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> GOWE GWE-1008123 Atomic Absorption Spectrophotometer User Manual

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High Accuracy Atomic Absorption Spectrophotometer for Soil or Mineral Analysis

1. INTRODUCTION

This manual provides detailed instructions for the safe and efficient operation of the GOWE GWE-1008123 High Accuracy Atomic Absorption Spectrophotometer. This instrument is designed for precise analysis of elements in soil and mineral samples, utilizing atomic absorption principles. Please read this manual thoroughly before operating the device to ensure proper usage and to maximize its performance and longevity.



Figure 1: The GOWE GWE-1008123 Atomic Absorption Spectrophotometer main unit. This image displays the complete instrument, featuring its control panel, sample introduction system, and gas inlets, highlighting its robust design for laboratory use.

2. KEY FEATURES

- **Integrated Data Processing:** Features a built-in computer for data processing and an LCD display. It incorporates a highly integrated micro digital circuit for stability and reliability. Functions include integral holding, peak height and area calculation, auto zero adjustment, deuterium lamp and background correction, multi-linear and non-linear curve fitting, and display of various parameters and working curves.
- **External PC Interface:** Equipped with an interface for external PC connectivity, enabling advanced data management and report printing.
- **Enhanced Baseline Stability:** An optimized double-beam system automatically compensates for light source

and wavelength drift caused by temperature variations, as well as electronic circuit drift, ensuring excellent baseline stability. This allows for immediate sample analysis without prolonged cathode lamp pre-heating.

- **Precision Gas Path System:** Features precision pressure stabilizing and current stabilizing devices for stable flame and low noise operation. A fine light beam passes through the flame, ensuring high precision analytical tests and low characteristic concentration.
- **Total Reflection Optical System:** Adapts a total reflection system to eliminate color difference across the full range. Chemical conversion transforms a round light spot into a long light spot, which then enters the slit.
- **Durable Atomization System:** Includes a long-life and anti-corrosive atomization system.
- **Advanced Burner Design:** The burner is made of new type titanium alloys, offering anti-corrosive properties and fast thermal equilibrium, meeting sensitivity requirements without the need for water-cooling.
- **Multi-functional Analysis Modes:** Supports flame absorption, flame emission, graphite furnace atomic absorption, and hydride generation methods.
- **Safety Gas Path System:** Incorporates special devices for quick gas conversion and safety protection, suitable for air-acetylene flame analysis.

3. SETUP INSTRUCTIONS

Proper setup is crucial for the accurate and safe operation of the spectrophotometer. Follow these steps carefully:

1. **Unpacking and Placement:** Carefully unpack the instrument and all accessories. Place the spectrophotometer on a stable, level surface in a well-ventilated area, away from direct sunlight, vibrations, and strong electromagnetic fields.
2. **Power Connection:** Connect the instrument to a stable 220V, 3A, 50Hz power supply. Ensure the power switch is in the OFF position before connecting.
3. **Hollow Cathode Lamp Installation:** Install the appropriate hollow cathode lamp for the element to be analyzed. Connect the hollow cathode lamp power supply, which has adjustable current.
4. **Deuterium Lamp Connection:** Ensure the deuterium lamp power supply (fixed current) is correctly connected for background correction.
5. **Gas System Connection:**
 - Connect the **Air compressor** to the instrument's air inlet.
 - Connect the **Gas external pipe** from the acetylene cylinder to the instrument's fuel gas inlet.
 - Install the **Acetylene cylinder pressure-reducing valve** onto the acetylene cylinder and connect it to the gas external pipe.
 - Integrate the **Water knockout gas filter** into the gas line to ensure clean gas delivery.

Ensure all gas connections are secure and leak-free. The gas path system includes precision pressure stabilizing and current stabilizing devices for optimal flame conditions.

6. **Burner Installation:** Install the inter-changeable titanium alloy burner (10cm or 5cm slits) as required for your application.
7. **PC Interface (Optional):** If external PC control or data processing is desired, connect the PC via the RS 232 interface.

4. OPERATING INSTRUCTIONS

This section outlines the general operating procedures for the spectrophotometer. Specific analytical methods may require additional steps.

Characteristics:

Inter-changeable titanium alloy burner of 10cm and 5cm slits. Gas path is equipped with pressure indication, high precision voltage stabilizing flow adjustment, fast conversion of air and nitrous oxide, gas supply cut off, power cut off, prevention of flashback and logic interlock protection devices;

Absorbance, concentration, emission and emission concentration; Standard curves: linear regression, curve fitting and multi-point standard calibration. Average value, standard deviation, relative standard deviation and correlation coefficient can be worked out. Standard curves, atomic absorption peak diagram, spectrum outline sketch, data as well as instrument parameters list and analytical reports can be displayed and printed out.

Figure 2: Key operational characteristics of the GOWE Atomic Absorption Spectrophotometer. This image details the instrument's capabilities regarding gas path safety, analytical measurements (absorbance, concentration, emission), and data processing features like standard curve generation and report printing.

1. **Power On:** Turn on the main power switch. Allow the instrument to warm up for the recommended period (typically 15-30 minutes) to ensure stability. The double-beam system is designed for good baseline stability, minimizing pre-heating time for the cathode lamp.
2. **Gas Flow Adjustment:** Activate the gas supply (air and acetylene). Adjust the gas flow rates using the precision pressure and current stabilizing devices to achieve a stable flame. The gas path system includes safety protection devices for quick gas conversion.
3. **Wavelength Selection:** Select the appropriate wavelength for the element being analyzed using the instrument's controls. The C-T type monochromator allows for precise wavelength selection.
4. **Lamp Current Adjustment:** Adjust the hollow cathode lamp current as specified for the element.
5. **Zero Adjustment and Background Correction:** Perform auto zero adjustment and activate deuterium lamp background correction to compensate for non-specific absorption.
6. **Calibration:** Prepare a series of standard solutions. Aspirate the blank and standard solutions, and generate a calibration curve. The instrument supports multi-linear and non-linear curve fitting, and can calculate average value, standard deviation, relative standard deviation, and correlation coefficient.
7. **Sample Analysis:** Aspirate the unknown samples. The instrument will display absorbance, concentration, emission, or emission concentration values.
8. **Data Processing and Reporting:** Utilize the built-in computer data processing capabilities to view various parameters, working curves, atomic absorption peak diagrams, and spectrum outline sketches. Analytical reports can be displayed and printed out.
9. **Shutdown:** After analysis, turn off the gas supply first, allowing the flame to extinguish. Then, turn off the instrument's power.

5. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your spectrophotometer.

- **Cleaning:** Regularly clean the exterior of the instrument with a soft, damp cloth. Avoid using abrasive cleaners or solvents.
- **Burner Care:** The titanium alloy burner is anti-corrosive. However, it should be cleaned periodically to prevent blockages from sample residues. Refer to specific cleaning procedures in the detailed technical manual if available.

- **Atomization System:** The atomization system is designed for long life and is anti-corrosive. Inspect it periodically for any signs of wear or blockage.
- **Gas Lines and Filters:** Regularly check gas lines for leaks and ensure the water knockout gas filter is clean and functional to prevent contamination of the gas system.
- **Lamp Replacement:** Replace hollow cathode lamps and deuterium lamps as needed when their performance degrades or they reach their end of life.
- **Calibration Verification:** Periodically verify the instrument's calibration using certified reference materials to ensure continued accuracy.

6. TROUBLESHOOTING

This section provides general guidance for common issues. For complex problems, please contact technical support.

- **No Power:** Check the power cable connection, the main power switch, and the circuit breaker. Ensure the power supply meets the 220V, 3A, 50Hz requirement.
- **Unstable Baseline:** Allow sufficient warm-up time. Check gas flow stability and ensure the double-beam system is functioning correctly. Verify that the deuterium lamp is active for background correction.
- **Low Sensitivity/Poor Signal:** Ensure the correct hollow cathode lamp is installed and its current is set appropriately. Check the burner for blockages and ensure proper alignment. Verify gas flow rates and sample aspiration.
- **Calibration Curve Issues:** Re-prepare standard solutions. Check for contamination. Ensure proper zero adjustment and background correction.
- **Gas Leak Alarm:** Immediately shut down the gas supply and power. Inspect all gas connections for leaks. Do not operate until the leak is resolved.

7. SPECIFICATIONS

Technical specifications for the GOWE GWE-1008123 Atomic Absorption Spectrophotometer:

Specification:
v Working spectral range: 190-900nm
v Wavelength accuracy: $\leq \pm 0.5\text{nm}$
v Wavelength repeatability: $\leq 0.3\text{nm}$ (single direction)
v Spectrum bandwidth: 0.2nm, 0.4nm, 0.7nm, 1.4nm, 2.4nm, 5.0nm
v Resolution: <40%
v Base line stability: $\pm 0.004\text{Abs}/30\text{min}$
v Characteristic concentration of copper: $\leq 0.04\text{mg/ml}/1\%$
v Detection limit of copper: $\leq 0.008\text{mg/ml}$
v Background calibration ability: Greater than 30 times.
v Standby Interface: RS 232
v Instrument power supply: 220V, 3A, 50Hz

Figure 3: Detailed technical specifications for the GOWE Atomic Absorption Spectrophotometer. This image provides critical performance parameters such as spectral range, wavelength accuracy, resolution, and power requirements.

- **Working Spectral Range:** 190-900 nm
- **Wavelength Accuracy:** $\leq \pm 0.5$ nm
- **Wavelength Repeatability:** ≤ 0.3 nm (single direction)
- **Spectrum Bandwidth:** 0.2 nm, 0.4 nm, 0.7 nm, 1.4 nm, 2.4 nm, 5.0 nm
- **Resolution:** <40%
- **Baseline Stability:** ± 0.004 Abs/30 min
- **Characteristic Concentration of Copper:** ≤ 0.04 mg/ml/1%
- **Detection Limit of Copper:** ≤ 0.008 mg/ml
- **Background Calibration Ability:** Greater than 30 times
- **Standby Interface:** RS 232
- **Instrument Power Supply:** 220V, 3A, 50Hz
- **Manufacturer:** Gowegroup
- **Model Number:** GWE-1008123
- **Item Weight:** 2.2 pounds

8. INCLUDED ACCESSORIES

The following accessories are typically supplied with the instrument and are ready for use upon purchase:

Accessories:

- v Air compressor;
- v One piece of Cu hollow cathode lamp;
- v Gas external pipe;
- v Acetylene cylinder pressure-reducing valve;
- v Water knockout gas filter;

Figure 4: Essential accessories included with the GOWE Atomic Absorption Spectrophotometer. This image lists components such as the air compressor, hollow cathode lamp, gas pipes, and safety valves, all necessary for initial setup and operation.

- Air compressor
- One piece of Cu hollow cathode lamp
- Gas external pipe
- Acetylene cylinder pressure-reducing valve
- Water knockout gas filter

9. WARRANTY AND SUPPORT

For warranty information, technical support, or service inquiries, please refer to the documentation provided with your purchase or contact GOWE customer service directly. Ensure you have your model number (GWE-1008123) and purchase details available when contacting support.

For further assistance, visit the official GOWE store: [GOWE Store on Amazon](#)

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