



Agilent 55B AA Spectrometer

Rugged. Reliable.

Specifications



Design overview

The Agilent 55B AA system is a standalone, keyboard controlled atomic absorption spectrometer fitted with two lamp positions and automatic lamp selection. The 55B AA is a true double beam spectrometer, ensuring a stable baseline. The 55B AA flame instrument is suitable for manual flame analyses and vapor generation using the Agilent VGA 77 Vapor Generation Accessory. Automated flame analyses are available with external computer control and additional accessories.

The Agilent 55B AA spectrometer is manufactured according to a quality management system certified to ISO 9001.

Instrument hardware

Optics

Narrow beam optics match flame and furnace profiles. Optics are mounted on a reinforced flat plate with a fitted cover for protection from dust and vapor. Mirror surfaces are quartz overcoated for enhanced protection. The 55B AA features a single beamsplitter plus a Rotating Beam Combiner, which alternately passes the sample or reference beam into the monochromator for maximum light transmission. Wavelength range is 185–900 nm.

Monochromator

Automated self calibrating 250 mm focal length Czerny-Turner monochromator with microstepping driver for enhanced resolution. Wavelength repeatability: ± 0.04 nm. Software controlled wavelength selection and peaking. Features a holographic diffraction grating with 1200 lines/mm blazed at 240 nm. Wide range (185–900 nm) R446 photomultiplier tube. Automated slit selection. Settings: 0.2, 0.5 and 1.0 nm.

Lamps

Support for 2 lamps mounted in fixed positions. Fast lamp selection using mirror with automated selection. Compatible with coded or uncoded lamps. Lamps secured by the base without restraining clips or power cables. Pre-warming of second lamp.

Background corrector

High intensity deuterium background corrector covering wavelength range 185–425 nm. Corrects up to 2.3 background absorbance. 2 ms response. Electronic modulation with automatic gain attenuation for improved beam balance. Deuterium lamp easily aligned and replaced by the user. Optimized electronic control ensures long lamp lifetime.

Internal air purge

Barb fitting on rear of spectrometer enables connection to a clean, dry air supply for purging the instrument internally. This excludes dust and corrosive vapors, enhancing corrosion protection.

Gas control

Automatic gas control with preset oxidant flow and manual fuel flow control with flow display using a flow meter. Ignition on air/acetylene with automatic oxidant change-over. Interlocked safety system prevents selection of the nitrous oxide flame if the nitrous oxide burner is not fitted.

Flame safety system

Separate ignite and flame-off buttons. Ignition occurs only when the ignite button is held. Eight safety interlocks monitor burner type, burner correctly fitted, liquid trap, pressure relief bung, flame shield, flame operation, mains power, oxidant pressure within safety reservoir and deuterium lamp cover. Gas connections to atomization system made directly — there are no loose gas hoses. Separate upper and lower flame shields and a chimney protect the operator against heat and UV radiation from the flame. External adjustment of all burner and spray chamber controls. Violation of any safety interlock either inhibits flame ignition or extinguishes existing flame.

Flame atomization

Universal Mark 7 atomization system supplied as standard. Features a fluorinated high density polyethylene spray chamber compatible with acidic and organic solutions (requires optional organic o-ring kit). 'Twist and lock' assembly ensures simple maintenance. Features a pressure relief bung at the rear of the spray chamber. Removable twin-headed mixing paddles can be positioned in the spray chamber to improve mixing and extend operation with high dissolved solids solutions. An externally adjustable glass impact bead provides tuneable performance for optimum sensitivity and best precision. Optional Teflon bead for use with HF solutions. Integral nebulizer with adjustable flow, inert platinum/iridium capillary and PEEK venturi for corrosion resistance. Integral liquid trap with magnetic float liquid level interlock. Burner constructed from Incoloy alloy with Teflon base for corrosion resistance. Choice of air-acetylene or nitrous oxide-acetylene burner. Manual adjustment of burner height and burner rotation.

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Typical performance

>0.9 Absorbance with precision of <0.5 % RSD from ten 5 second integrations for 5 mg/L Cu standard.

User interface

Utilizes a built-in keyboard for setup and control with result display on a rugged LCD screen. Keyboard features numeric, Enter and Cursor keys (for navigating menus), separate Read key and nine dedicated function keys (Load Method, Measurement Parameters, Optimize, Calibration, Results, Instrument Parameters, Options, Reslope and Alternate). Option to use external computer for control by connecting a compatible computer with the Agilent SpectrAA Base software using a PCI-IEEE interface and cable.

Methods

Storage provided for 30 custom methods. 'Cookbook' methods are also provided for each element. Methods include all recommended parameters and can be edited as required.

Measurement modes

Absorption or flame emission using PROMT, Integration or Integrate Repeat with manual sampling. Pre-read delay variable from 0–99.9 seconds. Up to 10 replicates with read time variable from 0.2–60 seconds.

SIPS support

Supports single pump Agilent SIPS 10 Sample Introduction Pump System for on-line five point calibration from a single standard and fast, on-line dilution capability.

Calibration and blank correction

Calibration in Concentration using new Rational fit with up to five standards and separate Calibration Zero blank. Reslope standard measurement can be performed at any time. Individual standard readings can be repeated or perform a complete Recalibration at any time. Calibration can be displayed on screen to enable visual check of the fit and linearity. Cursor provided to enable absorbance and concentration to be read from the calibration.

Data display

Displays choice of available methods, Measurement Parameters, signal bars for lamp and signal optimization, Calibration Parameters, Calibration Graph, Results, Instrument Parameters and Options. Result display includes real time absorbance bar with display of current element, conc./Abs and precision. When calibrated, display ranges from zero to absorbance of the top standard. Result display includes data summary with sample number, concentration, precision (%RSD or % precision), mean absorbance, dilution factor applied and absorbance reading for the current replicate. Current solution and previous five solution results displayed. Parameters displayed are dependant on the selected measurement mode.

Options menu enables user to modify settings including enabling SIPS and editing SIPS settings, enabling serial output and selecting alternate language display (choice of English, French, German, Italian, Spanish, Russian, Dutch and Japanese (Katakana)).

Data reporting/transfer

Real time serial comma-delimited output includes sample number, batch number, concentration result, precision, mean absorbance, all replicate readings and method parameters. Can be directed to a LIMS or a serial (RS-232) printer (separate serial-to-parallel converter required for output to a parallel printer).

Foot switch support

Optional foot switch triggers READ command. Connects to 9 pin Accessories port. Remote control is possible via the Serial port.

Diagnostics

Built-in diagnostic tests completed automatically at power-up. Customer service representative has additional diagnostic tests available to troubleshoot operation.

Software upgrades

Operating software stored in Flash memory. Upgrades can be performed at any time without removing covers.

Accessories

On-line calibration and dilution

Single pump SIPS 10 provides on-line multi-point calibration for flame AA from single bulk standard. Immediate dilution of over-range samples with 'Smart Rinse' to eliminate memory effects.

Enhanced flame sensitivity

Agilent ACT 80 Atom Concentrator Tube increases sensitivity of flame AA by 2–3 times for a number of air/acetylene elements.

Vapor generation

VGA 77 continuous flow Vapor Generation Accessory for determination of Hg, As, Se, Sb, Te, Bi and Sn at $\mu\text{g/L}$ concentrations. Typical precision 1–2 % RSD with sample throughput of 60–70 samples/hour determined in triplicate. Compatible with the Agilent SPS 3 Sample Preparation System for automated sampling (with optional external computer control) and unattended hydride analyses when used with the Agilent ETC 60. Features 'plug-in' plumbing modules, which can be dedicated to specific hydride chemistries. Simply change modules for rapid change-over between elements with incompatible chemistries, avoiding cross-contamination.

Unattended hydride analyses

ETC 60 Electrothermal Temperature Controller is an electrically heated quartz cell, which increases sensitivity of hydride determinations by 30% compared with flame hydride determinations. Consists of control unit with built-in touch panel keyboard and workhead with user replaceable cell. Control unit provides default temperature programs for each element, which can be edited and saved. Thermocouple temperature control over range from ambient to 999 °C. Couple the ETC 60 with the VGA 77, the SPS 3 sample preparation system and the SpectrAA software running on an external computer to enable unattended hydride analyses.

Recommended environmental conditions

Instrument storage

5–45 °C at 20–80 % relative humidity, non condensing.

Instrument operation

<853 m, 10–35 °C, 8–80 % relative humidity, non condensing. 853–2133 m, 10–25 °C, 8–80 % relative humidity, non condensing.

Electrical requirements

Single phase AC supply with three-wire system terminated at an appropriate receptacle. 100/120/220/240 VAC $\pm 10\%$, 230 VAC +14% -6%, 230 VAC +6% -14% 50/60 Hz.

Gas requirements for flame operation

Air supply: Clean, dry, oil-free at pressure of 350 kPa (50 psi). Typical consumption 11–20 L/min.

Acetylene supply: Instrument grade (99.0% pure) packaged in acetone at pressure of 75 kPa (11 psi). Typical consumption 1.5–10 L/min.

Nitrous oxide: Instrument grade (99.5% pure) at pressure of 350 kPa (50 psi). Typical consumption 11–20 L/min

Fume extraction

Spectrometer must be located under an extraction system ducted to an external vent. Minimum flow required is 6 cubic metres/min (200 cfm).

Weights, dimensions and power requirements

Weight

56 kg (123 lb) unpacked

Dimensions

79 x 58 x 59 cm (31 x 23 x 23 in.), W x D x H

Power consumption

170 VA

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Installation requirements

System Installation

For details of AA installation requirements, refer to the site preparation guide.

Support and training

Agilent is renowned for providing expert applications and service support. Agilent has a global network of factory-trained specialists ready to provide support for hardware, software, or applications wherever you are located. Services include:

- Full 12-month warranty support
- Seven (7) year hardware support period from date of last unit manufacture. After this time, parts and supplies will be provided if available.
- Preventive maintenance to deliver consistent operation and minimize downtime
- Troubleshooting, maintenance and repair
- Software support services
- Comprehensive warranty extension and service contracts, including peripherals
- Classroom training and onsite training delivered by experts

Further details

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