More Focus • More Knowledge • More Choice

Spectronic Unicam is a company dedicated to the manufacture, sale and support of Visible and UV-Visible spectrophotometers. Formed from the integration of two long established spectroscopy companies, Spectronic Unicam's unique focus gives customers access to premium quality technical support and knowledgeable applications advice. More focus means we also provide a greater choice of customer driven products and accessories. By choosing Spectronic Unicam our customers will have chosen a spectrophotometer that exactly matches their requirements.

The apparatus described in this document has been designed as far as possible to meet high international safety standards when installed and operated in accordance with accepted procedures and with the safety precautions detailed in the User Manual. We reserve the right to alter the specification of the equipment described in this document without prior notice.

Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation.

AccuVac is a registered trademark of the Hach Company.

Our quality management system is registered to the ISO9001 standard.

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A Thermo Electron Company

ISO9001
Today’s industry has to satisfy increasing environmental legislation and regulation, but control costs in the face of global competition. That’s why we’ve made AquaMate powerful enough to handle all your water analyses, yet simple enough to be used by non-scientific users. Whether you are optimising your cost of analysis using test kits, searching for unknowns or troubleshooting a problem, you can trust AquaMate to provide the most versatile, cost-effective solution.

The heart of the system
AquaMate is available in two versions, both with a class leading, high-resolution 2nm bandwidth monochromator. A Visible version provides a wavelength range of 325-1100nm while the extended 190-1100nm range of the UV-Visible version provides additional flexibility to analyse detergents and screen for organics.

AquaMate provides optical performance previously unheard of in a water analysis spectrophotometer. The 2nm bandwidth optical system means AquaMate has the analyte selectivity and sensitivity to handle a wide range of environmental applications other than just water analysis using test kits. For example, AquaMate is probably the only water analysis spectrophotometer capable of retrieving useful information from the sharp peaks found in chlorophyll spectra or from organic contaminants that absorb in the ultraviolet region of the spectrum. Superb linearity, stability and signal-to-noise ratio also means you can trust AquaMate to take stable measurements from highly absorbing or light scattering samples.

improve your workflow

- Optical performance previously unheard of in a water analysis spectrophotometer
- Ready, out of the box, to run test kits from all the leading manufacturers
- Simple operation for non-scientific users
- Versatile functionality for experienced scientists
- Unique calibration validation tools verify instrument performance

The versatile water analysis spectrophotometer you can trust
AquaMate is ready, out of the box, to use test kits from all the leading manufacturers, so there is no need to change the way you work when you replace your existing photometer or spectrophotometer. AquaMate is pre-programmed with the most common tests, for example, Nitrate, Phosphate and Chloride. It is also supplied with floppy disks containing more than 300 methods and calibrations from all the leading test kit manufacturers. Many of these are equivalent to DIN, ISO and APHA.AWWA.WPCF methods. AquaMate’s built-in disk drive makes it easy to load these methods and calibrations into AquaMate’s non-volatile memory. You can load methods and calibrations from one kit manufacturer or from several kit manufacturers to make sure you get the best combination of speed, sensitivity, selectivity and low cost of analysis. AquaMate is supplied with detailed instructions for all these methods so you can be operational immediately.

Stay current
The combination of built-in disk drive and intelligent programming allows you to keep your AquaMate current with the very latest kit technologies and chemistries. There are no more lengthy delays waiting for your instrument supplier to provide you with the latest calibrations. We can send you the latest calibrations on disk, via e-mail or you can enter the calibrations yourself. The floppy disk drive can also be used to archive your results or transfer them to a PC for further processing or statistical analysis.

Choose kits from suppliers who offer you the best combination of speed, sensitivity, selectivity and cost for your type of analysis.
As part of the standard package AquaMate is supplied with sample accessories to accommodate tubes, vials, ampules, 1" square cells and cuvettes of 1-50mm pathlength.

Optional sample handling accessories provide even more flexibility and productivity. Long pathlength cuvette holders up to 100mm deal with low analyte concentrations and small sample volumes can be measured with the 50uL cuvette option. A low price, 7-position automatic carousel allows you to automate the generation of calibration curves. The MiniSipper is ideal when you want to quickly process large batches of samples. This peristaltic pump based sample introduction system is available with 1mm, 10mm, 20mm and 40mm glass or quartz flowcells. The MiniSipper improves productivity by processing up to 300 samples per hour.

It’s so simple
We’ve made working with AquaMate simple because we know that is what your operators will demand and expect. They will simply select a method or calibration from a list on the graphical display, put a cuvette, tube, vial, cell or ampule in the sample compartment holder, enter an alphanumeric sample ID and press run. The sample results and calibration curve will be displayed graphically and, if selected, automatically printed and archived to disk.
In multi-user environments or those with non-scientific operators you can control operator access to your AquaMate. In this mode authorised operators are required to log on and enter a password, which assigns them privileges based on their job function and experience. For example, you can prevent operators editing methods, calibrations, QC pass-fail limits and calculations etc. These may be privileges you want to reserve for senior operators or the system administrator only. You may also decide that fundamental instrument parameters such as re-setting instrument lamp hours are the privilege of the administrator only.

If you want to set up your own methods or modify your test kit supplier's calibration you'll find AquaMate has all the functionality you'll ever need. You can run calibrations using up to 20 standards, each with 3 replicates and choose from 4 curve fits. You can also program up to 20 different wavelengths. Built-in procedural timers allow you to control events, such as the time required for the sample color to develop. You can enter QC limits that generate an on-screen and hard copy PASS or FAIL. You can apply calculations to your raw data to change the reported units or correct for different sample weights, volumes or dilutions.

If you don't know the analyte wavelength AquaMate will find it for you and show the peak profile and peak wavelength on the graphical display.

Reporting results
AquaMate provides a comprehensive choice of print options to satisfy regulatory requirements for detailed hard copy results. An optional, built-in 110mm (4.38") graphics printer is ideal for environments with limited space or where transportability is required. AquaMate also has built-in drivers for LaserJet, DeskJet and dot matrix printers for environments that require a full size hard copy, colour hard copy or where you wish to utilise an existing printer.

The hard copy report is the same regardless of print option. It includes hard copy of date and time of analysis, date and time of hard copy, method, operator and sample identification, calibration curve, instrument parameters, software version and serial number.

Plus the results!
Calibration Validation Carousel (CVC) verifies the spectrophotometer. AquaMate's unique attention to the validation and calibration of kit chemistries and methodologies but only Test kit manufacturers go to great lengths to Performance verification

The traceability path is preserved through an to NPL or NIST primary reference materials. CVC are secondary reference materials traceable to a scientist, but with the CVC anyone can perform other duties. Validating other validation as a chore and it frees them up to
electronic archive. The tests run unattended and generates a hard table on the right. The CVC performance as shown in the

2.2 nm 2.0 nm PASS -0.2 nm

SPECIFICATION BANDWIDTH RESULT DIFFERENCE

<table>
<thead>
<tr>
<th>BANDWIDTH</th>
<th>ACTUAL</th>
<th>MEASURED</th>
<th>RESULT TOLERANCE DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>340.0 nm</td>
<td>3.3979</td>
<td>PASS</td>
<td>3.3 A 0.0979 A</td>
</tr>
<tr>
<td>220.0 nm</td>
<td>3.7932</td>
<td>PASS</td>
<td>3.3 A 0.4932 A</td>
</tr>
</tbody>
</table>

STRAY LIGHT

<table>
<thead>
<tr>
<th>STRAY LIGHT</th>
<th>ACTUAL</th>
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<th>RESULT TOLERANCE DIFFERENCE</th>
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</thead>
<tbody>
<tr>
<td>&lt;0.002A/hr</td>
<td>&lt;0.0001A</td>
<td>PASS</td>
<td>&lt;0.001A</td>
</tr>
</tbody>
</table>

Noise

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<tr>
<th>NOISE</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>dB</td>
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<td>1.0</td>
</tr>
<tr>
<td>nm</td>
<td>&lt;0.2 nm</td>
<td></td>
</tr>
</tbody>
</table>

Absorbance accuracy @ 1A +/- 0.005A
Absorbance repeatability @ 1A +/- 0.002A
Wavelength accuracy 1nm
Wavelength repeatability +/- 0.2nm
Stability

<table>
<thead>
<tr>
<th>STABILITY</th>
<th>ACTUAL</th>
<th>MEASURED</th>
<th>RESULT TOLERANCE DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;0.002A/hr</td>
<td>&lt;0.0001A</td>
<td>PASS</td>
<td>&lt;0.001A</td>
</tr>
</tbody>
</table>

Calibration Validation Carousel (CVC)

Method & data storage
Up to 30 methods, calibrations or results files in non-volatile memory. Plus, built-in industry standard 1.44Mb disk drive for unlimited method, calibration and results storage. Each disk stores up to 20 methods/calibrations etc. Also used for electronic archiving, transfer of results to a PC and for upgrading instrument applications software

Sample handling accessories supplied with AquaMate
Combination test tube/cuvette holder: accommodates tubes up to 125mm high ("i") and 18mm diameter ("i") and 18mm pathlength glass or quartz cuvettes. Variable pathlength cell holder: accommodates glass or quartz cuvettes from 1-50mm pathlength. Cell holder for Hach 1" square cells and AccuVac® ampules

Optical system
Single beam with high energy 2nm bandwidth monochromator and Quartz coated optics

Wavelength range 190-1100nm or 325-1100nm
Bandwidth 2nm
Stray light <0.05% @ 220nm and 3400nm
Absorbance accuracy @ 1A +/- 0.005A
Absorbance repeatability @ 1A +/- 0.002A
Wavelength accuracy 1nm
Wavelength repeatability +/- 0.2nm
Stability <0.002A/hr
Noise <0.0001A

Display
1/4 VGA Graphics LCD

Computer interface RS232C

Printer interface Centronics parallel

Method & data storage
Up to 30 methods, calibrations or results files in non-volatile memory. Plus, built-in industry standard 1.44Mb disk drive for unlimited method, calibration and results storage. Each disk stores up to 20 methods/calibrations etc. Also used for electronic archiving, transfer of results to a PC and for upgrading instrument applications software

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Technical specifications

Wavelength range 190-1100nm or 325-1100nm
Bandwidth 2nm
Stray light <0.05% @ 220nm and 3400nm
Absorbance accuracy @ 1A +/- 0.005A
Absorbance repeatability @ 1A +/- 0.002A
Wavelength accuracy 1nm
Wavelength repeatability +/- 0.2nm
Stability <0.002A/hr
Noise <0.0001A

Sharing our expertise
Calibration and validation is an increasingly important requirement for many laboratories, factories and institutions. That's why we've also taken the filters from the CVC and turned them into boxed sets of filters. They can be used to validate the calibration of any well-designed spectrophotometer, so even your existing spectrophotometers can benefit from Spectronic Unicam's calibration expertise.

Performance verification
Test kit manufacturers go to great lengths to validate the ruggedness and reliability of their kit chemistries and methodologies but only Spectronic Unicam pay the same degree of attention to the validation and calibration of the spectrophotometer. AquaMate's unique Calibration Validation Carousel (CVC) verifies all aspects of spectrophotometer performance as shown in the table on the right. The CVC automatically runs these tests and generates a hard copy report and disk based electronic archive. The tests run unattended so your operators won't view calibration validation as a chore and it frees them up to perform other duties. Validating other spectrophotometers requires a skilled scientist, but with the CVC anyone can generate consistent, error free proof of spectrophotometer performance.
The wavelength and Absorbance filters in the CVC are secondary reference materials traceable to NPL or NIST primary reference materials. The traceability path is preserved through an accredited ISO/IEC Guide 25 calibration process allowing AquaMate to pass the most detailed internal or regulatory body audit.

CVC TEST RESULTS

WAVELENGTH ACCURACY

ACTUAL 279.5 nm 276.6 nm PASS 1.3 nm 0.9 nm
365.1 nm 361.0 nm PASS 1.3 nm 0.1 nm
452.0 nm 448.6 nm PASS 1.5 nm 0.1 nm
556.1 nm 551.0 nm PASS 1.6 nm 0.1 nm

ABSORBANCE ACCURACY

ACTUAL 0.9479 A 0.9461 A PASS 0.0070 A -0.0009 A

UV ABSORBANCE ACCURACY

ACTUAL 0.8073 A 0.8022 A PASS 0.0050 A -0.0054 A
0.9356 A 0.9350 A PASS 0.0005 A -0.0004 A
0.6597 A 0.6595 A PASS 0.0002 A -0.0004 A

STRAIGHT LIGHT

ACTUAL 3.7632 A 3.7633 A PASS 0.0001 A 0.0001 A
3.3579 A 3.3579 A PASS 0.0001 A 0.0000 A

BANDWIDTH SPECIFICATION

ACTUAL 2.2 nm 2.0 nm PASS -0.2 nm

NOISE

ACTUAL 0.0001 A 0.0002 A PASS 0.0001 A 0.0003 A
1.0 A 1.0 A PASS 0.0001 A 0.0001 A

DRIFT

ACTUAL 0.0001 A/hr 0.0002 A/hr PASS 0.0001 A/hr 0.0001 A/hr

Ordering Information

0423 AQA 2500E AquaMate Visible spectrophotometer
0423 AQA 2700E AquaMate (with built-in printer) Visible spectrophotometer
0423 AQA 2000E AquaMate UV-Visible spectrophotometer
0423 AQA 2200E AquaMate (with built-in printer) UV-Visible spectrophotometer
0423 UV 4270E MiniSipper including tubing kit
0423 UV 4280E Spare tubing kit for MiniSipper
0423 UV 3400E 7 cell carousel for AquaMate
0423 UV 1400E CVC for AquaMate (NPL)
0422 UV 1460E CVC for AquaMate (NIST)
4401 161 00391 Paper for built-in printer on AquaMate (1 roll)
0423 148 14601 10mm compact UV Silica flow cell for MiniSipper
0423 168 14591 Compact glass 10mm flowcell for MiniSipper
0423 168 14351 10mm std UV Silica flow cell for MiniSipper
0423 168 11301 10mm Glass stoppered cell
0423 168 11321 10mm UV Silica stoppered cell
0423 UV 1240E 100mm pathlength rectangular cell holder
0423 UV 2110E 100mm pathlength cylindrical cell holder
4013 172 82111 Parallel printer cable
4013 172 95951 Spare DS lamp for AquaMate UV-Vis
4013 UV 00004 Spare D2 lamp for AquaMate UV-Vis
4013 UV 00008 Spare Tungsten lamp for AquaMate