

## AELAB A3 Series & Lamps Turret Atomic Absorption Spectrophotometer

The A3 Atomic Absorption Spectrometer is a high performance automated instrument designed to meet the requirements of the modern laboratory. Due to its versatility and performance it can be used for a wide range of applications including:

- ◆ Agricultural
- ◆ Environmental
- ◆ Metal
- ◆ Geological
- ◆ Pharmaceutical
- ◆ Clinical
- ◆ Food
- ◆ Mining
- ◆ Petrochemical



The versatile instrument is available in three configurations:

**A3F** - The instrument is equipped with a flame atomiser only. The positioning of which is fully controlled by the embedded computer system and AA-Win 3.0 software. Three flame options are available to the user with the Air/Acetylene being the standard configuration. This flame can be used for nearly all standard elements while the N<sub>2</sub>O/Acetylene and the Air/LPG (Natural gas) are available as an option for the more demanding of elements. All three flame configurations offer coded burner for full safety protection.

**A3G** -The instrument is equipped with a Graphite Furnace Atomiser only. The graphite head is fixed into the optical path to maximise performance and eliminate drift. The temperature of the transversely heated graphite tube is accurately controlled by means of a precision feedback system. Pyrolytically coated platform tubes are supplied as standard to improve the performance and eliminate many analytical problems associated with this technique.

**A3FG** -The instrument is equipped with both Flame Atomiser and Graphite Atomiser as described above. Both configurations are installed into the instrument and can be changed over by a simple selection in the versatile AA-Win 3.0 software.

### FEATURES & FUNCTION

- ◆ PC System is used to control the instrument. Preinstalled AA-Win 3.0 software, user manuals, cook book and Windows operating system.
- ◆ AA-Win 3.0 software provides full control of the instrument and autosampler with easy method change for each technique.
- ◆ Automatic 8 Hollow Cathode lamp turret controlled and optimised by the AA-Win 3.0 software. Operating lamp current and warm-up lamp current can be individually controlled to eliminate drift commonly associated with lamp warming.
- ◆ D2 lamp background correction system fitted as standard to all configurations. High energy D2 lamp and adjustable beam splitter mirror are optimised by the AA-Win 3.0 software.
- ◆ Self Reversal background correction system fitted as standard to all configurations. The high performance background system uses the same hollow cathode lamp as installed for the analysis. Minimum extra components are required and optical alignment is very simple. Self Reversal can be used for any element at any wavelength making it extremely versatile.
- ◆ High precision minimal optics ensures maximum light throughput to the computer controlled Czerny-Turner monochromator.
- ◆ A universal autosampler is available as an optional accessory which is conveniently mounted on the front of the A3 instrument.
- ◆ Absorption and Emission modes are standard features in the AA-Win3.0 software as well as peak height, peak area, sequential and manual integration modes.

### Air/Acetylene

- ◆ The Air/Acetylene flame uses a 100mm single slot burner for the standard configuration.
- ◆ The high sensitivity (Cu 2ppm >0.280abs) is due to the efficiency of the fixed position glass nebuliser fitted as standard. An acid resistant replacement is available as an option.
- ◆ The flame can be easily set from blue lean flame through stoichiometric to fuel rich by means of computer control.

### **N2O/Acetylene**

- ◆ The N2O/Acetylene flame uses a 50mm single slot burner and is available as an optional extra.
- ◆ This flame configuration is used to measure elements less prone to ionization such as: Aluminium, Tin, Titanium, Calcium, Vanadium and Molybdenum.
- ◆ Switching from Air/Acetylene to N2O/Acetylene to Flame Off is fully controlled by the AAWin3.0 software.

### **Air/Propane(LPG)**

- ◆ This flame uses a 3 slot burner and with the lowpressure requirement it is also much safer to operate.
- ◆ Due to the low temperature of the flame it is ideal for analysing alkali metals such as: Potassium, Sodium and Lithium, especially when used in the emission mode.
- ◆ Some remote areas of the world have difficulty obtaining Acetylene gas of a high enough purity to operate the flame correctly, LPG can give a real alternative and offer comparable results for most elements throughout the wavelength range.

### **FLAME ATOMISER FEATURES**

The flame atomiser offers three flame options: Air/acetylene is the standard configuration with the N2O/ acetylene and Air/LPG as options.

### **SAFETY FEATURES**

- ◆ Pressure monitoring for all gases
- ◆ Burner Identification
- ◆ Flame sensor
- ◆ Drain Trap level Sensor
- ◆ Gas Leak Detector
- ◆ Over Pressurein Premix
- ◆ Safety Cut off Switch

### **GRAPHITE ATOMISER FEATURES**

- ◆ The integrated Graphite Furnace Atomiser is available in two instrument configurations.
- ◆ In the A3G instrument the graphite furnace head is fixed into the light path so alignment with the optical path is simple and accurate.
- ◆ In the A3FG instrument the graphite furnace head is fixed behind the flame atomiser assembly and is motorised into position by a simple operation in the AA-Win3.0 software. The positions for the flame and graphite are saved making it easy to swap between modes for different analysis.

### **SAFETY FEATURES**

- ◆ Argon Gas pressure Sensor
- ◆ Water flow sensor
- ◆ Over Temperature Sensor
- ◆ Broken graphite tube protection

### **FEATURES & FUNCTIONS**

- ◆ The temperature of the transversely heated graphite tube is accurately controlled by means of a precision feedback system and has been designed to reduce analytical problems normally associated with this type of technique.
- ◆ Pyrolytically coated graphite tubes are used as standard and are manufactured to improve performance as well as increase the analytical life.
- ◆ Platform graphite tubes are supplied as standard and will accept volumes up to 20ul. Non-platform graphite tubes are also available as an optional extra.
- ◆ Up to 10 heat stages are available for the programming of the graphite atomiser. These can be set and stored within the AA-Win3.0 software.
- ◆ The graphite tube is held in position by means of a gas piston. Replacement of the graphite tube is performed by a simple command in the AA-Win Software.
- ◆ The graphite tube is efficiently cooled by an additional water circulation system (supplied separately).



<b>Spectrometer System</b>	
Wavelength range	185nm -910nm
Light Source	Hollow cathode lamp (HCL), Deuterium Arc lamp (D2)
Modulation	Square Wave Pulse
Modulation frequency	100Hz Self reversal (SR) background, 400Hz Deuterium Arc (D2) background
<b>Monochromator</b>	
Grating	1800 grooves/mm diffraction grating
Blazed Wavelength	250nm
Focus	300nm
Bandwidth	0.1nm, 0.2nm, 0.4nm, 1.0nm, 2.0nm (Software selectable)
Scan mode	Automatic
Photometric Type	Single Beam
Wavelength Accuracy	± 0.15nm
Wavelength Resolution	0.2nm ± 0.02nm
Wavelength Reproducibility	< 0.05nm
Baseline Stability	0.005Abs/30min
Background Correction	Deuterium Arc (D2) 1.0Abs, Self Reversal (SR) 3.0Abs
<b>Flame Analysis</b>	
Flame Types	Air/Acetylene, Nitrous Oxide/Acetylene, Air/Propane (LPG)
Sensitivity (Cu)	2ug/ml Absorption >0.28Abs
Characteristic Concentration	Cu < 0.02ug/ml, Ba < 0.15mg/ml (N2O/Acetylene)
Detection Limit	Cu < 0.004ug/ml
Repeatability	Cu < 0.7% (Air/Acetylene Flame) Ba < 1.0% (Nitrous Oxide/Acetylene Flame)
Burner heads	Titanium Alloy
Nebuliser	High efficiency glass, Acid proof available as an option
Pre-mix Chamber	Corrosion Resistant
Atomiser Selection	Automatic changeover (A3FG), Manual (A3F)
Safety Features	Burner identification, Flame Sensor, Gas Leak Sensor, Low Gas Pressure Sensor, Drain Trap, Sensor, Power Loss Protection
<b>Graphite Furnace Analysis</b>	
Graphite Head	Transversally Heated
Temperature Range	Ambient - 3000 OC
Heating Program	Up to 10 steps. Drying, Ashing, Atomisation, Cleaning
Feedback	Voltage and Optical temperature control feedback
Sensitivity (Cu)	50ng/ml Absorption > 0.40Abs
Detection Limit	Cd < 0.004ng/ml
Repeatability	Cu < 2.0%, Cd < 2.0%
Graphite Tubes	Pyrolytically Coated with Platform
Sample Size	Up to 20ul
Graphite Cooling	Water Circulator Available
Safety Features	Argon Pressure Sensor, Water Flow Sensor, Over Temperature Sensor, Broken Tube Protection
<b>Data Processing</b>	
PC System	PC, Windows Operating System
Operating Program	AA Win 3.0 software
Analytical Methods	Flame AA, Flame AE, Graphite Furnace, Hydride Generation
Readout Mode	Continuous, Peak Height, Peak Area
Calibrations	Multi-Standard Calibration, Standard Addition, Interpolation
Data Storage	Analytical results, instrument and measurement parameters, signal profile, calibration curve
<b>Power Requirements</b>	
Main Unit	220VAC 50/60Hz
Graphite Power Supply	220VAC 50/60Hz Instantaneous power 7KW
<b>Dimensions</b>	
Main unit	110cm x 54cm x 54cm 75Kg
Graphite Power Supply	50cm x 54cm x 54cm 70Kg

Standard packaging

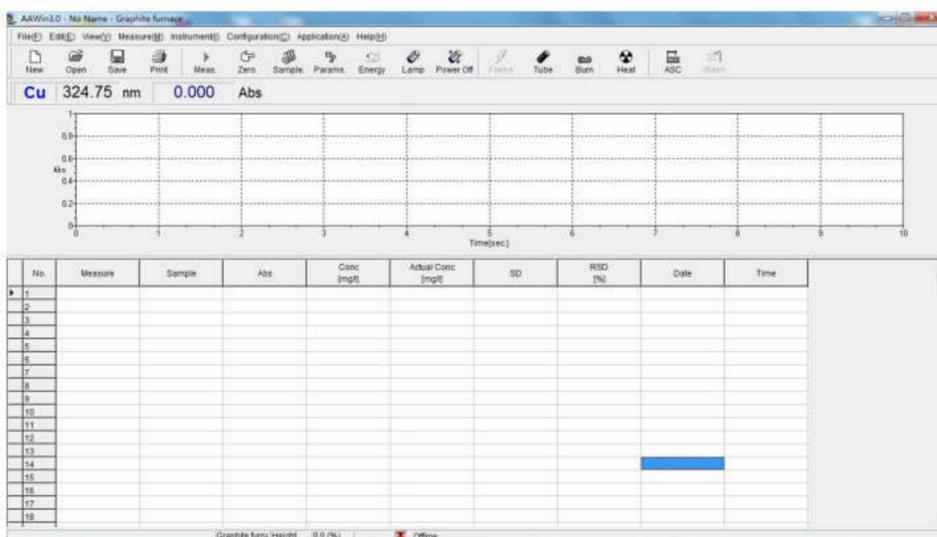
A3F	
1	Main unit
1	A3 instruction Manual
1	Cook Book
1	Safety Manual
1	System validation document
1	Data coded Air/Acetylene burner
1	Glass Nebuliser
8	Hollow cathode Lamp Holders
2	Power Cables
1	Gas tubing Air
1	Gas Tubing Acetylene
1	Drain Trap and Tubing
1	Tool Kit
1	Various gas Fittings

A3G	
1	Main unit
1	A3 instruction Manual
1	Cook book
1	Safety Manual
1	System Validation document
8	Hollow cathode Lamp Holders
2	Power Cables
1	Tool Kit
1	Various Gas Fittings
10	Graphite Tubes
1	Gas Tubing Argon
1	Connection Cable (Graphite)
1	Pipette
1bag	Pipette Tips

A3FG	
1	Main unit
1	A3 instruction Manual
1	Cook Book
1	Safety Manual
1	System validation document
1	Data coded Air/Acetylene burner
1	Glass Nebuliser
8	Hollow cathode Lamp Holders
2	Power Cables
1	Gas tubing Air
1	Gas Tubing Acetylene
1	Drain Trap and Tubing
1	Tool Kit
1	Various gas Fittings
10	Graphite tubes
1	Gas Tubing Argon
1	Connection Cable (graphite)
1	Pipette
1bag	Pipette Tips

AA-Win 3.0 Software is a powerful and intuitive software product designed to allow control and data acquisition from the A3 series Atomic Absorption Spectrometer.

The AA-Win 3.0 software allows the Analyst to control all aspects of their analytical method whilst providing an extensive range of tools for data collection, storage and interpretation.



The software interface consists of three key work areas, whilst having toolbars to access many others. These work areas allow the user to view real-time signal acquisition, up-to-date display of calibration curves and a flexible, sample table.

