



Colorimeters and UV/Visible Spectrophotometers



WPA, Biochrom Ltd

and UV/Visible Spectrophotometry

WPA Ltd was acquired by Biochrom Ltd in 2002 because their range of colorimeters and innovative spectrophotometers provided a perfect extension for the Ultrospec and Libra range of UV/Visible spectrophotometers. Together, these brands address the market need — from hand-held colorimeters up to Pharmacopoeia compliant high-resolution products. The products are now designed and manufactured at our headquarters in the United States.

UV/Visible Spectrophotometry is a popular analytical technique used in most laboratories for a whole host of applications. Across the Biochrom brands, there are products for every need. The guide below will assist with your WPA brand selection.

WPA Brand Selection Guide

Colorimeters

Product	Light Sources	Optical System	Instrument Parameters				Comment
			Wavelength Range	Absorbance Range	Bandwidth	Stray Light	
CO 7000	Tungsten	Filters	400, 440, 470, 490, 520, 550, 580, 590, 680, 700 nm	-0.3 to 1.99 A	40 nm	<1%T at filter wavelength	Portable filter-based unit, tropicalised for in-the-field clinical colorimetry
CO 7500	Tungsten	Filters	440, 470, 490, 520, 550, 580, 590 nm	-0.3 to 1.99 A	40 nm	<1%T at filter wavelength	Robust filter-based unit for simple colorimetry and a battery option for portability
CO 8000	600nm LED	LED	600 nm	-0.3 to 1.99 A	40 nm	<1%T at 600 nm	Portable LED base unit for devoted OD600 cell culture measurements

Spectrophotometers

S800*	Tungsten	Single beam, Monochromator	325 to 1100 nm	-0.3 to 2.5 A	<7 nm	<1%T at 340 nm	Single-beam monochromator for basic non-scanning VIS measurements
S1200*	Tungsten	Single beam, Monochromator	325 to 1100 nm	-0.3 to 2.5 A	<7 nm	<1%T at 340 nm	Single-beam monochromator with scanning VIS measurements
Lightwave II/II*	Xenon	Single beam, Monochromator	190 to 1100 nm	-0.3 to 2.5 A	5 nm (3 nm* versions)	0.5%T at 220 and 340 nm	Split beam monochromator with scanning UV-VIS measurements
Biowave II/II*	Xenon	Single beam, Monochromator	190 to 1100 nm	-0.3 to 2.5 A	5 nm (3 nm* versions)	0.5%T at 220 and 340 nm	Split beam monochromator with scanning UV-VIS measurements and pre-defined life science methods



CO 7000 Colourwave Medical Colorimeter

Tropicalised colorimeter ideal for use in hot, humid, remote locations for clinical/medical applications

The CO 7000 is a portable colorimeter designed for use by doctors and medical technologists in small and medium-sized clinics. The unit has been tropicalised to protect it in hot and humid conditions, to 45°C and 70%, respectively. The 10 gelatin filters are encased in glass to prevent fungal growths appearing and the PCB has been completely coated so that individual components are sealed to prevent corrosion. The instrument is powered by an internal rechargeable NiMH battery or by external power, allowing it to be used where the power supply could be unreliable.

The CO 7000 is very easy to use as there are only three buttons and the wavelength required is selected by rotating an integral filter wheel. The filters at 400, 440, 470, 490, 520, 550, 580, 590, 680 and 700 nm enable assays in the wavelength range of 400 to 700 nm to be measured. The instrument has been designed as an "open" system so that test kits for clinical and medical applications from virtually any supplier may be used. Examples of routine assays that may be measured in serum and plasma include Albumin, Cholesterol, Glucose, Creatinine, Total Protein and Urea.

Those in cerebrospinal fluid include Glucose and Total Protein*. The samples may be measured in either standard 10 mm path length cuvettes (a minimum of 400 µl is required) or in 10/12/16 mm diameter test tubes (adapters are included with the instrument). There is a drain hole at the bottom of the cell compartment so that spillages do not affect the instrument.



- Fully tropicalised and portable
- Reads assays in the wavelength range 400 to 700 nm using many proprietary test kits
- Easy, three-button operation: on/off, reference and test
- Rechargeable battery
- Registered for IVD applications

Ordering Information

CO 7000 Medical Colorimeter (includes test tube adapter set), mains/rechargeable battery	80-3000-42
Spare lamp, CO 7000L	80-3000-55
Spare filter set, CO 7000F	80-3000-56

*Recommended methods for these routine clinical chemistry assays together with full details of reagents required, manual colorimetric procedures, calibrations and quality assurance may be found in *District Laboratory Practice in Tropical Countries, Parts 1 & 2 (2nd edition)* by Monica Cheesbrough from Cambridge University Press (or other similar publications).

CO 7500 Colourwave Educational Colorimeter

Robust colorimeter that is ideal for schools and colleges



- Designed with the student user in mind
- Rugged, portable and easy to use
- Extremely versatile
- Rechargeable battery version available



The CO 7500 is a value for money instrument that has been designed for use in educational establishments including sixth form colleges, secondary schools, technical schools and colleges. With a large, clear digital display and simple push button controls the instrument is ideal for students. The unit is compact and robust enough to withstand the rigors of the teaching environment and is available in mains only or mains / internal rechargeable NiMH battery versions.

The CO 7500 is easy to use. The eight filters at 440, 470, 490, 520, 550, 580, 590 and 680 nm are encased in an integral filter wheel. The wavelength required is selected by rotating this until the relevant, colour-coded number is

visible in the indicator window. The ergonomic design makes this very convenient and filters cannot be accidentally lost or damaged. With only five buttons (on/off, reference, test, convert between Absorbance and % Transmission readings and kinetics) the instrument is ideal for beginners. When used in kinetics mode to study rates of reaction, the CO 7500 takes readings every second. These may be sent to a chart recorder via the analogue output or results may also be downloaded directly to a PC or data logging system.

The samples may be measured in either standard 10 mm path length cuvettes (a minimum of 400 μ l is required) or in 16 mm diameter test tubes (adapters

for 10/12 mm test tubes are an optional accessory with the CO 7500). There is a drain hole at the bottom of the cell compartment so that spillages do not affect the instrument.

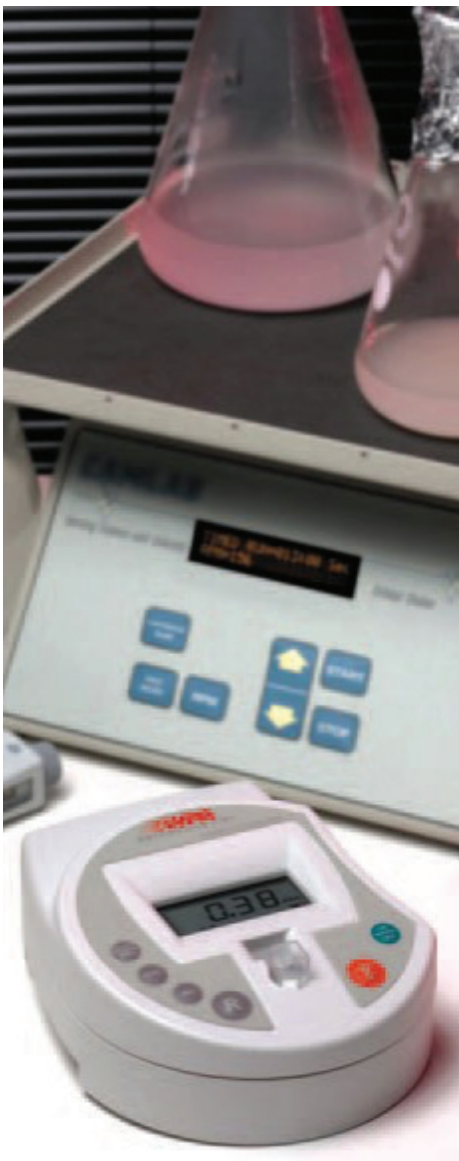
Ordering Information

CO 7500 Educational Colorimeter, mains only
CO 7500B Educational Colorimeter, mains/rechargeable battery
Spare lamp, CO 7500L
Spare filter set, CO 7500F test tube adapter set
S2000P printer, including lead

80-3000-43
80-3000-44
80-3000-59
80-3000-58
80-3001-00

CO 8000 Biowave Personal Cell Density Meter

Cell density meter for *E. coli* and yeast cell culture OD measurements



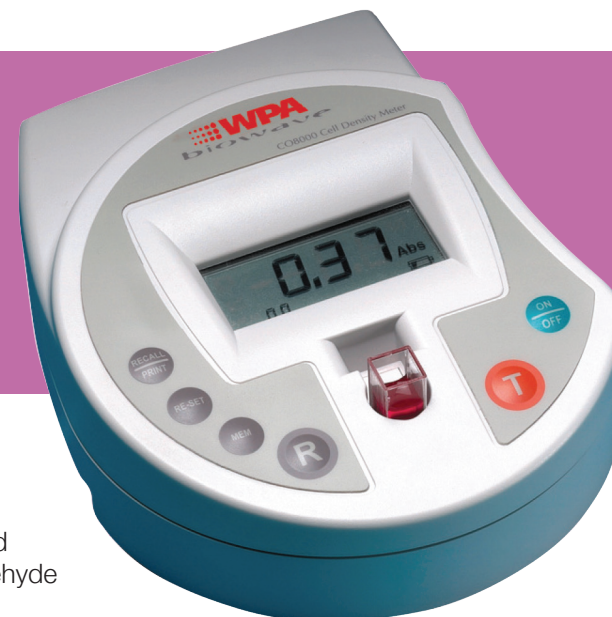
- Small portable and dedicated cell density meter that may be used where cells are actually cultured
- Measures at 600 nm using a long lifetime LED source
- Easy to use, easy to clean, easy to sterilize
- Rechargeable battery that will last up to one month

The CO 8000 cell density meter is a small, portable and easy-to-use instrument for measuring the density of *E. coli* and yeast cells in suspension at 600 nm. It has been designed to give comparable readings to other spectrophotometers. Ideal for use in small research labs, where cultures may be grown in 200 ml to 5 litre volume conical flasks, the CO 8000 may be taken to the area of the lab where the cells are grown or used in incubation cabinets or under anaerobic conditions.

Up to 99 results may be stored for subsequent recall, printing or download to spreadsheet. Since it can accept either 10 mm path length cuvettes or tubes, the instrument may be used with Erlenmeyer side arm flasks. In addition, cell culture spillages can be easily wiped from the smooth surface and then removed from the cell compartment area by pouring

ethanol through the unit. Sterilization may be achieved by pouring through formaldehyde or ethylene oxide.

The instrument has rechargeable batteries that are automatically charged when it is connected to the mains. This allows almost one-month's use under normal operating conditions when fully charged offering great flexibility and portability. A 600 nm LED source in combination with a fibre optic is used to obtain the optical density measurement. The instrument may be linked via a serial lead to either a serial printer for hard copy output or to a PC for download of results to spreadsheet.



Ordering Information

CO 8000 Personal Cell Density Meter, mains/rechargeable battery

80-3000-45

S800+ Visible Spectrophotometer

Scanning visible instrument for education



- Visible spectrophotometer covering 325 to 1100 nm
- Save data on a USB memory stick
- PVC (Print Via Computer) software included to transfer data to your PC from the instrument
- Absorbance, % Transmission, Concentration, and Rate

Ease of use and low maintenance are just some of the benefits of the WPA S800+ – a flexible visible spectrophotometer suitable for a wide range of applications.

Its small footprint makes it ideal for laboratories where space is at a premium. Its rugged lightweight construction with no moving parts makes it both portable and highly reliable.

Great functionality such as the automatic calibration at start-up gives you the confidence you need in your measurements. With no lid or moving parts, this robust instrument is easy to use, clean and store.

Conveniently save your data to a USB memory stick or transfer immediately to your PC using the PVC (Print Via Computer) software, supplied as standard, and export your data to Excel® and other formats.

Increase your measurement flexibility with the optional test tube cell holder which allows you to measure 10 to 18 mm test tubes. The standard cell holder accepts 10 mm glass and disposable cuvettes and is easily removed for cleaning. An optional thermostatted cell holder is also available giving you the added capability of measurements at 37°C.

Ordering Information

S800+ Visible Spectrophotometer
Test tube cell holder (10 to 18 mm)
Heated cell holder

80-3007-10
80-3007-12
80-3007-13

S1200+ Visible Spectrophotometer

Scanning visible instrument for QC and routine use



- Visible spectrophotometer covering 325 to 1100 nm
- Save data on a USB memory stick
- PVC (Print Via Computer) software is included to transfer data to your PC from the instrument
- More onboard applications such as Bradford, BCA, Biuret, and Lowry assays

Wavelength scanning and pre stored methods are just some of the great benefits of the WPA S1200+, which gives outstanding functionality from an instrument with a small footprint.

This is an easy-to-use, low maintenance visible spectrophotometer. It includes stored methods for Bradford, BCA, Biuret, and Lowry protein quantitation, in addition to absorbance, transmittance, OD600, and concentration modes.

Great features such as the automatic calibration at start-up gives you the confidence you need in your measurements. With no lid or moving parts, this robust instrument is easy to use, clean and store.

Conveniently save your data to a USB memory stick or transfer immediately to your PC using the PVC (Print Via Computer) software, supplied as standard, and export your data to Excel® and other formats.

Increase your measurement flexibility with the optional test tube cell holder which allows you to measure 10 to 18 mm test tubes. The standard cell holder accepts 10 mm glass and disposable cuvettes and is easily removed for cleaning. An optional thermostatted cell holder is also available giving you the added capability of measurements at 37°C.

Ordering Information

S1200+ Visible Spectrophotometer
Test tube cell holder (10 to 18 mm)
Heated cell holder

80-3007-20
80-3007-12
80-3007-13

Lightwave II UV/Visible Diode Array Spectrophotometer

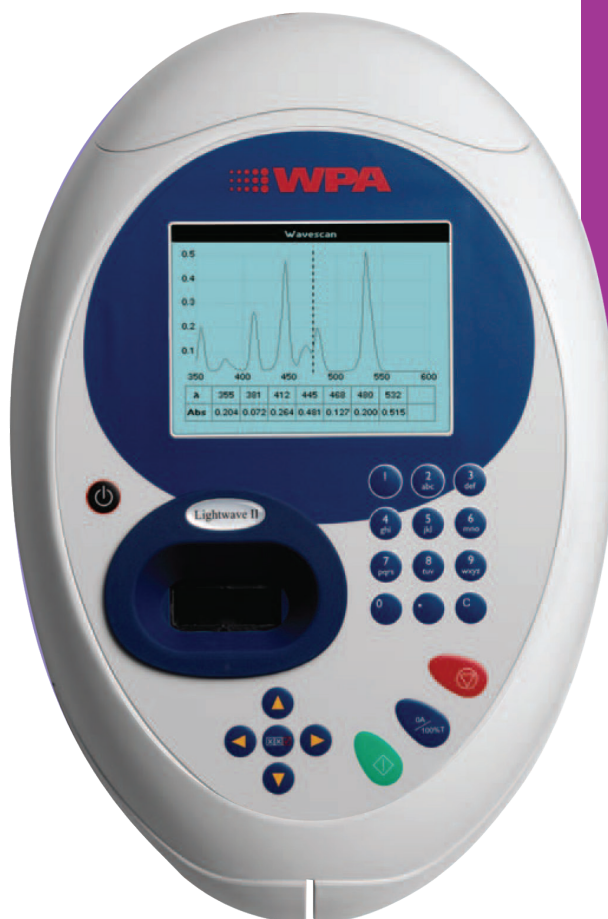
Scanning instrument for general UV/VIS applications

The Lightwave II diode array UV/Visible spectrophotometer is the perfect combination of ease of use with flexibility, incorporating Novel Optics with no moving parts and a Xenon source for high energy performance with longer lamp lifetime. The instrument includes a large wide-view display and in-built software providing flash scan, fixed wavelength measurements, kinetics and concentration with comprehensive graphics capability plus the ability to store up to 90 methods. On-peak confirmation is also a feature of the flexible software. Concentration may be measured using either a factor, single-point calibration, multi-standard curves or Lightwave II. Alternatively there is a multi-wavelength mode where equations using absorbance values may be used for ratio calculations.

Samples may be measured in 10, 20 or 40 mm path length cells (glass, quartz or disposable) and all results may be printed to an optional integrated high quality printer for permanent record. Alternatively the instrument may be linked to a PC via a USB cable connection, the optional wireless Bluetooth® or SD Card accessories for data storage or printing.

The Lightwave II has been designed to meet the needs of customers in most laboratory situations and is compact, lightweight, convenient and an excellent value compared to conventional systems.

With its elegant new user interface, Gifford Optics and Bluetooth® connectivity, the Lightwave II is an obvious choice in a multi-function environment. A higher resolution Lightwave II+ with a 3 nm bandwidth is also available.



- Novel optics for high energy combined with a xenon source for long lamp lifetime
- Unique, integral cuvette tray for storage and sample support
- Wavelength scanning, kinetics and concentration functionality with full graphics display
- Integrated printer (optional)
- Wireless Bluetooth® connectivity (optional)
- Integrated SD card accessory for data storage and export (optional)
- Simple selection software

Ordering Information

Lightwave II UV/Visible Spectrophotometer	80-3003-72
Lightwave II UV/Visible Spectrophotometer with printer	80-3003-73
Lightwave II+ UV/Visible Spectrophotometer	80-3004-60
Lightwave II+ UV/Visible Spectrophotometer with printer	80-3004-61
SD Card Accessory	80-3005-00
Bluetooth® Accessory	80-3003-96

Biowave II Life Science Spectrophotometer

Life science oriented product with stored routines for nucleic acid quantification/proteins/cell density

- Novel optics for high energy combined with a xenon source for long lamp lifetime
- Unique, integral cuvette tray for storage and sample support
- Wavelength scanning, kinetics and concentration functionality with full graphics display
- Integrated printer (optional)
- Wireless Bluetooth® connectivity (optional)
- Integrated SD card accessory for data storage and export (optional)
- Simple selection software

The Biowave II diode array spectrophotometer offers all the benefits described for the Lightwave II with the addition of key life science applications.

There are pre-defined methodologies for nucleic acid quantification (DNA, RNA and oligonucleotides), protein assays (BCA, Biuret, Bradford and Lowry) and for cell culture density measurements. The visualisation of the nucleic acid scan is particularly useful, especially for RNA samples where impurities may be present in the 230 nm region, yet not have an adverse effect on the A260/A280 ratio. The system is compatible with disposable low volume UV cuvettes.

The combination of the life science methods with the rapid scanning, kinetics and concentration capabilities of the Biowave II make it a very useful addition to any molecular biology laboratory. In kinetics mode, the basic plot of absorbance against time may be supplemented with the result for A/min. In addition the correlation coefficient is also calculated for the duration of the assay. This slope may be multiplied automatically by a factor to convert it directly to rate of reaction.

Once again, all results may be printed to an optional integrated high quality printer for permanent record or the instrument may be linked to a PC via a USB cable connection, optional wireless Bluetooth® or SD Card accessories for data storage or printing.



Ordering Information

Biowave II UV/Visible Life Science Spectrophotometer	80-3003-75
Biowave II UV/Visible Life Science Spectrophotometer with printer	80-3003-76
Biowave II+ UV/Visible Life Science Spectrophotometer	80-3004-80
Biowave II+ UV/Visible Life Science Spectrophotometer with printer	80-3004-81
Printer accessory	80-3003-84
Spare printer paper (20 rolls)	80-3004-07
SD card accessory	80-3005-00
Bluetooth® accessory	80-3003-96

Resolution PC Software

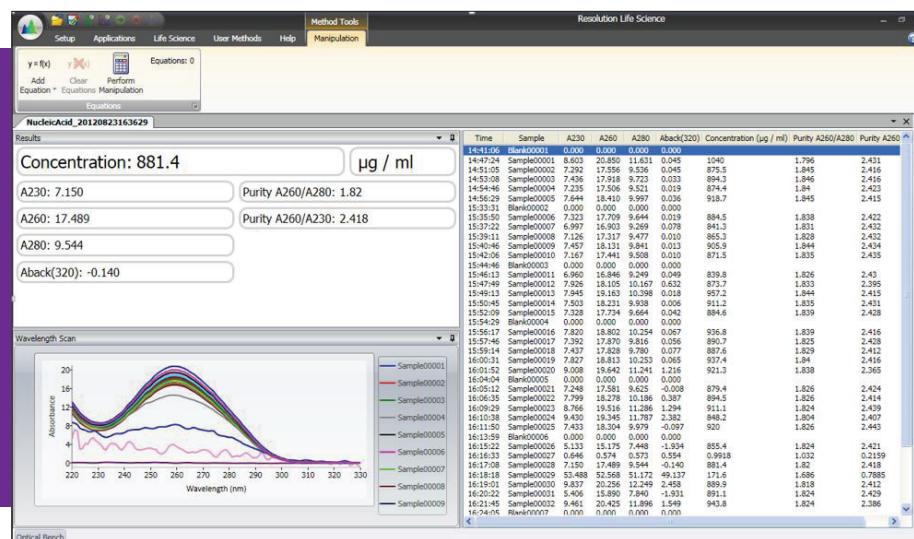
Four versions for your analysis:

- Resolution Lite — data acquisition using a Quick Read module
- Resolution — for all routine measurements
- Resolution Life Science — for nucleic acid, proteins and cell density measurements
- Resolution CFR — if you need full 21 CFR part 11 compliance

Resolution PC Software is an easy-to-use software platform with powerful modules for measurement and analysis. Resolution can be used with your WPA spectrophotometer for instrument control, increasing your options for working with your spectrophotometer outside of the lab. Resolution PC Software was developed with an applications focus for superior usability. Resolution PC software is for use with all Biochrom UV/Vis Spectrophotometers.

Key features include

- Quick Read and Quick Scan for fast measurements with limited setup
- Bespoke method development for your unique laboratory requirements
- Powerful graphical data display and manipulation options
- Microsoft® look and feel for intuitive use
- Resolution Life Science version has pre-programmed methods for fast measurements of common methods like protein and DNA/ RNA quantification and purity measurements as well as cell density measurements and CyDye quantification
- Library of reference material if your laboratory environment requires regular verification
- Compatible with Windows® XP, Windows Vista and Windows 7
- Save, print or export your analysis as an Excel®, Extended Metafile, HTML, pdf, rich text format, text, Word or XPS file types



Software	Part Number	Use With	Application Modules
Resolution Lite	80-7100-30	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Quick Read, Quick Scan, Validation
Resolution	80-7100-31	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Quick Read, Quick Scan, Validation, Fixed Wavelength, Wavelength Scanning, Quantitative Analysis, Kinetics, Methods Developer
Resolution Life Science	80-7100-32	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Quick Read, Quick Scan, Validation, Fixed Wavelength, Wavelength Scanning, Quantitative Analysis, Kinetics, Methods Developer, Life Science Methods
Resolution CFR	80-7100-33	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Quick Read, Quick Scan, Validation, Fixed Wavelength, Wavelength Scanning, Quantitative Analysis, Kinetics, Methods Developer, Life Science Methods, 21 CFR Part 11 compliance
Upgrade Resolution to Resolution Life Science	80-7100-34	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Upgrade Resolution to Resolution Life Science
Upgrade Resolution to Resolution CFR	80-7100-35	WPA S800+, S1200+, Biowave II/II+, Lightwave II/II+	Upgrade Resolution to Resolution CFR

Cells (all 10 mm path length) Ordering Guide

Description	Part number
Disposable cells	
Acrylic, pack of 100 (volume 2.5 ml)	80-2004-53
Polystyrene, pack of 100 (volume 1.5 ml)	80-2084-11
UV plastic, semi-micro, pack of 100 (min. volume 750 µl)	80-3000-77
UV plastic, ultra-micro, pack of 100 (fill volume 80 µl)	80-3000-81
Glass cells	
Standard rectangular with lid (volume 2.5 ml)	80-2003-87
Semi micro with lid (min. volume 750 µl)	80-2004-15
Quartz cells	
Standard rectangular with lid (volume 2.5 ml)	80-2002-58
Semi micro with lid (min. volume 750 µl)	80-2002-77
Micro with lid (min. volume 400 µl)	20-2002-95
Ultra-micro (fill volume 70 µl)	80-2103-69
Ultra-micro (fill volume 15 µl)	80-3000-83
Matched cells	
Glass, 8 matched standard rectangular with lid (volume 2.5 ml)	80-2109-83
Quartz, 2 matched standard rectangular with lid (volume 2.5 ml)	80-2099-89
Quartz, 2 matched semi micro with lid (min. volume 750 µl)	80-2100-13
Quartz, 2 matched micro with lid (min. volume 400 µl)	80-2100-25
Quartz, 8 matched standard rectangular with lid (volume 2.5 ml)	80-2109-80
Glass, 8 matched cells with lid)	80-2109-81
Quartz, 8 matched micro with lid (min. volume 400 µl)	80-2109-82

Technical Specifications

Light source, optical system, wavelength range, absorbance range, bandwidth and stray light at 340 nm are shown at the front of this brochure. Other parameters are shown below:

Parameter	Colorimeters (CO7000, CO7500, CO7500B, CO8000)
Stored methods	n/a
Wavelength accuracy	n/a
Photometric reproducibility	±0.02 A at 1 Z using cuvettes
Photometric accuracy	< ±0.05 A at 1 A using Neutral Density Filters
Outputs	RS 232 digital (CO7500, CO7500B, CO8000) 0 to 2 V for 0 to 2 A, 0 to 1.00 V for 0 to 199% T (CO7500, 7500B)
Dimensions (WxDxH)	150 x 180 x 60 mm
Weight	0.6 kg

Spectrophotometers (S800⁺, S1200⁺)

Stored methods	99 (S1200 ⁺), 72 (S800 ⁺)
Wavelength accuracy	±2 nm
Photometric reproducibility	±0.002 A at 0 to 0.5 A, 546 nm
Photometric accuracy	±0.003 A at 0 to 0.5 A
Outputs	USB
Dimensions (WxDxH)	325 x 225 x 133 mm
Weight	<2 kg

Spectrophotometers (Lightwave II, Biowave II)

Stored methods	90
Wavelength accuracy	±2 nm
Photometric reproducibility	±0.002 A at 0 to 0.5 A, 546 nm
Photometric accuracy	±0.008 Abs or 1.3% of the reading, whichever is greater between 0 and 2.5 A
Outputs	USB, Bluetooth® option, SD card option
Dimensions (WxDxH)	260 x 390 x 100 mm
Weight	<4.5 kg

All products are CE marked and comply with relevant legislation, including EMC and low voltage directives.

Biowave II and Lightwave products have a two-year warranty and a lamp life of three years.
All other WPA instruments have a one-year warranty.

As part of our policy of continuous instrument development, we reserve the right to alter specifications without notice.

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WPA belongs to the Biochrom® group of companies.

UV/Visible Spectrophotometry

UV/Visible Spectrophotometry is a fundamental analytical technique and, together with suitable sample handling accessories, is used in laboratories for absorbance and transmission measurements of samples in all application areas. Biochrom, through its Novaspec, Ultrospec, GeneQuant, Libra, and WPA brands, manufactures an extensive range of attractive UV/Visible products and accessories, with performance and reliability guaranteed by over 35 years of experience in the field. Amongst other technological advances, these instruments feature PTR (Press to Read) capability, which dramatically extends the lifetime of the source lamps.

Microtitre Plate Readers, Washers, Dispensers

In the food testing, clinical, biotech and pharmaceutical industries, the demand to increase sample throughput and reduce sample volumes continues. This is where the microtitre plate comes into its own and Biochrom offers an excellent range of fast, versatile, and reliable plate readers with user-friendly designs. In addition, a range of microplate washers is available, with a unique manifold design for minimised residual volumes, digitally-controlled aspiration, and dispensing pumps for high accuracy and low noise performance.

Amino Acid Analysis

Biochrom has been in the field of dedicated amino acid analysis for over 30 years using established ion exchange chromatography to provide rapid, specific amino acid analysis for clinical, pharmaceutical, proteomics, food and feedstuff industries. These state-of-the-art benchtop products feature proven ninhydrin detection technology fully integrated into a complete package utilising the latest graphic software, ceramic and PEEK components for long life and elimination of contamination. In addition, we offer a range of robust ion exchange columns for customised applications.

Distributors worldwide