply with Pharmacopoeia, GMP, or GBC's final test criteria. This application will also make IQ/OQ and instrument performance verification easier with the use of the final test suites.



Colour Results



Colour Method

Colour Analysis - calculates a range of colour co-ordinate schemes derived from tristimulus values.

Kinetics / Time Studies - performs photometric measurements including wavelength scans and multi-cell measurements as a function of time.

Multi-component - for the quantification of a number of components in an unknown sample mixture.

DNA Melt - performs photometric measurements as a function of temperature with standard calculations for the determination of Tm and %GC.

Many Applications

System Validation Application (SVA)

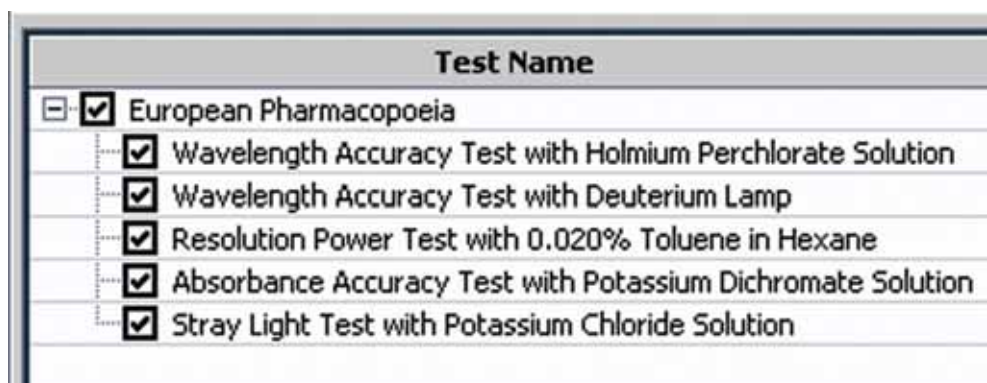
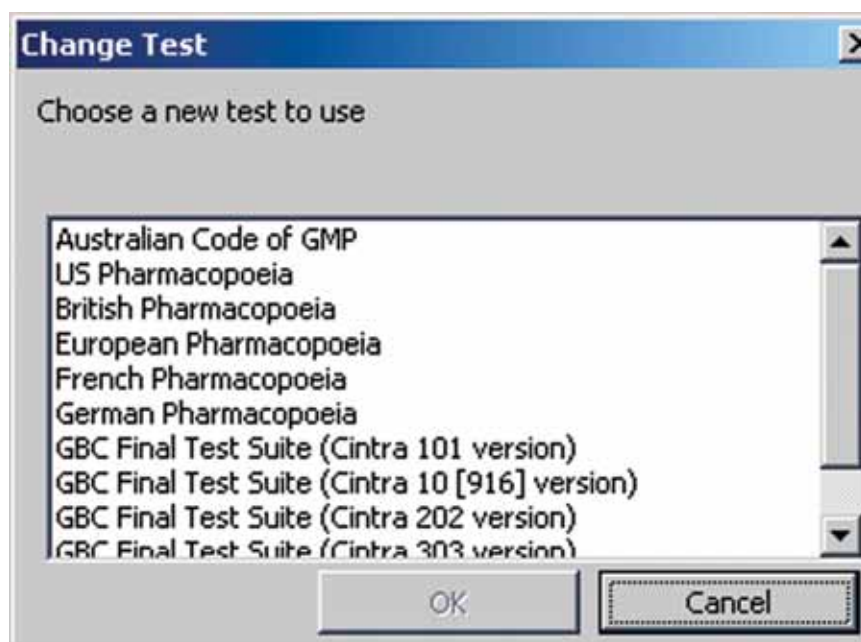
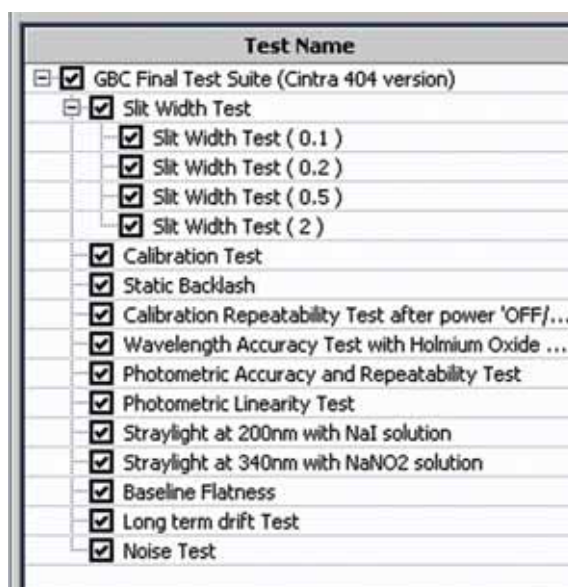
The System Validation Application (SVA) allows the user to test the Cintra to ensure that it meets any criteria set by Pharmacopoeia, GMP or GBC's final test criteria for IQ/OQ and performance verification. This wizard style application guides the user through each step of the test. Once the test is completed a report is generated which clearly shows test results and pass/fail criteria.

Test suites available in SVA are:

- US Pharmacopoeia
- European Pharmacopoeia
- British Pharmacopoeia
- French Pharmacopoeia
- German Pharmacopoeia
- Australian GMP Tests
- GBC Final tests for service and IQ/OQ use

Each of these test suites contain some or all of the following tests:

- Wavelength Accuracy
- Wavelength Repeatability
- Resolution
- Stray Light
- Photometric Accuracy
- Photometric Repeatability
- Baseline Flatness
- Photometric Linearity
- Noise at 0,1,2,3 and 4 Abs



Meet regulatory requirements

Life science applications made easy

Enzyme kinetics made easy

The software provides a complete range of easy to use kinetics functions designed to meet the needs of the enzyme kineticist. Transform data and calculate enzyme activities, or determine substrate concentrations using the “end point” technique from a single mouse click. Choose from a number of standard graphical transformations for the determination of $V_{\max}$ and K_m , including Lineweaver-Burk, Eadie-Hofstee, Hanes, or Wolf.



DNA Melt

A complete range of Peltier-effect thermo-cells is available, providing precise and accurate computer control of sample temperature. Sample immersion probes provide accurate measurement of the true sample temperature. Perform heating or cooling temperature ramps while collecting single wavelength or wavelength scans. Results can be evaluated using graphical or derivative methods to calculate T_m . Choose from the standard Marmur equations or a user-entered expression to derive %GC.

Micro volume capability

The biggest problem facing the biochemist is the requirement to obtain accurate analysis from limited sample volumes. At GBC we recognise this problem and the innovative optical system is designed to meet this challenge. You can be assured of precise and accurate results even from μL volumes. Whatever your microsampling requirements, there is a configuration that will more than meet your needs. Measure a single sample with the micro-cell holder. Or, if high sample throughput is required, measure up to 12 samples simultaneously with an automated sample changer using volumes as low as 5 μL .

Simplified setup

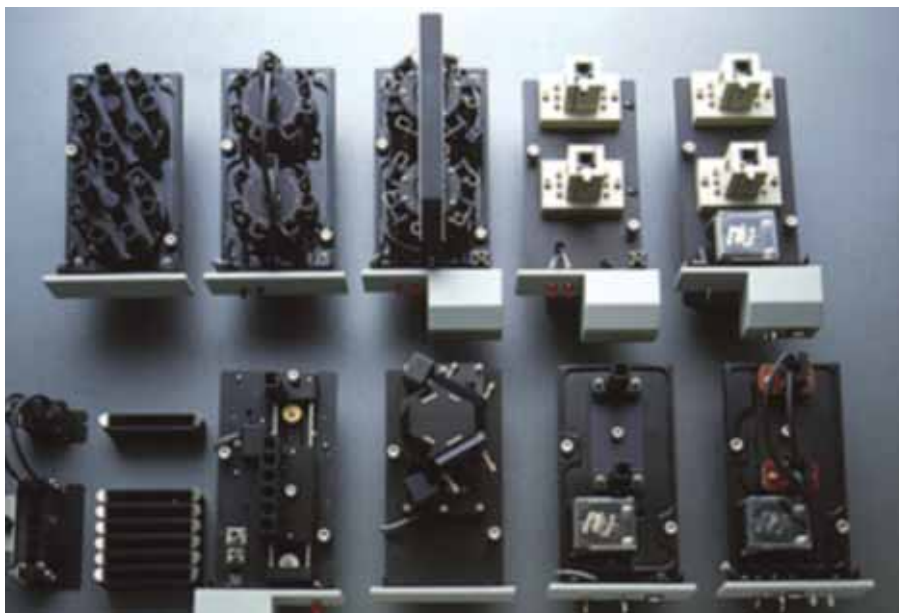
Accessories

Modular drop-in accessories for quick and easy changeover

It takes only seconds to replace the standard cell holder with a specialised easy-to-use cell holder. Automated accessories plug directly into built-in ports in the sample compartment, and are automatically recognized by the instrument. There is no need for expensive add-on interfaces or structural extensions. Just drop in the accessory and start analyzing.

1 x 1 cell holders for specialised applications

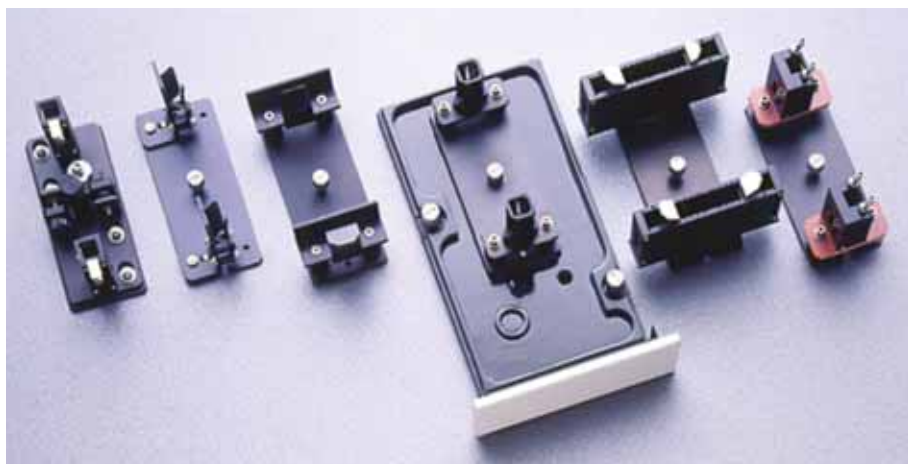
- Micro-cell holder with simple adjustment of horizontal and vertical position for maximising light throughput.
- Variable path length cell holder for rectangular cells with path lengths between 5 and 100 mm.
- Cylindrical cell holder with simple spring clip action. Holds cells of up to 100 mm path length.
- Slide/solid sample holder for solid samples up to 10 mm thick.



Sample changers for increased sample throughput

Two types of sample changer are available. They provide speed and precision in the positioning of your samples for fast and accurate measurements of sample batches.

The Cintra series has a comprehensive range of interchangeable sampling accessories. Automated accessories are controlled and automatically identified by the Spectral software package when connected.



Sample and reference cell holders for single sample measurements are available in a variety of configurations.

All sample changers are fully computer controlled, providing random access to all positions, taking less than one second to move between adjacent cells.

Dual Carousel sample changers

The 7 x 7 sample changer is available in standard and water-thermostatted versions. A 6 x 6 sample changer with a Peltier-effect thermocell is also available for high stability temperature control, including temperature gradients.

The dual carousel sample changer offers two modes of operation:

- 7x7 (or 6x6) mode for measuring 7(6) samples against 7(6) references.
- 12x2 (or 10x2) mode for measuring up to 12(10) samples in true double beam mode against 2 reference solutions.

Meeting your needs

Thermostatable cell holders for temperature-sensitive analyses

Water-thermostatted cell holders are available in single cell or sample changer (linear or carousel) configurations. When connected to a constant-temperature circulating water bath, these cell holders ensure constant temperature.

For precise and rapid temperature control, a range of Peltier-effect thermocells is available in single cell or sample changer (linear or carousel) configurations. Peltier-effect controllers are useful in applications where an accurate constant temperature or an accurate controlled temperature ramp is required. Optional sample immersion probes are available for accurate monitoring of the true sample temperature.



Thermostatable cell holders are available in a range of configurations



High speed SDS-270 auto sampler for increased productivity

In conjunction with the sipper, the SDS-270 autosampler provides high speed automated analysis. Samples are contained in three racks, permitting different tube sizes within a batch. The autosampler is totally controlled by the software via an easy-to-use interface. A built-in diaphragm pump provides a continuous stream of clean rinse solution.

6 x 1 Linear Movement sample changer

The 6x1 Linear movement sample changer provides the ultimate in sample changer flexibility. Allowing up to 6 samples to be measured in batch mode against a single reference solution, the sample changer can be fitted with a range of 6x1 cell holders, including standard, variable path length, water thermostatted and Peltier-effect thermocell versions.



Total Integrating Sphere

The total integrating sphere is ideal for measuring the total reflectance from solid samples such as plastics, paper, textiles and coated surfaces.

The sphere provides a transmission position, making it suitable for the measurement of turbid or scattering samples. Spheres are available up to 800nm for standard DRS applications and the DRS 1150 for NIR applications up to 1150 nm.

Auto Sipper for automatic sample introduction

The auto-sipper removes the need for cell handling. Sample introduction is as easy as a simple button press. The accessory features computer controlled pump times, and the ability to be used with a number of flow-cell types, including micro-cells. Standard, water-thermostatted and Peltier-effect thermocell versions are available.

Increased productivity

	Cintra 101	Cintra 202	Cintra 303	Cintra 404
Instrument Format	Spectrometer module with external IBM compatible PC	Spectrometer module with external IBM compatible PC	Spectrometer module with external IBM compatible PC	Spectrometer module with external IBM compatible PC
Photometric System	Double-beam, direct ratio recording system	Double-beam, direct ratio recording system	Double-beam, direct ratio recording system	Double-beam, full double monochromator, direct ratio recording system
Light Source	Tungsten-halogen lamp and deuterium lamp	Tungsten-halogen lamp and deuterium lamp	Tungsten-halogen lamp and deuterium lamp	Tungsten-halogen lamp and deuterium lamp
Light Source Changeover	Automatic Source change-over at user selectable wavelength	Automatic Source change-over at user selectable wavelength	Automatic Source change-over at user selectable wavelength	Automatic Source change-over at user selectable wavelength
Wavelength Range	190-1100nm	190-1200nm	190-900nm	190-900nm
Monochromator	Czerny-Turner mounting with holographic grating and automatic lamp peaking	Czerny-Turner mounting with holographic grating and automatic lamp peaking	Czerny-Turner mounting with holographic grating and automatic lamp peaking	Dual Littrow monochromators arranged in Czerny-Turner configuration with automatic lamp peaking
Spectral Bandpass	1.5nm	1.5nm	0.2nm to 5.0nm in 0.1nm steps	0.1nm to 2.0nm in 0.1nm steps
Scanning Speed	60 to 3200nm/min	5 to 10,000nm/min	5 to 10,000 nm/min	5 to 10,000 nm/min
Slew Speed	6000nm/min	15,000nm/min	15,000nm/min	15,000nm/min
Detector	Silicon Photodiode	Silicon Photodiode	R446 side-on photomultiplier tube	R928 side-on photomultiplier tube
Electrical Requirements	110-120 or 200-240VAC, 200VA, 50/60Hz	110-120 or 200-240VAC, 200VA, 50/60Hz	110-120 or 200-240VAC, 200VA, 50/60Hz	110-120 or 200-240VAC, 200VA, 50/60Hz
Sample Compartment	150 x 125 x 280mm (WxDxH)	150 x 125 x 280mm (WxDxH)	150 x 125 x 280mm (WxDxH)	150 x 125 x 280mm (WxDxH)
Dimensions	660 x 640 x 270mm	660 x 640 x 270mm	660 x 640 x 270mm	660 x 640 x 270mm
Weight	42 kg (unpacked) 86 kg (packed)	42 kg (unpacked) 86 kg (packed)	42 kg (unpacked) 86 kg (packed)	42 kg (unpacked) 86 kg (packed)

Specifications

	Cintra 101	Cintra 202	Cintra 303	Cintra 404
Stray Light @220nm (10g/L NaI) @340nm (50g/L NaNO ₂)	<0.02%T	<0.0001%T <0.0009%T	<0.00077%T <0.00008%T	<0.00003%T <0.000005%T
Wavelength Accuracy	± 0.16nm	± 0.1nm	± 0.1nm	± 0.1nm
Wavelength Reproducibility	± 0.05nm	±0.019 nm	±0.019nm	±0.018nm
Photometric Accuracy (NIST 930D standard filter, 0 to 0.5A)	± 0.001A	±0.0004A	±0.0003A	±0.0001A
Photometric Accuracy (NIST 930D standard filter, 0 to 1.0A)	± 0.001A	±0.0008 A	±0.0006 A	±0.0003 A
Photometric Repeatability (0 to 0.5A)	± 0.001A	±0.000061A	±0.000022A	±0.000015A
Photometric Repeatability (0 to 1.0A)	± 0.001A	±0.000068 A	±0.000023A	±0.00002 A
Photometric Noise (500nm, 2nm SBW, 1s smoothing)	<0.0002A	<0.00002 A @ 0A <0.00004 A @ 1A <0.00029 A @ 2A	<0.000023 A @0A <0.000038 A @1A <0.000190 A @2A <0.000262 A @3A	<0.000023 A @0A <0.000045 A @1A <0.000199 A @2A <0.000364 A @3A <0.00191 A @4A
Photometric Drift (340nm, 2nm SBW, stable ambient temperature, 1 hour warm-up)	<0.0003A/hr	<0.00012 A/hr	<0.00013 A/hr	<0.00017 A/hr
Photometric Linearity		<0.6% @ 3Abs	<0.2% @ 3Abs	<0.3% @ 4Abs <1.2% @ 5Abs
Baseline Flatness (baseline corrected across entire wavelength range)	<0.003A	<0.00013A	<0.00059A	<0.00055A

Typical specifications

Auto Sippers

Standard four-roller peristaltic pump based system with quick release tubing. Connects directly to the instrument's inbuilt accessory port in the sample compartment. Controlled by software with control of flow speed, timing and direction. Flow through or sample return modes. Can be used in conjunction with an autosampler for high speed unattended analysis. Pump speed: 0–16 rpm. Fill/empty time: 1–150 s. Pump direction: forward and reverse. Provided with standard 1x1 cell holder for use with 10 mm cells. Compatible with: 1x1 cylindrical cell holder, 1x1 micro cell holder, 1x1 variable path length cell holder. Flow cell must be ordered separately.

Water-thermostated

As per standard auto-sipper but includes built-in water thermostatted cell holder for temperature control. Suitable for use with 10 mm cells. Requires constant temperature water recirculator for temperature control.

Peltier Effect Thermocell*

As per standard auto sipper but includes built-in 1x1 Peltier effect thermocell for precise control of temperature. Suitable for use with 10 mm cells. Peltier effect thermocell is controlled by Spectral software with control of temperature, ramp rate and temperature stability. Steady state and temperature ramp modes. Optional sample immersion probes for monitoring sample temperature. Peltier element is air cooled. Temperature range: 5 –100 °C. Heating/cooling rates: 0.1–10 °C/minute. Temperature control accuracy: $\pm 0.5^{\circ}\text{C}$. Temperature control precision: $\pm 0.5^{\circ}\text{C}$. Temperature stability: User selectable in the range 0.1–5 °C. Note that the achievable lower temperature limit depends upon the ambient temperature.

Peltier Effect Thermocell

Accessories*

Available in 1x1, 6x1 and 6x6 configurations. Peltier effect thermocell is controlled by software with programmable temperature, ramp rate and temperature stability.

Steady state and temperature ramp modes.

Peltier element is cooled by external water supply. Optional sample immersion probes for monitoring sample temperature. Temperature range: (Water temperature - 15)°C to 100 °C. Heating/cooling rates: 0.1–10 °C/minute. Temperature control accuracy: $\pm 0.5^{\circ}\text{C}$. Temperature control precision: $\pm 0.5^{\circ}\text{C}$. Temperature stability: User selectable in the range 0.1 to 5 °C. Note that the achievable lower temperature limit depends upon the temperature of the external water supply.

Reflectance Spheres*

The reflectance spheres are a barium sulfate coated, integrating sphere, with light detection by a built-in photo multiplier tube for the standard sphere, or a silicon photodiode for the DRS1150. The accessory is fitted with 10 mm cell holders and solid sample holders for both sample and reference beams. Capable of measuring total %transmittance, absorbance and reflectance. Sample incident angle 8°. Supplied with a pair of Spectralon reference disks. Connects directly to the instrument's built-in accessory ports in the sample compartment.

Sphere diameter: 63 mm. Port/sphere area ratio: 8%.

Total Integrating Sphere: Wavelength range: 200–800 nm. Detector: R446 side-on photo multiplier tube. Corrected baseline 200–800 nm: 0.002 A. Photometric noise at 500 nm (0 Abs): <0.0005 A RMS.

DRS1150: (For use with Cintra 202 only) Wavelength range: 450-1150nm. Detector: silicon photodiode. Corrected baseline 450-1150nm: 0.006 Abs. Photometric noise at 900nm (0 Abs): <0.0005 A RMS

Linear movement module*

Linear movement based sample changer for controlled movement of up to six samples within the sample compartment. Connects directly to the instrument's built-in accessory port in the sample compartment. May be fitted with standard, variable path length, water thermostatable and Peltier-effect thermocell 6x1 cell holders. Six sample beam cells. One reference beam cell. 6x1 cell holder must be ordered separately.

6x1 CELL HOLDERS

6x1 standard cell holder suitable for use with 10 mm cells. Minimum path width 4 mm.

6x1 variable path length cell holder suitable for use with 5, 10, 20, 30, 40, 50 and 100 mm pathlength cells. Minimum path width 4 mm.

6x1 water thermostatted cell holder for use with 10 mm cells. Minimum path width 4 mm. Control of sample and reference temperatures. Requires constant temperature water recirculator for temperature control.

6x1 Peltier effect thermocell for use with 10 mm cells. Minimum path width 4 mm. Computer control of sample and reference temperatures. Requires external water supply for heat transfer.

Dual carousel sample changers - 7x7 and 6x6*

The dual carousel sample changer comprises automated twin carousels, capable of holding 7 (6) sample/reference pairs or up to 12 (10) samples and 2 reference cells in true double beam mode. Connects directly to the instrument's built-in accessory port in the sample compartment. Standard and water thermostatable versions are available for the 7x7 dual carousel sample changer. Peltier effect thermocell version is available for the 6x6 dual carousel sample changer. Suitable for use with 10 mm cells. Minimum path width 4mm. Seven (six) Sample beam cells. Seven (six) Reference beam cells. Operation modes 7x7 (6x6 Peltier) or 12x2 (10x2 Peltier).

SDS-270 Sample Delivery System*

X-Y-Z autosampler with capacity for up to 270 samples and ten standards with continuous flow rinse position via built-in diaphragm pump. Supplied with three 60 position sample racks to hold 180 samples. PTFE-coated inert sample probe with adjustable height. Controlled by software with control of sipper flow speed, timing and direction, as well as rinse time, air slug capability and measurement delay time. Flow through or sample return modes. Requires auto-sipper for operation. Connects to serial port of computer. Optional racks for 21, 24, 40, 60 or 90 samples.

Power Requirements: 100-260 V AC, 47-440 Hz, 30 VA.

Dimensions: 405 x 375 mm.

* not available on Cintra 101

GBC Cintra 10e, Cintra 20 and Cintra 40 Ordering Information

UV-Vis Spectrometers

Cintra 101	99-0553-01
Cintra 101 with data acquisition system	99-0553-02
Cintra 202 with spectral software	99-0554-01
Cintra 202 with cintral software	99-0554-81
Cintra 303 with spectral software	99-0555-01
Cintra 303 with cintral software	99-0555-81
Cintra 404 with spectral software	99-0556-01
Cintra 404 with cintral software	99-0556-81

Each Cintra UV/Visible spectrometer is supplied complete with a standard dual 10 mm pathlength cell holder, Operation Manual and software.

1x1 Cell Holders

1x1 cylindrical cell holder	99-0175-00
1x1 micro-cell holder	99-0176-00
1x1 water-thermostatable cell holder	99-0190-00
1x1 Peltier-controlled thermo-electric cell holder	99-0191-11
1x1 variable pathlength cell holder (up to 100 mm)	99-0177-00
1x1 slide/solid sample holder	99-0222-00

Sample Changers

7x7 dual carousel	99-0178-00
7x7 water-thermostatable dual carousel	99-0179-00
6x6 Peltier-controlled thermo-electric dual carousel	99-0343-11
Linear movement module (without cell holders)	99-0181-00

Accessories for linear movement module:

6x1 cell holder	99-0183-00
6x1 water-thermostatable cell holder	99-0184-00
6x1 Peltier-controlled thermo-electric cell holder	99-0185-11
6x1 variable path length cell holder (up to 100 mm)	99-0208-00
Auto-sipper	99-0189-00
Auto-sipper with water-thermostatable cell holder	99-0214-00
Auto-sipper with Peltier-controlled thermo-electric cell-holder	99-0205-11
SDS-270 Sample Delivery System	99-0326-11

Supplied complete with test tubes, teflon coated probe, cables, tubing and three 60-position sample racks

Other Accessories

Total Integrating Sphere	99-0188-00
DRS1150 Diffuse Reflectance Sphere (for use with Cintra 202)	99-0521-00
Certified Filter Kit	95-0623-00
Certified Reference Kit	95-0551-00

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GBC reserves the right to change specifications without prior notice

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GBC SCIENTIFIC EQUIPMENT

Manufacturer of world-class scientific instruments and accessories—
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