The Libra Range of UV/Visible Spectrophotometers

PARTNERS IN SCIENCE

biochrom

Biochrom Ltd and UV/Visible spectrophotometry

Biochrom has been a leading supplier of quality instrumentation to science and industry for more than 30 years. Tens of thousands of our analytical instruments have been supplied around the world, sold as own-label brands through our distribution partners.

UV/Visible Spectrophotometry is a popular analytical technique used in most laboratories for a whole host of applications, and Biochrom manufactures well known industry standard products such as WPA, Novaspec, Ultrospec and GeneQuant UV/Visible spectrophotometers.

Whilst still addressing Life Sciences applications through the powerful distribution arm of GE Healthcare, Biochrom has now developed the exciting new Libra range of affordable and easy to use UV/Visible spectrophotometers for other market segments.

With its long experience of manufacturing reliable and proven products, you can be sure that the new range of Libra instruments will be built for longevity, ease of use and versatility. Offering such innovations as Press To Read (PTR) lamps for reduced cost of ownership, Reference Beam Compensation (RBC) for accurate measurement and Instrument Performance Validation (IPV) for GLP compliance, the Libra Spectrophotometers are worthy additions to the laboratory bench.

Spectrophotometer selection guide

Product	Lamp sources	Optical system	Instrument parameters				Comment
			Wavelength Range, nm	Absorbance Range, A	Bandwidth, nm	Stray Light at 340nm, %T	
Libra S2	tungsten	filters	440, 470, 490, 520, 550, 580, 590, 680	-0.3 – 1.99	40	<1% at filter wavelength	colorimeter for student and field use
Libra S4	tungsten	diode array	330 – 800	-0.3 –2.5	7	< 1%T	ideal for teaching labs
Libra S6	tungsten	diode array	330 – 800	-0.3 – 2.5	7	< 1%T	ideal for QC labs
Libra S11	tungsten	single beam	325 – 999	-0.3 – 3.000	5	< 0.05%T	ideal for QC labs
Libra S12	deuterium / tungsten	single beam	200 – 999	-0.3 – 3.000	5	< 0.05%T	ideal for teaching labs
Libra S21	xenon press to read	split beam, reference beam compensation	325 – 1100	-0.3 – 3.000	< 3	< 0.05%T	laboratory workhorse
Libra S22	xenon press to read	split beam, reference beam compensation	190 – 1100	-0.3 – 3.000	< 3	< 0.05%T	laboratory workhorse
Libra S32/S35PC	deuterium / tungsten press to read	split beam, reference beam compensation	190 – 1100	-0.3 – 3.000	< 1.8	< 0.025%T	ideal for analytical labs
Libra S35/S35PC	deuterium / tungsten press to read	split beam, reference beam compensation	190 – 1100	-0.3 – 3.000	1	< 0.025%T	pharmacopoeia compliant

All products have safety certifications (CE 89/336/EEC (EMC directive); CE 73/23/EEC (LV directive); EN-61010-1 (IEC1010-1).
As part of our policy of continuous instrument development, we reserve the right to alter specifications without notice.

Libra S2 and Libra S2B Colorimeters

- Designed with student, QC and field users in mind
- Rugged, portable and easy to use
- Extremely versatile
- Rechargeable battery version available

The **Libra S2** colorimeter is a small, robust, easy to use instrument that has been designed with both the student user and "field" user in mind. It is ideal for teaching the principles of science and analysis in schools and secondary education colleges, as well as being rugged enough for measurements in, for example, remote location health clinics where simple diagnostic tests need to be made. The instrument surface is designed for ease of cleaning and decontamination. Rechargeable batteries are included in the Libra S2B and the system will operate for almost 1 month on a single charge to provide complete portability.

The instrument measures in Absorbance and % Transmission mode as well as in simple kinetics, enabling changes in Absorbance over time and reaction rates to be determined (readings are taken approx. every second). It may be used to cover the 400 – 700 nm wavelength range as it has an integral, colour coded rotating wheel containing filters at 440, 470, 490, 520, 550, 580, 590 and 680nm. These are made from coloured gelatin and are encased in glass, so that the instrument can be used in "tropical" conditions. A filter is selected by moving the wheel until the required wavelength is displayed in the window above the cell compartment.

The instrument may be linked via a serial lead to either a serial printer for hardcopy output or to a PC for download of results to spreadsheet. It has an analogue output, and may also be connected to a chart recorder using a standard 2 x 4 mm socket to output absorbance-time data when in kinetics mode.

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S2 mains only	80-5000-02	Tungsten	Filters	440, 470, 490, 520, 550, 580, 590, 680	-0.3 – 1.99	40
Libra S2B mains and battery operated	80-5000-03	Tungsten	Filters	440, 470, 490, 520, 550, 580, 590, 680	-0.3 – 1.99	40

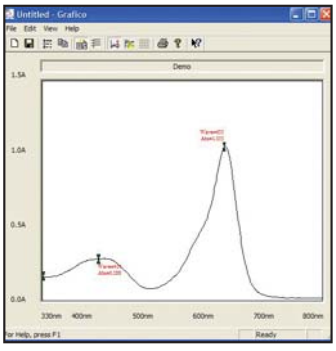
Libra S4 Visible spectrophotometer

- Absorbance, % Transmission, Concentration and Rate
- Educational experiments and UV/Visible tutorial
- Analogue output for connection to chart recorder
- Grafico PC utility software

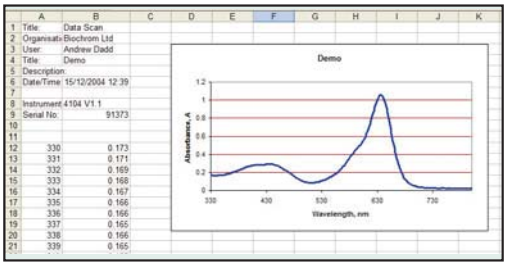
The **Libra S4** visible spectrophotometer is the ideal instrument for education and QC laboratories. The instrument is compact, lightweight and ergonomically designed for the simpler applications. There is a large display for ease of reading plus a very simple user interface for rapid set up and analysis. For educational purposes, the user manual includes simple experiments for the determination of λ max, extinction coefficient and natural bandwidth plus the construction of a standard curve and the measurement of stray light.

The Libra S4 measures Absorbance, % Transmission and concentration as well as being able to output absorbance–time plots directly to chart recorder. The instrument is delivered with Grafico PC utility software package and a serial lead, providing the student with the means to capture, print and interpret a wavelength scan from the instrument on a PC; the data for the scan or other results may be easily exported from Grafico to Excel. Note that Grafico also includes an educational tutorial on UV/Visible spectrophotometry.

The Libra S4 accepts standard 10mm pathlength glass or disposable cuvettes. A test tube adapter set is available for 10, 12 and 16mm. In the event of a spill, the cell holder may be removed for cleaning. The instrument is delivered with a starter pack of disposable cuvettes.

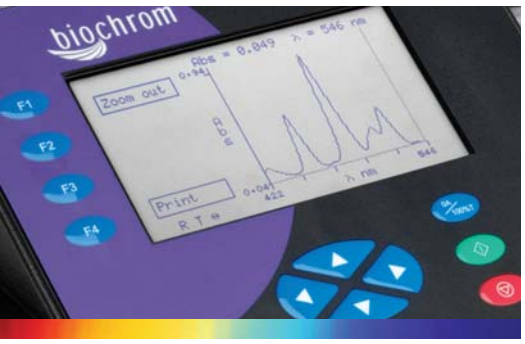


Typical scan output viewed using Grafico; note that peaks may be labelled



The same scan exported to Excel

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S4	80-5000-00	Tungsten	Diode array	330-800	-0.3 –2.5	7

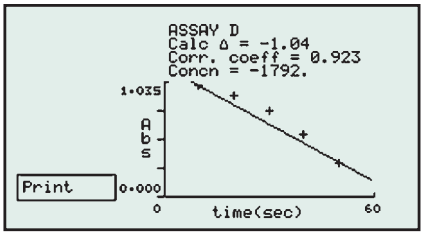


Libra S6 Visible spectrophotometer

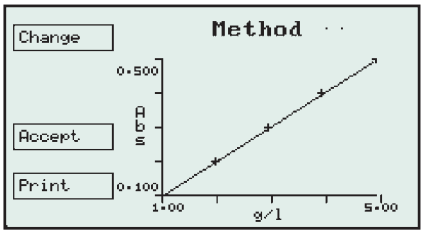
- "Flash Scan" diode array
- Simple menu driven software
- Comprehensive 99 method storage
- Wavelength scan, kinetics and standard curve functionality with full graphics
- Grafico PC utility software

The **Libra S6** visible diode array spectrophotometer has been designed to meet the routine spectroscopy needs of customers requiring a compact, light weight instrument that is easy to use and which includes farm ore features than similar priced products. The Libra S6 measures Absorbance, % Transmission, Absorbance ratio, Concentration and Kinetics. A large backlit graphical display enables wavelength scans, kinetic assays (including slope calculation) and standard curves to be viewed. The instrument is delivered with Grafico PC utility software package and a serial lead, to facilitate transfer of results to computer. Alternatively, graphics may be printed to either the S1000P or the industry standard Seiko DPU-414 printer plus kinetics data may be output to a chart recorder.

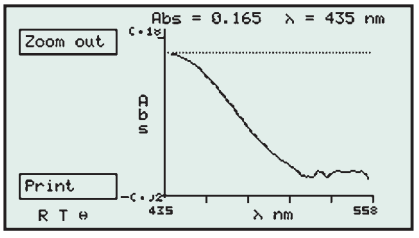
The Libra S6 accepts standard 10mm pathlength glass or disposable cuvettes. A test tube adapter set is available for 10, 12 and 16mm (COD measurements can be made using standard 16mm tubes). The cell holder may be removed for cleaning or decontamination. Another version of the instrument, the Libra S6H, is available with a factory fitted electrically heated cell holder for thermostatted measurements at 37°C.



Kinetics assay



Standard curve



Wavelength scan

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S6	80-5000-10	Tungsten	Diode array	330-800	-0.3 –2.5	7
Libra S6H with heated cell holder	80-5000-11	Tungsten	Diode array	330-800	-0.3 –2.5	7

Libra S11 Visible and Libra S12 UV/Visible spectrophotometers

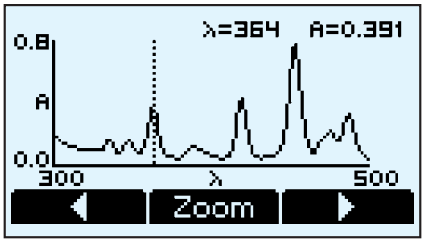
- High energy optics
- Lamp saver mode
- Customisable user interface
- Automatic system calibration
- Wide range of sample handling accessories

Libra S11 and **S12** address quality control needs in the analytical and industrial laboratory where higher specification and a wider choice of accessories are required.

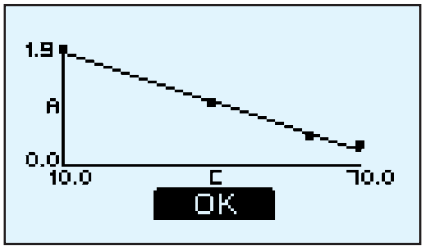
The instruments have absorbance, transmittance, absorbance ratio and factor concentration modes, as well as absorbance against time and scanning capabilities. The benefits of enhanced software functionality, including standard curve mode, reaction rate slope calculation, multi-wavelength equation definition and storage of user defined methods, will be useful in the QC laboratory. Graphics are displayed and can be printed out for the scan, kinetics and standard curve routines.

The instrument start-up menu may be customised by the laboratory manager in order to meet the applications requirements of the laboratory. As measurement needs change, the menu can be altered accordingly.

Both Libra S11 and S12 have a 25 pin multi-purpose output as standard for output to PC or chart recorder with the appropriate interface. In addition, it can be used with a parallel output printer. Furthermore, the instrument can be used in conjunction with Acquire Lite PC-based software to expand the capability of the instrument.



Wavelength scan



Standard curve

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S11	80-2115-15	Tungsten	Single beam	325 - 999	-3.000 to + 3.000	5
Libra S12	80-2115-10	Deuterium / tungsten	Single beam	200 – 999	-3.000 to + 3.000	5

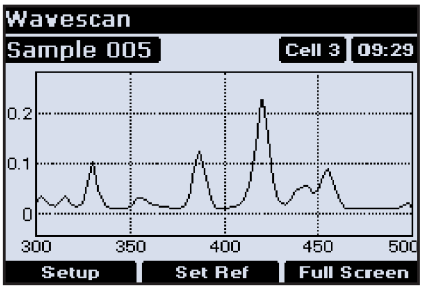
Libra S21 Visible and Libra S22 UV/Visible Spectrophotometers

- Press To Read (PTR) xenon lamp technology
- Reference Beam Compensation (RBC)
- Instrument Performance Validation (IPV) facility
- 8-position sample changer as standard
- Rapid System Operation

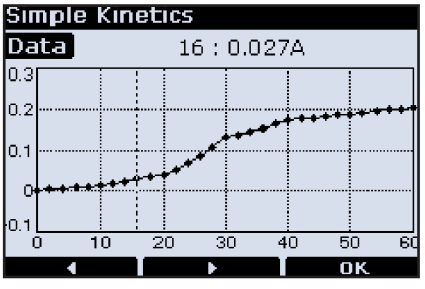
Libra S21 and **S22** are simple-to-use instruments with advanced performance, incorporating xenon lamp technology for longer source lifetime and lower maintenance costs. A further benefit of this design is optical noise compensation to improve signal to background measurements. Instrument Performance Validation (IPV) is included as standard, and will benefit any laboratory that needs to prove the quality of their results; the GLP results can be viewed on the display or printed out.

In addition to measuring absorbance, transmittance and concentration, they provide a standard curve routine for analyte determination. Wavelength scan (with zoom), absorbance changes with time, reaction rate determinations and standard curves can be displayed as graphics and printed out. User defined equations can be entered using multi-wavelength mode and up to 18 methods can be saved in separate operator folders. The instrument can be upgraded for more sophisticated applications, as well as data manipulation, with Acquire Software and a PC.

With its large sample compartment and wide range of accessories, Libra S21 and S22 are versatile and reliable instruments for use in any laboratory performing general-purpose measurements.



Wavelength scan



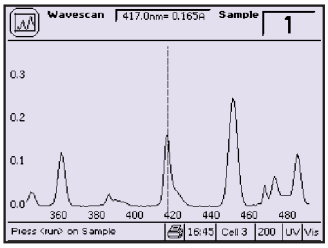
Kinetics

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S21	80-2115-25	Xenon Press to read (PTR)	Reference beam compensation (RBC)	325 - 1100	-3.000 to + 3.000	< 3
Libra S22	80-2115-20	Xenon Press to read (PTR)	Reference beam compensation (RBC)	190 - 1100	-3.000 to + 3.000	< 3

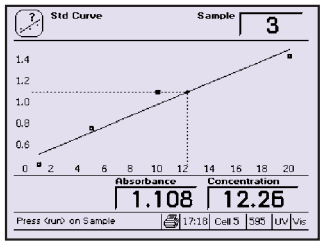
Libra S32 and Libra S32PC UV/Visible spectrophotometers

- 1.8nm Bandwidth
- Unique Press To Read (PTR) high energy deuterium and tungsten sources
- Instrument Performance Validation (IPV) facility
- Rapid scan facility
- 8-position sample changer as standard

The **Libra S32** and **S32PC** instruments are high performance systems intended for the busy multi-user analytical laboratory. The instruments are provided with a Qualification and Performance Verification Logbook supplied to keep an ongoing record of instrument performance for GLP purposes.



Wavelength scan



Standard curve

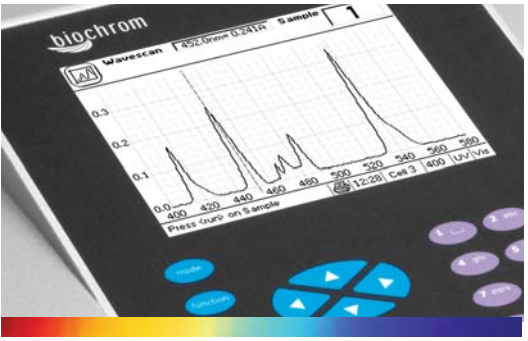
Libra S32 only

- Free standing instrument
- Comprehensive on-board applications software covering wavelength scan, enzyme kinetics, standard curve, substrate concentration, and multi-wavelength equation entry and there is the capacity for 50 user definable stored methods
- Direct download of results to Excel for archiving using supplied spreadsheet interface software
- Provides display and print-out information in English, German, French, Italian, Spanish or Russian

Libra S32PC only

- Compact, PC-based instrument
- Supplied with Acquire software and serial cable

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S32	80-2115-30	Deuterium / tungsten Press to read (PTR)	Reference beam compensation (RBC)	190 – 1100 (in 0.1 nm steps)	-3.000 to + 3.000	< 1.8
Libra S32PC (includes Acquire software)	80-2115-40	Deuterium / tungsten Press to read (PTR)	Reference beam compensation (RBC)	190 – 1100 (in 0.1 nm steps)	-3.000 to + 3.000	< 1.8

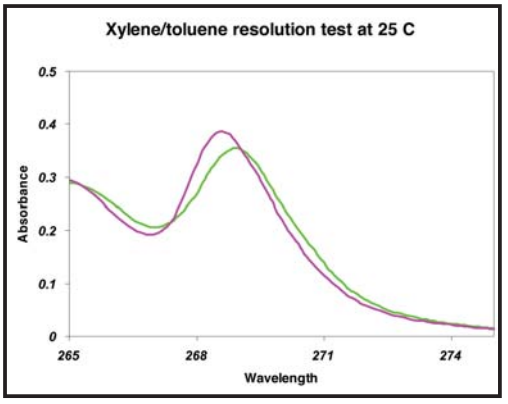


Libra S35 and Libra S35PC Pharmacopoeia compliant UV/Visible spectrophotometers

- Pharmacopoeia Compliant
- 1nm Bandwidth
- Unique Press To Read (PTR) high energy deuterium and tungsten sources
- Instrument Performance Validation (IPV) facility
- Rapid scan facility
- 8-position sample changer as standard

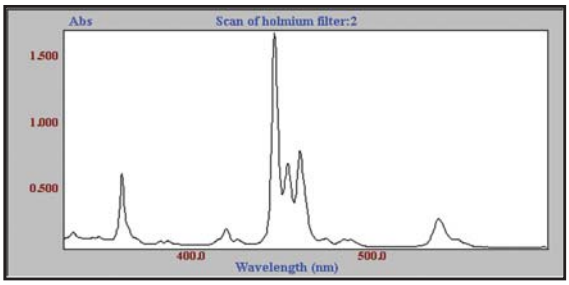
The **Libra S35** and **S35PC**instruments are high specification systems with a 1nm bandwidth intended for the busy multi-user laboratory in Pharmaceutical QC, Analytical and Research laboratories, whose requirements include high performance, GLP, IQ/OQ certification test plans and output to LIMS. In some cases, compliance with 21 CFR part 11 may also be needed. With press to read lamp technology, lamp life is only consumed during the measurement cycle; therefore long term running costs are minimal. The on-board self test diagnostics for instrument performance validation may be used in conjunction with the Qualification and Performance Verification Logbook (provided with the instruments) so that an ongoing record of instrument performance over time may be kept for GLP purposes.

The Libra S35 is a compact, free-standing instrument with local control. The Libra S35PC requires a PC or laptop and is supplied with Acquire software and a serial cable; when used with the optional Acquire CFR software, the system is fully Pharmacopoeia compliant.

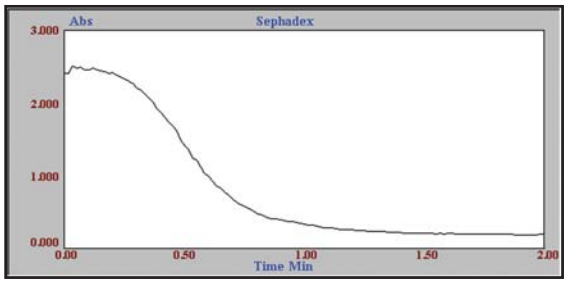


The diagram shows the effect of bandwidth when the xylene/toluene test specified in the Pharmacopoeia is applied to different instruments. The absorbance ratio of the peak around 269nm to the trough around 266nm is 2.0 and 1.7 for the Libra S35 and S32, respectively. The value for the Libra S35 confirms that it is fully compliant with all the ratios stated in the Pharmacopoeia monographs.

Instrument	Part number	Lamps	Optics	Wavelength range, nm	Absorbance range, A	Bandwidth, nm
Libra S35	80-5000-35	Deuterium / tungsten Press to read (PTR)	Reference beam compensation (RBC)	190 – 1100 (in 0.1 nm steps)	-3.000 to + 3.000	< 1.0
Libra S35PC (includes Acquire software)	80-5000-36	Deuterium / tungsten Press to read (PTR)	Reference beam compensation (RBC)	190 – 1100 (in 0.1 nm steps)	-3.000 to + 3.000	< 1.0



Wavelength scan



Reaction kinetics

Acquire Software

- Comprehensive software for UV/Visible spectrophotometry
- Audit trail (data log) facility in all modes of operation
- Flexible results formatting and presentation
- Extensive on-line help
- Export to spreadsheet capabilities

Acquire software has the following application modules and selected features:

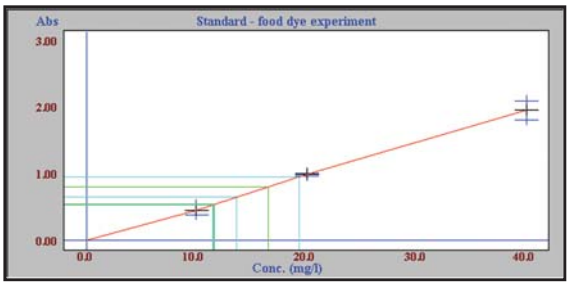
Instrument control	Simulates instrument control panel
Wavelength scanning	Zoom, 1-4 derivative, overlay, mathematics, peak search
Reaction kinetics	Serial and parallel assays, multi wavelength assays, Michaelis Menten
Quantification	Standard curve, substrate concentration, curve fit, load by record, append
Multi wavelength	User defined equation entry
Time drive	Long term measurements with automatic save, multi wavelength

To assist with regulatory compliance, Acquire software has automatic saving of data from the spectrophotometer to user specified directories/ folders that can have restricted access on the network. There is also an audit trail facility; operator actions used in defining and creating results, followed by subsequent editing of results or data manipulation are recorded in the form of a read only/write protected text file for subsequent examination by a supervisor. Acquire software has been developed by scientists for scientists in an ISO accredited environment and our software development process is available for external audit, if required.

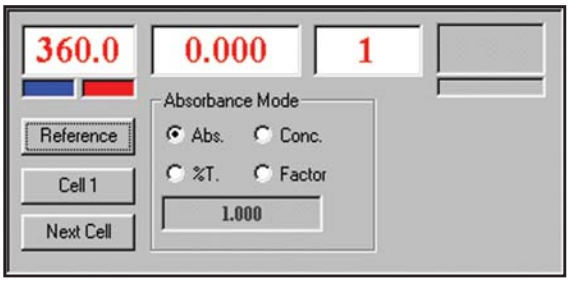
Personal computer specification for Acquire software

For optimum performance, an IBM compatible Pentium or greater personal computer running Microsoft Windows 95, 98, 2000, NT or XP is required. The PC should have a minimum of 32 MB RAM, 200 Mb hard disk, a CD-ROM disk drive, a serial mouse installed, one free COMMS serial port and VGA graphics. Any printer supported by Microsoft Windows 95, 98, 2000, NT or XP can be used with the PC. Contact your supplier for further information.

Software	Part number	Use with	Application modules
Acquire	80-2115-31	Libra S21, S22, S32, S32PC S35, S35PC	Instrument control, Wavelength scanning, Reaction kinetics, Quantification, Multi-wavelength, Time drive
Acquire Lite	80-2112-24	Libra S11, S12	Instrument control, Wavelength scanning, Reaction kinetics, Quantification, Multi-wavelength, Time drive



Quantification



Instrument control

21 CFR part 11 compliant Acquire Software

- Compliant software in terms of electronic records and signatures, with full password protection
- Export of data directly to Excel spreadsheet and Adobe Acrobat
- Full audit trail
- All the functionality of standard Acquire software, including flexible results formatting/presentation and extensive on-line help

Acquire CFR software has the additional application modules and selected features when compared to standard Aquire:

CFR administrator	Provides system administrators with user management capabilities, enabling the required security functions to be established

21 CFR part 11 Acquire applications software is for use with the high specification instruments in the Libra range of UV/Visible spectrophotometers, and these powerful systems are ideal for Analytical, QC or Research laboratories that operate within controlled environments. It comprises both client and server applications for networked installations, and both of these may be installed on one PC if required. As in any 21 CFR part 11 compliant environment, it is the responsibility of the end user to have the necessary standard operating procedures (SOPs) and training in place to ensure that the maximum benefit is obtained from the system.

It is the CFR Administrator tool that enables the system administrator to set and define access privileges for individual users or user groups in the laboratory. The audit trail is always enabled and separate file and application logs are automatically kept; when ready, methods or data may be signed off by the user using the File > e-signature function. Results may be printed or exported in spreadsheet or, very conveniently, in Acrobat format.

Personal computer specification for Acquire CFR software

21 CFR part 11 compliant Acquire software requires a PC or network with one of the following Microsoft Windows operating systems to be installed:

NT 4.0 with Service Pack 6.

2000 with Service Pack 2 or 3.

XP with Service Pack 1.

Additionally, at least one NTFS (New Technology Filing System) formatted directory must be available in order to use the software (note that FAT & HPFS are not adequate alternatives).

The computer should have both a free USB port available for the software dongle and a serial port for connection to the spectrophotometer (alternatively another USB port used in conjunction with an appropriate USB to serial converter can also be used).

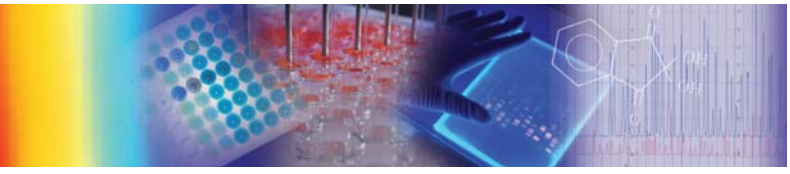
Software	Part number	Use with	Application modules
Acquire CFR	80-5000-31	Libra S21, S22, S32, S32PC, S35, S35PC	Instrument control, Wavelength scanning, Reaction kinetics, Quantification, Multi-wavelength, Time drive, CFR administrator

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, using its Novaspec, Ultrospec, GeneQuant, Libra and WPA brand names, manufactures an extensive range of attractive UV/Visible products and accessories, with performance and reliability guaranteed by over 20 years 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 and dispensers

In the food testing, clinical, biotech and pharmaceutical industries, the demand is for ever increasing sample throughput and smaller and smaller volumes. This is where the microtitre plate comes into its own and Biochrom offer an excellent range of fast, versatile and reliable plate readers with robot friendly designs, via its Asys Hitech subsidiary company. In addition, a range of washers is available, with a unique manifold design for minimised residual volumes and digitally controlled aspiration and dispensing pumps for high accuracy and low noise performance. To minimize human intervention and possible error, there is a growing requirement to dispense low volumes of liquids rapidly, accurately and reproducibly. Biochrom's liquid dispensers meet these needs exactly, with units for two or six, any well format, microtitre plates and the ability to deliver volumes of liquid down to two microlitres using a non-contact delivery technique, thereby eliminating cross contamination.



Gel electrophoresis

Gel Electrophoresis remains one of the most important techniques in the life sciences. Biochrom, via its Hoefer and Scie-Plas sister companies, offers a full range of electrophoresis products for analytical and preparative nucleic acid studies and manual DNA sequencing, including both horizontal and vertical units together with all appropriate buffers, sampling and blotting accessories.

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 bench top products feature proven ninhydrin detection technology fully integrated into a complete package utilising the latest graphical software, active components in ceramic and PEEK for long life and elimination of contamination and a range of robust ion exchange columns for customised applications.

If you want to know more about us, or our products, please get in touch . . . .

biochrom

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